



POPE JOHN PAUL II
STATE SCHOOL OF HIGHER
EDUCATION IN BIAŁA PODLASKA
INSTITUTE OF HEALTH



MEDICAL ASPECTS OF CIVILIZATION DISEASES
IN THE MODERN WORLD

Edited by
BARBARA SOKOŁOWSKA

Białą Podlaska 2013

POPE JOHN PAUL II STATE SCHOOL OF HIGHER EDUCATION
IN BIAŁA PODLASKA

**Medical aspects of civilization diseases
in the modern world**

Medyczne aspekty chorób cywilizacyjnych we współczesnym świecie

Edited by

Barbara Sokołowska

Biała Podlaska, wrzesień 2013

Scientific Reviewers:

Prof. dr hab. Zbigniew Borzęcki

Prof. dr hab. Jadwiga Daniluk

Prof. dr hab. Janusz Schabowski

Copyright © 2013 by Państwowa Szkoła Wyższa
im. Papieża Jana Pawła II w Białej Podlaskiej



ISBN 978-83-61044-15-4

Nakład: 100 egzemplarzy

Liczba ark. wyd.: 8,7

Editorial address:

Instytut Zdrowia

Państwowa Szkoła Wyższa

im. Papieża Jana Pawła II w Białej Podlaskiej

21-500 Biała Podlaska ul. Sidorska 102, tel. (083) 344 99 18

e-mail: zdrowie@pswbp.pl

Image on the cover:

Adam Spisacki

Printing, binding and cover design:

Agencja Reklamowa TOP, ul. Toruńska 148, 87-800 Włocławek,
tel.: 54 423 20 40, fax: 54 423 20 80, www.agencjatorp.pl

Contents

Foreword	7
----------------	---

I. Clinical aspects in modern medicine

I. Aspekty kliniczne w medycynie współczesnej

**Marek Tomaszewski, Sylwia Ciemięga, Grażyna Olchowik,
Monika Tomaszewska, Marcin Mandryk**

Irritable bowel syndrome and quality of life	11
<i>Zespół jelita drażliwego, a jakość życia</i>	

Marek Tomaszewski, Grażyna Olchowik, Monika Tomaszewska

Asthma-consciousness disorders and disease progression	25
<i>Astma oskrzelowa- świadomość schorzenia, a postęp choroby</i>	

**Marek Tomaszewski, Ewelina Kędra, Grażyna Olchowik,
Monika Tomaszewska, Marcin Mandryk**

Gastric and duodenal ulcers, and human consciousness	34
<i>Choroba wrzodowa żołądka i dwunastnicy, a świadomość człowieka</i>	

Marek Tomaszewski, Grażyna Olchowik, Monika Tomaszewska

Liver cirrhosis- disease awareness and dietary behavior	46
<i>Marskość wątroby- świadomość schorzenia, a postępowanie dietetyczne</i>	

Marta Nowak

Sexual dimorphism of cephalo- and somatometric parameters and body components of rural children and youth from the Subcarpathian region at the beginning of the 21st century	55
<i>Dymorfizm płciowy parametrów cefalo- i somatometrycznych oraz komponentów ciała dzieci i młodzieży wiejskiej z regionu Podkarpacia na początku XXI wieku</i>	

Elżbieta Bernaciak, Małgorzata Lesicka-Sawicka, Jolanta Barzowska

Feeling the coherence at women with the diagnosed cancer of the breast	78
<i>Poczucie koherencji u kobiet z rozpoznaną chorobą nowotworową piersi</i>	

Krzysztof Jeziorski

- Gastro-entero-pancreatic neuroendocrine tumors – a challenging group
of rare neoplasms 87
*Guzy neuroendokrynnego układu pokarmowego – wyzwanie terapeutyczne
rzadkich nowotworów*

**Wojciech Józwicki, Mateusz Matusiak, Cezary Jochymski,
Anna Koper, Krzysztof Pławski, Anna A. Brożyna**

- Estrogen (ER), progesterone (PR) and human epidermal growth factor
HER-2 receptors expression status in breast cancers: study
on the patients population at the Oncology Centre in Bydgoszcz 94
*Status ekspresji receptorów estrogenowych (ER), progesteronowych (PR)
i ludzkiego epidermalnego czynnika wzrostu HER-2 w rakach piersi:
badania populacji pacjentek Centrum Onkologii w Bydgoszczy*

Maciej Kisiel , Dariusz Kacik , Małgorzata Konon-Kisiel

- Long-term results of the incision and resection of the bladder neck
with bladder outlet obstruction based on the own material. 107
*Odległe wyniki nacięcia i resekcji szyi pęcherza moczowego
z powodu przeszkody podpęcherzowej w materiale własnym*

**Edyta Guty, Magdalena Kozimala, Małgorzata Dziechciaż,
Luiza Balicka – Adamik, Joanna Hłzecka**

- Assessment of functional capacity in patients with dementia 115
Ocena sprawności funkcjonalnej pacjentów z otępieniem

**Edyta Guty, Magdalena Kozimala, Małgorzata Dziechciaż,
Luiza Balicka – Adamik,**

- Factors influencing the occurrence of urinary incontinence
in patients of psycho-geriatric ward..... 129
*Czynniki wpływające na występowanie nietrzymania moczu
wśród pacjentów oddziału psychogeriatrycznego*

Dariusz Kacik , Maciej Kisiel

- TUR syndrome - pathophysiology, symptoms, diagnosis and treatment. 139
Zespół poresekcyjny (TUR syndrom) - patofizjologia, objawy, diagnostyka i leczenie

Anna A. Brożyna, Anna Gutowska, Cezary Jochymski, Wiesława Windorbska, Ryszard Gólda, Wojciech Jóźwicki

- Epidermal growth factor receptor type 2 (HER-2) expression
in gastric cancer – a correlation between clinical and histological features
in patients at the Oncology Centre in Bydgoszcz 148
*Ekspresja naskórkowego czynnika wzrostu typu 2 (HER-2)
w raku żołądka - korelacja cech klinicznych i histologicznych
u pacjentów Centrum Onkologii w Bydgoszczy*

Renata Gładka, Elżbieta Malecka

- Stroke prevention as practiced by nurse professionals in the Silesian Voivodship 162
*Stosowanie profilaktyki udaru mózgu przez grupę zawodową
pielęgniarek w województwie śląskim*

Alicja Karwowska, Marek Gacko, Anna Milewska, Jan Karczewski

- Epidemiological analysis of potential risk factors for abdominal
aortic aneurysms - preliminary results 181
*Analiza epidemiologiczna potencjalnych czynników ryzyka występowania
tętniaków aorty brzusznej – wyniki wstępne*

Gustaw Wójcik, Jolanta Piskorz, Teresa Stawińska, Barbara Sokółowska, Włodzimierz Bulikowski

- Diagnostic methods used in detecting aortic aneurysm 193
Metody diagnostyczne stosowane w wykrywaniu tętniaków aorty

Paweł Kozłowski

- Venous thromboembolic disease – potentially life-threatening clinical problem 201
Żyłna choroba zakrzepowo-zatorowa – potencjalnie groźny dla życia problem kliniczny

Anna Kręgiel, Marlena Zakrzewska

- Stroke – pain and shoulder dysfunction..... 210
Udar mózgu – ból i dysfunkcja barku

Ewa Rudnicka – Drożak, Justyna Natora, Ewa Dutczak, Robert Sambor

- The epidemiology of multiple sclerosis, the potential factors causing
and affecting the course of the disease 224
*Epidemiologia stwardnienia rozsianego, potencjalne czynniki
wywołujące i wpływające na przebieg choroby*

II. Transplantation of organs according to the survey of public opinion

II. Transplantacja narządów w świetle badań opinii publicznej

**Edyta Letka-Paralusz, Anna Kukielczak, Marta Brożyna, Karolina Sobczyk,
Karolina Jędrzysek**

The level of education as a determinant of awareness in the field
of organs transplantation in the selected populations 235
Poziom wykształcenia jako czynnik determinujący
świadomość z zakresu transplantacji narządów w wybranych populacjach

**Edyta Letka-Paralusz, Anna Kukielczak, Marta Brożyna,
Karolina Sobczyk, Karolina Jędrzysek**

Has Poland already overcome a resistance to transplantation?
Public opinion about organ transplantation 250
Czy w Polsce pokonano już niechęć do transplantacji?
Opinie społeczne dotyczące przeszczepiania organów

Foreword

Medical aspects of civilization diseases in the world today is the title of the monograph that allows you to understand the deep roots of many civilization diseases. It brings a fundamental understanding of the causes which are deposited in the current society characterized by diverse etiology, pathogenesis, and treatment methods diagnostic and ways to prevent them.

Progress in medicine is just one of the pillars of the lengthening of life of people in industrialized countries with a high standard of living.

The authors of these works, experienced clinicians, basing on their own experience and professional life as scientists in various fields of medicine show health problems of modern society. What is extremely important is the development of most of the work, based on the world's latest scientific reports.

Articles represent the position of experts in the field of gastroenterology, surgery, neurology, oncology and bioethics. These studies affect so important topics as lifestyle diseases, the possibility of reparative medicine, the use of artificial organs and advances in transplantation.

The monograph consists of two parts containing review articles and original papers each of which is a separate chapter in the field of medicine. The work presented in the first part of the monograph concentrate on medical aspects of health of the population and show their characteristics. The second part of the monograph contains the works of Polish public opinion about the transplantology.

All presented works undoubtedly broaden scientific achievements in the field of medicine, showing the diversity and multidimensionality. They contribute to the reflection, "Primum non nocere," and that is a timely invitation to all to not to harm patients.

Editor

Chapter I

Clinical aspects in modern medicine

Aspekty kliniczne w medycynie współczesnej

**Marek Tomaszewski^{1,2}, Sylwia Ciemięga³, Grażyna Olchowik^{2,4},
Monika Tomaszewska⁵, Marcin Mandryk³**

¹Department of Human Anatomy, Medical University of Lublin

¹Katedra i Zakład Anatomii Prawidłowej Człowieka UM w Lublinie

²John Paul II State School of Higher Education in Biała Podlaska

²Państwowa Szkoła Wyższa im. Papieża Jana Pawła II w Białej Podlaskiej, Instytut Zdrowia

³School of Social Sciences in Lublin

³Wyższa Szkoła Nauk Społecznych w Lublinie

⁴Department of Biophysics, Medical University of Lublin

⁴Zakład Biofizyki UM w Lublinie

⁵Department of Radiology, Medical University of Lublin

⁵I Zakład Radiologii Lekarskiej UM w Lublinie

Irritable bowel syndrome and quality of life

Zespół jelita drażliwego, a jakość życia

Summary

Irritable bowel syndrome (IBS) is a chronic disease of the small intestine and colon, which is not conditioned either organic or biochemical changes. It is manifested in chronic pain or discomfort in the abdomen, supplemented by disturbances in bowel habits (constipation, diarrhea). This paper presents the results of a diagnostic survey for knowledge of IBS in the population of Lublin.

Keywords: irritable bowel syndrome, poorly soluble diet, diarrhea, constipation

Streszczenie

Zespół jelita drażliwego (ZJD) jest przewlekłą chorobą jelita cienkiego i grubego, która nie jest uwarunkowana ani zmianami organicznymi ani biochemicznymi. Objawia się on przewlekłym bólem lub dyskomfortem w jamie brzusznej, uzupełnionym o zaburzenia w oddawaniu stolca (zaparcie, biegunka). Artykuł przedstawia wyniki sondażu diagnostycznego dotyczącego znajomości choroby wśród populacji lubelskiej cierpiącej na ZJD.

Słowa kluczowe: zespół jelita drażliwego, dieta uboga błonnikowa, biegunka, zaparcie.

Introduction

Irritable bowel syndrome (IBS) is a chronic disease of the small intestine and colon, which is not conditioning organic or biochemical changes. IBS occur in as many as 10-20% of the population and concerns of young people (mostly aged 30-40 years old) were twice as likely in women than men (Mule deer, 2006; Mule deer in 2007).

Now, in force, proposed at a conference in Los Angeles, so-called. Rome III criteria, since 2006. According to them, the IBS recognize when there is a recurring pain or discomfort in the abdomen, lasting for at least three days a month for the last three months, during the six months preceding the appointment with a specialist, associated with two (or more) symptoms: improvement after a bowel movement, beginning discomfort associated with a change in frequency of bowel movements and the beginning of symptoms associated with a change in stool consistency. Rome III Criteria include eight major groups. Each of these includes several types of disorders distinguished on the basis of characteristic symptoms: a total of 45 functional disorders, including 17 occurring in infants, children and adolescents (Drossman, 2006).

IBS is a chronic condition with interwoven remissions and exacerbations. Depending on the prevailing side can be distinguished: the dominant form of constipation (hard or lumpy stools, to be cast in an effort followed by a feeling of incomplete bowel movement fewer than three bowel movements per week), diarrheal form (semi-liquid or watery stools preceded by painful urination, occurs when meals, mental stress and hours of the morning or during the day) and mixed form (hard or lumpy stools or watery and loose, figure intertwined that a dozen or so days) (Paradowski, 2007).

According to the Rome III Criteria in addition to pain / discomfort in the abdomen, and disturbances in bowel habits in patients with IBS you notice symptoms such as feeling sticks in the throat, functional dysphagia, hiccups, coronary-liked pain, heartburn / burning sensation behind the breastbone, aerophagia, belching, feeling of fullness in the upper abdomen, feeling of early satiety, Restoring food, nausea and vomiting, bloating, admixture of mucus in the stool. More than that observed as fatigue, urological and gynecological disorders (Paradowski, 2007).

Materials and methods

The paper used the method of diagnostic survey, engineering study was to survey and tool-interview by questionnaires, the questionnaire.

The study was conducted on 100 patients, aged from 15 to over 60 years of age patients who are public health care in Lublin and sufferers of IBS. Respondents agreed to participate in surveys conducted.

Sheet survey consisted of 22 questions concerning knowledge of IBS. These included issues such as symptoms, medications, causes of exacerbations, the impact of factors on the quality of health (diet, sports).

Results

The vastmajority (79%) patients with irritable bowel syndrome are women. Incidence men is not as high as 30% (Fig. 1).

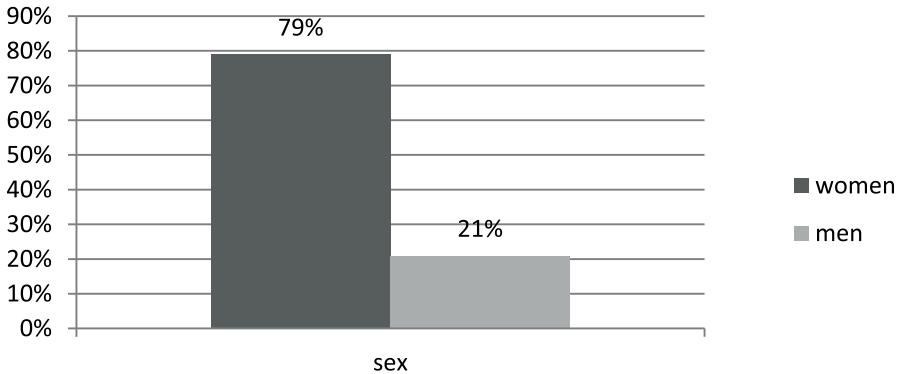


Fig. 1. Percentage of women and men in the survey.

The disease affects the most numerous age group (95 people) in the interval between 15 and 50 years old as much as 95%, a smaller group of patients (5%) above 50 years of age. (5 persons). None of the affected individuals had less than 15 years (Fig. 2).

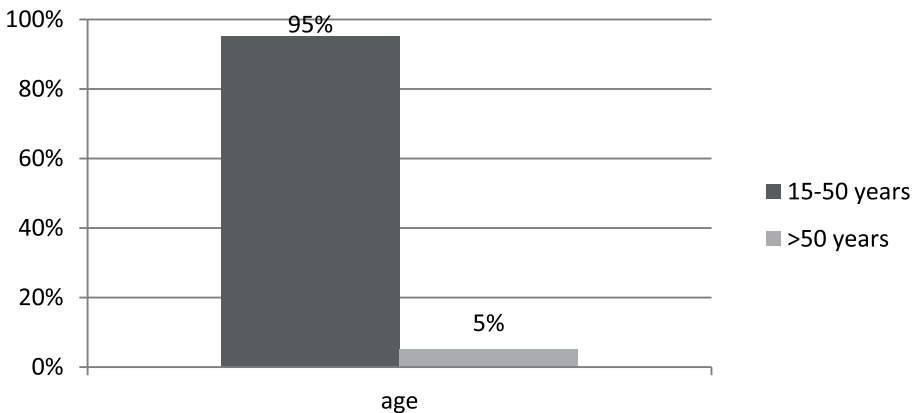


Fig. 2. Percentage distribution of respondents according to age.

Group of patients who know what is irritable bowel syndrome is the most analyzed group (88 persons)- 88%. Only 12% (12 people) of the patients said they did not have adequate knowledge about the disease (Fig. 3).

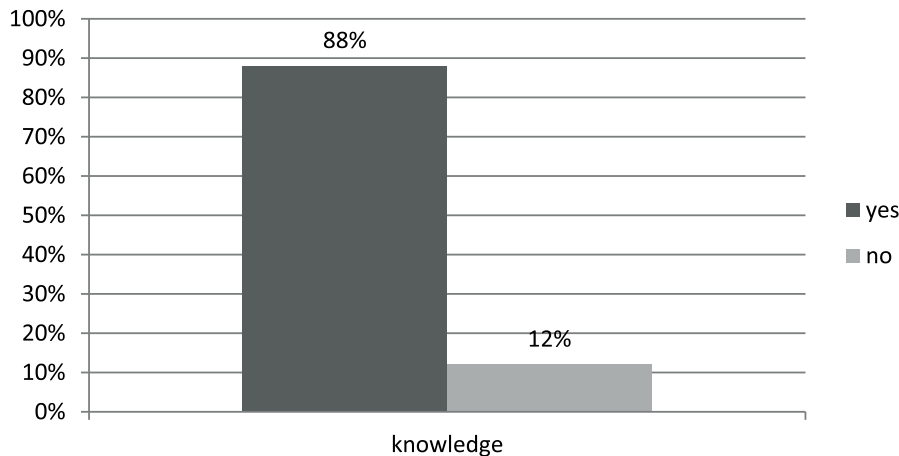


Fig. 3. Percentage distribution of respondents according to the knowledge of the disease.

In the studied population of patients, 62% (62 osoby) revealed the presence of a IBS constipation. Patients with a mixed variety are 26%, and the smallest group (12%) are suffering from diarrheal form (Fig. 4).

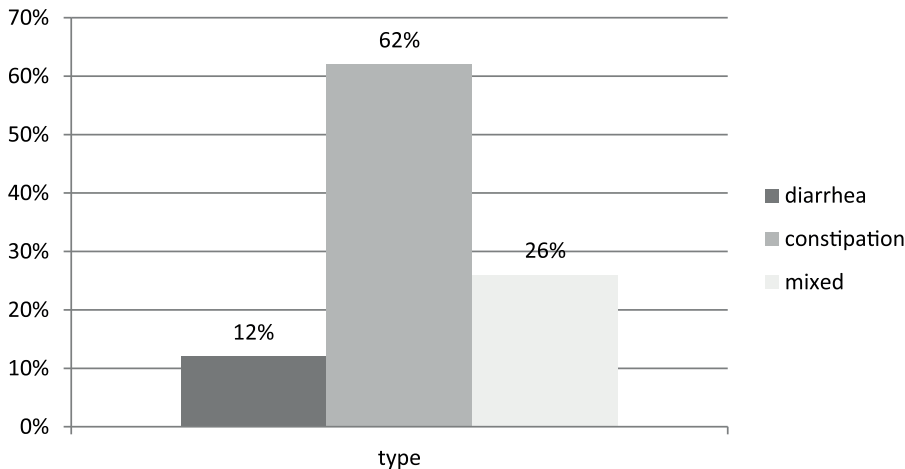


Fig. 4. The proportion of respondents, depending on the form of IBS.

The most common symptoms include pain and/ or flatulence (44%), other values are approximate 26% for diarrhea and /or constipation and 21% of the gas and / or the transferred. Symptoms such as malaise, accompanied by 9% of respondents (Fig. 5).

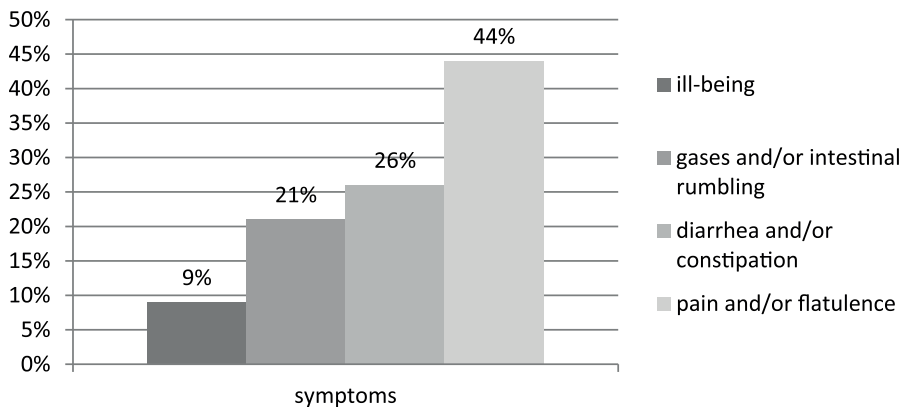


Fig. 5. Percentage distribution of respondents according to the reported symptoms.

Of the 100 respondents to the survey, 61% of known problems for several years. The second largest group consisted of patients with IBS during a six-year (28%). The smallest group represented patients with IBS diagnosed in the last 3 months (12%) (Fig. 6).

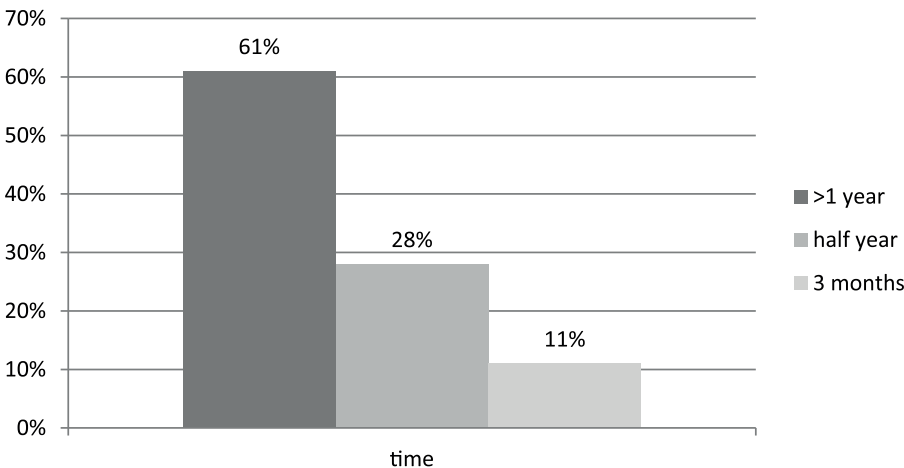


Fig. 6. The proportion of respondents, depending on the time of persistent discomfort.

The permanent medical uses little more than half of the patients (57 patients)- 57%, 43% considered to be ineffective consultation with a doctor (Fig. 7).

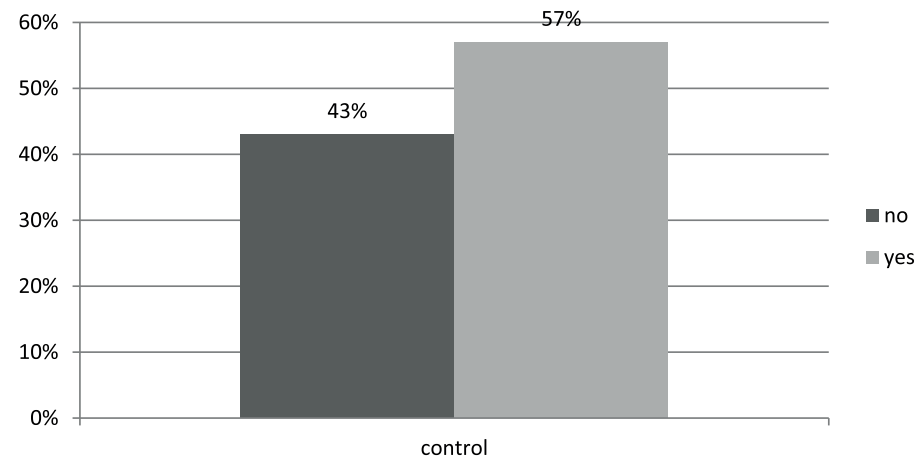


Fig. 7. Percentage distribution of respondents according to the medical surveillance.

Nearly half of the patients (49%) taking medications only when severe symptoms, with regular visits to the doctor uses 27% of the respondents. The smallest group of respondents are taking medication conservatively 11% (Fig. 8).

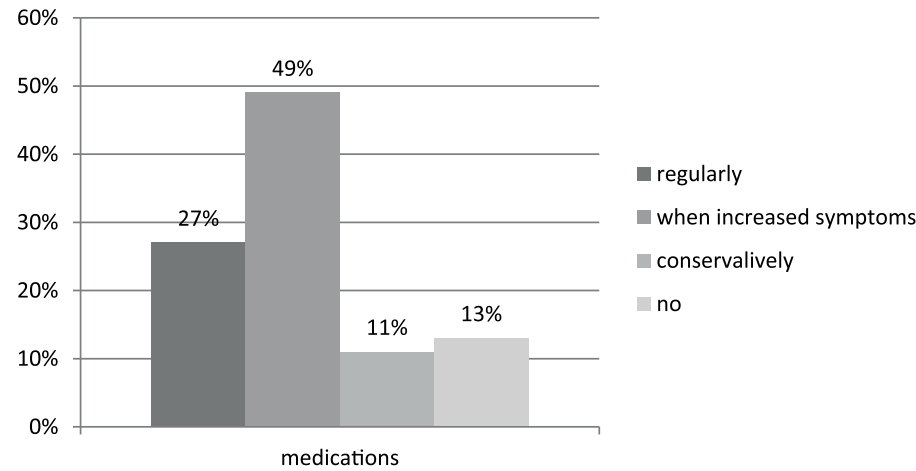


Fig. 8. Percentage distribution of respondents according to the systematic use of pharmacological agents.

In the overall study population were the most commonly used drug preparations antimeteorism (26%). Almost identical data emerged in relation to the antidepressant (23%) and pain relievers systolic (24%). At least patients benefit from antibiotic treatment (1%) (Fig. 9).

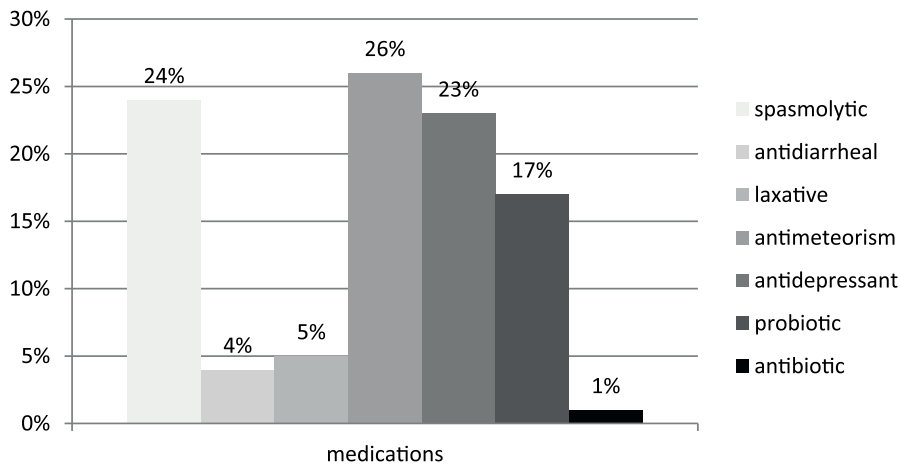


Fig. 9. Percentage distribution of respondents according to the group of pharmacological medication.

A broad group of respondents (54%) of the flax seeds to improve peristalsis. Popularity among patients also showed a herbal tea (36%). Carefully bran are used because only 10% of respondents (Fig. 10).

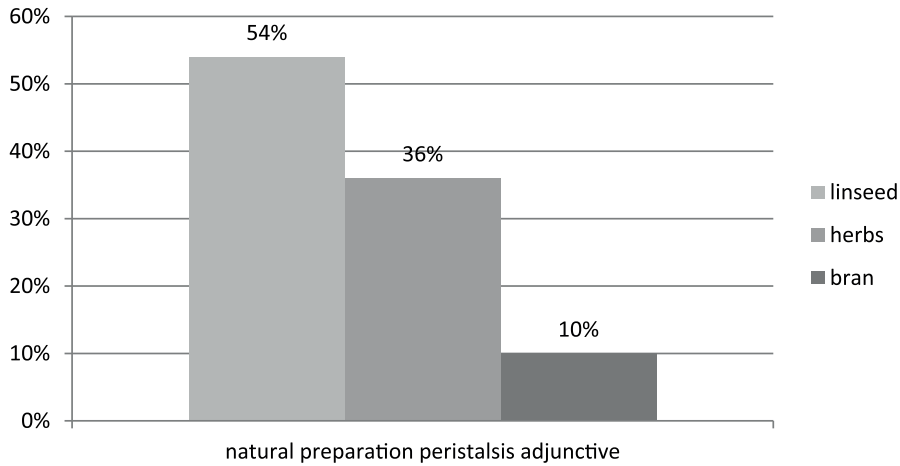


Fig. 10. Percentage distribution of respondents according to the consumed natural aids bowel.

In the vast number of the population of patients (62%) poor-fiber diet was the cause of developing IBS. Overuse of laxative sand hormone replacement therapy has left an impact on 32% of the respondents. The smallest circle represents 2% of patients because of previous infection of intestinal (Fig. 11).

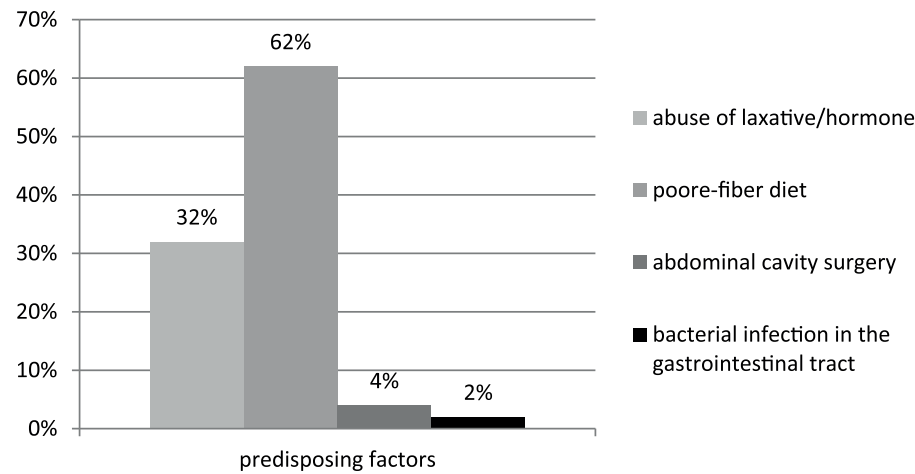


Fig. 11. Percentage distribution of respondents according to the etiological agent.

Just over half of respondents 53 people (53%) actively spend time (Fig. 12).

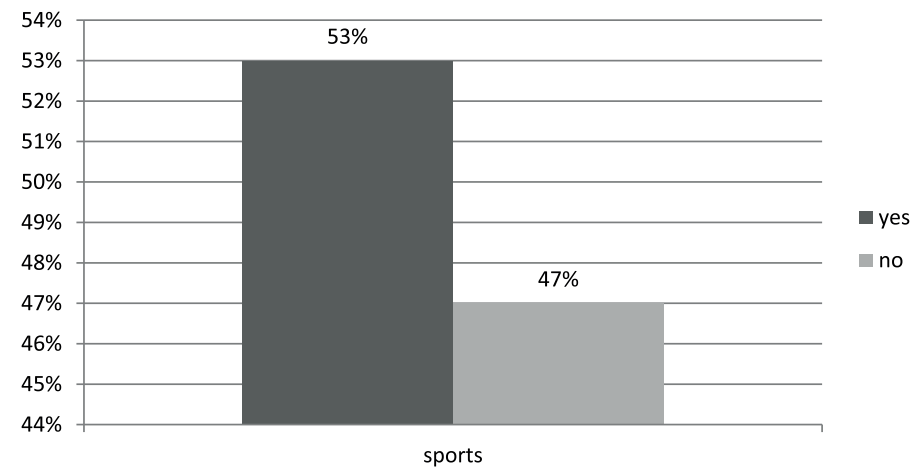


Fig. 12. The proportion of respondents, depending on the sport.

73% of respondents confirmed a positive impact of sport on the course of IBS (Fig.13).

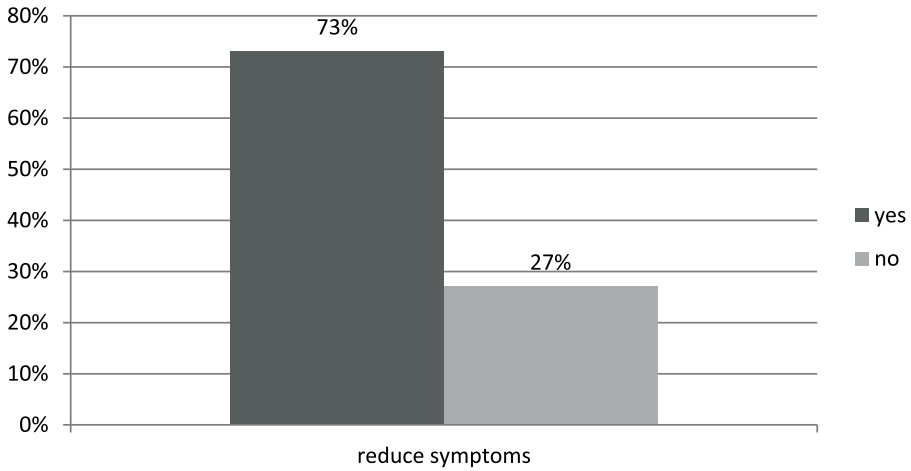


Fig. 13. Percentage of respondents according to relieve symptoms of the disease through physical activity.

One of the dominant factors (89%) deepening the symptoms of irritable bowel syndrome is stress (Fig.14).

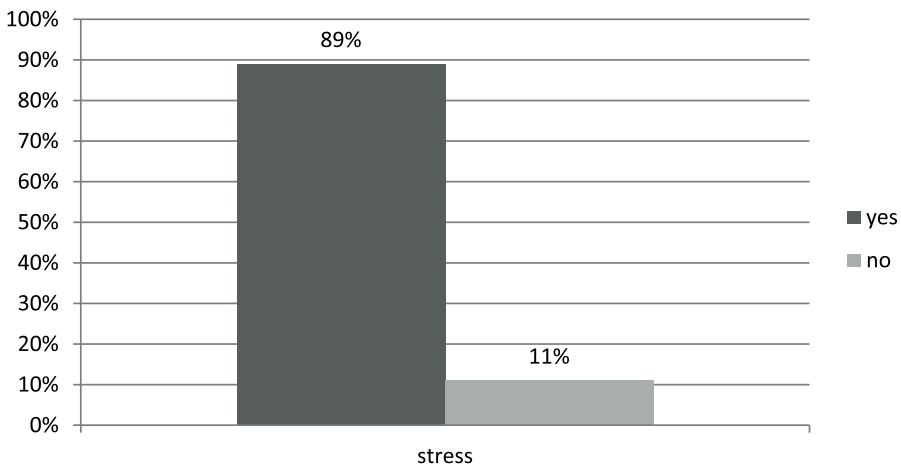


Fig. 14. Percentage distribution of respondents according to the impact of stress on deepening problems.

In a group of 100 patients with the most common nutritional factor causing discomfort are swell products (27%). The least frequently cited by respondents was the natural coffee (10%) (Fig. 15).

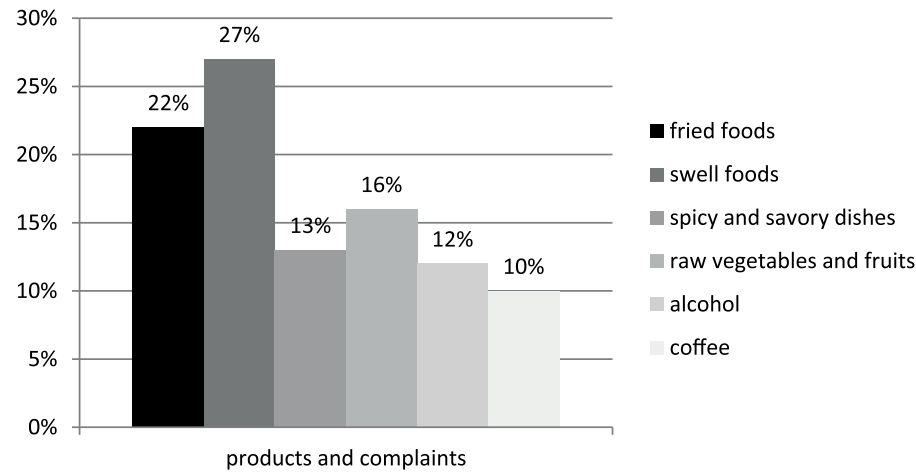


Fig. 15. Percentage distribution of respondents according to the negative effects of food on mood.

The most bother some symptoms after eating the wrong foods are for patients with irritable bowel syndrome, abdominal pain and bloating (52%). On average, surveyed a large group of constipation (21%). The appearance of diarrhea (13%) and general malaise (14%) after dietary ranks errors made almost at the same level (Fig. 16).

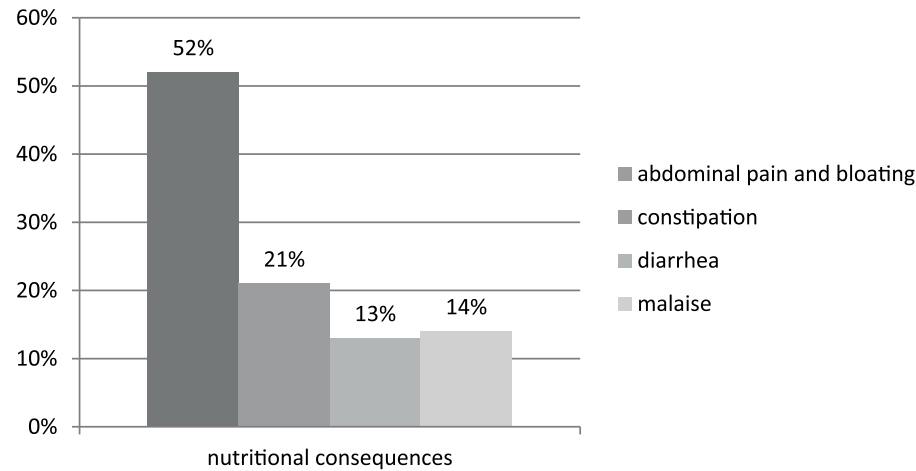


Fig. 16. The proportion of respondents, depending on the result of “mistakes habits”.

Almost all respondents (96%) stated that by following a proper diet can inhibit the occurrence of unpleasant symptoms of irritable bowel syndrome. Only 4 patients (4%) patients diet had no effect on their well-being (Fig. 17).

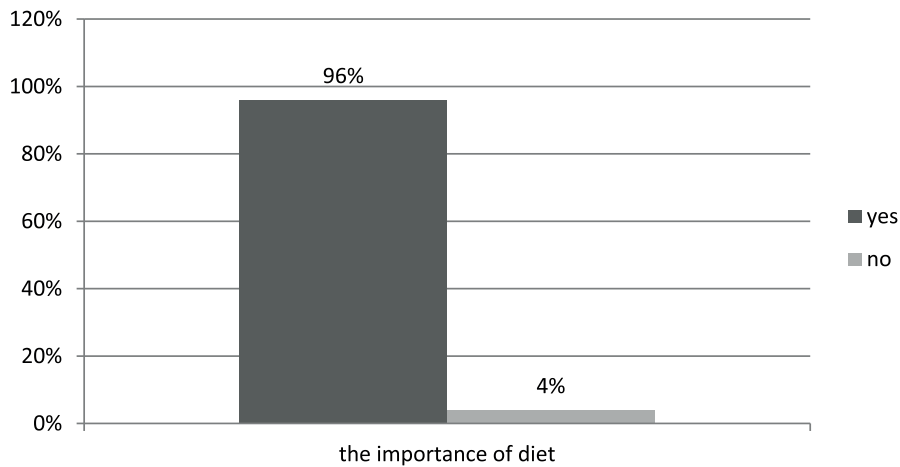


Fig. 17. The proportion of respondents, depending on the importance of diet.

More than half of respondents (63%) are aware of proper nutrition during the course of the disease and to prevent its recurrence. In 17 patients (17%) of respondents lacked knowledge of proper diet (Fig. 18).

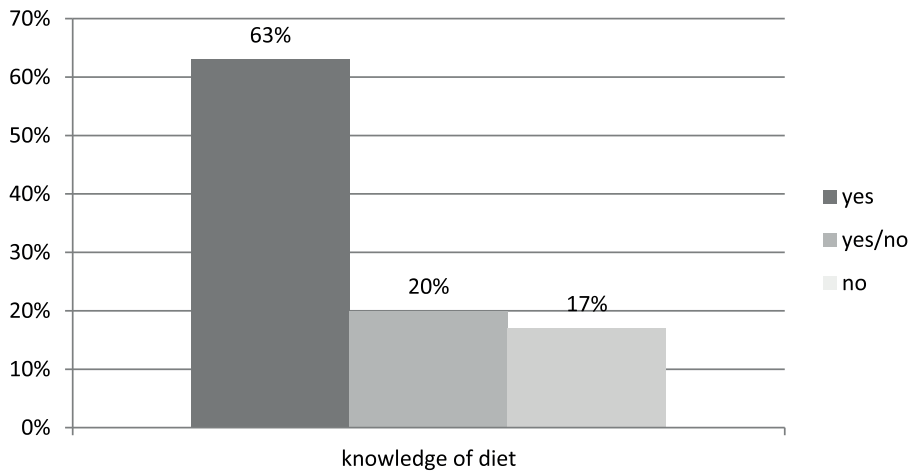


Fig. 18. Percentage distribution of respondents according to the knowledge of the nutritional guidelines in IBS.

In a large proportion (64%) patients who know the rules of nutrition in disease apply to designated diet. Minority of people (36%) of respondents are not using the recommended diet (Fig. 19).

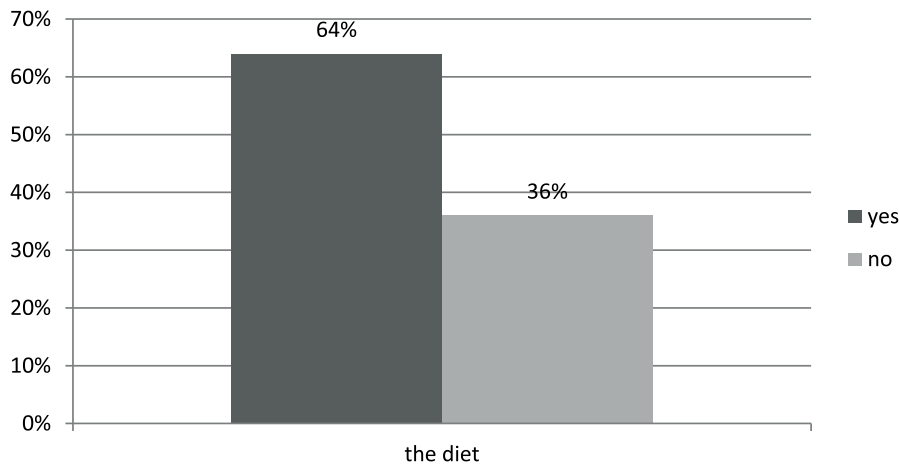


Fig. 19. Breakdown of respondents, depending on adherence to dietary recommendations.

To reduce the unpleasant sensations of the gastrointestinal tract in more than half the patients (58%) as a safe method of cooking used cooking. Braising, also enjoys popularity among the respondents (23%). However, the smallest group is selecting subjects for the treatment of food-frying products (7%) (Fig. 20).

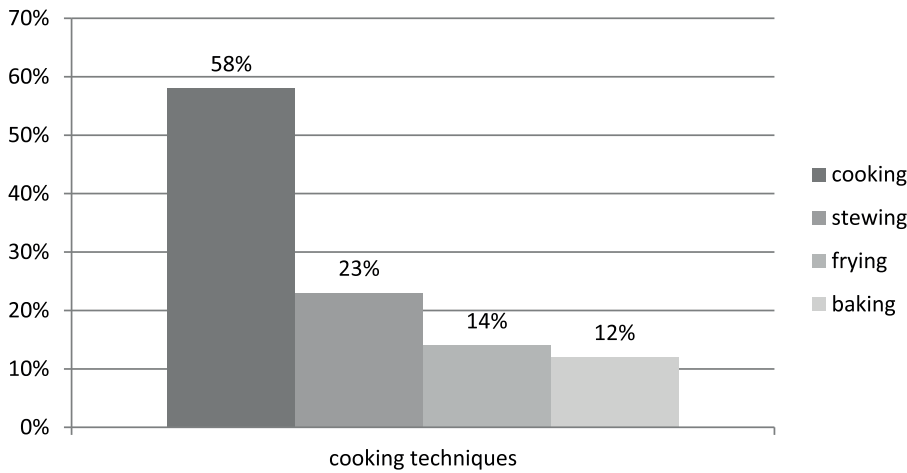


Fig. 20. Breakdown of respondents, depending on the application chosen culinary techniques.

The disease as deprived the wide strange of social contacts interviewed as many as 42 people (42%). The work was forced to give up 13% of the respondents (Fig. 21).

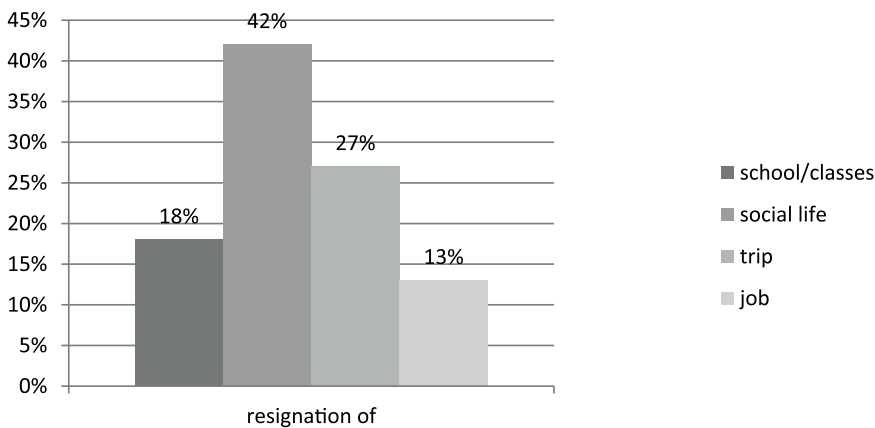


Fig. 21. The proportion of respondents, depending on its impact on everyday life.

More than half of the respondents-54 people (54%) do not fully question the principles of healthy mode of life. The smallest group in this study is a population that cares about their health 22 people (22%) (Fig. 22).

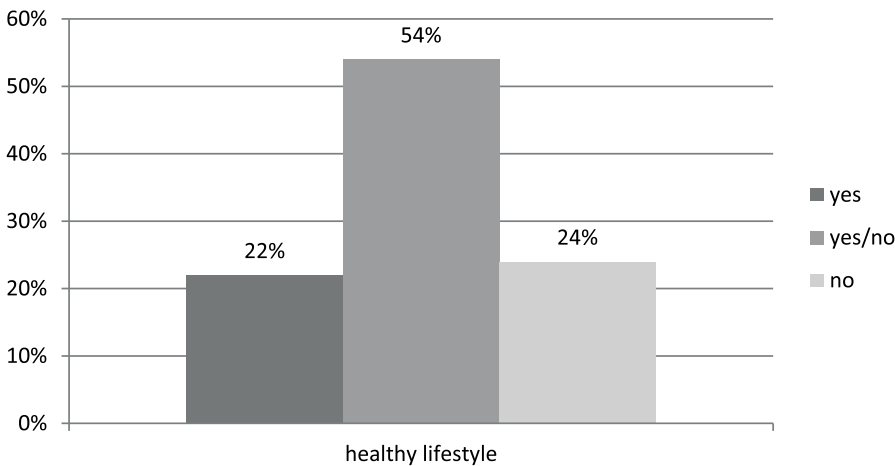


Fig. 22. Percentage distribution of respondents according to lead a healthy life.

On the basis of the survey confirmed that the predisposing factors for onset of IBS include: poor diet and stress. The elimination of this factors, and regular participation in sports, can significantly alleviate the unpleasant symptoms (pain, bloating). Another positive aspect of the diagnostic survey was the fact that in most cases patients are aware of the nature of the disease and are under constant medical supervision.

Conclusion

Today's reality dictates the right attitude in human behavior. Constant stress, eating meals in a hurry, poor diet, lack of physical activity make it appear undesirable symptoms of the digestive system. At first they are discomfort, and sometimes become so troublesome that are distinct disease entity, difficult to treat. All this of course leads to reductions in quality of life, makes it difficult to work in a professional or social contacts.

Epidemiological data indicate that less than half of adults with symptoms of the disease seeking medical advice, and 25-50% of outpatients are already on treatment with gastroenterologists because of IBS. Accurate diagnosis and greater awareness in society, will certainly more effective treatment, so-mysterious to the end of the disease [Drossman, 1992; Lynn and Friedman, 1995].

Bibliography

1. Drossman D.A. (2006). The functional gastrointestinal disorders and the Rome III process. *Gastroenterology*. 130, 1377–1390
2. Drossman D.A., Thompson W.G. (1992) The irritable bowel syndrome: Review and a graduated multicomponent treatment approach. *Ann Intern Med*. 116, 1009
3. Lynn R.B., Friedman L.S. (1995) Irritable bowel syndrome: managing the patient with abdominal pain and altered bowel habits. *Med Clin North Am* 79, 373.
4. Mulak A., Waszczuk E. (2007). Zespół jelita nadwrażliwego Patofizjologia zaburzeń czynnościowych układu pokarmowego. *Zaburzenia czynnościowe przewodu pokarmowego*. Cornetis. Wrocław. 111-126
5. Mulak A., Waśko-Czopnik D., Paradowski L. (2006). Choroby czynnościowe dolnego odcinka przewodu pokarmowego i zespół czynnościowego bólu brzucha według Kryteriów Rzymskich III. *Gastroenterol Pol*. 13, 6, 473-478
6. Paradowski L. (2007). Zaburzenia czynnościowe przewodu pokarmowego. *Cornetis*. Wrocław

Number of signs with spaces: 13 347 + graphics

Marek Tomaszewski^{1,4}, Grażyna Olchowik^{2,4}, Monika Tomaszewska³

¹Department of Human Anatomy, Medical University of Lublin

¹Katedra i Zakład Anatomii Prawidłowej Człowieka UM w Lublinie

²Department of Biophysics, Medical University of Lublin

²Zakład Biofizyki UM w Lublinie

³I Department of Radiology, Medical University of Lublin

³I Zakład Radiologii Lekarskiej UM w Lublinie

⁴John Paul II State School of Higher Education in Biała Podlaska

⁴Państwowa Szkoła Wyższa im. Papieża Jana Pawła II w Białej Podlaskiej, Instytut Zdrowia

Asthma-consciousness disorders and disease progression

Astma oskrzelowa- świadomość schorzenia, a postęp choroby

Summary

Asthma is one of the most common childhood respiratory diseases in Poland and includes from 5 to 10% of the population. In the world it occurs in varying degrees, depending on the place of several to several tens of percent. In some Member States, two or even three-fold increase in the incidence of asthma in recent decades. There is no scientific evidence to date of a link between an increased incidence of disease and the territory of any specific geographical or biological parameters. From the point of view of hygiene theory, the incidence of severe asthma is combined with the so-called. Western lifestyle, which consists of specific measures to comfort, living conditions and habits of the dominant non-natural, chemical treatments, cosmetic preservatives. An important factor affecting the frequency of cases is the degree of exposure to allergenic and infectious agents. At the root of asthma lies the allergic-immunologic mechanisms and intern tendency to react to certain substances of human external environment. This article contains the current state of knowledge about the nature of the disease and forms of coping with the disease.

Keywords: asthma, bronchial hyperresponsiveness, bronchial obstruction

Streszczenie

Astma oskrzelowa jest jedną z częstszych dziecięcych chorób układu oddechowego w Polsce i dotyczy od 5 do 10% populacji. Na świecie występuje ona w różnym nasileniu, w zależności od miejsca, w kilku procentach do kilkudziesięciu. W niektórych państwach odnotowuje się jednak dwu a nawet trzykrotny wzrost zachorowalności na astmę w ciągu ostatnich dziesięcioleci. Nie ma do dzisiaj naukowych dowodów na związek między wzmocnionym występowaniem choroby a terytorium o jakichkolwiek określonych parametrach geograficznych czy biologicznych. Z punktu widzenia teorii higienicznych nasiloną zachorowalność na astmę oskrzelową łączy się z tzw. zachodnim stylem życia, na który składają się specyficzne, zmierzające do komfortu, warunki mieszkaniowe i żywieniowe z dominantą nienaturalnych, chemicznych środków pielęgnacyjnych, kosmetycznych, konserwujących. Istotnym uwarunkowaniem częstotliwości zachorowań jest też stopień ekspozycji na czynniki alergizujące oraz infekcyjne. U podłoża astmy oskrzelowej leżą więc mechanizmy

alergicznio-immunologiczne oraz wrodzona skłonność do reakcji na niektóre substancje środowiska zewnętrznego człowieka. Poniższy artykuł zawiera aktualny stan wiedzy na temat istoty choroby oraz formy radzenia sobie z tą chorobą.

Słowa kluczowe: astma oskrzelowa, nadreaktywność oskrzeli, obturacja oskrzeli

Introduction

Asthma is a chronic respiratory disease involving many body cells which release substances that contribute to its development. It is characterized by increased airway hyperresponsiveness that leads to recurrent episodes of wheezing, dyspnea, chest tightness, and persistent cough. Symptoms usually occur at night and in the morning. The clinical picture is usually accompanied by diffuse bronchial obstruction, which is reversible either spontaneously or with treatment (GINA, 2010).

Bronchial asthma can be divided according to the etiology of the allergic and non-allergic, due to the severity and course of the sporadic and chronic (mild, moderate and severe), or because the degree of control of the disease in a controlled, partly controlled and uncontrolled (Fanta, 2009; British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009).

Asthma is one of the most common chronic diseases of the respiratory system, where the prevalence is estimated at an average of approximately 5% in adults, women often suffer. The average annual death rate for this reason, is about 180 000 worldwide. The disease course is often episodic, with a tendency to remission (Fanta, 2009; British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009).

According to current standards of asthma diagnosis is possible only after three years of life (3-5 years). At this time the attacks of angina occur without associated viral infections, and the results indicate auxiliary usually allergic etiology. In younger children (<3 years) diagnosis and treatment of this disease is difficult because of the lack of effective methods for monitoring bronchial obstruction, a different course than in older children and not fully understood pathophysiology. Asthma is diagnosed in adulthood is often non-allergic and has a more severe (Global strategy for the Diagnosis and Treatment of Asthma in Children 5 Years and Younger, 2009; Papadopoulos, 2012).

Pathomechanism of asthma

Asthma is a chronic inflammatory disease of the lower respiratory tract, wherein the air restriction is caused by swelling of the bronchial mucosa (inflammation), bronchial smooth muscle contraction (bronchial hyperreactivity, and obstruction), the formation of mucus plugs and bronchial remodeling (Brown et al. , 2006).

The inflammation of the bronchi leading to asthma, formed under the influence of various triggers: physical (cold air, increased humidity, dust, dirt, soot, odors), biological (plant food allergens, viruses, bacteria, fungi, parasites, feathers) chemicals (ozone, brick, cement, foodstuffs), individual differences (physical, individual predispositions). These factors cause the activation of the cells (mast cells, eosinophils, T lymphocytes) that produce various inflammatory mediators, chemokines, cytokines and growth factors (GINA, 2010).

In the case of allergic asthma underlying disease is IgE-dependent mechanism. This applies especially to children and young adults. In this group of patients in contact with an allergen leads to the early phase of an allergic reaction, initiated by the binding of allergen-specific IgE antibodies on the surface of mast cells. The granularity of the cells reaches to the release of inflammatory mediators including histamine, proteases and heparin. In addition, new products such as cysteinyl leukotrienes, prostaglandins D2 and adenosine. In consequence, there is initiated state bronchial obstruction. After 6-8 hours, discloses a late phase of an allergic reaction. At this time, mast cells, basophils, and other cells release cytokines and chemokines, multiply bronchial influx of inflammatory cells (especially eosinophils). At the same time as the resulting state, comes to tilt the balance in the direction of CD4 + Th phenotype. Th cells secrete include: IL-4, IL-5, IL-9, IL-13 (Fanta, 2009, Sutherland et al., 2004).

Pathophysiology non-allergic asthma is not fully understood. Perhaps at the root of this state shall be immune process, triggered by an infection. However, histology of allergic and non-allergic asthma is very close. The cells of the airway wall (fibroblasts, myofibroblasts, smooth muscle cells) secrete several cytokines and growth factors, contributing to keep a chronic inflammatory bronchial epithelium. Damaged epithelium stimulates repair processes, resulting in structural and functional changes, present even in the early stages of the disease (bronchial reconstruction). It leads to fibrosis reticular layer of the basement membrane hypertrophy of fibroblasts and smooth muscle cells, hypertrophy of mucous glands, and bronchial epithelial goblet cells and increased vascular proliferation. These changes make for a particularly severe cases, obstruction is irreversible (Fanta, 2009, Sutherland et al., 2004).

Risk Factors

The main risk factors for asthma can be divided into:-individual and environmental factors. The individual factors include: genetic predisposition, allergies, bronchial hyperresponsiveness, female sex, and black race. Environmental factors affecting the development of asthma in predisposed individuals include indoor allergens (house dust mites, pet allergens, molds and yeast), the external environment allergens (pollen), occupational factors for skin sensitization, tobacco smoke (smoking active and passive), air pollution and indoor respiratory infections, parasitic infestations, socio-economic status and obesity. (GINA, 2010, Fanta, 2009, Sutherland et al., 2004).

The factors that trigger asthma attacks and exacerbations or bring their persistence include indoor allergens atmospheric and indoor air pollution and indoor respiratory infections, exercise and hyperventilation, changes in the weather, food and / or food additives drugs (beta-blockers, aspirin), very strong emotions, tobacco smoke, irritants (aerosols used in household paint fumes) (Fanta, 2009, Sutherland et al., 2004).

The clinical picture

During the seizure shortness of breath and no exacerbations of asthma, signs and symptoms may be absent. Exacerbation of asthma can be mild, moderate or severe. Many years of untreated or poorly treated disease eventually leads to progressive, irreversible airflow limitation by inhalation and can lead to death of the patient (Fanta, 2009; GINA 2010).

The symptoms include: shortness of breath exhaust (paroxysmal, variably severe, can occur at any time of the day or night after exposure to a trigger and resolve spontaneously or

with treatment) or chest tightness, wheezing, cough (dry, paroxysmal) and other symptoms of allergic diseases (eg, allergic rhinitis) (Fanta, 2009; GINA 2010).

Among the signs of lung fields be heard wheezing (diffuse, bilateral, exhaust) or dry rale and observed prolonged exhalation. When it comes to the severity of dyspnea is labor intensive accessory muscles and tachycardia (Fanta, 2009; GINA 2010).

In asthma exacerbations occur, which can have a different waveform. When tightening up gradually (hours, days, weeks) is the most common cause of respiratory infection or failure of prior therapy. Treatment of this condition is also done slowly. In the case of exacerbations the symptoms develop rapidly (asthma attack), they are mainly caused by an allergic reaction to a trigger. In this case, the response to treatment is generally faster (Fanta, 2009; GINA 2010).

Recognition

Among the disease entities with dyspnoea, to differentiate from asthma are mentioned: COPD, vocal dysfunction, heart failure, bronchiectasis, pulmonary embolism, respiratory tract infections and other less common, such as tumor or a foreign body in the airway, tracheal stenosis after tracheostomy, bronchiolitis obliterans or pneumothorax (Fanta, 2009; GINA 2010).

If symptoms such as recurrent wheezing in the chest, coughing and / or shortness of breath occurring especially at night and in the morning, when changes in humidity, temperature, air inhaled or during exercise, you can also consider the possibility of a diagnosis of asthma (GINA 2010).

The diagnosis of asthma is based on: a typical interview, the signs in question (if present), the presence of reversible airflow obstruction, bronchial hyperresponsiveness finding in cases without obstruction on spirometry and reduced peak expiratory flow (PEF) or increased diurnal variation in PEF (GINA, 2010).

Interview is one of the most important methods of confirming asthma. It allows you to build a picture of the disease, based on the data obtained in the past. If the information of mentions a persistent inflammation of the bronchi and lungs, respiratory infectious diseases, acute upper respiratory tract infections, persist after treatment with antibiotics, family prone to allergic reactions, and completed the child is allergic disease, it may be suspected asthma. The existence of environmental factors (concomitant diseases, air quality) affects the frequency of asthma attacks, as well as increasing the frequency of contacts with various allergens. The region is typified variability of symptoms, such as reducing the dose of drugs, spontaneous remission or exacerbation. Their frequency increases, however, with the duration of the disease (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009).

An indication of the existence of asthma in the course of a prolonged hardened exhaust phase, combined with diffuse wheezing on lung fields and reinvent the symptoms of shortness of breath. None of these symptoms do not preclude the disease because the patient may be at the time of disease remission (Brown et al. 2006].

Setting inspiratory chest between the attacks of dyspnea indicates an obstruction phase of distension of the pulmonary parenchyma-it is sometimes the only symptom of the disease. The state of the patient's airway hyperresponsiveness in asthma as a

symptom may indicate the occurrence gradually worsening cough, wheezing during the test or exercise any hyperventilation [Brown et al., 2006; Sutherland et al., 2004].

The physically diagnosed allergic diseases, asthma is often associated are: team atopic dermatitis, allergic rhinitis or conjunctivitis (Brown et al., 2006; Sutherland et al., 2004; Fanta, 2009).

On the basis of physical examination, based on clinical and functional asthma was established and characterized the degrees of gravity.

The criteria indicating the degree of severity was found: the frequency of daytime and night-time symptoms between attacks of breathlessness, and rate of FEV1 (forced expiratory volume in one second) and PEF (peak expiratory flow). In the current percentage w / w ratios are compared to predicted or maximum value for the patient. The percentage of variability due to the difference of the evening and morning. There are four degrees of severity of asthma (GINA 2010):

- Stage 1, which is characterized by intermittent asthma less frequent than once a week, the daily occurrence of symptoms between episodes, and less or equal to two times a month nocturnal symptoms. FEV is less than or equal to 80% of the value, a variation less than 20%.
- Stage 2, mild chronic asthma has more or equal to one time per week daytime symptoms, night more than two times a month. FEV as above, and the variation between 20 and 30%.
- Stage 3, moderate persistent asthma, a daily daytime symptoms, night once a week, FEV more than 60 to 80% of predicted, and the variability of more than 30%. In this case, the attacks of angina disrupt life activity.
- Stage 4, severe persistent asthma, daytime symptoms on a daily basis, night-often, FEV less than 60% of the value and volatility greater than 30%. Symptoms restrict daily life activity.

Because of the degree of control of the disease, bronchial asthma can be divided into (GINA 2010):

- Asthma is controlled where daytime symptoms occur more often than two times a week there is no limit daily activities, nocturnal symptoms and exacerbations, emergency treatment is required more often than two times a week PEF or FEV1 fall within the normal range
- Asthma is partly controlled where daytime symptoms occur more frequently than 2 times per week, with minor limitations, daily activities and night symptoms, emergency treatment is required more often than two times a week PEF or FEV1 values are <80% of predicted or maximum patient, exacerbations occur more frequently than once a year
- Uncontrolled asthma observed in at least three partially controlled asthma criteria met in any one week, with at least one exacerbation in any one week (every week with exacerbation of asthma is considered to be a week from uncontrolled asthma).

The diagnosis of asthma is the differential diagnosis, a complete list of the symptoms of the disease to others, such as immunocompromised groups, airway inflammation and sinusitis, aspiration groups, including foreign body aspiration, cystic fibrosis,

pulmonary embolism, bronchopulmonary dysplasia disorders, construction and function of the respiratory system (pneumothorax tracheomalacia, bronchiectasis, bronchiolitis obliterans, vascular compression, fistula between the respiratory and digestive tract, tumors of the chest, the teams ciliary dyskinesia, stenosis of the larynx, paralysis, paresis, vocal cord dysfunction, narrowing trachea after tracheotomy), defects in the cardiovascular system, heart failure, abnormal emotional and neurotic (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009).

The diagnosis of asthma beside basic physical examination performed additional tests, using measuring devices. These include spirometry, measurement of PEF a peak flow meter, test the reversibility of airflow obstruction, airway hyperresponsiveness test. Pulsoximetry and arterial blood gas analysis is performed to assess the severity and monitoring of exacerbations (GINA, 2010).

Spirometry is a lung volumes during forced expiration, performed by the spirometer. It can be given to persons who have completed 7-8 years of age and are able to repeat spirometry testing. The presence of asthma in one of its symptoms, airflow obstruction, indicating lower rates of FEV1 and PEF less than 80% predicted. The continuing process of obstruction also causes a decrease in the FVC, or forced vital capacity. The study spirometry calculated rate of lung volume and bronchial patency rates (Szczeklik and Gajewski, 2011).

- Indicators spirometric lungvolume:
 - VC vital capacity (quiet exhaust)
 - FEVC - Forced vital capacity exhaust(of less than 6arenot suitable for interpretation; in chronic obstructive pulmonary disease FVC is less than VC)
 - FIVC - Forced inspiratory vital capacity
- Indicators spirometric bronchial obstruction:
 - FEV1 - severe expiratory volume in one second (the “gold standard”)
 - FEV1/VC - rate Tiffeneau
 - MEF50-the maximum flowafter50% of severe exhaust (test small airways)
 - PEF - peak expiratory flow (test less reliable than FEV1).

PEF measurements using the peak flow meter (peakflowmetry) is used in asthma control that you can do at home, although not as accurate as spirometry. If the device shows the PEF less than 60% predicted or maximum for the patient as soon as possible to intervene therapeutically as measurement points to inadequate control of the disease. With the score 60-80% range of control is sufficient, but it requires the verification of treatment. PEF ratio above 80% indicates good control of the disease (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009, GINA, 2010).

Bronchial obstruction reversibility test check determines whether bronchial obstruction improved after inhalation of a short-acting alpha-2-agonist. Repeated after 15-20 minutes then measuring FEV1 or PEF. The observed relative increase in FEV1 of 12% compared to baseline or above 15% PEF is the basis for the diagnosis of asthma (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009, GINA, 2010).

During dyspnea asthmatic attack is carried out arterial blood gases. It allows the evaluation of the degree of disorder of ventilation and hypoxemia. PaO₂ less than 60 mmHg and PaCO₂ greater than 45 mmHg while breathing air show a very severe exacerbation of asthma and the need for immediate oxygen administration and implementation of hospital treatment in the ICU (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009, GINA, 2010).

Another additional test is a test of airway hyperresponsiveness performed by comparing measurements of FEV₁ before and after inhalation of incrementing doses or concentrations of the factors that cause bronchospasm, usually histamine or methacholine. These data are used to calculate the value of PD₂₀ or PC₂₀, the dose or concentration of a substance which causes a reduction in FEV₁ of 20%. The lower the values, the sensitivity of the bronchi is greater. However, test accuracy is not characterized as only negative values allow the exclusion of asthma, while positive is not always confirm the diagnosis (British Guideline on the Management of Asthma. May 2008, revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009, GINA, 2010).

Perform additional testing in the form of positive allergy tests is not the diagnosis of asthma. They help only to detect risk factors for the development of the disease, thus sensitizing allergens, which can be at least partially eliminated from the patient's environment (GINA, 2010).

The most frequently used tests to detect allergies immediate (Type I), IgE-mediated, and late (type IV), which confirms the presence in the skin of immunoglobulin E (IgE), which reflect a genetically determined immune blemish-atopy. Detection of Type I allergy skin prick tests are used, and under the skin, and type IV allergy help diagnose epidermal patch test. The diagnosis of allergic (atopic) are important prick tests skin (PTS) (GINA, 2010, Fanta, 2009).

PTS is designed to confirm the presence of specific IgE in the skin by inducing immediate erythematous reaction was purged as a response to a given allergen. Skin response is associated with mast cell degranulation and release of mediators of the early allergic response, especially histamine. The allergens used in testing PTS include statements inhalants (pollens of grasses, trees and grains, mold spores, animal dander, dust mites) and food over the latex and insect stings (GINA, 2010, Fanta, 2009).

PTS is easy to make, safe, very kind, allergenic extracts have a long service life. In contrast, intradermal test rarely discloses the reaction of late (GINA, 2010, Fanta, 2009).

Before performing the PTS should be discontinued drugs that inhibit skin reaction (glucocorticoids, medications p / histamine). Then carried out two controlled trials (test must fall negatively) with solvent antigen and histamine test, assessment of skin reactivity. Keep in mind that children, including those with atopic dermatitis and metastatic malignancies, can be seen less skin reactivity (GINA, 2010, Fanta, 2009).

It is important to care about the quality of the preparation of allergen and the need to store them at 2-8° C (lyophilized especially insects Hymenoptera venom allergens and allergen solutions stabilized glycerol or albumin). According to medical prescription only dry skin intact and suitable for performance testing. Even healed lesions are a contraindication, because damaged nerve endings of the skin give false negative reactions. Positive Control allows you to determine the correct skin reactivity and

technology studies, and excludes the existence of negative adverse reactions to trauma (eg too strong prick), solvent or used equipment. The prick tests can be used Polfa histamine dihydrochloride solution (1: 1000, in an ampoule) (GINA, 2010, Fanta, 2009).

Histamine produces an average bubble diameter (the largest and perpendicular to it passing through its center) of at least 3 mm, and this reaction is always accompanied by erythema (GINA, 2010, Fanta, 2009).

Skin prick tests performed on the volar aspect of the forearm. Allergenic extracts is applied in a distance of 5 cm from the wrist and at least 3 cm from the elbow, which is associated with a lower reactivity of the skin around the wrist (GINA, 2010, Fanta, 2009).

Histamine, like allergens strong reaction should be applied closer to the cubital fossa, and those with fewer assays - closer to the wrist. Such positioning includes lymph flow toward the heart. Special lancet puncture the skin (non-rechargeable), and assuming a drop of the solution, it should go through the superficial layer at an angle of 60-70 degrees (it should be slightly lifted and create a small canal). The second way, accompanied by a gentle, one-second compressions, the puncture perpendicular to the surface of the skin. The appearance of bleeding disqualifies the study. Never use tests from the fridge. Too low temperature of the solution may cause a contraction of the skin and a decrease in acidity. Tests are read after 15 to 30 minutes, depending on the patient (GINA, 2010; Fanta 2009; Szczeklik and Gajewski, 2011).

Treatment

Asthma is a chronic disease that “modern medicine” cannot be cured, but proper drug treatment generally allows you to control the disease. The general recommendation is effective therapy: proper inhalation technique of inhalation drugs, a written self-management plan for the patient, for the treatment of chronic and steps the patient should be taken in the event of exacerbations, avoidance of exposure to the patient triggers seizures and exacerbation of asthma and influenza vaccination (Szczeklik and Gajewski, 2011).

Among the drugs used in the treatment of asthma controller medications include disease (taken daily) and relievers (assumed temporarily). The first group include: corticosteroids (CS) is inhaled (beclomethasone, budesonide, ciclesonide, fluticasone), oral corticosteroids (prednisone, prednisolone, methylprednisolone), long-acting beta-2 agonists (formoterol, salmeterol), leukotriene (montelukast, zafirlucast), methylxanthines in sustained release form and omalizumab (monoclonal anti-IgE used in the severe and very poorly controlled allergic asthma). The second group includes: fast-acting beta-2 agonists (fenoterol, salbutamol), a short-acting inhaled anticholinergics (ipratropium bromide) as well as oral corticosteroids and other drugs for a short time, in order to control asthma exacerbations. Choice of drugs depends on the degree of asthma control and current treatment (Szczeklik and Gajewski, 2011).

Conclusion

Asthma is a chronic inflammatory disease of the lower respiratory tract symptoms like wheezing and persistent cough. Over time uncontrolled disease results in rebuilding the walls of the bronchial tree, leading to a reduction in physical activity and life. Following the general principles for the prevention of asthma exacerbations may be

greater or lesser extent (depending on the patient's subordination) to control the disease. Suitable conditions will not halt the awareness of the disease, but it can reduce the inevitable progress.

Bibliography

1. Szczeklik A., Gajewski P. (2011). Choroby wewnętrzne. Medycyna Praktyczna
2. Global Strategy for Asthma Management and Prevention, Global Initiative for Asthma (GINA) (Update 2010). <http://www.ginaasthma.org> (cyt. 24.10.2012)
3. Global Strategy for the Diagnosis and Treatment of Asthma in Children 5 Years and Younger (2009). <http://www.ginaasthma.org> (cyt. 28.10.2012)
4. British Guideline on the Management of Asthma. (May 2008), revised June 2009. British Thoracic Society, Scottish Intercollegiate Guidelines Network. 2009. Available at: <http://www.sign.sc.uk/guidelines/fulltext/101/index.html>. Accessed April 8, 2010
5. Papadopoulos N.G., Arakawa H., Carlsen K-H et al. (2012). International consensus on (icon) pediatric asthma. *Allergy*. 67, 976-997
6. Fanta C.H. (2009). Asthma. *N Engl J Med*. 360, 1002-1014
7. Sutherland E.R., Martin R.J., Bowler R.P., Zhang Y., Rex M.D., Kraft M. (2004). Physiologic correlates of distal lung inflammation in asthma. *J Allergy Clin Immunol*. 113, 1046-1050
8. Brown R.H., Pearse D.B., Pyrgos G., Liu M.C., Togias A., Permutt S. (2006). The structural basis of Airways hyperresponsiveness in asthma. *J Appl Physiol*. 101, 30-39

Number of signs with spaces: 28 018

**Marek Tomaszewski^{1,2}, Ewelina Kędra³, Grażyna Olchowik^{2,4},
Monika Tomaszewska⁵, Marcin Mandryk³**

¹Department of Human Anatomy, Medical University of Lublin

¹Katedra i Zakład Anatomii Prawidłowej Człowieka UM w Lublinie

²John Paul II State School of Higher Education in Biała Podlaska

²Państwowa Szkoła Wyższa im. Papieża Jana Pawła II w Białej Podlaskiej, Instytut Zdrowia

³School of Social Sciences in Lublin

³Wyższa Szkoła Nauk Społecznych w Lublinie

⁴Department of Biophysics, Medical University of Lublin

⁴Zakład Biofizyki UM w Lublinie

⁵I Department of Radiology, Medical University of Lublin

⁵I Zakład Radiologii Lekarskiej UM w Lublinie

Gastric and duodenal ulcers, and human consciousness

Choroba wrzodowa żołądka i dwunastnicy, a świadomość człowieka

Summary

Chronic peptic ulcer disease is a cyclic appearance of peptic ulcers in the stomach or duodenum. Its prevalence is estimated at 5-10% of the adult population. Among the most common causes include infection of *Helicobacter pylori* and the use of non-steroidal anti-inflammatory drugs (NSAIDs). The article presents the results of a survey tool for the assessment of diet and eating habits that may influence the development of gastric ulcer or duodenal ulcers.

Keywords: peptic ulcer, gastric ulcer, duodenal ulcer, *Helicobacter pylori*, NSAIDs

Streszczenie

Choroba wrzodowa jest cyklicznym pojawieniem się wrzodów trawiennych w żołądku lub dwunastnicy. Jej chorobowość oszacowano na 5-10% dorosłej populacji. Wśród najczęstszych jej przyczyn wymienia się zakażenie *Helicobacter pylori* oraz stosowanie niesteroidowych leków przeciwzapalnych (NSAIDs). Artykuł przedstawia wyniki sondażu diagnostycznego dotyczącego oceny sposobu odżywiania oraz nawyków żywieniowych, które mogą wpłynąć na rozwój choroby wrzodowej żołądka lub dwunastnicy.

Słowa kluczowe: choroba wrzodowa, wrzód żołądka, wrzód dwunastnicy, *Helicobacter pylori*, NSAIDs.

Introduction

Peptic ulcer disease is a cyclic appearance of peptic ulcers in the stomach or duodenum (spring and / or autumn). The term peptic ulcer is called a loss in the mucosa, accompanied by inflammatory infiltration and necrosis of blood clots in the environment (Szczeklik and Gajewski, 2011).

Peptic ulcers occur in the gastrointestinal tract, where the mucous membrane is in direct contact with hydrochloric acid and pepsin (duodenum bulb, stomach) (Talley, 1999).

Peptic and duodenal ulcer is the most common gastrointestinal disorders, where the prevalence is estimated at 5-10% of the adult population. Among the most common causes include infection with *Helicobacter pylori* (*H. pylori*) and the use of non-steroidal anti-inflammatory drugs (NSAIDs). Physiological stress in terms of the Intensive Care, Zollinger-Ellison syndrome, Crohn's disease, glucocorticoids (in combination with NSAIDs), systemic mastocytosis, carcinoid syndrome, basophilia in myeloproliferative syndromes, infection, HSV and CMV virus, radiation, chemotherapy (fluorouracil) sarcoidosis are less frequent causes of onset of ulcers. The factors contributing to the healing of the ulcer as well as increasing the risk of recurrence include smoking, blood type "0" (Lewis b antigen to the adherence of *H. pylori*), alcohol, nutrition, stress and other psychological factors. The risk of mucosal damage by NSAIDs increase: age > 60 r.ż., a history of peptic ulcer or bleeding ulcer, other serious diseases, concomitant use of several NSAIDs or high-dose glucocorticoid therapy and or anticoagulants (Dixon, 1996; EHPSG, 2002; Dzieniszewski, 2004).

The main symptom of the presence of peptic ulcers is the pain or discomfort in the upper abdomen, occurring within 1-3 hours after a meal and retiring after ingestion of food or acceptance of antacids. Quite often the pain occurs at night or early in the morning (Talley, 1999, Dixon, 1996; EHPSG, 2002; Dzieniszewski, 2004).

The study confirms the changes in the appearance of gastric / duodenal endoscopy, a test detecting *H. pylori* are invasive methods (urease test, histological examination, cell culture) and non-invasive (breathing tests, serological tests, test for the detection of *H. pylori* antigen in stool) (Dixon, 1996; EHPSG, 2002; Dzieniszewski, 2004).

Treatment of peptic ulcers is primarily on eliminating the symptoms and triggers when there is evidence-eradication of *H. pylori* (now proposes to triple combination therapy over 7 days) (Dixon, 1996; EHPSG, 2002; Dzieniszewski, 2004).

Material and methods

The paper used the method of diagnostic survey, engineering study was to survey and tool-interview by questionnaires, the questionnaire.

The study included 100 randomly selected patients who are public health care center in Lublin. Respondents agreed to participate in surveys conducted.

Sheet survey consisted of 43 questions concerning the evaluation of diet and eating habits that can affect the development of ulcers in the stomach or duodenum.

Results

Of the 100 respondents 66% were women and 34% men, 81% of which are under 30 years old, 16% aged 30-50 years old, and 3% were over 50 years old (Fig. 1).

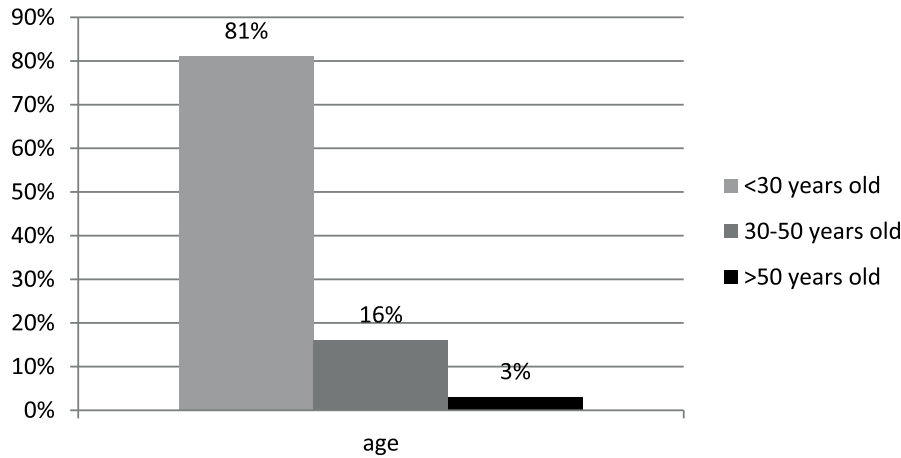


Fig. 1. Percentage distribution of respondents according to age.

Blood type for 26% percent of the respondents are not known, 21% have blood group A, 20% of blood group O, 17% of blood type AB, and 16% of the blood group B (Fig. 2).

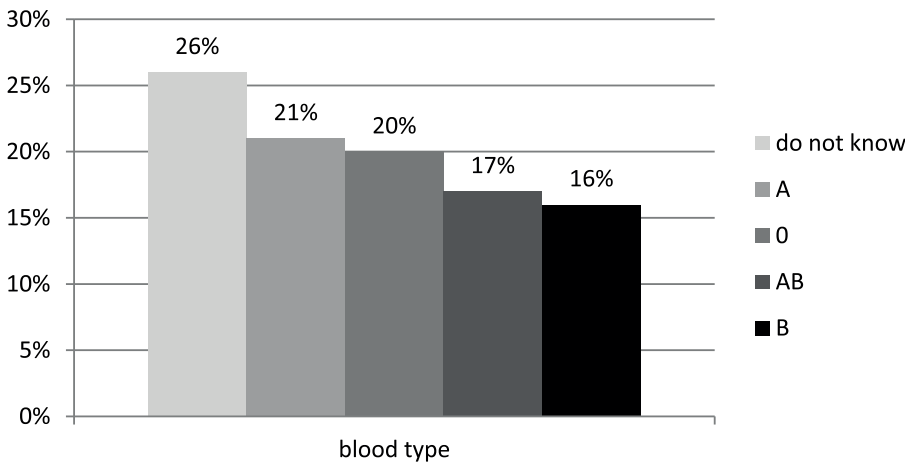


Fig. 2. Percentage distribution of respondents according to blood group.

The survey shows that 58% of respondents do not smoke tobacco, and 42% said they smoke. Among those who smoke 36%- burns 5-10 cigarettes per day, 33%- burns under five, 23% burns 10-20, and 20 cigarettes burns over 8% of respondents (Fig. 3).

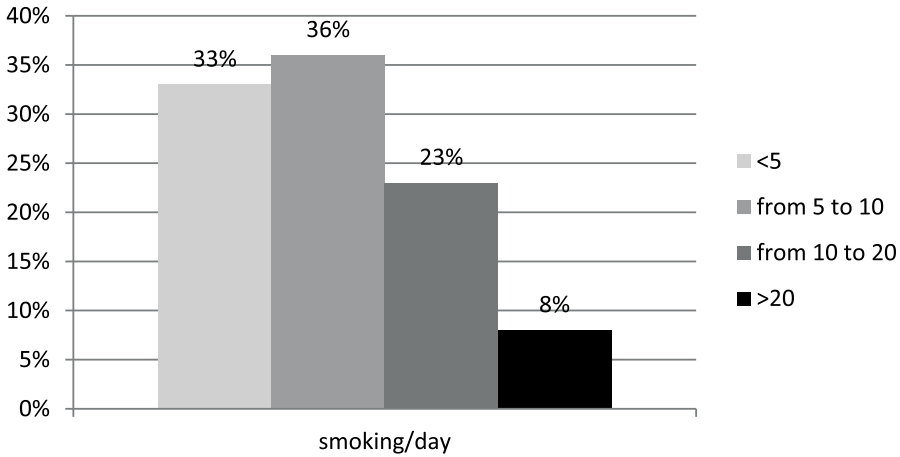


Fig. 3. The percentage number of cigarettes smoked by the respondents.

The largest group of respondents 42% said that the smoke from five to 10 years, 23% 3-5 years 14% longer (15-30 years), 13% 1-2 years, and less than a year consumes 8% (Fig. 4).

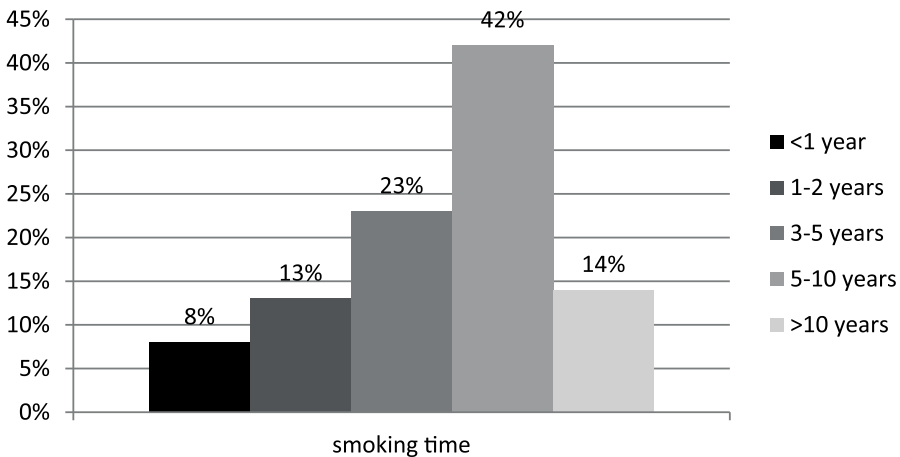


Fig. 4. The proportion of the length of cigarette smoking among respondents.

Only 1% of respondents did not drink beverages containing in its composition methylxanthine, 99% answered “yes” to this question.

The study shows that the majority- 37% of drinks one cup of coffee per day, 32% of drinks 2-3 cups of coffee, 29% do not drink coffee at all, and 2% of respondents drinks 4-5 cups of coffee per day (Fig. 5).

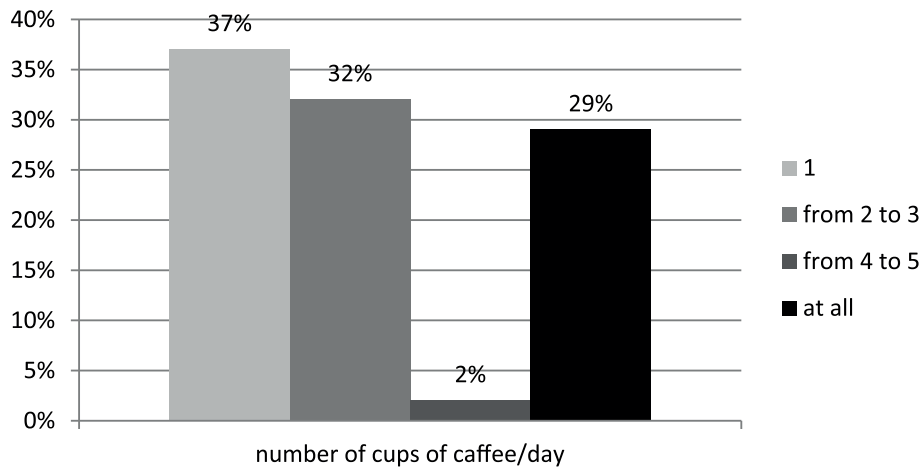


Fig. 5. The quantities of coffee drunk daily by respondents.

Among those surveyed, almost half as much as 49% 2-3 drinks tea daily, 1 tea drinks 33%, 11% 4-5 teas, and 7% do not drink at all (Fig. 6).

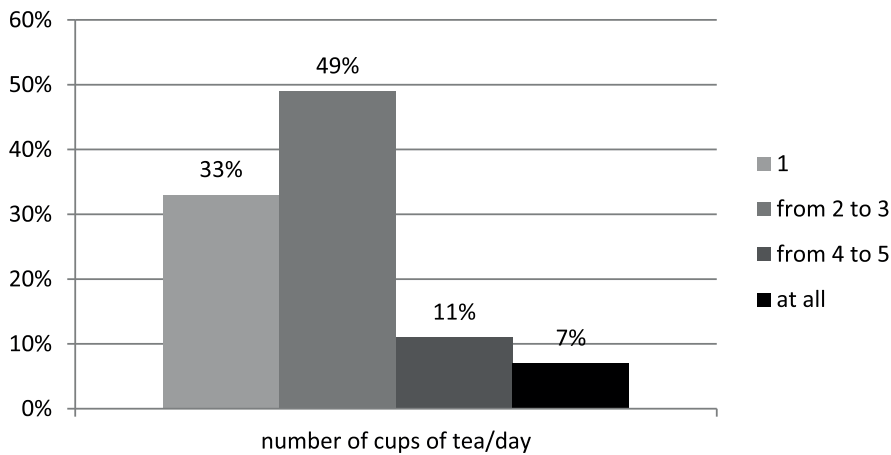


Fig. 6. The quantities of tea drunk daily by the respondents.

Frequency of alcohol consumption was as follows: once a week- 42% of the respondents, 2-3 times a month (26%), less 18%, and once a month- 14% (Fig. 7).

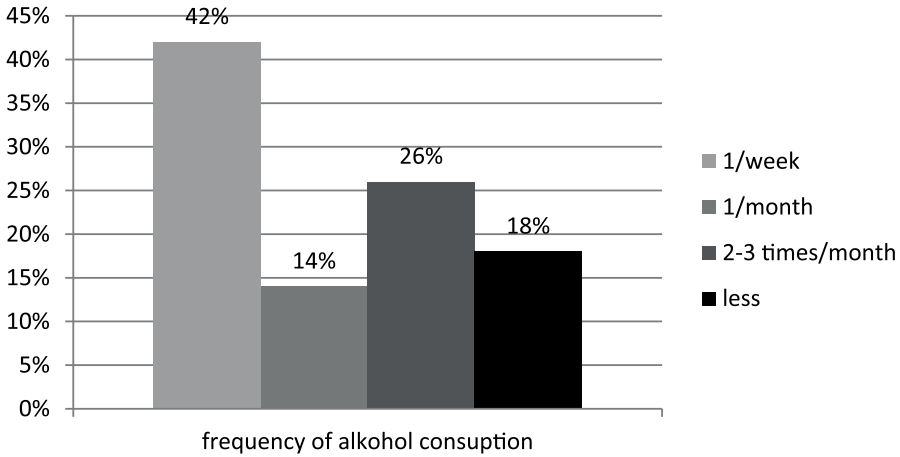


Fig. 7. Percentage distribution of the frequency of alcohol consumption among the respondents.

Most respondents reach for beer (51%), less the wine (24%) and vodka consumed 23% of respondents from other spirits: whiskey- 2% (Fig. 8).

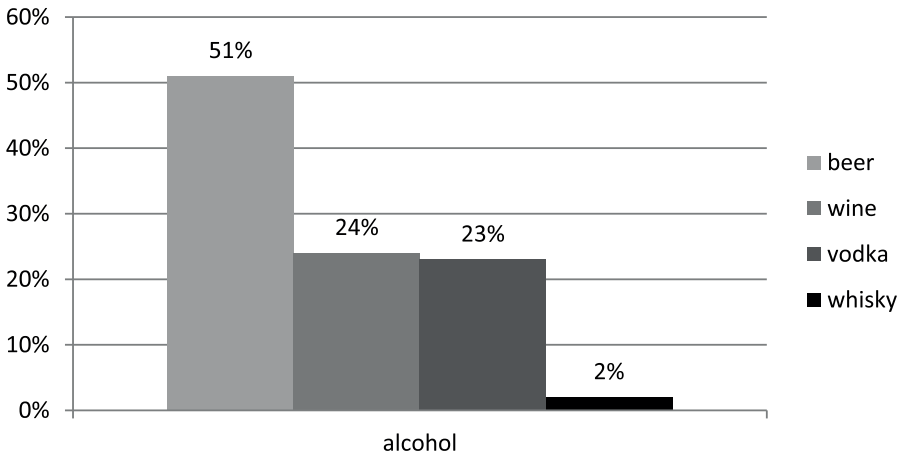


Fig. 8. Percentage distribution of alcohol type consumed by respondents.

In the open questions about the amount of food spirits, wine and beer respondents mainly indicated 0.02-0.5 liters of spirits (65%), 200ml- 1L wine (51%), 1-10 pack of beer (82%).

Frequency of eating spicy foods among the respondents is as follows: 31% consumed 1-2 times a week, 28% once a month, 23% do not use hot spices, and 18%- every day (Fig. 9)

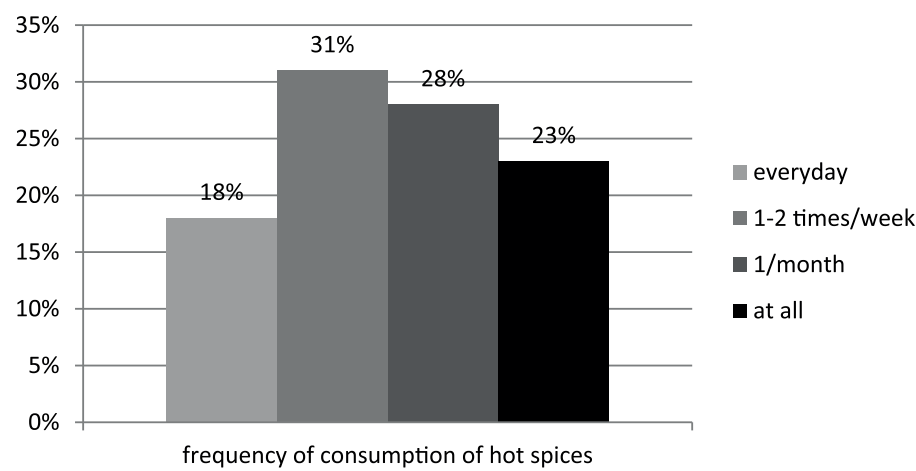


Fig. 9. Percentage distribution of frequency of consumption of spicy foods.

In 52% of physical work and 48% mental.

More than half of the respondents as much as 61% in the last time it was under heavy stress, while for 39% of major stressful stimuli were studied and related exams, surgery, family problems, as well as the death of a loved one.

Most of the respondents (72%) uses drugs from non-steroidal anti-inflammatory group (NSAIDs), with the following frequency: once a month- 81%, once a week- 14%, 2-3 times a week- 4%, and more- 1% (Fig. 10).

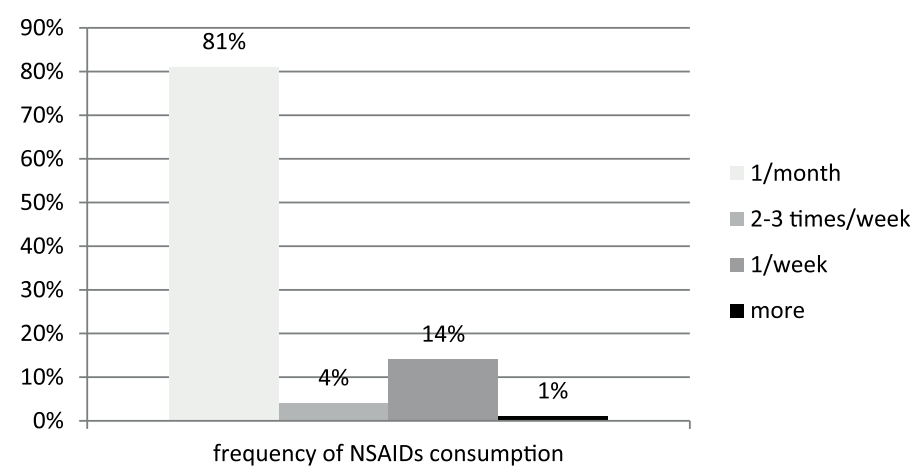


Fig. 10. Percentage distribution of frequency of NSAIDs consumption.

The most commonly used NSAIDs are ketoprofen, 54% of respondents have indicated that response, 41% used other of the above, including Ibuprom, Apap, Nurofen, 3% used idomedacin, and 2% piroxicam (Fig. 11).

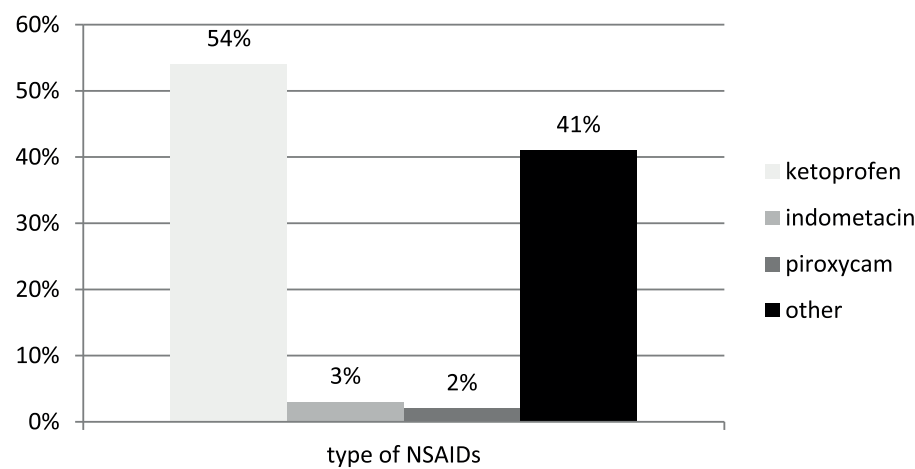


Fig. 11. Percentage distribution of NSAIDs type consumed by respondents.

Respondents asked about the use of corticosteroids negatively answers in 89%. Among the respondents, 89% did not consume NSAIDs in combination with corticosteroids (CCS), 1% usually combine (Fig. 12).

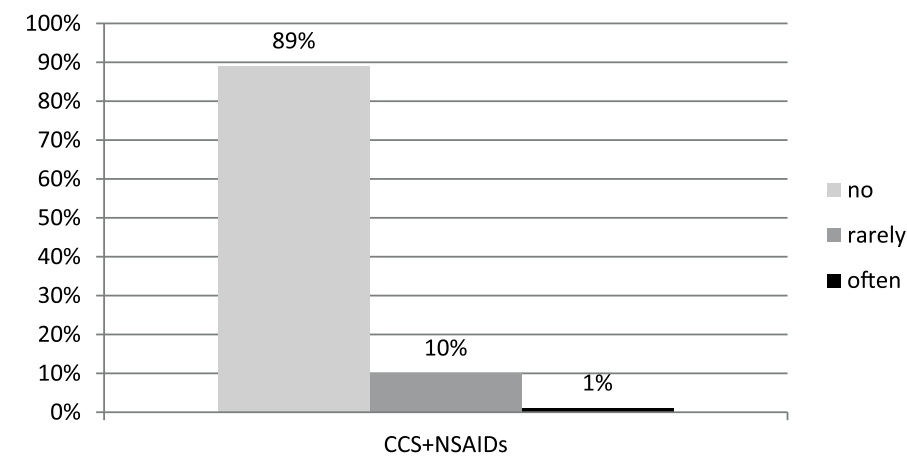


Fig. 12. Percentage distribution of the respondents taking NSAIDs with corticosteroids (CCS).

More than half of the respondents (60%) do not eat meals at regular times and tranquility, while 40% confirmed the regularity of meals. Respondents asked about the number of meals answered as follows: 4-5 meals consumed 47%, 41% 3 meals and 1-2 meals consumed 12% of the respondents (Fig. 13).

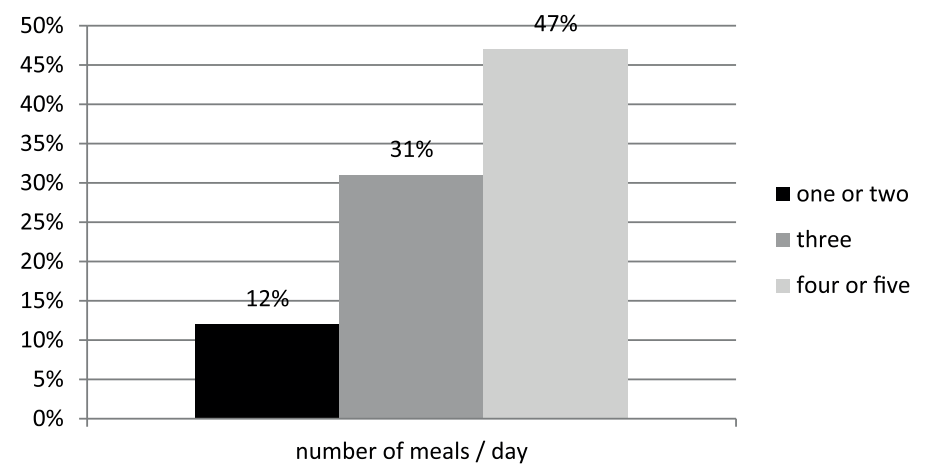


Fig. 13. Percentage distribution of number of meals consumed by respondents.

Among the culinary ways prevails cooking- 37%, then frying- 33%, baking- 21%, grilling- 7% and constriction- 2% (Fig. 14).

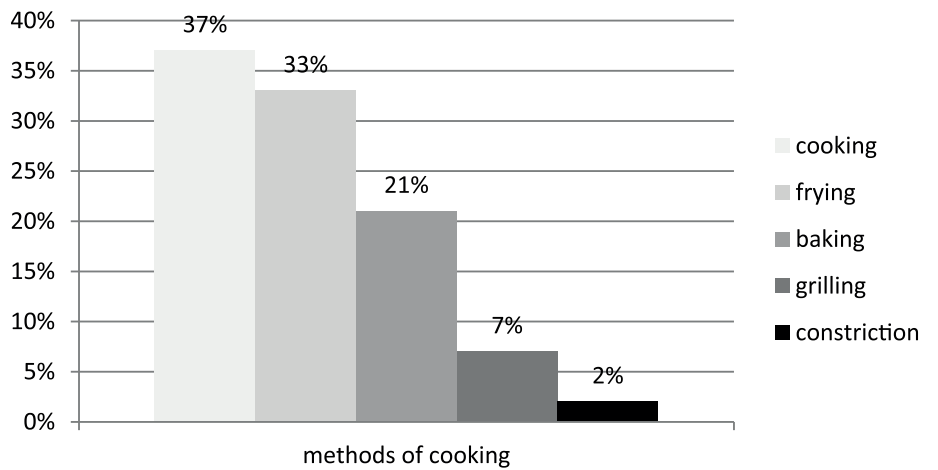


Fig. 14. Percentage distribution of cooking methods used by respondents.

Respondents asked about eating a “Fast Food” responded as follows: 2-3 times a month (45%), 2-3 times a year (33%), not eat this type of food (13%), 2-3 a week (8%) and 1% consumed daily (Fig. 16).

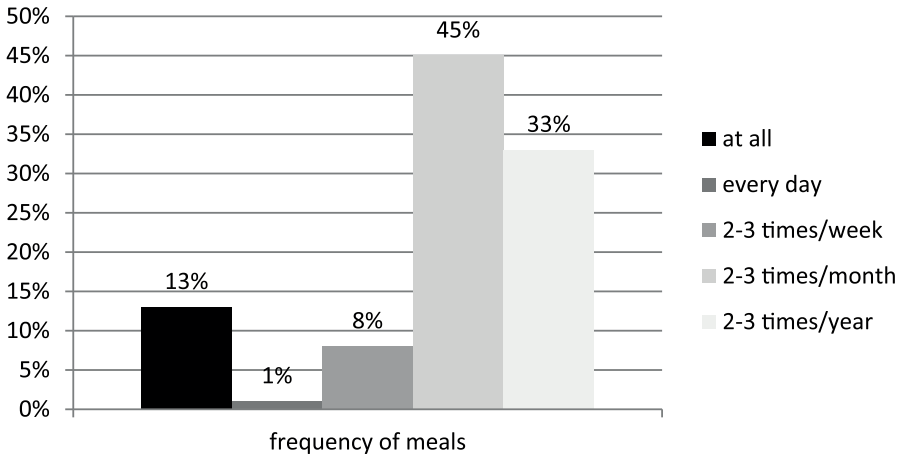


Fig. 16. Percentage distribution of frequency of eating a "Fast Food" by the respondents.

In 7% of patients have chronic peptic ulcer disease and 93% of the respondents negate this disease (Fig. 17).

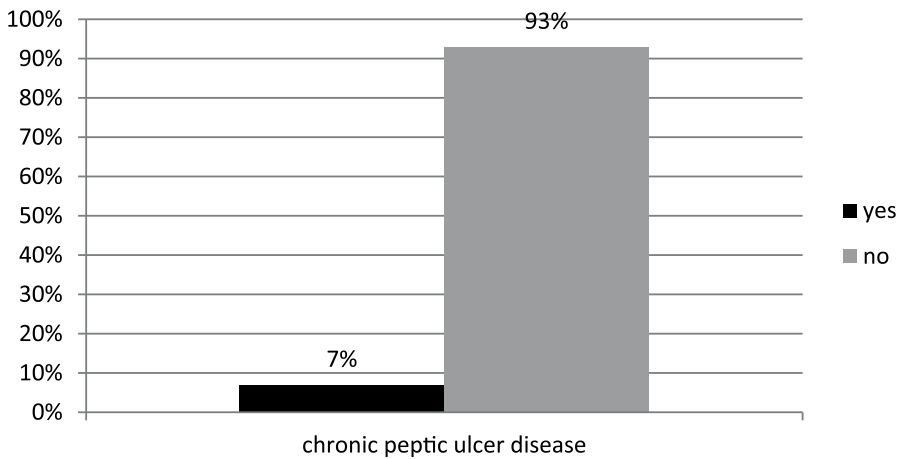


Fig. 17. Percentage distribution of frequency of chronic peptic ulcer disease.

Interview in the presence of gastric or duodenal ulcer was as follows: 93% negates, 5%-but confirmed a long time ago, and in 2% of respondents ulcer occurred recently (Fig. 18).

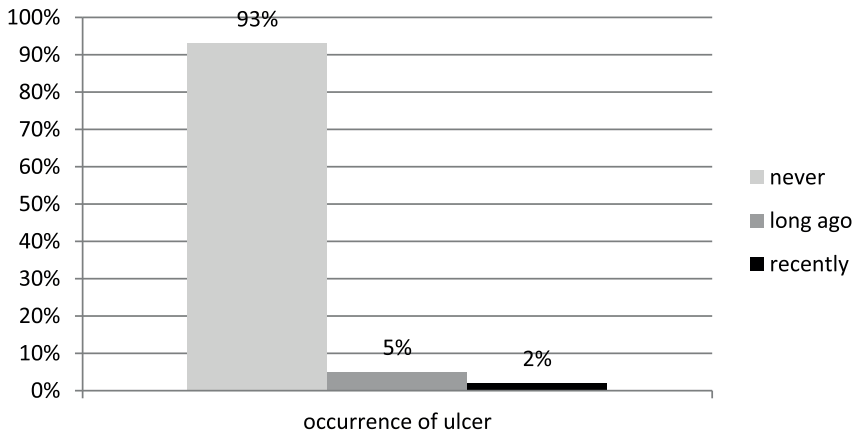


Fig. 18. Percentage distribution of respondents who there was or there was not experienced gastric/duodenal ulcer.

Another question concerned the possible occurrence of symptoms related to the occurrence of ulcers of the stomach or duodenum. These symptoms include: abdominal pain at night or on an empty stomach (23% of respondents confirmed), abdominal pain 1-3h after a meal (20% of respondents confirmed), abdominal pain retiring after eating antacids (8% of the respondents confirmed), with other people (49%), there were none of the symptoms (Fig. 19).

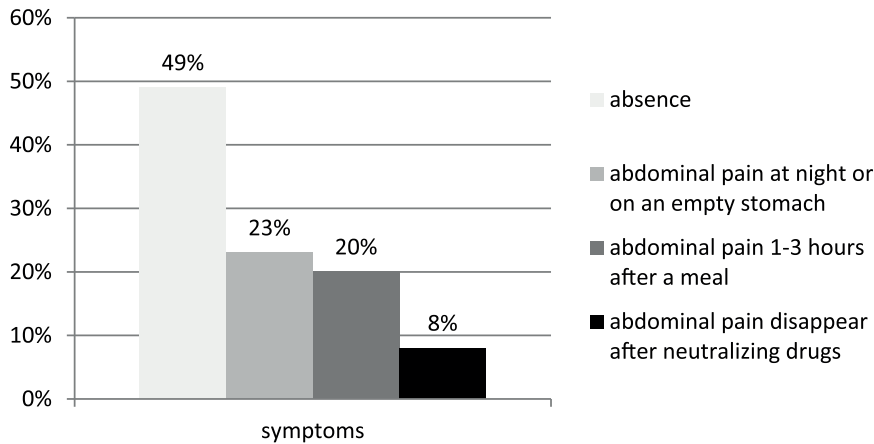


Fig. 19. Percentage distribution of respondents who experienced symptoms associated with chronic peptic ulcer disease.

Among the 81% of respondents disregarded tests for *Helicobacter pylori*. 19% of respondents made diagnostic tests on *Helicobacter pylori*: urease test (49%), histological examination from the antrum (23%), serological tests (17%), a test to detect *H. pylori* antigen in stool (5%), cell culture (1%), breathing tests (5%) (Fig. 20).

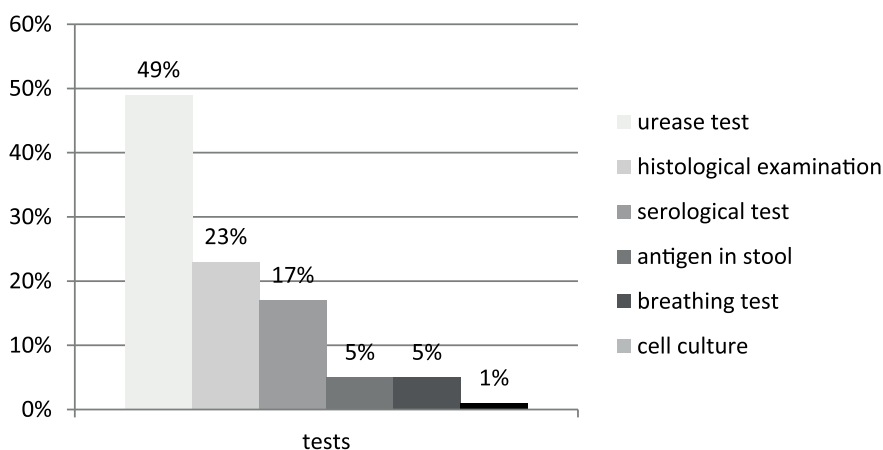


Fig. 20. Percentage of tests performed on *Helicobacter pylori*.

Conclusion

Analysis of these responses indicates that you should educate patients about the effects of various factors on the development of gastrointestinal diseases, especially gastric ulcer or duodenal ulcers. Awareness of the risks associated with an unhealthy lifestyle is very important, because the genetic predisposition is only a small part of the contribution to the development of disease. To a large extent, our health depends on factors that can modify themselves as: the nature of work, physical activity, ways to cope with stress or diet. Despite this false behavior patterns significantly remolded in human nature. Today, many people live in high stress and pace, regardless of the quality of products consumed. Most meals are "Fast Food" supplemented with plenty of painkillers and drunk the same amount of alcohol. And we are responsible for our lives yet.

Bibliography

1. Dixon M.F., Genta R.M., Yardley J.H. et al. (1996). Classification and trading of gastritis: the update Sydney System: International Workshop on the Histopathology of Gastritis 1994. *Am J SurgPathol.* 20, 1161-1181
2. Dzieniszewski J., Jarosz M. i Grupa Robocza PTG. (2004). Postępowanie w zakażeniu *Helicobacter pylori* (rok 2004). Wytyczne opracowane przez Grupę Roboczą Polskiego Towarzystwa Gastroenterologii. *Gastroenterol Pol.* 11, 41-48
3. European *Helicobacter Pylori* Study Group (EHPSG): Current concepts in the management of *Helicobacter pylori* infection- the Maastricht 2-2000 Consensus Report *Aliment Pharmacol Ther.* (2002), 16, 167-180
4. Szczeklik A., Gajewski P. (2011). Choroby wewnętrzne. Medycyna Praktyczna, Kraków
5. Talley. N.J., Stanghellini V., Heading R.C., et al. (1999). Functional gastroduodenal disorders. *Gut.* 45, suppl. II, II37-II42

Marek Tomaszewski^{1,4}, Grażyna Olchowik^{2,4}, Monika Tomaszewska³

¹Department of Human Anatomy, Medical University of Lublin

¹Katedra i Zakład Anatomii Prawidłowej Człowieka UM w Lublinie

²Department of Biophysics, Medical University of Lublin

²Zakład Biofizyki UM w Lublinie

³I Department of Radiology, Medical University of Lublin

³I Zakład Radiologii Lekarskiej UM w Lublinie

⁴John Paul II State School of Higher Education in Biała Podlaska

⁴Państwowa Szkoła Wyższa im. Papieża Jana Pawła II w Białej Podlaskiej, Instytut Zdrowia

Liver cirrhosis - disease awareness and dietary behavior

Marskość wątroby - świadomość schorzenia, a postępowanie dietetyczne

Summary

Cirrhosis is a condition defined histologically characterized by multiple clinical consequences. Following the generalized damage to the flesh, comes to fibrosis and normal liver architecture changes and disruption of the vascular system. With progression of liver failure, symptoms of metabolic impairment of the function and portal hypertension. Among the most common causes include the alcohol and hepatotropic viruses (hepatitis B, D and C). If left untreated, can lead to the transformation of liver cancer (hepatocellular carcinomacell, HCC). The goal of treatment is to eliminate the etiological agent, inhibiting the further progress of the disease and prevention of complications. Among the treatment options is a diet. This article contains the current state of knowledge about liver cirrhosis, as well as dietary tips which can slow down the progression of the disease.

Keywords: liver cirrhosis, HCV, HBV, alcohol, diet

Streszczenie

Marskość wątroby jest stanem definiowanym histologicznie, charakteryzującym się wieloma konsekwencjami klinicznymi. W następstwie uogólnionego uszkodzenia mięszu, dochodzi do włóknienia i przemiany prawidłowej architektury wątroby oraz dezorganizacji układu naczyniowego. W miarę pogłębiania się niewydolności wątroby pojawiają się objawy upośledzenia jej czynności metabolicznej i nadciśnienia wrotnego. Wśród najczęstszych przyczyn wymienia się alkohol oraz wirusy hepatotropowe (WZW B, D lub C). Nieleczona doprowadzić może do przemiany nowotworowej wątroby (rak wątrobowo komórkowy). Celem leczenia jest wyeliminowanie czynnika etiologicznego, zahamowanie dalszego postępu choroby oraz zapobieganie wystąpieniu powikłań. Wśród możliwości leczniczych duże miejsce zajmuje dietoterapia. Poniższy artykuł zawiera aktualny stan wiedzy dotyczący marskości wątroby, jak również wskazówki dietetyczne mogące spowolnić postęp choroby.

Słowa kluczowe: marskość wątroby, HCV, HBV, alkoholizm, dieta

Introduction

Cirrhosis is a condition defined histologically characterized by multiple clinical consequences. Following the generalized damage to the flesh, comes to fibrosis and normal liver architecture changes and disruption of the vascular system. With progression of liver failure, symptoms of impaired its metabolic activity and / or portal hypertension (decompensated cirrhosis). Cirrhosis without decompensation defined as compensated (Sass and Chopra, 2009; Wojcik and Piekarska, 2005; Szczeklik and Gajewski, 2011).

In the past, liver cirrhosis was considered irreversible disease of the course. Subsequent studies have confirmed the possibility of reversing the process of fibrosis. The condition for this is to remove the primary damaging agent, which is the cause of cirrhosis. Withdrawal fibrosis is observed in the case of successful treatment of chronic hepatitis C and hemochromatosis and patients with alcoholic liver disease who have stopped drinking (Strader et al., 2004).

Liver cirrhosis is a common condition among men, but the incidence depends on the amount of alcohol consumed and the prevalence of infections with hepatotropic viruses (geographical variation). Morbidity caused by cirrhosis of the liver is 200-300/100 000 population, and mortality-2% / year. The disease develops at any age with an increased incidence of male population (Blei and Cordoba, 2001; Szczeklik and Gajewski, 2011, Riley TR, Bhatti, 2001).

Every year in Poland, about 1500 cases of viral hepatitis B, and most of them are forms of chronic HBV infection. According to epidemiological studies conducted in Poland in 2009, to 26 thousand people (about 2% of the population) is infected with HCV. In most cases, HCV infection is not recognized prior to the disclosure of his irreversible consequences such as liver cirrhosis and primary liver cancer (Habior, 2001, Foster, 2009; Szczeklik and Gajewski, 2011).

Course of the disease from diagnosis to the extreme histological liver failure lasts a long time in different ways. 10 years experienced only 10-20% of patients. It depends on the etiology and treatment undertaken (Blei and Cordoba, 2001).

Liver cirrhosis is considered to be pre-cancerous condition, which can develop hepatocellular carcinoma cell (HCC). The risk of malignant transformation is high, especially in patients with cirrhosis, a viral infection (HCV infection mostly) (Ryder, 2003).

Etiology

Cirrhosis is the final stage of many chronic liver diseases. Among the most common causes include the alcohol and hepatotropic viruses (hepatitis B, D and C). Other factors include a proven connection: autoimmune hepatitis, metabolic diseases, diseases of biliary tract, disease with impeded venous return, sarcoidosis, syphilis, drugs and toxins. The factors of the relationship unconfirmed include hepatitis G, mycotoxins, malnutrition, obesity, diabetes and schistosomiasis. In case it fails to establish the etiology, we are dealing with cryptogenic cirrhosis or disease Hindu children (Strader et al., 2004; Bhatti, 2001).

Risk factors for cirrhosis of the liver, in addition to the already mentioned alcohol abuse and chronic hepatitis B and C, male gender, genetic predisposition, and possibly smoking (Habior, 2001; Strader et al., 2004).

Pathogenesis

The pathogenesis of liver cirrhosis is still not fully elucidated. We know, however, that this process is the result of disturbed homeostasis between the formation and deposition of extracellular matrix and its degradation and destruction (Blei and Cordoba, 2001; Zahorska-Markiewicz and Małecka-Tender, 2009).

Under the influence of chronic damaging factor hepatocyte, comes to its launch necrosis and inflammation. Thus released cytokines and growth factors, stimulate the stellate cells (Ito cells), leading to their proliferation and transformation into myofibroblasts. The latter, in turn, begin to produce various cellular matrix components that accumulate in the spaces underendothelium of Disse (fibrosis about sinus). Consequently, this leads to kapilarizations bays probably responsible for clinical signs of fibrosis (portal hypertension, liver metabolic dysfunction) (Arroyo and Colmenero, 2003; Zahorska-Markiewicz and Małecka-Tender, 2009).

There are four levels of activity in cirrhosis: Io-phase inactive cirrhosis (fibrosis limit does not include parenchyma cells), IIo-bridging fibrosis with partial tuberosity (partial destruction of the plaque border); IIIIo-bridging fibrosis tuberosity (complete destruction of the plaque border), IVo-cirrhosis of the liver (fibrosis ongoing, active inflammation, infiltration of eosinophils, plasma cells, macrophages, cholestasis, liver cell necrosis nodes and beyond nodules, malignant transformation) (Grant et al., 2004).

Type of cirrhosis

Due to the different distribution criteria, we distinguish several types of diseases. Having morphological changes (capacity regenerative nodules) cirrhosis divided into: micronodular (nodules up to 3 mm, all of equal size), macronodular (nodes size from 3 mm to several centimeters) and mixed; due to the etiology of: after necrotic cirrhosis (after hepatitis), portal vein cirrhosis (alcohol-induced), dysmetabolic cirrhosis, biliary cirrhosis (primary and secondary); due to functional changes in: compensated and decompensated cirrhosis (Blei and Cordoba, 2001).

The clinical picture

The clinical picture liver cirrhosis depends on several factors: the duration of illness, number of parenchyma, and portal circulation disorders of the treatment. In less than half of the patients with liver cirrhosis (30-40%), the disease was completely asymptomatic and detected incidentally during testing for other reasons or during surgery (Habior, 2001; Piekarska, 2008; Zahorska-Markiewicz and Małecka-Tender, 2009; Wojcik and Piekarska, 2005).

During adjusted cirrhosis symptoms are most often unspecific. As the disease progresses accompanied by: weakness and increased fatigue, loss of appetite and weight loss, bloating, nausea and / or vomiting, right upper abdominal pain, the state of low-grade fever, itchy skin, decreased sex drive, menstrual disorder and infertility, painful gynecomastia, painful muscle cramps, bleeding gums and nose (Habior, 2001; Piekarska, 2008; Zahorska-Markiewicz and Małecka-Tender, 2009; Wojcik and Piekarska, 2005).

The adjusted form of liver cirrhosis there is no significant signs. At the time of onset of signs of decompensation (decompensated cirrhosis) occurs: the characteristic silhouette of the body (slim upper and lower limbs with enlarged abdominal circumference), ascites (accumulation of fluid in the peritoneal cavity), gynecomastia (enlargement of the

mammary glands in males resulting non-neoplastic proliferation of glandular tissue), and testicular atrophy, hirsutism in women (excess hair mature areas androgens sensitivity), swelling of the salivary glands, enlarged liver and spleen. Skin symptoms manifest themselves: jaundice (yellow coloring of whites, mucous membranes and skin, caused by accumulation of bilirubin in the tissues), stellate angioma, palmar and plantar erythema, telangiectasias (dilated presence of small blood vessels), tufts of yellow, leukonychia (color change nail), loss of hair on the chest and under the arms of men, Dupuytren's contracture (palmar fascia contracture), dilated veins of collateral circulation in the abdomen ("head of Medusa"), smoothing language (Habior, 2001; Piekarska, 2008; Zahorska-Markiewicz and Małecka-Tender, 2009; Wojcik and Piekarska, 2005).

Ratingliver failure

The clinical significance and prognostic value in cirrhosis of the liver is split progress of the failure of the Child and Pugh criteria into three steps, from the smoothest- A by B, the most severe failure- C, based on the determined serum levels of albumin, bilirubin and prothrombin, and the presence of ascites or encephalopathy (Table 1).

Tab. 1. Classification of liver failure according to Child and Pugh criteria

parameter	points according to the degree of abnormality		
	1	2	3
encephalopatya	not	1-2 degree	3-4 degree
ascites	not	moderate	strained
bilirubin (mg/dl) (in primary biliary cirrhosis, PBC)	< 2	2 – 3	>3
albumin (g/dl)	> 3,5	2,8 -3,5	< 2,8
prothrombin time (in "s" more than normal)	1 –4	5 -10	> 10
total score	5 -6	7 -9	>10
result	A	B	C

Patients in the Class A there is no indication for liver transplantation (compensated cirrhosis), and patients in the class B and C are eligible for transplant (decompensated cirrhosis).

Diagnostics

Diagnosis of cirrhosis based on laboratory tests, imaging, endoscopic and morphological (histological). Among the irregularities laboratory findings are: thrombocytopenia, macrocytic anemia (hemolysis indicates Wilson's disease), leukopenia, increased alanine aminotransferase and aspartate aminotransferase (inflammatory etiology), increased alkaline phosphatase (cholestatic etiology), gamma-glutamyl-transferase (alcoholic etiology, autoimmune and viral), decreased cholinesterase activity, polyclonal hypergammaglobulinemia (due to the current collateral circulation), hyperglycemia (due to impaired insulin metabolism in hepatocytes), hypertriglyceridaemia (alcoholic etiology), hypercholesterolemia (cholestatic etiology), increased serum alpha-feto-protein (values > 200 µg/ml indicate hepatocellular carcinoma cell). In decompensated cirrhosis, serum appears: hyperbilirubinemia (with a predominance of conjugated bilirubin), hypoalbuminemia, plasma coagulation (prothrombin time, deficiency of factor V and antithrombin III), hypoglycemia, increased creatinine, and ammonia, hyponatremia, hypo-/hyper-kaliemia, hypokalaemic alkalosis (Habior, 2001; Piekarska, 2008; Szczeklik and Gajewski, 2011).

Imaging studies are performed in order to: determine the size and shape of the organ, accompanying the diagnosis of fatty liver cirrhosis, detection of lesions and the evaluation of symptoms of portal hypertension and liver blood flow. Among the imaging methods take into account the ultrasound, computed tomography, scintigraphy and possibly arteriography (Habior, 2001; Piekarska, 2008).

Endoscopy (esofago-gastro-duodenoscopy) is performed to look for characteristics of portal gastropathy (esophageal varices), or changes in ulcer (Habior, 2001; Piekarska, 2008).

Histological examination of the liver section is made to substitute a clear diagnosis of liver cirrhosis and liver disease staging (Habior, 2001; Piekarska, 2008).

Complications

Complications of cirrhosis include: ascites, spontaneous bacterial peritonitis, gastrointestinal bleeding, jaundice, bleeding disorders, hormonal disorders, hepatic encephalopathy, hepatorenal syndrome, hepato-pulmonary syndrome, hypersplenism, portal vein thrombosis and hepatocellular carcinoma cell (Choudhury and Sanyal, 2003; Zahorska-Markiewicz and Małecka-Tender, 2009; Szczeklik and Gajewski, 2011).

Treatment

The goal of treatment is to inhibit the further progression of the disease and the prevention of complications. First of all, the aim must be to eliminate the causative factors. Absolute hospital bed and the regime recommended by exacerbations of cirrhosis and the occurrence of complications. Treatment of rest, dietary and pharmacological tests must be applied simultaneously. Only this will lead to a successful therapeutic effect (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewicz, 2003; Książczyńska, 2010; Szczeklik and Gajewski, 2011).

Accidental adjusted cirrhosis is alcohol abstinence and proper diet (Halsted, 2004; Gajewska, 2009).

Products recommended for the preparation of diet in liver cirrhosis include bread (wheat and rye milling low), small cereal, rice, small pasta, noodles lane, cottage cheese,

cottage cheese, skim milk, eggs (in limited quantities), lean meat (veal, poultry, lean fish such as cod, crucian carp bream), lean meats (ham, sirloin), meatballs, fresh butter, cream, olive oils (soya and sunflower) in the form of mashed potatoes, carrots, beets, spinach, pumpkin, celery, apples, strawberries, blueberries, apricots, honey, jams, weak tea, coffee, cereal, yogurt, kefir, fruit juices (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

Nutritional therapy in liver cirrhosis should be in each case individually. It depends on many factors and includes: disease duration, severity, complications, the operation of compensatory mechanisms. The most important factor that determines the choice of diet is the nutritional status of the patient and their clinical condition (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

Dietary treatment should include: a balanced diet in terms of supply of nutrients and energy, taking into account the deficiencies in minerals, vitamins and rich diet with adequate preparations which protects the liver (eg S-methylmethionine, phosphatidylcholine, polyunsaturated fatty acids, glutamine). Many difficulties make the right nutrition disorders of the gastrointestinal tract, such as anorexia, vomiting or nausea (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

Adequate energy intake is recommended for all patients with chronic liver disease. It is also a major factor in preventing protein-energy malnutrition. The adjusted cirrhosis and normal body mass caloric intake of foods should be compatible with standard saline: 10 000 to 11 700 kJ (2400-2800 kcal.). For patients malnourished amount of energy should be increased to 12 600 kJ (3000 kcal), and even more (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

In most cases, the patients is recommended the rich of proteins diet with an increased amount of energy. Note, however, that the protein is not used by the liver leads to increased conversion of nitrogen metabolites, contributing indirectly to an increase in the concentration of ammonia (encephalopathy factor). Therefore, patients should observe the reaction of your body to prescribed diet and if necessary make changes in it, and only after consultation with the doctor (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

In patients with compensated cirrhosis optimum protein intake should be 1-1.5 g / kg / day. The dose by stimulating liver cell renewal processes, reduce fatty infiltration of liver, favoring tissue complement deficiency and synthesis of serum albumin, has a beneficial effect on the disease. Protein in about 60% should come from animal products, and should cover up to 15-20% of energy (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

Consumption of sugar but does not exceed 300-400 grams / day (approximately 70% of daily energy intake), including 50-70 g digestible sugars summer (in honey, jams and confectionery). Please note that this is not artificially colored products with the addition of preservatives. An excess of these sugars in the diet causes an increased synthesis of triglycerides in the liver and leads to severe steatosis of the liver. The demand for carbohydrates covers mainly starch contained in cereals and potatoes (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książdźyna, 2010).

The daily amount of fat should be limited and should not exceed 1.0 g / kg / day, which is about 25% of total energy intake. The diet should be eliminated animal fats with high melting such as lard or bacon at the expense of unsaturated fats, high in nutrition (soybean oil, sunflower oil, olive oil) (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

It is important that the diet was varied and included in its composition to the mineral salts and vitamins. These components, as a result of malabsorption, there are respectively the quantity stored and used. This causes latent deficiencies in the body. If your diet does not cover the increased need for vitamins, the doctor will advise you to take pre-vitamin supplements. Antioxidant vitamins (E, C, A and carotenoids) contained in green leafy plants, play an important role in slowing the progression of liver disease. They should be used in an amount of 150-200g per day. Deficiency of fat-soluble vitamins can be seen in patients with biliaryinsufficiency (cholestasis), alcoholism, fat intolerance, patients taking certain medications (cholestyramine). Supplementation of these vitamins may need patients with fatty diarrhea (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

In the feeding of patients with cirrhotic liver plays an important role fiber. It is given a similar dose to healthy people. By eliminating constipation, which is a common problem, fiber improves intestinal peristalsis. In addition, fractions soluble fiber reduces insulin resistance and favorably alter plasma lipid profile (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

In the feeding patients should be small and frequent meals (7-8/dobę), with an evening snack. Additional last meal should provide about 200-300 calories (15-20% of the total daily requirement) and consist largely of carbohydrates. Doing so will shorten the life of hunger and improves nitrogen balance (small reserve of glycogen stimulates faster glikogenezy at night). In addition, all patients should be bound by the absolute prohibition of drinking alcohol (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

The demand for energy in patients with decompensated cirrhosis of the liver for energy is 35-40 kcal / kg / day and protein intake is about 1.2-1.5 g / kg / day. These values result from impaired protein consumption and aminoaciduria and severity of decline. Fats are administered in a dose of 1 g / kg m.c. / Day. In the case of liver failure associated with cholestasis, the supply should be reduced to 0.8 g / kg / day (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010; Gajewska, 2009).

It is recommended to split meals for four to six a day, eaten in the same time interval (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

If you have varicose veins of the esophagus, the consistency of the diet should be modified. In this case, avoid harsh and hard vegetables or fruit, meat, with significant amounts of connective tissue and hard bread. Patients with ascites preparations should use high energy, but with a low content of sodium in order to reduce the retention of body fluid. Malnourished patients should be supplemented electrolytes and vitamin deficiency (Kaniowska and Grzymisławski, 2008; Ciborowska and Rudnick, 2009; Hryniewiecki, 2003; Książczyzna, 2010).

However, the primary method of treatment of patients with decompensated cirrhosis of the liver, liver transplantation is still (Murray and Carithers, 2005)

Conclusions

Cirrhosis is a chronic condition in which the liver parenchyma is incorrect reconstruction. The consequence of this situation is a dysfunction of the organ, which is not only a threat to our health, but often also for life. Of great importance in the treatment of this pathology plays a proper diet. Scrupulous observance of the correct principles of healthy eating in a short time can slow or even halt further progression of the disease.

Bibliography

1. Arroyo V., Colmenero J. (2003). Ascites and hepatorenal syndrome in cirrhosis: Pathophysiological basis of therapy and current management. *J Hepatol.* 38, 69
2. Blei A.T., Cordoba J. (2001). Hepatic encephalopathy. *The American Journal of Gastroenterology.* 96, 1968-1975
3. Choudhury J., Sanyal A.J. (2003). Treatment of ascites. *Current Treatment Options in Gastroenterology.* 6, 481-491
4. Ciborowska H., Rudnicka A., (2009). *Dietetyka żywienia zdrowego i chorego człowieka.* Wydawnictwo Lekarskie PZWL, Warszawa, 357-359.
5. Foster G.R. (2009). Recent advances in viral hepatitis. *Clinical Medicine.* 6, 9, 613-616
6. Gajewska D. 2009. Zasady postępowania dietetycznego w marskości wątroby. BawaSa'eed i in., 2009, *Dietoterapia 1*, Wydawnictwo SGGW, Warszawa, 66-89.
7. Grant A., Neuberger J., Day C., Saxseena S. (2004). Guidenlines on the use of liver biosy in clinical practice. *British Society of Gastroenterology* ([http://www.bsg.org.uk/pdf word docs/liver biopsy.pdf](http://www.bsg.org.uk/pdf_word_docs/liver_biopsy.pdf))
8. Habior A. (2001). Postępowanie w marskości wątroby. *Medycyna po dyplomie.* 1, 10, 8. 100-103
9. Halsted C.H. (2004). Nutrition and alcoholic liver disease. *SeminLiverDis.* 24, 289
10. Hryniewiecki L. (2003). Żywnienie w chorobach wątroby. W: Hasik J., Gawędk J., (red). *Żywnienie człowieka zdrowego i chorego, t.II*, Wydawnictwo PWN, Warszawa, 197-212.
11. Kanikowska A., Grzymisławski M., (2008). Żywnienie pacjentów z niewyrównaną marskością wątroby. *Terapia*, 210, 75-78
12. Książczyzna D. (2010). Żywnienie w chorobach wątroby i dróg żółciowych. W: Poniewierka E., (red.). *Żywnienie w chorobach przewodu pokarmowego i zaburzeniach metabolicznych*, Wydawnictwo Cornetis, Wrocław, 71-81.
13. Murray K.F., Carithers R.L. (2005). AASLD practice guidelines: evaluation of the patient for liver transplantation. *Hepatology.* 41, 1407-1432
14. Piekarska A. (2008). Chory na przewlekłą chorobę wątroby. *Lekarz Rodzinny.* 10, 134, 1010
15. Riley T.R., Bhatti A. (2001). Preventive strategies in chronic liver disease, Cirrhossis. *AmFam Physician.t. II*, 64, 1555-1560

16. Ryder S.D. (2003). Guidelines for the diagnosis and treatment of hepatocellular carcinoma (HCC) in adults. *Gut*. 52, iii1-iii8
17. Sass D.A., Chopra K.B. (2009). Portal hypertension and varices hemorrhage. *MedClinNorth Am*. 93, 837
18. Strader D.B., Wright T., Thomas D.L., Seeff L.B. (2004). Diagnosis, management and treatment of hepatitis C. AASLD practice guideline. *Hepatology*. 39, 1147-1171
19. Szczeklik A., Gajewski P. (2011). *Choroby wewnętrzne. Medycyna Praktyczna*. Kraków. 557-561
20. Wójcik K., Piekarska A. (2005). Pacjent z marskością wątroby. *Lekarz Rodzinny*. 9, 97, 928-940
21. Zahorska-Markiewicz B., Małecka-Tendera E. (2009). *Patofizjologia kliniczna*. Urban& Partner. Wrocław. 256-261

Number of signs with spaces: 24 945

Marta Nowak

Department of Comparative Vertebrate Anatomy and Anthropology, University of Rzeszów
Zakład Anatomii Porównawczej Kręgowców i Antropologii, Uniwersytet Rzeszowski

**Sexual dimorphism of cephalo- and somatometric parameters
and body components of rural children and youth from
the Subcarpathian region at the beginning of the 21st century**
**Dymorfizm płciowy parametrów cefalo- i somatometrycznych
oraz komponentów ciała dzieci i młodzieży wiejskiej
z regionu Podkarpacia na początku XXI wieku**

Summary

Sexual dimorphism is genetically determined dimorphism of organisms which is manifested by the morphological, physiological, motor, psychological and social differentiation of women and men. The size of dimorphic changes of numerous anthropometric features depends on the age of a person, the biological, climatic-geographical, social-economic or urbanization factors. The aim of this thesis was to define the intersexual differences of the chosen morphologic features of the head and out of the head and the tissue components of the rural children and youth from the Subcarpathian region in comparison with the city series. The anthropometric data of the 1,887 rural boys and 1,809 girls at the age of 6–19 from the Subcarpathian Voivodeship collected in the school year of 2004/05 were used in the thesis. The ratio of dimorphism of 19 parameters were taken into account in the study: 6 cephalometric ones, 9 somatometric ones and 4 body components. The evaluation of the size of the intersexual differences of the studied parameters in the rural population was made in comparison with the city series from Rzeszów examined between 2003 and 2004 by Radochońska, Perenc (2006, 2008, 2009). The size of the sexual dimorphism in the compared series depends on the type of the examined parameter and the age class. In about 50% of the age group the developmental differences between the boys and the girls were marked stronger in the rural population, and in the other half – in the city one. The above phenomenon was emphasized to a different degree. In conclusion, the lack of unequivocal tendencies in the scope of the sexual dimorphism of the analysed features between the rural and city children may be the effect of the influence of the civilisation changes taking place in our country on the developmental processes of the children and youth.

Key words: sexual dimorphism, anthropometric features, rural children and youth

Streszczenie

Dymorfizm płciowy jest to genetycznie zdeterminowana dwupostaciowość organizmów przejawiająca się różnicowaniem morfologicznym, fizjologicznym, motorycznym, psychicznym i społecznym kobiet i mężczyzn. Wielkość zmian dymorficznych cech antropometrycznych jest uzależniona od: wieku osobnika, czynników: biologicznych, klimatyczno-geograficznych, społeczno-ekonomicznych czy urbanizacyjnych. Celem pracy było określenie różnic międzypłciowych wybranych cech morfologicznych oraz komponentów tkankowych dzieci i młodzieży wiejskiej z Podkarpacia na tle serii miejskiej. W pracy wykorzystano dane antropometryczne 1887 chłopców i 1809

dziewcząt wiejskich w wieku 6–19 lat z województwa podkarpackiego zebrane w roku szkolnym 2004/05. W opracowaniu uwzględniono wskaźnik dymorfizmu 19 parametrów: 6 cefalometrycznych, 9 somatometrycznych oraz 4 komponentów ciała. Ocenę wielkości różnic międzypłciowych badanych parametrów w populacji wiejskiej przeprowadzono na tle serii miejskiej z Rzeszowa przebadanej w latach 2003/04 przez Radochońską, Perenc (2006, 2008, 2009). Wielkość dymorfizmu płciowego w porównywanych seriach jest uzależniona od rodzaju badanego parametru oraz klasy wieku. W ok. 50 % grup wieku odrębności rozwojowe pomiędzy chłopcami i dziewczętami siniej zaznaczyły się w populacji wiejskiej, w drugiej połowie – w miejskiej. Powyższe zjawisko zostało zaakcentowane w zróżnicowanym stopniu. Podsumowując, brak jednoznacznych tendencji w zakresie dymorfizmu płciowego analizowanych cech pomiędzy dziećmi wiejskimi i miejskimi może być efektem wpływu przemian cywilizacyjnych zachodzących w naszym kraju na procesy rozwojowe dzieci i młodzieży.

Słowa kluczowe: dymorfizm płciowy, cechy antropometryczne, dzieci i młodzież wiejska

Introduction

Sexual dimorphism is a bidirectional formation connected with specimen's gender visible in morphological, physiological, motoric, psychical and social features of man (Drozdowski 2002 as cited in: Napierała 2007). Sex chromosomes in zygote decide on hermaphroditism of organism, and the level of its formation depends on biological, climate-geographical, socio-economic factors and on the lifestyle or physical activity (Wojtyna, Rodziewicz-Gruhn 2005, Napierała 2007, Krjaż et al. 2010).

In the world of animate nature, the above mentioned phenomenon was a subject of interest of various scientific environments (Tatarczuk 2002). Research aiming at acquiring knowledge on sexual dimorphism contributed to the development of human sciences. Interest in dimorphism in the last two centuries was connected with discrepancy between the process of sexual diversity of sociocultural functions and undertaking new occupations and fields of social activity by women (Krjaż et al. 2010). Previously conducted research focused mostly on metrical features, and in consequence they contributed to elaboration of standards of body structure of man and woman. Dimorphic differences are visible in many qualities, i.e. face features, type of adiposity, pigmentation, size of internal organs, shape of the line of hair base on forehead and nape or alignment of shoulders in cubital joint (Bednarska, Drozdowski 1982, Arska-Kotlińska, Drozdowski 1983, Malinowski 1994 as cited in: Bukszyński, Malinowski 2002).

In literature, the majority of works documents the intersexual diversification in the scope of bodily morphology. Dimorphism of physiological features or sport results is less explored (Jasiński 1993, Burdukiewicz et al. 1998, Bukszyński, Malinowski 2002, Rogowska, Orkwiszewska 2002, Tatarczuk 2002). The indicated phenomenon may also be analysed in context of: its size, environmental differences or secular changes (Bukszyński, Malinowski 2002, Rogowska, Orkwiszewska 2002, Perenc, Radochońska 2012).

With regard to considerable increase of population of elderly people, and to the prognosis of persistence of this tendency, in various countries research is conducted on sexual dimorphism on people of the second puberty period and of elderly and old age (Kim et al. 1997).

Aim of this paper

The aim of this paper was to:

- 1) define the intersexual differences of chosen cephalo- and somatometric features in population of rural children and youth;
- 2) evaluate the size of sexual dimorphism of the analysed parameters in rural series in comparison with urban one from Rzeszów.

Material and methods

The basis for preparation of this paper is constituted by materials collected in school year 2004/05. They include the anthropometric data on rural children and youth in the age between 6-19 years old coming from centrally located poviats in the Subcarpathian Voivodeship. Part of data was printed (Nowak 2011a, b) the rest of them is still elaborated. Measurements of students attending to schools with all education profiles (primary school, gymnasium, secondary school of general education and technical high schools) were conducted with use of Martin's technique (Malinowski, Bożiłow 1997). 1887 boys and 1809 girls participated in the research, in total 3696 people, which constitutes not less than 3,5 % of the general population in each age and sex group. Detailed frequency distribution of the participants was presented in table 1.

Table. 1 Number of rural boys and girls in particular age classes

Age [years]	Boys	Girls
6	109	104
7	114	108
8	119	113
9	122	116
10	125	120
11	130	128
12	137	138
13	145	144
14	149	143
15	151	142
16	147	137
17	146	138
18	147	138
19	146	140
Total	1 887	1 809

Arithmetic average of 19 parameters were used in the research, including:

- 6 cephalometric (the head length (*g-op*), the head width (*eu-eu*), the morphological face height (*n-gn*), the face width (*zy-zy*), the nose height (*n-sn*) and the nose width (*al-al*))
- 9 somatometric (the body height (*B-v*), the length of the head and the neck (*v-sst*), the trunk length (*sst-sy*), the upper extremity length (*a-da*), the lower extremity length (*B-sy*), the shoulder width (*a-a*), the hip width (*ic-ic*), the chest circumference on the height of *xiphiale* (*xi*) point in relaxation state and body mass)
- 4 body elements (the thickness of three fat skinfolds (vertical fold), on abdomen (oblique fold located in $\frac{1}{4}$ of distance between navel and anterior superior iliac spine), below the lower shoulder blade (horizontal fold) and total fatness (sum of the above folds).

On the basis of absolute average arithmetical differences of each morphological feature between boys and girls, a dimorphism index (DI) was calculated according to the formula: $2 \cdot (\bar{X}_{\square} - \bar{X}_{\square}) \cdot 10000 / (\bar{X}_{\square} + \bar{X}_{\square})$, where: $\bar{X}_{\square}$ and $\bar{X}_{\square}$ – arithmetic average of particular features in group of boys and girls (Wolański 1975).

This index enables an objective evaluation of sexual dimorphism of the analysed parameters, especially in the scope of development, as well as to indicate the size of differences regardless of applied units or levels of development. Dimorphism index may be also used to compare other differences between features in order to state which one of them is relatively bigger, and which one is smaller (Wolański 1975). Positive values indicate higher absolute value of a given parameter in case of boys in comparison with girls, while the negative ones indicate the dominance of girls in that scope (Malinowski 1976).

On the basis of values of this index, three metres of intersexual differences were calculated (Zaworski, Młyńska 2004) and they are necessary to define the age groups and parameters characteristic with the highest dimorphism:

- dimorphism of the analysed metrical features in particular age groups as DI;
- average dimorphism of parameter in the analysed period of ontogenesis as arithmetic average of DI of all (14) analysed age classes;
- dimorphism of general (multi-feature) body size as arithmetic value of DI of 15 features in each age class (except for the thickness of fat skinfolds).

The evaluation of the size of sexual dimorphism of presented parameters in case of rural children and youth was conducted in comparison with urban series from Rzeszów in age of 6–18 analysed in the years 2003/04 by Radochońska, Perenc (2006, 2008, 2009).

The values of the above index calculated for analysed morphological features in rural and urban population were presented in tables 2–9.

Results

In table 2, a comparative list of values of dimorphism index: head length, head width and morphological face height of rural children and youth and from Rzeszów was presented, and in table 3 – face width, nose height and width.

Relatively small intersexual diversity in the scope of metrical features of head in case of rural children can be observed in ontogenesis period from 6 to 13 years old. Exceptions were

noticed in case of 6 year old children with regard to head width and in case of 11 year old children – nose height. The smallest dimorphism was stated in: 7 year old children in the scope of nose height, 10 y.o. – face width, 6 and 12 y.o. – head length and morphological face height, while between 10–11 years old – head width. Only in case of 10 year old children there is no intersexual difference between nose width. The prevalence of girls over boys was observed only in case of 6–7 year old children. Gradual increase of intersexual differences is generally observed in the period of ontogenesis 14–19 year old. The highest dimorphism was observed in case of subjects in age of: 11 (nose height), 18 (head length and nose width) and 19 (head width, morphological face height and face width). From among the cephalometric parameters, the biggest differences between genders, defined on the basis of average value of DI of feature, were indicated in case of nose width, and then of morphological face length. Dimorphism of head length, head width and nose height was smaller, and the face width – the smallest.

Tab. 2 Values of the dimorphism index (DI) related to the head length (g-op), the head width (eu-eu) and the morphological face height (n-gn) of rural and urban children and youth

Age [years]	Dimorphism index (DI)					
	(g-op)		(eu-eu)		(n-gn)	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	111,28	237,77	327,87	147,55	5,19	163,78
7	175,55	238,66	250,86	172,17	65,07	35,98
8	170,50	179,96	193,95	228,29	123,77	106,68
9	164,87	274,31	122,87	231,02	235,41	92,06
10	169,66	274,93	98,16	227,51	193,19	306,54
11	185,90	186,67	111,47	208,53	175,83	331,66
12	138,16	182,20	124,43	232,47	83,52	293,41
13	284,21	195,29	276,60	216,84	473,43	174,06
14	302,25	191,20	290,56	205,36	427,97	161,31
15	309,35	232,42	408,72	224,05	549,18	489,81
16	416,15	268,95	384,66	214,93	435,71	713,61
17	534,47	314,58	428,88	225,22	597,36	817,83
18	590,40	376,18	457,34	212,31	620,89	956,40
19	574,43	-	492,05	-	693,35	-
$\bar{x}$	294,80	242,55	283,46	211,25	334,28	357,16

Similarly as in case of rural series, also in urban series boys are characterized with higher absolute values of the majority of cephalometric features in comparison with girls. Exceptions are: nose height in age from 7 to 14 y.o. and nose width in age of 12 y.o. Generally, smaller dimorphic diversity of metrical features of head was indicated in case of subject from Rzeszów in the period between 6 to 14 years old (tables 2, 3), so it remains for a year longer than in case

of rural series. In urban population, the smallest values of index were registered in age of: 6 for head width, 7 for morphological face height, 12 for nose width, 11–12 for head length, 15 for nose length and 16 for face width. Developmental distinctions of cephalometric features conditioned by gender usually increase in the period from 15 to 18 years old. In the indicated period, one can observe relatively small dimorphic differences in the scope of head and face width. Dimorphism of face width is different in case of urban series in the period from 8 to 13 years old, in which bigger intersexual differences were observed than in age from 15 to 18 y.o. It is also worth to notice the fact that the dimorphism index for head width remains at similar level in the period from 6 to 18 years old. With regard to presented data of subjects from Rzeszów, the specifics of sexual dimorphism formation for certain cephalometric features is distinctive. In rural series, developmental distinctions connected with gender are usually formed in accordance with the majority of reports presented in literature, so in a slightly different way than in case of urban population. In urban series, the strongest dimorphism was noticed at: 10- (face width), 12- (head width), 17- (nose width) and 18-year olds (head length face and nose height).

Bigger intersexual differences of cephalometric parameters in rural series in comparison with the urban ones were observed in the scope of: head length (13–18 y.o.), head width (6–7 and 13–18 y.o.), morphological face height (7–9 and 13–15 y.o.), face width (15–18 y.o.), nose height (in 6 and 11 y.o. and 13–16 y.o.) and nose width (6–7 and 12–13 y.o. and in 16 and 18 y.o.).

Tab. 3 Values of the dimorphism index (DI) related to the face width (zy-zy), the nasal height (n-sn) and the nasal width (al-al) of rural and urban children and youth

Age [years]	Dimorphism index (DI)					
	(zy-zy)		(n-sn)		(al-al)	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	221,96	342,40	-163,63	38,53	370,23	159,25
7	199,25	385,31	-48,60	-356,17	275,94	75,01
8	207,21	480,96	132,78	-509,11	160,28	244,72
9	193,71	526,77	148,49	-470,99	192,47	301,65
10	52,51	608,86	258,57	-519,10	0,00	110,50
11	103,50	514,66	674,65	-593,46	116,96	222,49
12	133,38	563,75	188,09	-196,14	208,71	-10,02
13	191,88	471,70	337,74	-83,86	450,83	438,52
14	219,80	366,58	316,60	-193,89	383,29	486,56
15	310,87	290,52	370,66	18,26	395,91	682,14
16	352,07	278,74	349,20	346,82	827,14	737,08
17	432,36	307,33	495,63	682,26	806,74	840,44
18	446,87	320,53	527,89	832,13	887,11	815,77
19	470,23	-	467,31	-	744,24	-
$\bar{x}$	252,54	419,86	289,67	-77,28	415,71	392,62

In other age classes, dimorphism of the analysed features is the most noticeable in urban population in comparison with the rural one, so in case of: head length (6–12 y.o.), head width (8–12 y.o.), morphological face height (in 6 y.o., 10–12 and 16–18 y.o.), face width (6–14 y.o.) face height (7–10 y.o., 12 y.o. and 17–18 y.o.) and nose width (8–11, 14–15 y.o. and 17 y.o.).

In urban series, the highest dimorphism, defined on the basis of average values of DI of each parameter in all age groups, was indicated in the scope of morphological face width, slightly smaller in case of nose width. Smaller differences between genders were stated in the scope of face height, and then length and width of head. The smallest dimorphism, indicating the prevalence of girls over boys, is characteristic for nose height. Rural population is characterized with different order of average intersexual diversity of cephalometric features in comparison with urban one.

Tab. 4 Values of the dimorphism index (DI) related to the body height (B-v), the length of head and neck (v-sst) and the trunk length (sst-sy) of rural and urban children and youth

Age [years]	Dimorphism index (DI)					
	(B-v)		(v-sst)		(sst-sy)	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	56,97	156,51	119,57	802,70	242,27	-100,81
7	125,19	272,57	246,04	1205,96	169,82	136,42
8	142,90	122,98	115,83	631,67	220,92	194,59
9	-10,49	201,60	171,66	514,06	-68,87	297,21
10	-4,32	217,01	-527,18	-35,61	544,53	150,26
11	-52,20	15,05	-676,64	-59,68	7,28	172,70
12	-18,59	-115,88	-548,19	-246,73	138,00	44,28
13	-12,13	-44,37	-62,13	-602,68	-30,78	139,61
14	167,59	231,33	50,11	-313,52	188,72	284,99
15	340,38	505,10	204,51	-51,50	410,40	372,32
16	619,69	649,71	536,91	493,74	497,99	585,95
17	781,62	724,40	669,83	603,25	669,19	702,33
18	668,81	806,43	708,55	740,99	705,74	787,53
19	727,18	-	786,16	-	851,23	-
$\bar{x}$	252,33	287,88	128,22	283,28	324,74	289,80

Specification of values of dimorphism index in rural and urban series for body height, head and neck length and trunk length was presented in table 4, for the length of upper and lower extremities and circumference of chest in table 5, while for shoulders width, hips width and body mass in table 6. In rural population, the values of sexual dimorphism index of height parameters in the period from 6 to 13 years old are diversified. Generally, they are decreased in prepubertal phase, and in certain age classes, the index remains at

negative values, indicating the prevalence of girls over boys, e.g. in case of body height (9–13 y.o.), head and neck length (10–13 y.o.), trunk length (in 9 and 13 y.o.), lower extremity length (in 6, 9 and 10 y.o.). In age between 10–12 years old, rural girls have considerably bigger head and neck length in comparison with their peers. The smallest dimorphism was noted in case of: body height (9–10 y.o.), head and neck length (13 y.o.), trunk length (11 and 13 y.o.), upper extremity length (7 and 11 y.o.) and lower extremity length (7 and 13 y.o.).

In the period between 6–13 years old, intersexual differences of circumference of chest in rural series are at a relatively low level, while in the period from 14 to 19 years old, they considerably increase with age. Relatively small dimorphism of the shoulder width usually occurs in the period from 6–13 years old, while the hip width between 11–15 y.o.

In the age between 13–15 years old, rural girls have wider hips than boys. In the period from 11 to 13 years old, small dimorphism of body mass was observed, while considerable intersexual differences were noticed in case of: 7- 8- and 10-year old children. The smallest values of DI were registered in age of: 6 (shoulder width), 11 (hip width and circumference of chest) and 13 years old (body mass).

Tab. 5 Values of the dimorphism index (DI) related to the upper extremity length ($a-da_{III}$), the lower extremity length ($B-sy$) and the chest circumference (xi) of rural and urban children and youth

Age [years]	Dimorphism index (DI)					
	$(a-da_{III})$		$(B-sy)$		(xi)	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	171,80	163,95	-81,84	51,56	141,77	269,28
7	100,63	104,92	4,98	16,93	375,06	169,14
8	414,04	135,96	109,58	-88,21	336,25	152,18
9	304,15	324,00	-47,46	41,68	281,87	147,34
10	263,99	177,83	-104,32	337,32	407,19	195,96
11	98,89	46,62	150,50	-44,09	62,63	-46,81
12	278,01	-145,49	85,93	-156,04	328,20	-520,90
13	202,20	15,70	15,83	34,70	367,75	-439,12
14	368,34	361,72	196,45	380,81	554,90	-141,57
15	535,31	598,05	368,82	750,74	733,12	158,00
16	832,77	895,36	701,67	734,14	708,32	434,32
17	958,60	850,61	817,31	775,56	1106,50	440,75
18	891,70	970,49	653,75	837,38	1126,47	467,37
19	940,97	-	629,99	-	1335,00	-
$\bar{x}$	454,39	346,13	250,08	282,50	561,79	98,92

Dimorphic differences of indicated somatometric parameters considerably increase with age in the period above: 14 (body height, upper and lower extremity length, shoulder width, circumference of chest, body mass), 15 (trunk length) or 16 y.o. (head and neck length, hip width). Dimorphism of these features is the most visible in case of: 17-year olds (body height, upper and lower extremity length) and 19-year olds (lengths of: head and neck, upper and lower extremity, circumference of chest and body mass). The highest values of dimorphism index in the scope of the hip width were registered in case of 10 (245,26) and 19 year olds (231,57).

On the basis of the average value of DI in rural series it was stated that from among the non-head features, boys and girls are the most diversified by body mass (620,46), slightly less by – the circumference of chest, and finally by: upper extremity length and shoulder width (approximate absolute index values). Smaller dimorphism was observed in reference to the trunk length, and then successively: body height and lower extremity length. The smallest intersexual diversity was observed in the scope of: head and neck length and hip width. Domination of the male gender over the female one is the most visible in case of the body mass, slightly less in case of circumference of chest.

In urban series in the period from 9 or 10 to 12 years old (depending on the parameter), generally there is a decreasing tendency for the value of dimorphism index of body height features with age. The smallest values, indicating the lack of fundamental intersexual differences, were observed in age of: 10 (head and neck length), 11 (body length and upper extremity length), 12 (trunk length) and 13 years old (lower extremity length). The above observations are compliant with the data achieved for rural population – they result from developmental phenomena connected with puberty period. The prevalence of girls from the city over boys was registered in certain age classes: body height (12–13 y.o.), head and neck length (10–15 y.o.), trunk length (6 y.o.), upper extremity length (12 y.o.) and lower extremity length (8 y.o. and 11–12 y.o.). In the period of ontogenesis of 14–18 years old, dimorphic differences of the indicated parameters increase with age, which is also confirmed by results of research conducted in rural series.

In case of subjects from Rzeszów in ontogenesis periods: 6–11 and 14–15, relatively low level of intersexual diversity of the circumference of chest was noted, while in periods: 12–13 and 16–18 y.o., dimorphism is increased. In the age between 11 and 14 years old, girls from the city have higher values of a given feature than boys, which is not true in case of their rural peers.

Minor developmental distinctions conditioned by gender in the scope of shoulder width in case of subjects from the city were observed in the period from 6–13 years old. Prevalence of girls over boys was stated in case of 6 year old children and in the period from 10–13 y.o. Above 14 years of age, intersexual differences have tendency to increase with age. Dimorphism of hip width forms in a different way. The highest values of DI, indicating the higher values of this parameter for boys, were registered in the period from 7 to 10 years old. A smaller prevalence of girls over peers was noted in case of 6 and 11 y.o., and slightly more considerable in the age from 12–14 years old. In the ontogenesis period from 15 to 18 years old, the values of dimorphism index of hip width increase, but they are lower than in case of 7–10 y.o. The formation of chosen width dimensions in municipal series occurs according to approximate developmental regularities, like

in case of rural population. The values of DI of body mass for 7–11 y.o. remain on a relatively high level. Smaller intersexual differences in urban series are visible in case of: 6 y.o. and 12–14 y.o., while the biggest ones were noticed for 16–18 year olds. In urban population, the strongest dimorphism was indicated in case of: 7 (head and neck length), 8 (hip width), 12 (circumference of chest) and 18 y.o. (body height, trunk length, upper and lower extremity length, shoulder width and body mass).

Tab. 6 Values of the dimorphism index (DI) related to the shoulder width (a-a), the hip width (ic-ic) and the body mass of rural and urban children and youth

Age [years]	Dimorphism index (DI)					
	(a-a)		(ic-ic)		masa ciała	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	11,76	-42,86	149,33	-42,44	-45,02	295,61
7	155,39	67,44	150,92	423,58	721,48	809,82
8	154,98	70,36	123,30	468,36	568,16	705,31
9	187,26	67,89	190,48	443,81	325,73	1224,36
10	53,52	-55,88	245,26	444,44	497,60	1037,46
11	262,93	-78,67	43,48	-18,21	-409,63	696,49
12	244,50	-92,81	84,92	-254,72	131,51	-373,51
13	71,60	-84,76	-97,13	-193,85	15,41	-75,23
14	395,23	245,07	-98,76	-280,92	473,84	321,70
15	495,12	609,58	-65,47	82,67	599,82	669,34
16	818,13	891,36	213,84	152,44	791,00	1282,70
17	1081,96	971,31	149,36	313,36	1633,75	1491,95
18	1065,41	1070,19	177,38	356,81	1596,41	1950,60
19	1234,77	-	231,57	-	1786,40	-
$\bar{x}$	445,18	279,86	107,04	145,79	620,46	772,05

On the basis of average values of DI of the analysed somatic features it was indicated that boys and girls from the city are the most diversified by body mass, less by length of upper extremity, then: trunk length, head and neck length, body height, lower extremity length and shoulder width. The dimorphism is smaller for the hip width, and the smallest for circumference of chest. The average sexual dimorphism of all analysed somatometric parameters indicated their higher values in case of boys in comparison with girls.

Stronger developmental distinction connected with gender in rural series in comparison with the urban one were noticed in the scope of: body height (8, 11 and 17 y.o.), neck and head length (10–12 and 15–17 y.o.), trunk length (6–8 and 10, 12 and 15 y.o.), upper extremity length (in 6 and 8 y.o., 10–14 years and 17 y.o.), lower extremity length (6 y.o. and 8–9 years old and 11 and 17 y.o.), circumference of chest (7–11 and 14–18 y.o.), shoulder width (7–9 and 11–12 y.o. and 14 and 17 y.o.), hip width (6, 11 and 16 y.o.) and body mass (14 and 17 y.o.).

In other age groups in rural population in comparison with the urban one smaller dimorphic differences were registered in the scope of the analysed non-head features, i.e. body height (6–7, 9–10 and 12–16 and 18 y.o.), head and neck length (6–9, 13–14 and 18 y.o.) trunk length (9 and 11 y.o. and 13–14 and 16–18 y.o.), upper extremity length (7 and 9 y.o. and 15–16 and 18 y.o.), lower extremity length (7 and 10 y.o. and 12–16 y.o. and 18 y.o.), circumference of chest (6 y.o. and 12 – 13 y.o.), shoulder width (6, 10, 13 y.o. and 15–16 y.o. and 18 y.o.), hip width (7–10, 12–15 and 17–18 y.o.), as well as body mass (6–13 and 15–16 y.o. and 18 y.o.).

The value of dimorphism index of fatness features for both series were presented in table 7 and on figure 1. In rural population, almost in the entire analysed period, there is a decisive prevalence of girls over boys with regard to thickness of three fat skinfolds and their total thickness (except for the fold located on abdomen in 10 and 12 y.o. and total fatness in case of 12 year olds). In ontogenesis periods: 6–10 y.o. (abdominal fold and total fatness), 7–10 y.o. (triceps skinfold) and 6–9 y.o. (subscapular skinfold) the dimorphic differences of indicated parameters decrease with age. In the period from 10–13 years old one can observe considerable fluctuations of DI values. In the period from 13–16 y.o., dimorphism of thickness of three fat skinfolds increases, while in the period from 16–19 years old, it decreases. Bigger intersexual differences were registered in periods: 14–18 years old in the scope of abdominal skinfold and total fatness, 14–19 y.o. – triceps skinfold and 15–17 years old – subscapular skinfold. The biggest dimorphism of skinfolds located on the shoulder and under shoulder blade and total fatness in rural series were observed in 16 y.o., and when it comes to skinfold measured in the area of navel – in age of 17 years old.

From among all parameters (19) analysed in this paper for rural population, generally the biggest sexual dimorphism, defined on the basis of average value of DI, is the dimorphism of thickness of fat skinfolds – in order: triceps skinfold (-2746,66), abdominal skinfold (-2346,49) and total fatness (-2289,35), and the smallest one – subscapular skinfold (-1747,88).

Tab. 7 Values of the dimorphism index (DI) related to the thickness of skinfolds and the total adiposity of rural and urban children and youth

Age [years]	Dimorphism index (DI)							
	The triceps skinfold		The abdominal skinfold		The subscapular skinfold		The sum of three skinfolds	
	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów	Rural area	Rzeszów
6	-1542,31	-944,21	-2997,12	-1452,51	-2152,30	0,00	-2194,40	-842,10
7	-1609,39	374,53	-2061,96	-181,82	-1510,49	307,69	-1528,24	175,95
8	-1440,54	371,75	-1087,56	84,39	-151,13	-92,16	-982,75	138,31
9	-490,51	1224,49	-388,35	714,28	-432,69	-1106,38	-442,79	370,83
10	-402,98	1548,39	165,68	1288,14	-909,58	-1538,46	-333,05	563,38
11	-1435,62	-361,01	-2304,72	847,46	-2184,02	-1509,43	-1715,23	-303,45

12	-270,68	-959,41	382,16	-448,43	-47,37	-2769,23	29,56	-1306,24
13	-1596,54	-2020,91	-1615,27	-1802,58	-2303,77	-3564,36	-1798,06	-2382,27
14	-3101,36	-3589,74	-3133,67	-3481,78	-2343,17	-3551,40	-3275,77	-3544,63
15	-4872,99	-4705,88	-4293,86	-3904,38	-3235,67	-3177,57	-4189,74	-4020,75
16	-5921,86	-3178,81	-4706,94	-4833,33	-3647,51	-2748,82	-4795,03	-3585,66
17	-5792,43	-625,00	-4750,59	-2941,18	-2620,79	-786,03	-4432,53	-1437,27
18	-5010,13	298,51	-3917,06	-2206,41	-1911,49	-1422,59	-3685,87	-1005,85
19	-4965,92	-	-2141,54	-	-1020,27	-	-2707,03	-
$\bar{x}$	-2746,66	-966,72	-2346,49	-1409,09	-1747,88	-1689,13	-2289,35	-1321,52

In urban population, in the overwhelming part of the analysed period of ontogenesis, girls also are the ones who achieve higher average values of thickness of particular fat skinfolds majority and their total thickness in comparison with boys. The exceptions are the subjects in age of: 7–10 and 18 y.o. (triceps skinfold), 8–11 y.o. (abdominal skinfold), in 7 y.o. (subscapular skinfold) and 7–10 (total fatness). In case of 6-year olds there are no intersexual differences in the scope of thickness of subscapular skinfold. Dimorphism in case of children in age from 6–12 years old is formed in a diversified manner (increase or decrease of the index value). In the period from 13–15 y.o., from 13–16 y.o. in case of abdominal skinfold and 12–13 y.o. for subscapular skinfold, the intersexual differences have an increasing tendency. In the period from 15–18 years old, the values of DI generally decrease with age or slightly fluctuate. The biggest dimorphism in the scope of fatness features was registered in case of: 13- (subscapular skinfold), 15- (triceps skinfold and total fatness) and 16-year olds – abdominal skinfold).

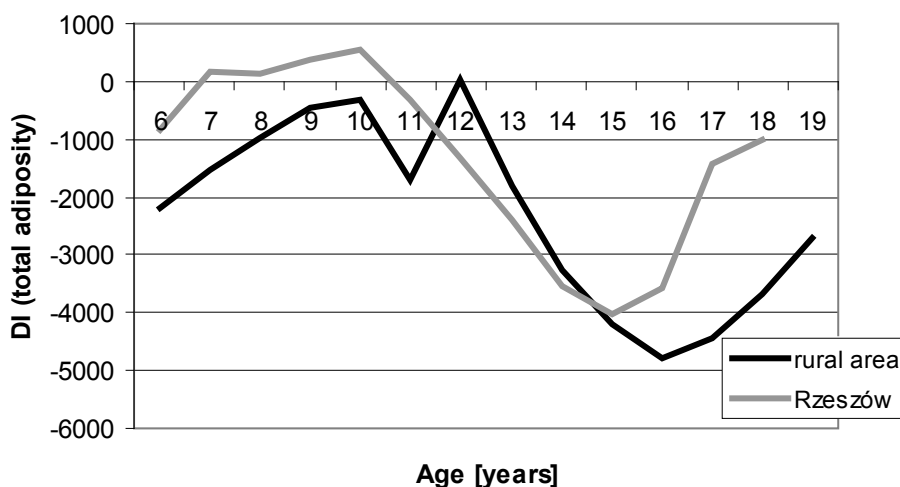


Fig. 1 The dimorphism index related to the total adiposity of rural and urban children and youth

In result of analysis of average values of DI of the tested body elements, it was indicated that boys and girls from the city are the strongest diversified with subscapular skinfold (-18689,13), less by abdominal skinfold (-1409,09) and total fatness (-1321,52), and in the smallest degree by triceps skinfold (-966,72). Except for the skinfold located under the shoulder blade, intersexual differences in the scope of level of subdermic fatness are much higher in case of rural population in comparison with the municipal one. The order of size of dimorphism in the scope of thickness of skinfolds and other morphological features is also slightly different for both series.

Consideration of DI value in comparison enables to state that the bigger dimorphism in urban population in comparison with the rural one is typical for subjects in age of: 9–10 and 12–14 years old. Moreover, in case of youth from Rzeszów in the age of 16, bigger intersexual differences in the scope of abdominal skinfold were indicated in comparison with their rural peers. Total fatness is more diversified in case of boys and girls from the city in age of 10 and in the period from 12–14 y.o. than in case of rural children.

In other age classes, bigger sexual dimorphism in the scope of fatness features was stated for the rural series. The above mentioned observations were made in the scope of thickness of the following skinfolds: triceps and subscapular (6–8, in 11 y.o. and 15–18 y.o.), abdominal (6–8, and 11 and 15 y.o. and 17–18 y.o.) and total fatness (6–9 and 11 y.o. and 15–18 y.o.).

A dimorphism index of multi-feature body size for 15 morphological features of head and non-head in particular age classes in rural and urban series with exclusion of body components was calculated for comparison purposes (Table 8, Figure 2).

Tab. 8 Values of the dimorphism index (DI) related to the multi-feature body size (general) for 15 morphological parameters of rural and urban children and youth

Age [years]	Dimorphism index (DI)	
	Rural area	Rzeszów
6	109,30	176,18
7	197,84	250,52
8	211,63	208,31
9	159,48	281,12
10	143,22	231,87
11	57,04	103,60
12	106,70	-53,07
13	165,69	10,84
14	282,46	153,78
15	397,78	375,43
16	565,68	578,66
17	744,24	670,74
18	741,65	766,74
19	797,66	-

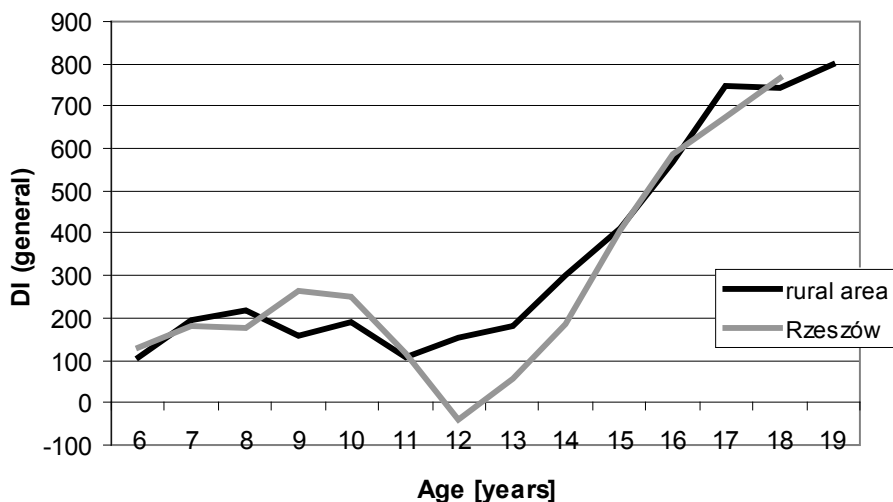


Fig. 2 The dimorphism index related to the general (multi-feature) body size of rural and urban children and youth

In rural and urban population, dimorphism of general body size has diversified values depending on the class age of subjects. In the group of rural children, low values of DI were noted in 6 y.o., while between 7 and 8 years old they were relatively high. In the age from 8–11 years old, decrease of multi-feature dimorphism of body size with age was observed. In 11 y.o. the DI has the lowest value, which indicates a small prevalence of boys over girls. Lack of fundamental intersexual differences in this age results from earlier puberty period in case of girls in comparison with their peers. In the period from 12–19 years old, gradual intensification of dimorphic differences was observed, which is the most visible in case of teenagers over 14 years old. Its highest value was stated for 19 year old teenagers.

Tab. 9 Mean values of the dimorphism index (DI) related to all examined parameters of rural and urban children and youth aged 6–18 years

Parameter	Dimorphism index (DI)	
	Rural area	Rzeszów
(g-op)	273,29	242,55
(eu-eu)	267,41	211,25
(n-gn)	306,66	357,16
(zy-zy)	235,80	419,86
(n-sn)	276,00	-77,28
(al-al)	390,43	392,62
(B-v)	215,80	287,88

(v-sst)	77,60	283,28
(sst-sy)	284,25	289,80
(a-da _{III})	416,96	346,13
(B-sy)	220,86	282,50
(xi)	502,31	98,92
(a-a)	384,44	279,86
(ic-ic)	97,45	145,79
m.c.	530,77	772,05
the triceps skinfold	-2575,95	-966,72
the abdominal skinfold	-2362,25	-1409,09
the subscapular skinfold	-1803,84	-1689,13
the sum of three skinfolds	-2257,22	-1321,52

In the period of ontogenesis from 6–10 y.o., dimorphism of general body size in urban series is on medium level. In the period from 10–12 years old, a decreasing trend was observed for the index value. Its lowest values, indicating the small intersexual differences, were registered for 12 and 13 y.o. In the age of 12, the DI has a negative value, which indicates the prevalence of girls over boys. In rural series there is no such phenomenon (negative value). In the period of ontogenesis from 12 to 18 years old, intersexual diversity of subjects from Rzeszów increases with age, which is especially noticeable in the period from 15 y.o. In rural series, essential increase of value of the above index can be observed in the age between 14 and 19 years old, so it starts a year earlier than in case of subjects from Rzeszów.

In result of comparative analysis it was indicated that in rural population, the index of multi-feature body size of the analysed parameters remains at lower level in the following periods: 6–7, 9–11 and 18 y.o., in comparison with urban series. In the period of ontogenesis from 12 to 15 and in case of 17-year olds, general dimorphism was more noticeable in rural group, although in that period the index values systematically decrease with age. The approximate DI values in compared series were registered for: 8, 15 and 16 y.o.

Discussion

Sexual dimorphism is variable and it depends from the phase of ontogenetic development. Proportions of human body during personal development change irregularly. The speed of these changes depends from the status of person's advancement in development, as well as from gender and genetic differences connected with it, which result in differences of body composition and functions of endocrine glands. Intersexual differences are visible already in the period of foetal life, they increase during progressive development and they are the most manifested in case of adults (Wojtyna, Rodziewicz-Gruhn 2005, Napierała 2007, Gworys et al. 2010).

At birth, boys have bigger dimensions of body in comparison with girls, and the difference amount to 1-3% with regard to body length and other linear dimension and 4% in the scope of body mass. During the first year of life, boys may present higher speed of development

than girls, but in the age from 1–9, the development speed of both genders is similar. In result of that, in the period from 5-10 years old, dimorphic differences in the scope of almost all body dimensions, except for head diameters, are small in comparison with the ones observed for adults (7,8–8,2 %). From the moment of pubertal spurt, girls have temporarily higher values of almost all metrical features, including the dimensions of lower part of face. The width of the upper part of face and calvaria indicate small dimorphic differences estimated to about 3–5 %, with regard to small size of pubertal spurt of these dimensions. Before puberty period girls have higher content of fat tissue, and after that period, their amount is considerably increased. In the age from 1-6, the loss of subdermic fatness is slower in case of girls, and its gain is faster from 6 y.o. in comparison with boys (Tanner 1963).

Sexual dimorphism is not only limited to structural and functional features of human organism, but it also includes the psychical sphere. Results of endocrinological, neurological, psychological and ethological tests indicate the influence of sex hormones on brain organisation at male or female direction already from the 6th week of intrauterine life, which results in differences between both genders in the scope of: cognitive skills (e.g. spatial orientation, perception speed, articulation), motor functions, behaviours or inclinations (Berenbaum, Hines 1992, Kimura 1992, Grabowska 2003 for: Gołąb 2009).

Results of research of Gołąb (2009) conducted in a group of students indicated the phenomena of coexistence of certain somatic features and motor properties with diversification of the so called “brain gender” within a given gender. In case of men, somatic differences between extreme groups were stronger in the scope of such features as: body height, height while sitting, and their direction was compatible with anatomic symptoms of sexual dimorphism. When it comes to extreme groups of “brain gender”, women indicated small, but consequent differences in: circumferences of limbs, trunk, especially neck and in distribution of subdermic fatness.

Morphological and functional dimorphic differences are the reason for different formation of physical efficiency of both genders. In categories of absolute values, women have lower: speed, power, strength, endurance, but higher: flexibility, agility, precision and accuracy of movement in comparison with men. In case of male students of physical education from Bydgoszcz, the results of test of motor skills were better than in case of female students (Napierała 2007).

Socio-cultural modifiers have a different and directed influence on variability of absolute body dimensions, which results in change of proportions, separate for both genders (Gworys et al. 2010). Women are characterized with relatively shorter upper extremities in comparison with the lower ones, bigger subdermic fatness, smaller development of skeleton and muscles in comparison with men (Drozdowski 1998 as cited in: Napierała 2007, Wolański 2006, Vercellotti, Piperata 2012). The influence of various factors on human organism contributes to creation of bigger intersexual diversity, and even more to intersubject diversification of population (Gworys et al. 2010). Phenotypic variability of human populations inhabiting various regions of the world is probably the result of long-term selection and adaptation to environment (Vercellotti, Piperata 2012).

Various factors are stated to form the phenotypic sexual differences, which mechanism has not been explained. They include among others the type of diet – big dimorphism occurs in case of average protein consumption, the biggest one – with considerable

consumption. Considerable intersexual differences occur in polygamous populations, small – in monogamous, however it does not influence the level of dimorphism. Bigger dimorphism of body height occurs in populations with small growth of women. Perhaps the above mentioned facts are connected with diversified sensitivity of both genders to environmental factors, which results in various formation of dimorphism depending on the stage of economic development of population (Wolański 2006).

Analysis of the value of sexual dimorphism index of the researched cephalo- and somatometric features generally allows to confirm the consistency of tendencies of developmental changes in the analysed rural population, and in compared urban one from Subcarpathia, with information from auxological literature (Bukszyński, Malinowski 2002, Tatarczuk 2002, Zaworski, Młyńska 2004, Zaworski 2006).

As it was already mentioned, the age of specimen is one of the main dynamic factors of dimorphic changes. As it results from literature overview, intersexual differences in the scope of somatic features are the most visible during puberty and in postpuberty period, the less visible in group of young children – before the puberty period (Jedlińska, Waliszko 1981, Burdukiewicz et al. 1998, Bukszyński, Malinowski 2002).

Migasiewicz (2006) noticed small intersexual differences in the scope of height and body mass in the period from 7.5 to 12.5 years old in population of children and teenagers from Wrocław. From 13 y.o., dimorphism of body height and since 14 y.o. – of body mass has systematically and progressively increased for the benefit of boys. Similar image of dimorphic changes was also achieved by Mleczko, Cieśla (1999) in group of children and youth from Małopolska. Compliance with data of Migasiewicz (2006) was indicated in rural series from the Subcarpathian Voivodeship with reference to minor dimorphism of body height in the period from 7-12 y.o. Intersexual differences of the body mass in the age from 7 to 10 years old on the other hand remain on average level, while during 10-12 y.o. they are considerably decreased, which does not confirm the results presented by the mentioned author. Similar relation concerning the body mass was noticed in subjects from Rzeszów. The increase of dimorphism of both parameters in rural and municipal population from Subcarpathia is observed from 14 y.o. As opposed to data presented by Żak (1994) for children from Wrocław, sexual dimorphism of body height for both series from Subcarpathia is much lower than the one for body mass almost in the entire analysed period, except from rural 6-year olds.

Czaja (2004 as cited in: Gworys et al. 2010) did not register considerable intersexual differences in the scope of the trunk length to 16 y.o., while after 16 y.o. he noted a considerable increase of dimorphism. The length of upper and lower extremity on the other hand, indicated bigger dimorphic differences in the previous period (14–15 y.o.) and increased until 20 y.o. in result of quicker increase of these dimensions for boys in comparison with girls. Similar conclusions were drawn from the results of research of Bożilow et al. (2003). The results of research of rural population from Subcarpathia are confirmed by the data achieved by the above mentioned authors. Except for rural 10 year olds that indicated big dimorphism of (*sst-sy*) dimension, increase of intersexual differences in the scope of the trunk length, upper and lower extremity length is observed since 15 y.o.

The nature of intersexual differences in human body structure depends on: mass and strength of muscles, spine flexibility, growth of shoulders and chest together with respiratory system (bigger in case of men) and fatty tissue mass (bigger in case of women). When it comes to the width of pelvis, dimensions of face and head, there is no considerable sexual dimorphism (Wolański 2006).

Similar character of intersexual differences was stated by Wojtyna, Rodziewicz-Gruhn (2005) in two groups: candidates for the faculty of pedagogy with physical education in Częstochowa and students of the I year of Academy of Physical Education in Katowice, with the average age of 19.5 y.o. In case of subjects from Częstochowa, the biggest dimorphism was noticed in the scope of width dimensions: chest, shoulders, hips or chest depth. Female and male students from Katowice were the most diversified by: the body mass, shoulder width, chest width and circumference of chest. The above data are compliant with results of research achieved for 19-year olds from villages in the Subcarpathian Voivodeship. From among the analysed somatic features, the biggest dimorphism was registered in the scope of: body mass, circumference of chest and shoulder width.

Similarly, Napierała (2007) in a group of students of the 1st year of physical education from Bydgoszcz observed the biggest intersexual differences in shoulder width (bigger in case of men) and in thickness of three fat skinfolds (bigger in case of women). However, as opposed to own materials, the hip width was higher for women than for men.

Compliance with the statement of Wolański (2006) was indicated in reference to a part of the analysed metric features of rural and urban population from Subcarpathia. Definitely the biggest dimorphism, presented in form of arithmetic average of all age classes (in rural series 6–19 y.o., in urban series 6–18 y.o.), is characteristic of the thickness of three fat skinfolds and total fatness indicating the prevalence of girls. From among the cephalo- and somatometric features, girls and boys in compared populations are the most diversified by the body mass. In group of rural children, slightly smaller intersexual differences were registered with regard to the length of upper extremity and circumference of chest, and then to– remaining at similar level – the shoulder and nose width. The values of dimorphism index for: morphological face height, trunk length, head length, nose height and head width in rural series are on medium level.

In case of subjects from Rzeszów, three cephalometric features (head width, morphological face height and nose width), as well as the length of upper extremity, quite essentially diversify boys and girls. Slightly smaller diversities conditioned by gender, although remaining on lower level in comparison with the above mentioned parameters, were noted in the scope of body height and shoulder width parameters.

In rural series, slightly less expressed dimorphism was registered in the scope of features such as: head width, body height and the length of lower extremity. Both genders are the less diversified by the hip width and neck and head length. In urban population on the other hand, the values of dimorphism index that also remain on low level are the hip width and, surprisingly, the circumference of chest, as well as nose width, which indicate the prevalence of girls over boys.

The achieved test results are not completely confirmed by information from Tanner (1963) and Wolański (2006) on minor intersexual diversity of width dimensions of head

and face – in rural series, the values of index remain on average level, while on the urban one the face width indicates quite big dimorphism. It is also worth to notice small intersexual differences in the circumference of chest in urban series.

Malinowski (2010) indicated quite a different order and intensity of dimorphic differences in the scope of morphological features of head for adult representatives of white race in comparison with the data achieved for rural 19-year old youth from Subcarpathia. Taking into consideration the parameters included in this paper, author achieved the following order, according to the decreasing level of dimorphism: head length, morphological face height, face width, nose width, head width and nose height. Rural boys and girls in the age of 19 y.o. are the most diversified by the nose width, then by morphological face height, head length, then, on similar level: head width, face width and nose height.

In group of rural children from Kaszuby, Zaworski (2006) indicated the highest sexual dimorphism in the scope of thickness of fat skinfold on triceps, then on the abdominal skinfold, and slightly lower – on subscapular skinfold. The results of research conducted in rural series from the Subcarpathian Voivodeship confirmed the above relations. The intersexual diversity of subdermic fatness in series from Rzeszów on the other hand, is slightly different (subscapular skinfold – abdominal skinfold – triceps skinfold).

Many authors states that the intensification of dimorphic changes depends on influence of urbanization factor. The biggest intersexual diversity is typical of children and youth from big cities, the average one for those from small towns, and the smallest one for those from rural areas (Malinowski 1976, Zaworski, Młyńska 2004). The above phenomenon is the result of smaller speed of development of rural populations in the scope of body dimensions and biological maturity and of a different way of spending free time by children from various environments (Jedlińska, Waliszko 1981, Bukszyński, Malinowski 2002). In rural environment, character of domestic and household activities for both genders is more similar, the load of physical work is also bigger (Wolański 2006).

The results of conducted comparative analysis of average values of dimorphic index of particular parameters in the period from 6 to 18 years old (Table 9) enable a partial confirmation of the statements of other authors on smaller intersexual diversification of morphological parameters in rural populations in comparison with the urban ones. Bigger dimorphism in rural series was registered with regard to: upper extremity length, shoulder width, head length, head width, hip width, nose height and thickness of fat skinfolds and their total thickness, in comparison with the subjects from Rzeszów. Urban girls and boys in comparison with the rural ones are more diversified by: body mass, face width, morphological face height, body height, head and neck length, lower extremity length, circumference of chest. Dimorphism of the nose width and trunk length remains on similar level in both series.

Perhaps an explanation for the achieved results of comparison of sexual dimorphism in both series may be the tendency for fading of intra-environmental differences caused by civilizational changes in our country during the last 25 years, which could affect the analysed children and youth in some extent. Fading of social differences have existed in some Nordic countries, e.g. in Sweden or Norway, for several years already (Lindgren 1976, Brundtland et al. 1980, Liestol 1982, Cernerud 1994). The anthropologists' opinions on the phenomenon of decreasing or fading of environmental differences

during the last several years in our country are divided. Some of them are of the opinion that environmental distances between city and rural areas still remain, or even deepen, so the research on developmental phenomena of children shall be continued (Szopa et al. 1999, Malinowski 2004). Some research result confirm the elimination of differences between populations: urban and rural (Nowak-Starz 2002, Śliwa et al 2003, Jopkiewicz et al. 2004, Saczuk, Saczuk 2004), of small and big cities (Charzewska et al. 1999), or environments of rural areas and small towns (Mleczek 2004).

Treating the analysed material in general, one can state that in case of about 50% of age groups, bigger developmental differences between boys and girls occur in urban series, and in the other half, in rural one. The above phenomenon occurs in a diversified level. The achieved results should be verified after the second series of research.

Conclusions

1. Image of dimorphic changes in the scope of majority of cephalo- and somatometric features and tissue elements in rural and urban series generally complies with well-known developmental regularities.

2. The size of intersexual differences in compared populations is diversified and it depends on the type of parameter and age class of subjects.

3. Lack of unambiguous tendencies in the scope of sexual dimorphism of the analysed features between rural and urban children from the Subcarpathian Voivodeship may be the result of civilizational changes in our country (e.g. political system transformation or unification of living conditions) which should be verified in the second series of research.

Bibliography

1. Berenbaum S.A., Hines M. (1992) Early androgens are related to childhood sex-typed toy preferences. "Psychol. Sci." 3: 203-206.
2. Bożyłow W., Krakowiak H., Gworys B., Jeka S., Čabryć M., Kurlej W. (2003) Analiza zmienności wybranych wskaźników rozwoju somatycznego dzieci i młodzieży wiejskiej województwa kujawsko-pomorskiego. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Skład M. Monografia IMW, Lublin; 101-114.
3. Brundtland G.H., Liestol K., Walloe L. (1980) Height, weight and menarcheal age in Oslo school children during the last 60 years. "Ann. Hum. Biol." 7(4): 307-322.
4. Bukszyński W., Malinowski A. (2002) Próba określenia wpływu czynników społecznych na nasilenie dymorfizmu płciowego u dzieci przedszkolnych regionu gdańskiego gdyńskich. In: Ontogeneza i promocja zdrowia w aspekcie medycyny, antropologii i wychowania fizycznego. Ed. Malinowski A., Tatarczuk J., Asienkiewicz R. Wyd. Uniwersytetu Zielonogórskiego, Zielona Góra; 98-102.
5. Burdukiewicz A., Janusz A., Miałkowska J., Pietraszewska J. (1998) Dymorfizm płciowy cech wydolności fizycznej dzieci i młodzieży wiejskiej. In: Człowiek wczoraj, dziś, jutro. Ed. Gąsiorowski A, Gurba J., Kozak-Zychman W. Wyd. UMCS, Lublin; 81-85.

6. Cernerud L. (1994) Are the still inequalities in height and body mass index of Stockholm children? "Scand. J. Soc. Med." 22: 161-165.
7. Charzewska J., Chabros E., Rogalska-Niedźwiedz M., Górowska D., Wilczewski A. (1991) Czy dystanse międzyrodowiskowe ulegają zmianom? „Wychow. Fiz. Sport.” 2: 31-41.
8. Gworys B., Malinowski A., Bożiłow W., Kordecki H. (2010) Dymorfizm płciowy w proporcjach ciała u dzieci i młodzieży – próba nowego ujęcia. In: Auksologia a promocja zdrowia. T. 5. Ed. Jopkiewicz A. KTN, WSE w Warszawie, Kielce – Warszawa; 27-35.
9. Gołąb S. (2009) Dymorfizm płciowy w zakresie cech somatycznych i właściwości motorycznych wśród młodzieży studenckiej na tle zróżnicowań „płci mózgu”. In: Akademicka Kultura Fizyczna Studentów. T. 3 – Sprawność Fizyczna. Ed. Zadarko E., Barabasz Z., Krosno; 23-38.
10. Jasiński R. (1993) Różnice płciowe w rozwoju cech mierzalnych ręki. In: Populacja dzieci wiejskich w badaniach longitudinalnych. Cz. 1. Ed. Janusz A., Ignasiak Z. Studia i Monografie AWF/ Wrocław; 109-122.
11. Jedlińska W., Waliszko A. (1981) Wielkość dymorfizmu płciowego u młodzieży z dużych miast, małych miast i wsi (na podstawie badań z lat 1966 i 1978). „Prz. Antrop.” 47(2): 309-316.
12. Jopkiewicz A., Przychodni A., Markowska M. (2004) Cechy budowy morfologicznej a wydolność fizyczna studentów. In: Auksologia a promocja zdrowia. T. 3 Ed. Jopkiewicz A. KTN, Kielce; 61-71.
13. Kim H.-S., Kwark C.G., Kim J.-T. (1997) Evolution of behavioral fitness of old male population. "Korean J. Sport Sci." 9: 18-32.
14. Krjaż V., Starosta W., Krjaż Z., Pawłowa-Starosta T. (2010) Dymorfizm płciowy wybranych cech somatycznych osób w wieku od 4 do 60 lat i starszych. Roczniki Naukowe WSWFiT, Białystok; 45-50.
15. Liestol K. (1982) Social conditions at menarcheal age: the importance of early of life. "Ann. Hum. Biol." 9: 521-537.
16. Lindgren G.W. (1976) Height, weight and menarche in Swedish urban school children in relation to socio-economic and regional factors. "Ann. Hum. Biol." 3: 501-528.
17. Malinowski A. (1976) Dziecko poznańskie. Normy i metody kontroli rozwoju fizycznego. Seria: Antropologia, Nr 3, Wyd. UAM, Poznań.
18. Malinowski A. (2010) Inter-variety differences of cephalometric features. In: Auksologia a promocja zdrowia. T. 5. Ed. Jopkiewicz A. KTN, WSE w Warszawie, Kielce – Warszawa; 57-67.
19. Malinowski A. (2004) Porównanie rozwoju fizycznego młodzieży wsi wielkopolskiej i Poznania z 2000 roku. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Popławska H., Skład M. Monografia IMW, Lublin; 13-19.
20. Malinowski A., Bożiłow W. (1997) Podstawy antropometrii. Metody, techniki, normy. PWN, Warszawa – Łódź.
21. Migasiewicz J. (2006). Wybrane przejawy sprawności motorycznej dziewcząt i chłopców w wieku 7–18 lat na tle ich rozwoju morfologicznego. Prace habilitacyjne AWF we Wrocławiu, Wrocław.

22. Mleczek E. (2004) Biologiczne przejawy nierówności społecznych w Małopolsce na przełomie wieków w świetle wyników badań poziomu rozwoju somatycznego i motorycznego dzieci i młodzieży z dużego miasta i wsi. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Popławska H., Skład M. Monografia IMW, Lublin; 737-745.
23. Mleczek A., Cieśla E. (1999) Zakres zróżnicowania międzypłciowego poziomu rozwoju morfofunkcjonalnego i motorycznego dzieci i młodzieży z Małopolski. In: Problemy dymorfizmu płciowego w sporcie. Cz. 5. Ed. Socha S. AWF i PSSK, Katowice; 66-73.
24. Napierała M. (2007) Dymorfizm płciowy w budowie morfologicznej studentów I roku wychowania fizycznego Uniwersytetu Kazimierza Wielkiego w Bydgoszczy. „Med. Biol. Sci.” 21(3): 73-76.
25. Nowak M. (2011a) Rozwój parametrów cefalometrycznych oraz proporcji głowy w populacji dzieci i młodzieży wiejskiej w wieku 6–19 lat z regionu Podkarpacia. „Prz. Med. Uniw. Rzesz. Inst. Leków.” 9(4): 485-502.
26. Nowak M. (2011b) Dziecko wiejskie podkarpackie. The rural child of podkarpackie province. Wyd. Uniwersytetu Rzeszowskiego, Rzeszów.
27. Nowak-Starz G. (2002) Charakterystyka rozwoju fizycznego dzieci i młodzieży z regionu świętokrzyskiego z roczników bilansowych zdrowia. In: Ontogeneza i promocja zdrowia w aspekcie medycyny, antropologii i wychowania fizycznego. Ed. Malinowski A., Tatarczuk J., Asienkiewicz R. Wyd. Uniwersytetu Zielonogórskiego, Zielona Góra; 138-142.
28. Perenc L., Radochońska A. (2012) Dymorfizm płciowy wybranych cech antropometrycznych u dzieci i młodzieży rzeszowskiej w wieku 3–18 lat badanych w latach 1978–2004. „Prz. Med. Uniw. Rzesz. Inst. Leków.” 1: 38-49.
29. Radochońska A., Perenc L. (2006) Tendencja przemian w otluszczeniu ciała u dzieci i młodzieży z Rzeszowa. „Prz. Med. Uniw. Rzesz.” 4(2): 113-121.
30. Radochońska A., Perenc L. (2008) Zmienność wybranych cech morfologicznych głowy w populacji dzieci i młodzieży rzeszowskiej w wieku od 3 do 18 lat w okresie 25-lecia. „Prz. Med. Uniw. Rzesz.” 6(2): 142-155.
31. Radochońska A., Perenc L. (2009) Trendy w rozwoju fizycznym u dzieci i młodzieży z Rzeszowa w dwudziestopięcioleciu 1978–2004. „Prz. Med. Uniw. Rzesz.” 7(3): 239-250.
32. Rogowska E., Orkwiszewska A. (2002) Dymorfizm płciowy cech somatycznych u dzieci ze szkół gdyńskich. In: Ontogeneza i promocja zdrowia w aspekcie medycyny, antropologii i wychowania fizycznego. Ed. Malinowski A., Tatarczuk J., Asienkiewicz R. Wyd. Uniwersytetu Zielonogórskiego, Zielona Góra; 47-49.
33. Saczuk J., Saczuk H. (2004) Dystrybucja tkanki tłuszczowej u dzieci wiejskich. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Popławska H., Skład M. Monografia IMW, Lublin; 171-180.
34. Szopa J., Jaworski J., Żychowska M. (1999) Zróżnicowanie środowiskowe i trend sekularny a poziom rozwoju somatycznego w populacji wiejskiej Żywiecczyny w latach 1964–1996. „Med. Ogólna.” 5(3-4): 238-246.

35. Śliwa W., Chlebicka E., Śliwa K. (2003) Zróżnicowanie środowiskowe w cechach somatycznych i postawie ciała dzieci w wieku piętnastu lat. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Skład M., Monografia IMW, Lublin; 95-100.
36. Tanner J.M. (1963) Rozwój w okresie pokwitania. PZWL, Warszawa.
37. Tatarczuk J. (2002) Dymorficzne zróżnicowanie wybranych cech somatycznych i komponentów ciała w grupie aktywnych ruchowo i u trenujących. In: Ontogeneza i promocja zdrowia w aspekcie medycyny, antropologii i wychowania fizycznego. Ed. Malinowski A., Tatarczuk J., Asienkiewicz R. Wyd. Uniwersytetu Zielonogórskiego, Zielona Góra; 109-111.
38. Vercellotti J., Piperata B.A. (2012) The use of biocultural data in interpreting sex differences in body proportions among rural Amazonians. "Am. J. Phys. Anthropol." 147: 113-127.
39. Wojtyna J., Rodziewicz-Gruhn J. (2005) Zróżnicowanie dymorficzne cech morfologicznych kandydatów na studia wychowania fizycznego w WSP w Częstochowie w roku akademickim 1996/1997. „Śląskie Prace Biologiczne” 1: 173-178.
40. Wolański N. (1975) Metody kontroli i normy rozwoju dzieci i młodzieży. PZWL, Warszawa.
41. Wolański N. (2006) Rozwój biologiczny człowieka. Podstawy auksologii, gerontologii i promocji zdrowia. PWN, Warszawa.
42. Zaworski B. (2006) Wpływ wybranych czynników środowiskowych na grubość podskórnej tkanki tłuszczowej u dzieci kaszubskich. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. T. 1. Ed. Saczuk J. ZWWF AWF, Biała Podlaska; 168-178.
43. Zaworski B., Młyńska D. (2004) Zróżnicowanie płciowe budowy ciała dzieci kaszubskich. In: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. Ed. Zagórski J., Popławska H., Skład M. Monografia IMW, Lublin; 254-265.
44. Żak S. (1994) Dymorfizm płciowy zdolności motorycznych dzieci i młodzieży z Krakowa w aspekcie uwarunkowań rozwojowych aktywności ruchowej. „Antropomotoryka” 11: 131-141.

Number of signs with spaces: 63 104

Elżbieta Bernaciak¹, Małgorzata Lesicka-Sawicka¹, Jolanta Barzowska²

¹ Pomeranian Academy, Institute of Theories about the Health in Słupsk

¹ Akademia Pomorska Instytut Nauk o Zdrowiu Słupsk

² University Centre of Sea and Tropical Medicine in Gdynia

² Uniwersyteckie Centrum Medycyny Morskiej i Tropikalnej w Gdyni Redłowie

Feeling the coherence at women with the diagnosed cancer of the breast
Poczucie koherencji u kobiet z rozpoznaną chorobą nowotworową piersi

Summary

Every patient is an individual example of having own stores which are stuck in it alone and for her environment. Psychological trademarks of the unit constitute the largest group of stores health determined as potentials, to rank among them it is possible feeling the identity, feeling the control over what around her is happening, the intelligence and competence. An environment is the second important resource: religion, support closest, care of the health. An attempt to take assessment of the level of the intelligibility, resourcefulness, sense was a purpose of the work, in a word cohesions with illness at patients of breasts having cancer as well as the preferred style of advising soya with illness. A method of the diagnostic survey was used for the accomplishment. The examination was conducted on days from 1 XII 2010 to 30 III 2011 in Gdynia Redłowo in the University Centre of Sea and Tropical Medicine. 52 women constituted the research group with diagnosed cancer of the mamma. They used the author's questionnaire of the questionnaire form containing 26 closed questions.

Based on obtained findings the following conclusions were drawn:

- in the examined group of patients was stated big supporting the family, friends, which mobilization influenced in taking all action associated with the improvement in the medical condition,
- illness caused lowering the standard of living of the entire family, but in no way it influenced relations ruling in it,
- women actually used resources in the form of the support closest what is providing about the great level of the intelligibility,
- the patient invalid didn't use other therapy than the ones which the doctor commissioned driver,
- women in the examined strategies of approval of the new one's situation in life, they demonstrated the great adaptation to illness, adopted strategies of the concentration on the problem which effectively it is necessary to untie, actively are battling against illness through the compliance to recommendations of the medical staff,
- women pretended oneself to the first visit to the doctor of the oncologist, because alone observed alarming manifestations by the end of three months,
- women willingly are talking to persons contending with the same health problems about their illness,
- handed over by the medical staff to information is held into the wrong way,
- religious observances decorated diagnoses of the breast cancer on intensity in the moment of proving correct with
- women participating in the survey think, that reconstruction of the breast in no way will improve the quality of their life,

- of the patient participating in the examination in they are ill longer than 5 years, and are assessing the condition of their health as good, even though are facing up to a fatal illness,
- every of women again will decide for the treatment, if such a need occurs.

Streszczenie

Każda pacjentka jest indywidualnym przykładem posiadania własnych zasobów, które tkwią w niej samej i jej środowisku. Największą grupę zasobów stanowią cechy psychiczne jednostki określane jako potencjały zdrowia. Zaliczyć do nich można poczucie tożsamości, poczucie kontroli nad tym, co się wokół niej dzieje, inteligencję i kompetencje. Drugim ważnym zasobem jest środowisko: religia, wsparcie najbliższych, opieka zdrowia. Celem pracy była próba podjęcia oceny poziomu zrozumiałości, zaradności, sensowności, jednym słowem spójności z chorobą u pacjentek chorujących na raka piersi jak i preferowanego stylu radzenia sobie z chorobą. Do realizacji wykorzystano metodę sondażu diagnostycznego. Badanie zostało przeprowadzone w dniach od 1 XII 2010 do 30 III 2011 w Gdyni Radłowie w Uniwersyteckim Centrum Medycyny Morskiej i Tropikalnej. Grupę badawczą stanowiły 52 panie z rozpoznanym rakiem gruczołu piersiowego. Posłużono się autorskim kwestionariuszem ankiety zawierającym 26 zamkniętych pytań.

Na podstawie uzyskanych wyników badań wyciągnięto następujące wnioski:

- w badanej grupie pacjentek stwierdzono duże wsparcie rodziny, przyjaciół, które mobilizująco wpłynęło w podejmowaniu wszelkich działań związanych z poprawą stanu zdrowia,
- choroba spowodowała obniżenie stopy życiowej całej rodziny, ale w żaden sposób nie wpłynęło to na relacje w niej panujące,
- panie właściwie wykorzystały zasoby w postaci wsparcia najbliższych, co świadczy o dużym poziomie zrozumiałości,
- pacjentki w trakcie leczenia nie korzystały z innych terapii niż te, które zlecił lekarz prowadzący,
- panie w badanej grupie przyjęły strategię akceptacji nowej sytuacji życiowej, wykazały duże przystosowanie do choroby, przyjęły strategię koncentrowania się na problemie, który skutecznie trzeba rozwiązać, aktywnie zmagają się z chorobą poprzez stosowanie się do zaleceń personelu medycznego,
- panie udały się na pierwszą wizytę do lekarza onkologa, gdyż same zaobserwowały niepokojące objawy przed upływem trzech miesięcy,
- panie chętnie rozmawiają o swojej chorobie z osobami borykającymi się z tymi samymi problemami zdrowotnymi,
- przekazywanie informacji przez personel medyczny odbywa się w niewłaściwy sposób,
- praktyki religijne przybrały na intensywności w momencie potwierdzenia się diagnozy raka piersi,
- panie uczestniczące w sondażu uważają, że rekonstrukcja piersi w żaden sposób nie poprawi jakości ich życia,
- pacjentki biorące udział w badaniu w chorują dłużej niż 5 lat, a stan swojego zdrowia oceniają jako dobry, mimo że stawiają czoła śmiertelnej chorobie,
- każda z pań ponownie zdecyduje się na leczenie, jeżeli zajdzie taka potrzeba,

Admission

Breast cancers are filling the disgraceful top one spot in terms of the incidence and the mortality amongst women in the world. “within 10 years of the war 58000 Americans got lost in Vietnam, and in the same time 33000 American women died (Jakubowski, 2005) because of the breast cancer. Diagnosing cancer considers itself the death sentence. However recently to observe it is possible, that more and more persons perceive this illness in other light. Many doctors, nurses and very patients more and more often treat this illness as chronic disease. They are picking up, abilities of dealing manifestations with, with therapy, often keeping the lifestyle moved close to it from ahead of illnesses. An operation treatment and a supplementing treatment are a beginning of the road which requires the full cooperation from the patient with the entire therapeutic team.

In the fight against illness a help of family and friends is important. Emotions which are accompanying diagnosing cancer it: fear, fear, anxiety, but also the faith in beautiful healing. Medicine already in ancient times knew, how great power lied in the human psyche and how very much she can be of help in the process of curing. Many rituals from the folk medicine from different ranges of the cultural and different directions of the world are based mainly for deep faith cured into the effectiveness of therapy. It is important so that the psyche happens with the ally in the treatment, rather than with enemy.

Aron Antonowsky trying to understand what affects the fact that ones persons are keeping the health and the long life, other whereas relatively more easily they are falling ill with illnesses and live more briefly. “formulated concepts genesis salute, which feeling the coherence is the most important notion in” (Antonovsky 2005). discovered principles with the help which it is possible to excuse functioning of generalized immunological stores. Strong feeling the coherence causes that the man is starting the stores typical of this situation and fully competently is using them. Incidence to malignant tumours of the breast, women, world is presented in Figure 1.

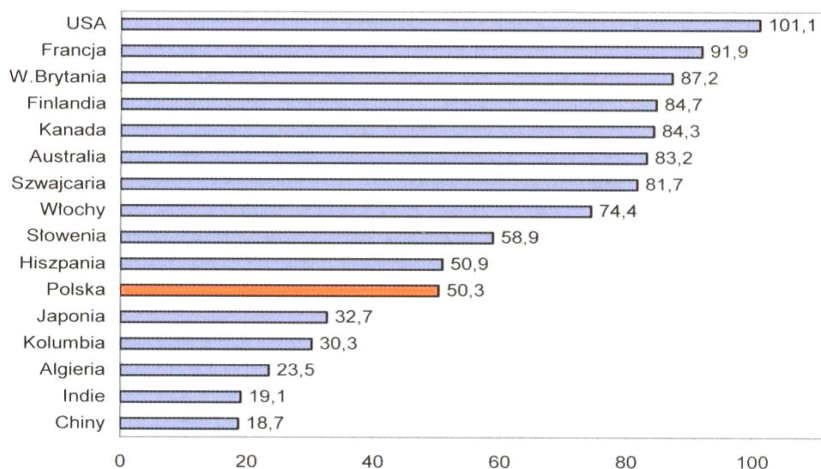


Fig. 1 Incidence to malignant tumours of the breast, women, world (Globocan 2002)

Source: Diagnostic imaging in mastopathies. Self-examination of the breast (Jakubowski 2005)

It is an extremely important element in the process of the early detection of the breast cancer, i.e. detecting disease when for her the state of the progress is creating very great chances of total healing. Breast check and every woman should have armpits in the habit. The breast check as part of the cancerous prevention is included in examinations the most stressed from the entire sequence of physical examinations. The significance of this examination is twofold, firstly it is a detailed examination of the breast, secondly for granting briefing the patient. To explain principles one should follow which during the self-examination. (Krajewska- Fist 2008) the Frequency of the self-examination should be correlated with the phase of the menstrual cycle (time in the month between 5-7 with day of the cycle, when breasts aren't swell up and painful).

They should explain their charges the facts of life to, that aren't examined for in order to find of tuber, but for in order to make sure that they don't have it. Making aware of the health hazard is one of the most important weapons for fight against this illness.

The self-examination of the breast consists of three stages:

- First phase in front of a mirror:
 - lift your arms high,
 - watch breasts whether you can't see changes in the shape of mammae
 - whether the skin on breasts isn't becoming wrinkled
 - whether the skin didn't change the colour
 - control it alone, what previously, with hands on hips
 - additionally clench warts and check whether he/she isn't secreted of them liquid
- Second phase under the shower:
 - put the left hand at the back heads, right on the left breast,
 - lightly pressing with three centre fingers roll small small wheels in length
 - breasts, up-down and back.
 - alone do it with the right breast. In this way you are checking, whether you don't have a nodule or a callous.

A technique of small and large circles is most often an adopted technique of the breast check. (Krajewska- Kulak 2008)

- The third stage:
 - up to the left shoulder put the towel rolled up, put the left hand up to the head, and three centre
 - with fingers of the right-hand man examine the left breast, with the same technique, what under the shower. Repeat it alone with the right breast. (Lewera 2005)
 - get your hands along the torso and examine armpits. Check, whether you don't have swollen glands

Material and research methods

Checking feeling the coherence which the intelligibility, the sense and the resourcefulness comprise at hurt patients was a purpose of research with problem of the cancer of the breast.

Too essential research problems were adopted:

- checking whether the sentence style is a preferred style of dealing illness with?
- the inspection or such variables sociodemographic as the age, level of education, do influence choice about specific ways of dealing cancer with?
- checking, or feeling the coherence is satisfactory even though at patients they put "fatal diagnosis" - crayfish?

Examinations were conducted on days from 1 XII 2010 to 30 III 2011 in the University Centre of Sea and Tropical Medicine in Gdynia Redłowie. It constituted the research group 52 patients, at which the crayfish was recognised pedestrians. In the examination women participated in the century from 31 - 70 and more years of age. From amongst fifty two patients women constituted the largest group from 51 - 60 of year of age 21 of them were what the 40% of all examined persons constitutes. Patients from 31 - 40 a 11% of the examined group that is 6 persons constituted the year of age. In order to obtain replies to stated research problems a method called the diagnostic survey was used. For that purpose an author's questionnaire of the questionnaire form containing 26 questions was drawn up. They were answering the survey anonymously, in order to eliminate the influence of subjective setting to given responses, in accordance with personal proceedings and expectations the polled person.

Discussing findings

First from hypotheses established, that patients touched with the cancer of the mamma, notice swimming information than one's closest, concerning the support and all help invalid and illness has an adverse impact to the household budget what to a considerable degree negatively influences relations ruling in the family. Based on obtained findings it is possible to state that the hypothesis was proven pole partly. Opinions of patients in the large per cent of the 96% (yes 44%, rather this way 52%) state big supporting the most immediate environment in the fight against illness. Only two women what the 4% constitutes from

of examined group, stated, that than aren't feeling supporting from the side closest. He is a truth, that illness has an adverse impact to the household budget of the 92% (yes 69%, rather tak23 %), but such a state isn't affecting relations ruling in the family. The second hypothesis assumed that patients were using all possible medicaments from the so-called alternative medicine. Findings aren't proving the above hypothesis. Straight majority of asked women (90%) stated that she had used no other medicines than the ones which the doctor prescribed oncologist. Another research problem assumed that patients with the breast cancer were abiding by medical recommendations, regularly are attending arranged visits, and in spite of all the difficulties, behind itself what everyday performance of lymphatic drainage is bringing him conscientiously are making. Patients with one's opinions confirmed the above thesis. In the examined group patients in the 86% declared the regular involvement in prophylactic examinations (yes the 52% and the 34%). In the opinion of the straight majority, the everyday performance of lymphatic drainage is undoubtedly hampering the 94% (yes 75%, 19% rather this way), and yet the 75% of polled women regularly performs that drainage, remaining the 25% doesn't perform lymphatic drainage. You participating in the survey went with the first visit to the doctor of the oncologist after the end of the month of examinations different from stating worrying manifestations within the mamma, by the way. Didn't manage to prove this hypothesis. 52% from the examined group to the oncologist arranged the first visit because of own anxiety, but 38 % women a doctor suggested the visit by the way of other examinations. A time which passed from stating the first worrying manifestations is more than 3 months - 48%. Statement talking about the fact that patients most willingly are

talking to the doctor about their illness, even though the way, into which information about the medical condition of patients is being provided is wrong was only proven in partly. It results from results of the survey that patients most willingly are talking to contending persons about their health trouble with the same health problems (55%), and as for information provided by the medical staff on their health stated that information was be/being handed over into the wrong way. "yes" answered 66%. Patients which fell ill on "breast cancer" more intensively they are involved in religious observances and in their life a hierarchy of values changed to the benefit of the care of the health. A conducted survey proved this hypothesis. Before falling ill of the 94% it declared its religiousness (yes 83%, rather tak11 %), a 6% being missing these are replies of not a 4% and rather nie2 %. After recognizing of the cancer of the patient 98 % declared their religiousness, and remaining a 2% is a reply: "rather not", "not", nobody answered. As for hierarchies of values from before and after diagnosing the breast cancer like already they recalled higher the hypothesis also proved correct. Family for people polled she has always been valid for the 52% before illness, and after illness declared the 56%, that in the life a family was most important, however after diagnosing illness of the patient diametrically changed their mind. Next hypothesis assuming that the age of patients is affecting decisions on taking advantage of the possibility of the surrender for the fugitive of reconstruction breasts, which treatment in the opinion of patients he won't correct/improve the quality of their life, proved correct.

In the examination women participated in 62 % after the fiftieth year of age, 27% from an age bracket 41-50, altogether it a 89% of the entire examined group is determining. The same women to the question: "whether breasts are be/planing reconstructions" in the 96% answered, that no, only a 4% of women decided on reconstructions of the breast. If walks improvement of quality of life of patients after the repair treatment of only a 20% agreed with this statement ("rather this way" 12%, 8% "yes"). Findings of conducted examinations are proving the constructed hypothesis, concerning the passing time of lasting illness which is having a positive effect on opinions of patients on the state their health. From amongst the examined group the 53% is ill longer than 5 years, but the 30% up to 5 years together (83%) of examined group. The same women asked about the condition of their health stated that he was: "very good 10%," good "42%" satisfactory "34%. Patients with cancer gland deep they think that it is worthwhile taking the fight against illness, because the life is worth the commitment and effort. Conducted examinations proved the hypothesis. A hundred per cent from the examined group thinks that it is worthwhile taking the fight against illness (96% yes, the 4% rather this way). For the 72% illness is a next difficult life experience, with which needs oneself to advise. Fourteen percent women claimed: "I am be/feeling heavily, but thanks to supporting the closest ladies (advice)". 8% from the examined group claimed: "I am be/feeling heavily, but I must get by alone" 6% of patients answered: "nightmare if it knew, what I must go through I would never make up my mind for undertaking to cure. Based on conducted examinations it is possible to state that feeling the coherence at women participating in the examination is on the highest level. The Amazons accepted the sentence model of dealing illness with, actively deal everyday problems with. Positively they redefined their life. Resources they have which at their disposal are enough for them to start powers in oneself to the fight against illness.

Supporting the family is justifying them for everyday taking an effort of caring about the own health. The passing time is doing the condition of their health good. It isn't possible also to skip religious observances which they dressed on intensity, in the moment of falling ill. The closest statement for experienced illness is presented in Figure 2.

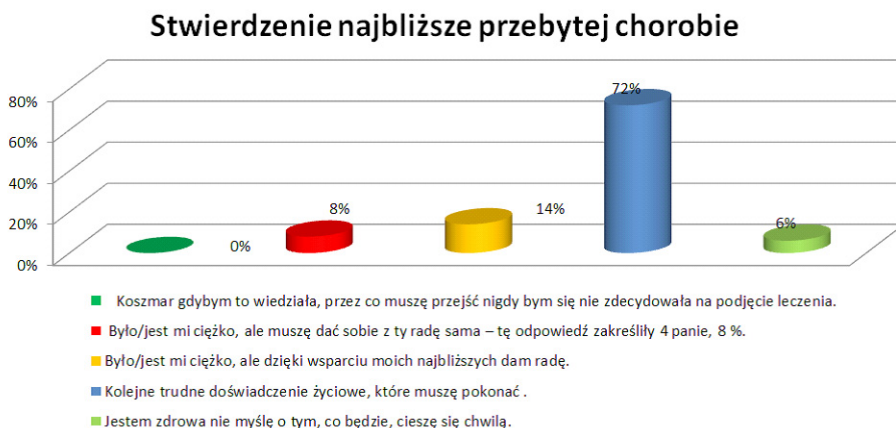


Fig. 2 The closest statement for experienced illness. Opinion of patients on the subject of the experienced cancer of the breast. Source: own study

Conclusions

1. In the examined group of patients big supporting the family was stated, of friends, which mobilizing influenced in taking all action associated with the improvement in the medical condition.
2. Illness caused lowering the standard of living of the entire family, but in no way it influenced relations ruling in it.
3. You actually used resources in the form of the support closest what is providing about the great level of the intelligibility.
4. Patients invalid didn't use other therapy than the ones which the doctor commissioned driver.
5. You in the examined group they adopted strategies of approval of the new their situation in life, demonstrated the great adaptation to illness, adopted strategies of the concentration on the problem which effectively it is necessary to untie.
6. Actively are battling against illness through the compliance to recommendations of the medical staff.
7. You they went to the first visit to the doctor of the oncologist, because alone observed alarming manifestations by the end of three months.
8. You willingly are talking to persons contending with the same health problems about their illness.
9. The transmission of information by the medical staff takes place into the wrong way.
10. Religious observances assumed diagnoses of the breast cancer on intensity in the moment of proving correct.

11. You participating in the survey think that reconstruction of the breast in no way will improve the quality of their life.
12. Patients participating in the examination in they are ill longer than 5 years, and are assessing the condition of their health as good, even though are facing up to a fatal illness.
13. Every of women again will decide on the treatment, if such a need occurs.

Bibliography

1. Antonovsky A. (2005) Rozwikłanie tajemnicy zdrowia. «Instytut Psychiatrii i Neurologii» Warszawa: 70 -120.
2. Barnaś E, Skręt A, Skręt-Magierko J. (2009) Jakość życia kobiet z chorobą nowotworową piersi. «Przegląd Menopauzalny»: 15 – 19.
3. de Walden-Gałuszko K.U Kresu. (2005) Opieka psychologiczna, czyli jak pomóc choremu, rodzinie, personelowi medycznemu środkami psychologicznymi. Gdańsk: 219- 222.
4. Chachaj A., Małyszczak K., Łukas J., Pyszczał K. (2007) Jakość życia kobiet z obrzękiem limfatycznym kończyny górnej po leczeniu raka piersi. Lublin 11/9: 444 – 448.
5. Chwałczyńska A., Woźniewski M., Rożek-Mróz K., Malicka J. (2004) Życie kobiet po mastektomii. „Wiadomości Lekarskie” LVII: 5- 6.
6. Czupryna A., Wilczek- Różyńska A. (2010) Wybrane zagadnienia pielęgniarstwa specjalistycznego. Lublin: 159
7. Graja T., Grodecka-Gazdowska S. (2005) Czynniki wpływające na jakość życia kobiet leczonych z powodu raka piersi. «Przegląd Ginekologiczny», Położnictwo: 5- 15
8. Jakubowski W. (2005) Diagnostyka obrazowa w chorobach sutka. Warszawa-Zamość I: 13- 25.
9. Jezierski A. (2005) Onkologia dla pielęgniarek. Leczenie chorych na nowotwór. Lublin: 95- 105.
10. Krajewska-Kułak E. (2007) Badania fizykalne w praktyce pielęgniarek i położnych. Lublin: 89- 97.
11. Kordek R. (2007) Onkologia podręcznik dla studentów i lekarzy. Gdańsk XXXII: 208- 209.
12. Kwiatkowska A. (2003) Komunikowanie interpersonalne w pielęgniarstwie. Lublin.
13. Lewera D. (2005) Poradnik dla amazonki: 8-10.
14. Paradowski L.I. (2006) Wybrane psychologiczne aspekty komunikowania się między lekarzem a pacjentem. „Adwent In Clinical and Experimental Medicine” 2006 I: 15.
15. Płuzańska A. (2006) Śmierć i nieuleczalna choroba jako problem w komunikacji z pacjentem w praktyce lekarskiej. „Onkologia Polska”: 166-171.
16. Wise T. (1999) Związek lekarz-pacjent. „Medycyna behawioralna”. Wrocław.
17. Wrzeński K., Skuza B. (2002) Wybrane zagadnienia medycyny psychosomatycznej i psychologii chorego somatyczne. Warszawa: 23.
18. Życińska J. (2006) Znaczenie poczucia własnej skuteczności w związku małżeńskim przez kobiety po mastektomii. Kraków: 43-48.

Strony internetowe:

1. http://pl.wikipedia.org/wiki/Poczucie_koherencji
2. [/www.psychologia.net.pl/artykul.php?level=119](http://www.psychologia.net.pl/artykul.php?level=119)
3. <http://amazonki.org.pl/aktualnosci.php?id=157>.
4. Rak sutka http://pl.wikipedia.org/wiki/Rak_sutka

Number of signs with spaces: 20 571

Krzysztof Jeziorski

John Paul II State School of Higher Education in Biała Podlaska

Państwowa Szkoła Wyższa im. Papieża Jana Pawła II w Białej Podlaskiej, Instytut Zdrowia

Gastro-entero-pancreatic neuroendocrine tumors – a challenging group of rare neoplasms

Guzy neuroendokrynne układu pokarmowego – wyzwanie terapeutyczne rzadkich nowotworów

Summary

Gastro-entero-pancreatic neuroendocrine tumors (GEP – NETs) are a heterogeneous group of rare neoplasms which may develop from neuroendocrine cells located in different parts of the digestive system (the foregut, the midgut and the hindgut). The classification is based on the mitotic rate and Ki67 labeling index. Therapy of GEP-NETs consists of different oncological methods such as: surgery, somatostatin analogs, interferon alpha, radioisotope therapy, chemotherapy and targeted therapy. Surgery remains the standard of care of neuroendocrine tumors of the digestive system. Resection or palliative debulking of liver metastases may improve overall survival. Somatostatin analogs are not only used in controlling hormonal symptoms in patients with functional GEP-NETs but also as antiproliferative agents. Peptide receptor radionuclide therapy is a special form of therapy in which somatostatin analogs are conjugated with isotopes. Chemotherapy is of limited value in well-differentiated GEP-NETs but is recommended in poorly differentiated GEP-NETs. Also, chemotherapy should be considered in individual patients when there is evidence of failure with other therapies. Targeted therapy is a new approach in the treatment of pancreatic neuroendocrine tumors.

Key words: gastro-entero-pancreatic neuroendocrine tumors (GEP-NETs), somatostatin analogs, interferon, targeted therapy, sunitinib, everolimus, chemotherapy, peptide receptor radionuclide therapy (PRRT), surgery

Streszczenie

Guzy neuroendokrynne układu pokarmowego stanowią heterogenną grupę rzadkich nowotworów wywodzących się z komórek neuroendokrynnych zlokalizowanych w różnych częściach układu pokarmowego (przedniej, środkowej i tylnej części jelita). Klasyfikacja tych nowotworów oparta jest na indeksach: mitotycznym i Ki-67. Terapia guzów neuroendokrynnych układu pokarmowego opiera się na różnych metodach: leczeniu chirurgicznym, stosowaniu analogów somatostatyny, interferonu alfa, terapii radioizotopowej, chemioterapii i terapii ukierunkowanej molekularnie (terapii wcelowanej). Chirurgia jest podstawową metodą leczenia. Resekcja lub zabiegi cytoredukcyjne zmian przerzutowych w wątrobie mogą przedłużyć całkowity czas przeżycia. Analogi somatostatyny są stosowane nie tylko w opanowaniu objawów hormonalnych występujących w zespole rakowiaka, lecz także jako leki o działaniu antyproliferacyjnym. Terapia radioizotopowa wykorzystuje analogi somatostatyny sprzężone z izotopami. Chemioterapia ma ograniczone zastosowanie w terapii guzów neuroendokrynnych układu pokarmowego, ale jest rekomendowana w nisko zróżnicowanych nowotworach

lub w przypadku niepowodzenia innych terapii pierwszego rzutu. Terapia ukierunkowana molekularnie jest nowym podejściem terapeutycznym w leczeniu guzów neuroendokrynnych trzustki.

Słowa kluczowe: guzy neuroendokrynnego układu pokarmowego, analogi somatostatyny, interferon, terapia ukierunkowana molekularnie (terapia celowana), sunitynib, ewerolimus, chemioterapia, terapia radioizotopowa, chirurgia

Gastro-entero-pancreatic neuroendocrine tumors (GEP-NETs) are a heterogeneous group of rare neoplasms that present many clinical challenges. It includes both malignant and rather benign variants of neoplasms. Although the majority of GEP-NETs are sporadic, there are some inherited syndromes connected with these neoplasms such as: multiple neoplasia type 1 and 2 (MEN-1 and MEN-2), von Hippel-Lindau syndrome, tuberous sclerosis and neurofibromatosis syndrome. The incidence of these tumors keeps increasing. For example the database of the National Cancer Institute demonstrated that the age-related incidence of neuroendocrine neoplasms (NEN) increased 481% within 30 years, from 1.09/100,000 in 1973 to 5.25/100,000 in 2004 (Yao JC et al, 2008) and the incidence of gastroenteropancreatic tumors increased 365% within 30 years, from 1.00/100,000 in 1973-1977 to 3.65/100,000 in 2003-2007 (Lawrence B, 2011). This type of tumors may develop from neuroendocrine cells located in different parts of the body and are grouped according to their embryonic origin: the foregut (lungs, thymus, stomach and duodenum), the midgut (jejunum, ileum, appendix, and the proximal part of large bowel), and the hindgut (distal part of large bowel and rectum). These rare tumors are generally characterized by a relatively indolent clinical course but the optimal management still remains to be defined.

Although there are different classifications of GEP-NET tumors such as: World Health Organization (WHO), American Joint Committee on Cancer (AJCC), North American Neuroendocrine Tumor Society (NANETS) the most commonly accepted are the classification of European Neuroendocrine Tumor Society (ENETS) and WHO. The both classifications include:

- NET – neuroendocrine tumor grade 1 (G1) – high grade of differentiation
- NET – neuroendocrine tumor grade 2 (G2) – intermediate grade of differentiation
- NEC – neuroendocrine carcinoma grade 3, large cell or small cell
- MANEC – mixed adenoneuroendocrine carcinoma

Both classifications calculate the tumor proliferation either on mitotic rate or Ki-67 labeling index. That is why the grading is based on these both parameters. Mitotic rate is expressed as the number in 10 high power microscope fields (hpf) or by percentage of cells labeling by immunohistochemistry for Ki67. The Ki67 labeling index usually correlates well with mitotic rate. The grade of GEP-NETs is a fundamental predictor of clinical outcome. For GEP-NETs a mitotic rate below 2/10 hpfs and Ki67 index <3% are typical for low grade malignancy (G1 – high grade of differentiation) and separate this type of tumors from tumors with intermediate grade of differentiation (2-20/hpfs and Ki67 index 3% - 20%), while poorly differentiated GEP-NETs (G3 grade) are characterized by a mitotic rate > 20/10 hpfs and Ki67 index >20%.

Therapy of GEP-NET tumors consists of different oncological methods such as: surgery, chemotherapy, radioisotope therapy, hormonal and targeted therapy.

Complete surgical resection of GEP-NET tumors is considered as the only potentially curative treatment. As far as non-functioning pancreatic neuroendocrine tumors are concerned, aggressive surgery is recommended for localized tumor larger than 2 cm (Hellman P et al, 2000; Triponez F et al, 2006) and lymph node dissection for tumors of 2.5 cm or larger and at least node sampling for tumors with a diameter of 1 cm or more. Debulking surgery should be advised in advanced tumors (Kim MJ et al, 2012). Resection of primary tumor in the setting of metastases may improve overall survival, especially in patients with small bowel tumors (Givi B et al, 2006; Schurr PG et al, 2007). Resection or palliative debulking of liver metastases in carefully selected patients may improve overall survival as well as control hormone mediated symptoms. However, such an approach is connected with a high recurrence rate up to 99% at 10 years (Mayo SC et al, 2010). Saxena et al. in a systematic review of clinical studies done before September 2010 confirmed that hepatic resection for hepatic metastases in GEP-NETs provides symptomatic benefit and is associated with favourable survival outcome although the majority of patients develop disease progression (Saxena A, et al., 2012). The other regional therapies for GEP-NETs include : hepatic arterial embolization, hepatic arterial chemoembolization, radiation therapy with ^{90}Y -labeled microspheres. Although these treatments are relatively well-tolerated with good radiographics response rates > 50%, there are no randomized trials supporting these beneficial results (Bergsland EK, 2013).

Somatostatin analogs (SA) play an important role in the treatment of GEP-NETs. They are not only used in controlling hormonal symptoms of patients with functional GEP-NETs but also as antiproliferative agents. SA control more than 70% of patients with carcinoid syndrome. They inhibit the secretion of peptides from tumors through somatostatin receptor subtype 2 (SSTR-2) and 5 (SSTR-5) . After activation of these both receptors intracellular potassium and calcium channels are activated , which leads to reduction of intracellular calcium and inhibition of protein kinase A through level inhibition of cyclic adenosine monophosphate (Toumpanakis C, Caplin ME, 2013). The antiproliferative activity of SA was shown in retrospective and in a prospective randomized phase III trial (PROMID study). In retrospective studies partial response (PR) was observed in up to 10% of patients and stabilization (SD) in about 50% of patients. In patients with progressive disease treatment with SA resulted in lower percentage of PR (3% - 7%) and SD (28% - 57%). Two recent studies (Bianchi A et al, 2011; Massuti B et al, 2011) demonstrated that treatment with lanreotide autogel led to higher percentage of SD (65,3% and 88,9%, respectively).

The PROMID trial demonstrated that progression-free survival (PFS) in patients with midgut GEP-NETs receiving octreotide LAR (long - acting release) was more than twice as long compared to patients who received placebo (14.3 months versus 6 months, retrospectively) (Rinke A et al., 2009). The antiproliferative activity of SA is based on direct and indirect mechanisms. The direct mechanism is connected with binding of SA to SSTR-2 and SSTR-5, which leads to inhibition of mitosis and cell cycle arrest. The indirect antiproliferative activity is mediated by: 1) decreased production of several growth factors such as growth hormone and epidermal growth factor, 2) inhibition of angiogen-

esis, 3) immunomodulation through activation of natural killer cells (Toumpanakis C, Caplin ME, 2013). The final results of a phase III trial (CLARINET study) investigating the role of another SA analog, lanreotide LAR (long – acting release), are expected to be published soon.

A special form of SA therapy is peptide receptor radionuclide therapy (PRRT) based on yttrium-90 and lutetium-177 isotopes conjugated with SA. Radiopeptides bind to SSTR-2 and are internalized, which allows delivery of radioactivity to tumor and adjacent tumor cells. The study of Kwekkebbom et al. showed high percentage of complete and partial responses (30%) and stabilization (41%) (Kwekkebbom DJ et al., 2003). PRRT is recommended after failure of other medical therapies but the role of this therapy requires further elucidation in randomized trials. Such a trial comparing treatment with PRRT with high dose octreotide LAR is currently underway.

Interferon alpha (IFN α) is another biological therapy used in GEP-NETs. IFN α binds to a common receptor at the surface of tumor cells via induction of the JAK-STAT pathway, which leads to initiation of transcription of interferon inducible genes. There are two recommendations for using IFN α in GEP-NETs. Firstly, IFN α is considered as a standard treatment for carcinoid syndrome. Secondly, IFN α is frequently used as a second-line therapy if somatostatin analogs are not tolerated or patients are refractory to these drugs. Stabilization is observed in 50% - 60% of patients treated with IFN α and symptoms of carcinoid syndrome are controlled in 40% - 70% of the patients. However, treatment with IFN α is connected with high toxicity including: influenza-like symptoms, fatigue and weight loss.

Chemotherapy is another method of treatment of neuroendocrine tumors of digestive tract. However, the role of chemotherapy is different in well differentiated and in poorly differentiated GEP-NETs. Chemotherapy is of limited value in GEP-NETs with low proliferation indices but may be useful in higher grade tumors. Objective responses range between 0% - 33% for drugs including 5-fluorouracil, streptozocin and dacarbazine when used in monotherapy or in combination. There are inconsistencies between clinical studies with respect to responses, rate of criteria, especially those comparing the role of 5-fluorouracil and doxorubicin versus streptozocin and 5-fluorouracil. However, the percentage of responses in well differentiated GEP-NETs is low and this therapy is associated with high toxicity. That is why the chemotherapy is not recommended in well differentiated GEP-NETs. The aggressiveness of poorly differentiated GEP-NETs is similar to that of small cell lung cancer. That is why in such tumors the treatment consists of palliative chemotherapy and corresponds to the treatment of extensive stage small cell lung cancer (Olsen et al., 2012). Survival outcomes are unaffected by the Ki67 in contrast to well-differentiated GEP-NETs tumors where such association was shown (Binderup et al., 2010). Generally chemotherapies based on cisplatin and etoposide or three drug regimen including carboplatin, etoposide, and vincristine are used. The median survival in first regimen is 19 months, while in the second one is 15.3 months (Olsen et al., 2012). Well differentiated GEP-Nets usually did not respond to chemotherapy based on cisplatin and etoposide (Moertel et al., 1991). Chemotherapy should be also considered in individual patients when there is evidence of failure with other therapies such as somatostatin analogs, interferon or PRRT in the absence of alternative antiproliferative drugs.

Targeted therapy is a new approach in the treatment of GEP-NET tumors. The rationale for using such a therapy lies in good vascularization of these tumors and in dysfunction of mTOR pathway in tumors located in the pancreas. Of special interest is sunitinib, an inhibitor of VEGF (*vascular endothelial growth factor*) and PDGF (*platelet-derived growth factor*) receptors. It was investigated in many studies. In a double-blind placebo-controlled phase III study of Raymond et al. treatment with sunitinib was associated with an improvement in median PFS from 5.5 to 11.4 months compared with placebo (Raymond E et al, 2011). Everolimus, an oral inhibitor of mTOR, was investigated in a multinational double-blind placebo-controlled phase III study in patients with pancreatic NET (RADIANT-3 study). Everolimus significantly prolonged median PFS from 4.6 to 11 months compared with placebo (Yao JC et al., 2011). However, beneficial results of antiangiogenic agents and mTOR inhibitors are limited by the development of resistance. That is why new strategies are tested such as targeting multiple proangiogenic pathways or targeting VEGF with transcription factors (hypoxia-inducible factor 1) and everolimus with combination therapy with cixutumumab (a monoclonal antibody) or somatostatin analogues: octreotide and pasireotide ((Dang M et al., 2012).

Conclusions

1. GEP-NETs tumors are a challenging group of rare neoplasms.
2. Surgery still remains the gold standard of treatment of these tumors
3. Somatostatin analogs may be used in controlling hormonal symptoms of patients with functional GEP-NETs as well as antiproliferative agents
4. The role of peptide receptor radionuclide therapy requires further elucidation in randomized trials
5. Chemotherapy is of limited value in well-differentiated GEP-NETs while is recommended in poorly-differentiated GEP-NETs. Also, chemotherapy may be used as a second line treatment after failure of other therapies
6. Targeted therapy is a new approach in the treatment of pancreatic neuroendocrine tumors.

Bibliography

1. Bergsland E.K. (2013). The evolving landscape of neuroendocrine tumors. *Semin Oncol* vol. 40, nr 1, 4-22.
2. Bianchi A., De Marinis L., Fusco A., Lugli F., Tartaglione L., Milardi D., Mormande M., Lassandro A.P., Paragliola R., Rota C.A., Della Casa S., Corsello S.M., Brizi M.G., Pontecorvi A. (2011). The treatment of neuroendocrine tumors with long-acting somatostatin analogs: a single center experience with lanreotide autogel. *J Endocrinol Invest* vol.34, nr 9, 692-697.
3. Binderup T., Knigge U., Loft A., Federspiel B., Kjaer A. (2010). 18F-fluorodeoxyglucose positron emission tomography predicts survival of patients with neuroendocrine tumors. *Clin Cancer Res* vol. 16, nr 3, 978 – 985.

4. Dang M., Phan A.T., Yao J.C., (2012). New strategies for advanced neuroendocrine tumors in the era of targeted therapy. *Clin Cancer Res* vol. 18, nr 7, 1830-1836.
5. Givi B., Pommier S.J., Thompson A.K., Diggs B.S., Pommier R.F.(2006). Operative resection of primary carcinoid neoplasms in patients with liver metastases yields significantly better survival. *Surgery* vol. 140, nr 6, 891-897.
6. Hellman P., Andersson M., Rastad J., Juhlin C., Karacagil S., Eriksson B., Skogseid B., Akerström G. (2000). Surgical strategy for large or malignant endocrine pancreatic tumors. *World J Surg* vol. 24, nr 11, 1353-1360.
7. Kim M.J., Choi D.W., Choi S.H., Heo J.S., Park H.J., Choi K.K., Jang K.T., Sung J.Y. (2012). Surgical strategies for non-functioning pancreatic neuroendocrine tumours. *Br J Surg* vol.99, nr 11, 1562-1568.
8. Kwekkeboom D.J., Bakker W.H., Kam B.L., Teunissen J.J., Kooij P.P., de Harder W.W., Feelders R.A., van Eijck C.H., de Jong M., Srinivasan A., Erion J.L., Krenning E.P. (2003) Treatment of patients with gastro-entero-pancreatic (GEP) tumours with the novel radiolabelled somatostatin analog [177-Lu-DOTA 0, Tyr3] octreotate. *Eur J Nucl Med Mol Imaging* vol.30, nr 3, 417- 422.
9. Lawrence B., Gustafsson B.I., Chan A., Svejda B., Kidd M., Modlin I.M. (2011) The epidemiology of gastroenteropancreatic neuroendocrine tumors. *Endocrinol Metab Clin North Am* vol. 40, nr 1, 1-18.
10. Massuri B, Alonso Y, Marmol M, et al. (2011). Evaluation of the efficacy and the safety of lanreotide autogel 120 mg on tumor growth stabilization in patients with progressive gastroenteropancreatic (GEP) and bronchopulmonary (BP) neuroendocrine tumors (NETs) who are not eligible to surgery or chemotherapy. Paper presented at 16th European Multidisciplinary Cancer Congress, 2011 September 23-27, Stockholm, Sweden.
11. Mayo S.C., de Jong M.C., Pulitano C., Clary B.M., reddy S.K., Gamblin T.C., Celinski S.A., Kooby D.A., Staley C.A., Stokes J.B., Chu C.K., Ferrero A., Schulick R.D., Choti M.A., menthe G., Strub J., Bauer T.W., Adams R.B., Aldrighetti L., Capussotti L., Pawlik T.M. (2010). Surgical management of hepatic neuroendocrine tumor metastasis” results from an international multi-institutional analysis. *Ann Surg Oncol* vol. 17,nr 12, 3129-3126.
12. Moertel C.G., Kvols L.K., O’Connell M.J., Rubin J. (1991).Treatment of neuroendocrine carcinomas with combined etoposide and cisplatin. Evidence of major therapeutic activity in the anaplastic variants of these neoplasms. *Cancer* vol. 68, nr 2, 227 – 232.
13. Olsen I.H., Langer S.W., Jepsen I., Assens M., federspiel B., Hasselby J.P., Hansen C.P., Kjaer A., Knigge U. (2012). First- line treatment of patients with disseminated poorly differentiated neuroendocrine carcinomas with carboplatin, etoposide, and vincristine: a single institution experience. *Acta Oncologica* vol. 51, nr 1, 97-100.
14. Raymond E., Dahan L., Raoul J.L., Bang Y.J., Borbath I., Lombard-Bohas C., Valle J., Metrakos P., Smith D., Vinik A., Chen J.S., Hörsch D., Hammel P., Wiedenmann B., Van Cutsem E., Patyna S, Lu D.R., Blanckmeister C., Chao R., Ruzsniowski P. (2011) Sunitinib malate for the treatment of pancreatic neuroendocrine tumors. *N Engl J Med*. Vol.364, nr 6, 501-5013.

15. Rinke A., Müller H.H., Schade-Brittinger C., Klose K.J., Barth P., Wied M., Mayer C., Aminossadati B., Pape U.F., Bläker M., Harder J., Arnold C., Gress T., Arnold R., PROMID Study Group (2009). Placebo-controlled, double blind, prospective, randomized study on the effect of octreotide LAR in the control of tumor growth in patients with metastatic neuroendocrine midgut tumors, a report from the PROMID Study Group. *J Clin Oncol* vol.27, nr 28, 4656-4663.
16. Saxena A., Chua T.C., Perera M., Chu F., Morris D.L. (2012). Surgical resection of hepatic metastases from neuroendocrine neoplasms: a systematic review. *Surgical Oncology* vol.21, nr 3, 131-141.
17. Schurr P.G., Strate T., Rese K., Kaifi J.T., reichelt U., Petri S., Kleinkans H., Yekebas E.F., Izbicki J.R. (2007) Aggressive surgery improves long term survival in neuroendocrine pancreatic tumors: an institutional experience. *Ann Surg* vol. 245, nr 2, 273-281.
18. Toumanakis C., Caplin M.E. (2013). Update on the role of somatostatin analogs for the treatment of patients with gastroenteropancreatic neuroendocrine tumors. *Semin Oncol* vol.40, nr 1, 56-68.
19. Triponez F., Goudet P., Dosseh D., Cougard P., Bauters C., Murat A., Cadiat G. Nicolli-Sire P., Calender A., Proye C.A., French Endocrine Tumor Study Group (2006). Is surgery beneficial for MEN1 patients with small (< or=2 cm), nonfunctioning pancreaticoduodenal endocrine tumor? An analysis of 65 patients from GTE. *World J Surg* vol. 30, nr 5, 654-662.
20. Yao J.C., Hassan M., Phan A., Dagohoy C., Leary C., Mares J.E., Abdalla E.K, Fleming J.B, Vauthey J.N, Rashid A., Evans D.B.(2008). One hundred years after "carcinoid": epidemiology of and prognostic factors for neuroendocrine tumors in 35,825 cases in the United States. *J Clin Oncol* vol.26, nr 18, 3063-3072.
21. Yao J.C., Shah M.H., Ito T., Bohas C.L., Wolin E.M., Van Cutsem E. , Habday T.J., Okusaka T., Capolevila J., de Vries E.G., Tomassetti P., Pavel M.E., Hoosen S., Haas T., Lincy J., Lebwohl D., Öberg K. (2011) RAD001 in Advanced Neuroendocrine Tumors, Third Trial (RADIANT-3) Study Group. Everolimus for advanced pancreatic neuroendocrine tumors. *N Engl J Med* vol. 364, nr 6, 514-523.

Number of signs with spaces: 21 739

**Wojciech Józwicki¹, Mateusz Matusiak¹, Cezary Jochymowski¹, Anna Koper¹,
Krzysztof Plawski², Anna A. Brożyna¹**

¹Department of Tumor Pathology and Pathomorphology, Oncology Centre - Prof. Franciszek Łukaszczyk Memorial Hospital, The Ludwik Rydygier Collegium Medicum, Bydgoszcz, Nicolaus Copernicus University, Toruń, Poland

¹Zakład Patologii Nowotworów i Patomorfologii, Centrum Onkologii im. Franciszka Łukaszczyka, Collegium Medicum im. Ludwika Rydygiera, Bydgoszcz, Uniwersytet Mikołaja Kopernika, Toruń, Polska

²Department of Breast Cancer and Reconstructive Surgery, Oncology Centre - Prof. Franciszek Łukaszczyk Memorial Hospital, Bydgoszcz, Poland

²Oddział Kliniczny Nowotworów Piersi i Chirurgii Rekonstrukcyjnej, Centrum Onkologii im. Franciszka Łukaszczyka, Bydgoszcz, Polska

Estrogen (ER), progesterone (PR) and human epidermal growth factor HER-2 receptors expression status in breast cancers: study on the patients population at the Oncology Centre in Bydgoszcz
Status ekspresji receptorów estrogenowych (ER), progesteronowych (PR) i ludzkiego epidermalnego czynnika wzrostu HER-2 w rakach piersi: badania populacji pacjentek Centrum Onkologii w Bydgoszczy

Summary

In Poland, the number of newly diagnosed cases of breast cancers increases continuously and currently amounts to ca. 16000 cases per annum, with a reduced tendency in a number of deaths caused by the breast cancer observed for last 20 years. According to statistical data for 2010, the breast cancer represented 22.4% of all neoplasms in women and was first in terms of occurrence. Routine prognostic and predictive tests for breast cancer include estrogen (ER) and progesterone (PR) receptors and human epidermal growth factor receptor 2 (HER-2) expression in cancer cells. There is also a group of breast cancer patients in which no expression of any of these receptors is observed. They represent from 10 - 30% of all cases. These are called triple-negative cancers. A significant percentage of patients with triple-negative breast cancers have BRCA1 gene mutations. The triple-negative cancers are characterised by more aggressive clinical course, and quicker and more frequent recurrence. The aim of this study was to analyse estrogen, progesterone and HER-2 receptors expression in the population of patients treated at the Oncology Centre in Bydgoszcz. In the studied group the triple-negative (ER-/PR-/HER-2-) status was found in 68 patients (16.2% of the cases). Estrogen receptor expression was found in 286 cases (68.1% of the patients), progesterone receptor expression in 231 cases (55% of the patients), and HER-2 receptor expression in 91 cases (21.7%). Simultaneous estrogen and progesterone receptors expression was found in 222 (52.9%) patients. One of the breast cancer subtypes associated with the worst prognosis is the triple-negative subtype (ER(-), PR(-), HER-2(-)). Frequency of that subtype is high. The high ratio of these tumours in the population of patients with breast cancer requires a research aiming at finding new predictive and prognostic factors, to characterise their malignant potential and plan effective therapeutic scenarios. Subsequent studies will concern distribution of histological

types, grades and prognoses in that subgroup of breast cancer patients. Moreover, neoplasms occurring in young patients will be studied in detail (histological type, grade, response to hormonal and chemotherapy).

Key words: breast cancer, estrogen receptors, progesterone receptors, HER-2 receptor

Streszczenie

Liczba nowych zachorowań na raka piersi w Polsce stale rośnie i aktualnie wynosi około 16000 na rok, przy czym na przestrzeni minionych 20 lat obserwuje się tendencję do obniżenia liczby zgonów spowodowanych rakiem piersi. Według danych statystycznych za rok 2010, rak piersi stanowił 22,4% wszystkich nowotworów u kobiet i znajdował się na pierwszym miejscu w kolejności występowania. Do rutynowych badań prognostycznych i predykcyjnych w raku piersi należy określenie ekspresji receptorów estrogenowych (ER) i progesteronowych (PR) w komórkach nowotworowych oraz ocena ekspresji receptora HER-2/neu (receptora ludzkiego epidermalnego czynnika wzrostu, ang. Human Epidermal Growth Factor Receptor 2). Istnieje grupa pacjentek z rakami piersi, w których nie obserwuje się ekspresji żadnego z tych receptorów. Stanowią one 10 - 30% wszystkich przypadków. Są to tzw. raki potrójnie ujemne (ang. triple negative). Znaczna część pacjentek z potrójnie ujemnymi rakami piersi ma mutacje w genie BRCA1. Raki potrójnie ujemne cechuje bardziej agresywny przebieg kliniczny oraz szybsze i częstsze wznowy. Celem niniejszej pracy była analiza ekspresji receptorów estrogenowych, progesteronowych oraz receptora HER-2 w populacji pacjentek leczonych w Centrum Onkologii w Bydgoszczy. W badanej grupie status potrójnie ujemny (ER-/PR-/HER-2-) stwierdzono u 68 pacjentek (16,2% przypadków). Ekspresję receptorów estrogenowych stwierdzono w 286 przypadkach (68,1% pacjentek), receptorów progesteronowych w 231 przypadkach (55% pacjentek), natomiast ekspresję receptora HER-2 w 91 przypadkach (21,7%). Jednoczesną ekspresję receptorów estrogenowych i progesteronowych stwierdzono u 222 pacjentek (52,9% pacjentek). Jednym z najgorzej rokujących subtypów raka piersi jest subtyp potrójnie ujemny (ER(-), PR(-), HER-2(-)). Częstość występowania tego subtypu jest wysoka. Uzyskane rezultaty są zgodne z obserwacjami innych autorów. Wysoki odsetek tych guzów w populacji chorych na raka piersi wymaga poszukiwania nowych czynników predykcyjnych i prognostycznych, pozwalających charakteryzować ich złośliwy potencjał i planować skuteczne scenariusze terapii. Kolejne badania będą dotyczyły rozkładu typów histologicznych, zaawansowania oraz rokowania w tej subgrupie pacjentek z rakiem piersi. Ponadto zostaną szczegółowo zbadane (typ histologiczny, zaawansowanie, odpowiedź na hormono- i chemioterapię) nowotwory występujące u pacjentek młodych.

Słowa kluczowe: rak piersi, receptory estrogenowe, receptory progesteronowe, receptor HER-2

Introduction

Breast cancer is a malignant neoplasm prevailing in women, although it also occurs rarely in men. In women it is diagnosed ca. 100-150 times more often, and analyses conducted in Poland show it may occur in one out of ten women (Chabner et al. 2009; Pawlicki 2011; Donegan and Spratt 2012). In Poland, the number of newly diagnosed cases increases continuously and currently amounts to ca. 16000 cases per annum, with

a reduced tendency in a number of deaths caused by the breast cancer observed for last 20 years. According to statistical data for 2010, the breast cancer represented 22.4% of all neoplasms in women and was first in terms of occurrence. The highest morbidity ratio (48%) concerned the age interval from 50 to 64 years, while only 2% of all breast cancers were diagnosed in young women (up to 35 years). On a basis of data published for 2010 it can be seen that the number of fatalities resulting from that cancer increases after 40 years of age and reaches its peak at the age between 50 to 59 years. In 2010, the malignant breast cancer, the second cause of death from malignant neoplasms in women after the lung cancer, resulted in death of almost 13% of all patients with malignant neoplasm. With the breast cancer morbidity/mortality ratio being 3.0 this means that over 5200 women received help too late (Zatoński et al. 2012).

It is not possible to distinguish just one factor involved in malignant neoplasm development. Usually, cancer development results from interaction of several agents (Pawlicki 2011). The following factors are listed amongst those predisposing to breast cancer development: age, gender, genetic factors, hormonal influence (including hormone replacement therapy, hormonal contraception), lifestyle, diet, exposure to ionising radiation, as well as the reproduction factor. The high-risk group includes women who had their first child at older age, these whose first period occurred early, as well as with late-onset menopause. An important factor for the breast cancer development are hereditary BRCA1 and BRCA2 gene mutations, with BRCA1 mutation being a stronger risk factor. These autosomal recessive genes act as tumour growth suppressors (Chabner et al. 2009). Mutations in these genes increase a risk of breast and prostate cancers in men and breast, ovarian and uterine cancers in women (Kirchhoff et al. 2004; Ding et al. 2012). A risk for malignant breast cancer developing in mutated gene carriers may reach even 80% throughout their life (Easton et al. 1993).

From early 1990s, a decrease in mortality for malignant breast neoplasms has been observed (Chabner et al. 2009; Donegan and Spratt 2012). The most important condition for effective treatment and, eventually, healing, is quick diagnosis of a neoplasm at an early stage of its development (Pawlicki 2011). A correct diagnosis, implementation of effective therapy and relevant auxiliary treatments allow achieving the intended objective with as minimum intervention as possible in the patient's body. It is possible, amongst the others, due to increasing application of screening imagining, as well as due to extensive modern laboratory diagnostic methods (Chabner et al. 2009; Donegan and Spratt 2012).

Routine prognostic and predictive tests for breast cancer include estrogen (ER) and progesterone (PR) receptors expression in cancer cells, and therefore, confirming or excluding their sensitivity to hormones (Nomura et al. 1992; Pawlicki 2011). Many breast cancers are hormone-dependant tumours, thus exposition to increased estrogen and/or progesterone is related to increased risk of their development (Dunnwald et al. 2007; Chabner et al. 2009).

Estrogen (ER) and progesterone (PR) receptors belong to the family of intracellular steroid receptors. Estrogen and progesterone are hormones that can penetrate into a cell where after binding to receptors in cytoplasm they move to the nucleus. Their interaction with DNA facilitates appropriate control over gene expression (Cui et al. 2005). So far,

a role and functions of estrogen receptors and estrogen in breast cancer biology has been studied in more detail. Properties of progesterone and its receptors, and their role in cancer biology, on the other hand, are less known, although similarity to estrogen and its receptors roles is suspected. Activated estrogen and progesterone receptors influence expression of genes responsible for proliferation, apoptosis and angiogenesis. ER receptors participation in these processes significantly contributes to promoting uncontrolled neoplastic cell growth (<http://www.cancer.gov> 30.04.2012; Cui et al. 2005; Thomas et al. 2008).

Determining ER and PR receptors expression is a crucial procedure in pathomorphological and clinical assessment of breast cancer and facilitates qualification for an effective supplementary hormonal therapy. As it was mentioned above, expression of these receptors is a predictive marker for response to hormonal treatment blocking steroid receptors activity. A hormonal medication used in breast cancers exhibiting ER or PR receptors expression is tamoxifen, having antimitogenic properties and acting as an estrogen antagonist (Johnston and Dowsett 2003). The hormonal therapy is ineffective in patients with the hormone-receptor-negative breast cancer (Chabner et al. 2009). Currently, determining receptors' presence in neoplastic cells is a sole predictive factor widely used in all patients. According to some authors, expression of these receptors depends on age and they are more often found in elderly patients (Pieńkowski 2000).

Besides assessment of ER and PR receptors expression, being now a routine procedure, HER-2/neu receptor (Human Epidermal Growth Factor Receptor 2) expression is also assessed in patients with invasive breast cancer (Harrison, 2010). HER-2 is a transmembrane glycoprotein with tyrosine kinase activity (Barros et al.; Brennan et al. 2000; Gullick 2009). Activated HER has a very strong oncogenic effect by stimulating cellular division processes, inhibiting apoptosis and increasing migration rate and independence from extracellular signals (Alroy and Yarden 1997). Because of these properties, HER-2 expression is linked to a neoplastic transformation process and/or change in neoplastic cells behaviour (Badache and Goncalves 2006). Disorders in a neoplastic cells are related to HER-2/neu gene amplification and/or overexpression of its product, reflected in the increased number of protein molecules on the cell surface. HER-2 overexpression and/or amplification was found in many neoplasms, including colonic, lung, ovarian and breast cancers (Ramieri et al. 2010). Breast cancers with HER-2 overexpression and/or amplification are characterised by poorer prognosis due to increased risk of metastases and recurrence, and changed sensitivity to chemotherapeutic agents and the hormonal therapy administered. Consequently, overall survival periods in these patients are shorter by half than in patients with a negative HER-2 result (Pawlicki 2011). However, some patients with the invasive cancer and positive expression of that oncogene, respond positively to a therapy with monoclonal antibody anti-HER-2/neu, i.e., trastuzumab, particularly, in combination with specific chemotherapeutic agents. In HER-2-negative patients it is necessary to implement the cytostatic therapy (Chabner et al. 2009). A possibility to determine the HER-2/neu gene amplification degree and its expression allows using that parameter as a prognostic and predictive factor, as well as facilitates selection of the most suitable adjuvant therapy regime (Pawlicki 2011). There is also a group of breast cancer patients in which no expression of any of these

receptors is observed. They represent from 10 - 30% of all cases (Osborne 1998; Althuis et al. 2004; Dunnwald et al. 2007). These are called triple-negative cancers. A significant percentage of patients with triple-negative breast cancers have BRCA1 gene mutations. The triple-negative cancers are characterised by more aggressive clinical course, and quicker and more frequent recurrence (in: (Stevens et al. 2013)).

The aim of this study was to analyse estrogen, progesterone and HER-2 receptors expression in the population of patients treated at the Oncology Centre in Bydgoszcz.

Materials and study design

Patients

Breast cancer patients treated at the Prof Franciszek Łukaszczyk Memorial Oncology Centre in Bydgoszcz in the years 2004-2009 were enrolled in the study. The computer database of the Oncology Centre was used for patients' selection. The patients who had estrogen, progesterone and HER-2 receptors expression determined with immunohistochemical methods were qualified for the study. In patients with the uncertain HER-2 status, gene amplification was assessed by in situ hybridisation (FISH or CISH). Ultimately, 420 patients were qualified for the study. The average patient's age was 58.4 years (ranging from 29 to 89 years; median – 57 years). For the needs of this study the patients were assigned to age groups, with the patients' group of up to 40 years old called young patients.

Immunohistochemical determination of nuclear and membrane receptors expression

ER, PR and HER-2 receptors were determined immunohistochemically in standard 4-5 μm sections fixed in 10% buffered formaldehyde and embedded in paraffin.

To determine the nuclear receptors expression the following antibodies were used: anti-ER (clone 1D5,) anti-PR (clone PgR636) (DakoCytomation, Carpinteria, CA, USA). After heating to 60°C, the sections were dewaxed and hydrated. Antigenic determinants were found by heating the sections in Tris/EDTA buffer (pH 9.0) in a microwave oven (650 W) for 20 minutes. In thus prepared sections, the endogenous peroxidase activity was blocked with 3% H_2O_2 , and then they were incubated with diluted antibodies at the ratio 1:100 (anti-ER) or 1:200 (anti-PR) with TBS with 0.1% albumin at the room temperature for 30 minutes. Antibodies' binding sites were visualised using a secondary antibody coupled with a horseradish peroxidase-labelled polymer (30 minutes incubation at the room temperature) and diaminobenzidine (DAB; 5 minutes at the room temperature) in the EnVision™ Detection System and the Peroxidase/DAB+ kits (DakoCytomation, Carpinteria, CA, USA). Cell nuclei were stained with hematoxylin and preparations were embedded in a solid medium (Consul Mount; Thermo Fisher Scientific Inc. Waltham, MA, USA).

To determine HER-2 expression, HercepTest™ (Dako, Carpinteria, CA, USA) was used following the manufacturer's protocol. After sections were heated in a thermostat to 60°C, they were dewaxed and hydrated, and antigenic determinants were found in citrate buffer, pH 6.0. The endogenous peroxidase activity was blocked with 3% H_2O_2 with 15mM NaN_3 , and then rabbit primary antibody anti-HER-2 (Ready-to-use) was applied on the sections and incubated at the room temperature for 30 minutes. The sections were rinsed, and then a secondary antibody coupled with dextran polymer and horseradish peroxidase was applied on them (30 minutes at the room temperature), and antibody-

binding sites were visualised with DAB (5 minutes at the room temperature). Then the sections were stained with hematoxylin and embedded in a solid medium (Consul Mount; Thermo Fisher Scientific Inc. Waltham, MA, USA). For each reaction, a positive control included in the kit and the negative control with a reagent for a negative control included in the kit used instead of the primary antibody were performed simultaneously.

Assessment of immunohistochemically-stained preparations

The immunohistochemically-stained histopathological preparations were assessed qualitatively. The hormonal nuclear receptors (ER and PR) status was assessed with the cut-off point method, and cases where at least 10% of cancer cells exhibited expression of the studied receptor were classified as positive (ER+ or PR+), regardless of labelling intensity. Photos of representative cases for ER+, ER-, PR+ and PR- are shown in Fig. 1 A-C and Fig. 2 A-C.

Immunohistochemically-determined HER-2 receptor expression was assessed using the 4-grade scale specified by the American Society of Clinical Oncology/College of American Pathologists (Wolff et al., 2007). According to these criteria, cancers with no membrane staining were classified as HER-2 0 (negative). Cancers with weak and heterogeneous HER-2 membrane expression were classified as HER-2 1+ (negative). Cancers with weak or heterogeneous membrane expression present in at least 10% of cancer cells were qualified as HER-2 2+ (ambiguous). Cancers classified as HER-2 3+ (positive) showed strong, uniform HER-2 membrane expression for at least 30% of cancer cells. Photos of representative cases classified as HER-2 0, HER-2 1+, HER-2 2+ and HER-2 3+ are shown in Fig. 3 A-D.

Statistical results evaluation

The statistical evaluation of the results was performed with the Prism 5.00 package (GraphPad Software, San Diego, CA), and results with $p < 0.05$ were considered as statistically significant. Results obtained for the analysed groups were compared using the Wilcoxon rank test.

Results

Tab. 1 lists data for estrogen, progesterone and HER-2 receptors expression in the patients qualified for this study. Tab. 2 shows expression of studied receptors in the patients in each age group. Estrogen receptor expression was found in 286 cases (68.1% of the patients), progesterone receptor expression in 231 cases (55% of the patients), and HER-2 receptor expression in 91 cases (21.7%). Simultaneous estrogen and progesterone receptors expression was found in 222 (52.9%) patients.

In the studied group the triple-negative (ER-/PR-/HER-2-) status was found in 68 patients (16.2% of the cases).

The average age of patients with triple-negative cancers was 58.3 years (median 57.5 years versus 58.2 years and 57 years in groups of patients with any receptor expression, respectively). The average age of patients with HER-2 positive cancers was 55.9 years (median 54.0 years versus 58.8 and 59.0 years in patients with the HER-2 negative status).

Although no statistically significant differences were found, cancers with the ER+ and/or PR+ and HER-2+ status were least often found in the group of patients below 40 years of age (2.9% versus 6.6-8.8% for other cancer subtypes).

Discussion

From literature, in ca. 60% of invasive breast cancer cases cells contain receptors for these hormones (Pieńkowski 2000; Hayes et al. 2001; Dunnwald et al. 2007; Pawlicki 2011). In the group of patients qualified for this study, expression of these receptors was found in 52.9% of cases.

It must also be emphasised that ER receptor expression is more frequently observed (54-80 % (Thorpe et al. 1987; Kreiger et al. 1991; Nomura et al. 1992; Tavassoéli and Devilee 2003; Althuis et al. 2004) than PR receptor expression (34 - 65% breast cancer cases (Thorpe et al. 1987; Kreiger et al. 1991; Nomura et al. 1992; Althuis et al. 2004). Also in the patient population in our study, ER receptor expression was found more often (68.1% of cases) than progesterone receptor expression (55.0% of cases).

The literature data indicates that, similarly as in our analysed population where overexpression was found for 21.7% of the cases, HER-2 overexpression and/or amplification is also found in 20-30% of breast cancer cases (Dowsett et al. 2000).

The breast cancer subtype (ER+ and/or PR+, HER-2 -; ER+ and/or PR+, HER-2 +; ER- and PR-, HER-2 -; ER- and PR-, HER-2 +) distribution in the analysed population was similar to that reported in the literature (e.g.: (Kwan et al. 2009)) and we did not observe a relationship between studied receptors expression and the patients' age. Other authors found significantly more frequent occurrence of ER+ and/or PR+, HER-2- subtype and ER+ and/or PR+, HER-2+ subtype in younger patients (Kwan et al. 2009). Similarly, according to published data, HER-2 overexpression and the triple-negative subtype is more often found in younger patients (e.g.: (Dolle et al. 2009; Kwan et al. 2009)). However, these relationships were not observed in the patients' population in this study.

Conclusions

One of the breast cancer subtypes associated with the worst prognosis is the triple-negative subtype (ER(-), PR(-), HER-2(-)). Frequency of that subtype is high. In our patients' population triple-negative tumours represented 16.2% of cases. Obtained results are consistent with observations of other authors (9.3% in the study (Kwan et al. 2009) or 12% in the study (Lund et al. 2009)). The high ratio of these tumours in the population of patients with breast cancer requires a research aiming at finding new predictive and prognostic factors, to characterise their malignant potential and plan effective therapeutic scenarios. Subsequent studies will concern distribution of histological types, grades and prognoses in that subgroup of breast cancer patients. Moreover, neoplasms occurring in young patients will be studied in detail (histological type, grade, response to hormonal and chemotherapy).

Tab. 1. Estrogen, progesterone and HER-2 receptors expression in breast cancer patients.

Receptor status	Number of patients/ percentage	Age [years] (mean/media)
ER+	286/68,1	58,6/59,0
ER-	134/31,9	57,2/56,0
PR+	231/55,0	58,7/59,0
PR-	189/45,0	57,6/56,0

HER-2 +	91/21,7	55,9/54,0
HER-2 -	329/78,3	58,8/59,0
ER+ and PR+	222/52,9	58,8/59,0
ER+ and PR-	64/15,2	58,3/56,5
ER- and PR+	9/2,1	56,8/53,0
ER- and PR-	125/29,8	57,2/56,0
ER+ and/or PR+, HER-2 -	261/62,1	58,9/59,0
ER+ and/or PR+, HER-2 +	34/8,1	56,0/54,0
ER- and PR-, HER-2 -	68/16,2	58,3/57,5
ER- and PR-, HER-2 +	57/13,6	55,8/54,0

Tab. 2. Estrogen, progesterone and HER-2 receptors expression in breast cancer patients grouped according to age.

Receptor status	Age group	Number of patients/ percentage
ER+ and/or PR+, HER-2 -	≤40 ys	17/6,5
	> 40 ys	244/93,5
ER+ and/or PR+, HER-2 +	≤40 ys	1/2,9
	> 40 ys	33/97,1
ER- and PR-, HER-2 -	≤40 ys	6/8,8
	> 40 ys	62/91,2
ER- and PR-, HER-2 +	≤40 ys	5/8,8
	> 40 ys	52/91,2
ER+	≤40 ys	11/4,0
	> 40 ys	275/96,0
ER-	≤40 ys	18/13,4
	> 40 ys	116/86,6
PR+	≤40 ys	14/6,1
	> 40 ys	217/93,1
PR-	≤40 ys	15/7,9
	> 40 ys	174/92,1
HER-2 +	≤40 ys	6/6,6
	> 40 ys	85/93,4
HER-2 -	≤40 ys	24/7,3
	> 40 ys	305/92,7

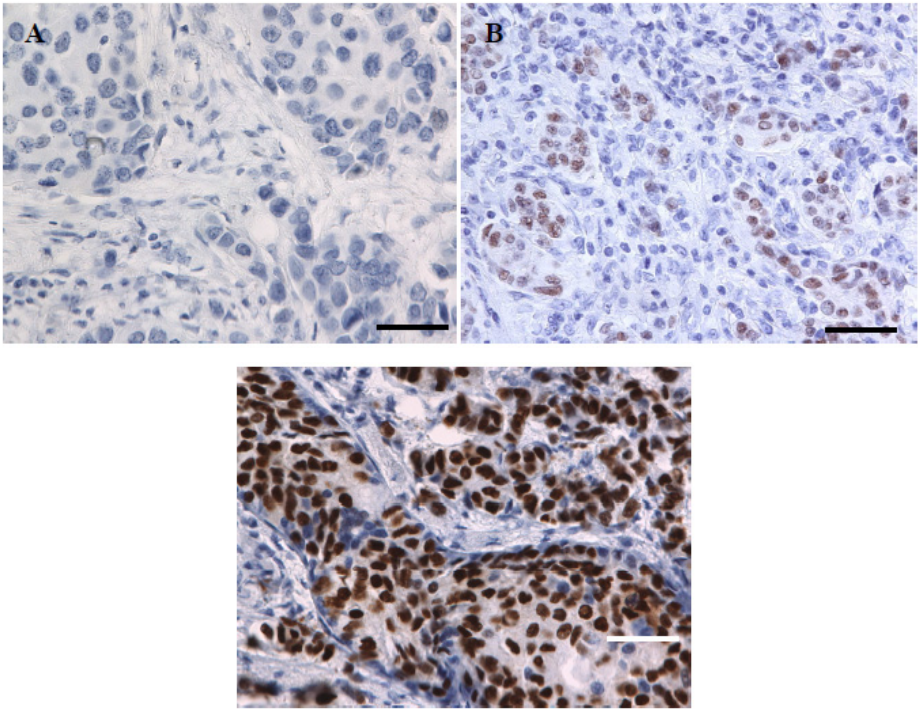
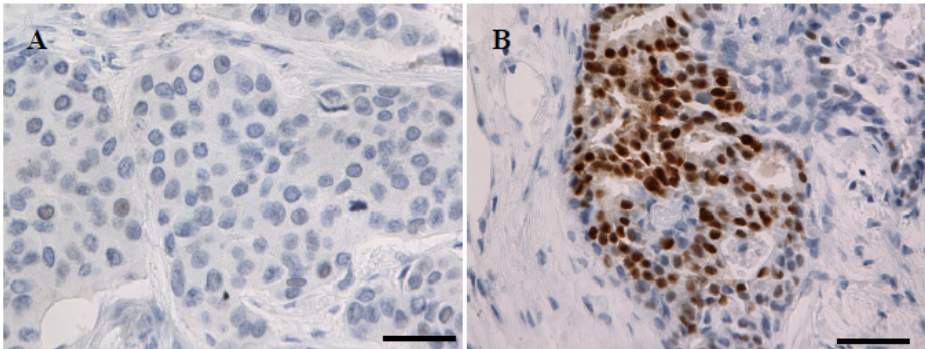


Fig. 1. The status of ER receptors detected using immunohistochemistry in the standard preparations fixed in formalin and soaked in paraffin. A) ER-negative expression (ER-) B) ER-positive expression (weak and average staining intensity in about 40% of cancer cells); C) ER-positive expression (strong and average staining intensity in about 90% of cancer cells). Scale bars - 50µm.



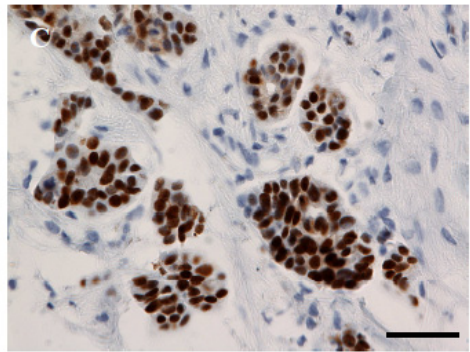


Fig. 2. The status of PR receptors detected using immunohistochemistry in the standard preparations fixed in formalin and soaked in paraffin. A) PR-negative expression (PR-) B) PR-positive expression (weak and average staining intensity in about 60% of cancer cells); C) PR-positive expression (strong and average staining intensity in about 90% of cancer cells). Scale bars - 50µm.

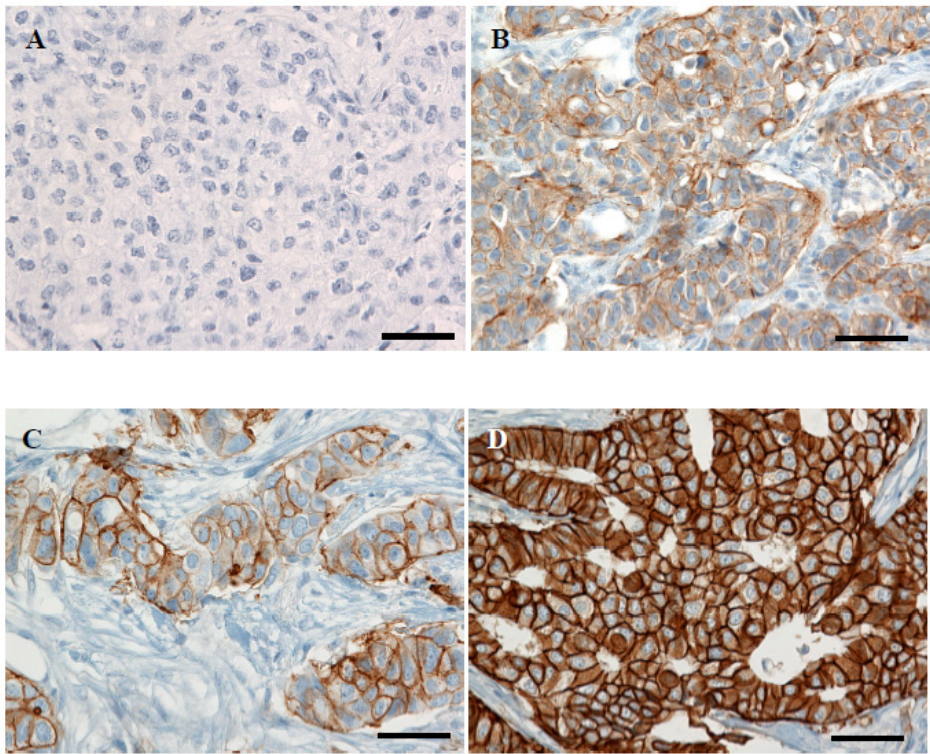


Fig. 3. A status of the HER-2 receptor in the sections labelled by immunohistochemistry in breast cancer. A) no HER-2 expression (HER-2 negative); B) HER-2 expression at 1+ (HER-2 negative); C) HER-2 expression at 2+ (HER-2 ambiguous status); D) HER-2 expression at 3+ (HER-2

positive). The blue-violet nuclei are tinted with hematoxylin. Scale bars-50 μ m.

Bibliography

1. Alroy I. and Yarden Y. (1997) The ErbB signaling network in embryogenesis and oncogenesis: signal diversification through combinatorial ligand-receptor interactions. *FEBS Lett* 410(1): 83-6.
2. Althuis M. D., Fergenbaum J. H., Garcia-Closas M., Brinton L. A., Madigan M. P. and Sherman M. E. (2004) Etiology of hormone receptor-defined breast cancer: a systematic review of the literature. *Cancer Epidemiol Biomarkers Prev* 13(10): 1558-68.
3. Badache A. and Goncalves A. (2006) The ErbB2 signaling network as a target for breast cancer therapy. *J Mammary Gland Biol Neoplasia* 11(1): 13-25.
4. Barros F. F., Powe D. G., Ellis I. O. and Green A. R. Understanding the HER family in breast cancer: interaction with ligands, dimerization and treatments. *Histopathology* 56(5): 560-72.
5. Brennan P. J., Kumagai T., Berezov A., Murali R. and Greene M. I. (2000) HER-2/neu: mechanisms of dimerization/oligomerization. *Oncogene* 19(53): 6093-101.
6. Chabner B., Lynch T. J. and Longo D., Eds. (2009). *Harrison. Onkologia*. Lublin, Czelej.
7. Cui X., Schiff R., Arpino G., Osborne C. K. and Lee A. V. (2005) Biology of progesterone receptor loss in breast cancer and its implications for endocrine therapy. *J Clin Oncol* 23(30): 7721-35.
8. Ding Y. C., McGuffog L., Healey S., Friedman E., Laitman Y., Paluch-Shimon S., Kaufman B., Liljegren A., Lindblom A., Olsson H., Kristoffersson U., Stenmark-Askmal M., Melin B., Domchek S. M., Nathanson K. L., i wsp. (2012) A nonsynonymous polymorphism in *IRS1* modifies risk of developing breast and ovarian cancers in *BRCA1* and ovarian cancer in *BRCA2* mutation carriers. *Cancer Epidemiol Biomarkers Prev* 21(8): 1362-70.
9. Dolle J. M., Daling J. R., White E., Brinton L. A., Doody D. R., Porter P. L. and Malone K. E. (2009) Risk factors for triple-negative breast cancer in women under the age of 45 years. *Cancer Epidemiol Biomarkers Prev* 18(4): 1157-66.
10. Donegan W. L. and Spratt J. S. (2012) *Cancer of the Breast*. <http://www.bcdecker.com/sampleofchapter/1550092723.pdf>.
11. Dowsett M., Cooke T., Ellis I., Gullick W. J., Gusterson B., Mallon E. and Walker R. (2000) Assessment of HER-2 status in breast cancer: why, when and how? *Eur J Cancer* 36(2): 170-6.
12. Dunnwald L. K., Rossing M. A. and Li C. I. (2007) Hormone receptor status, tumor characteristics, and prognosis: a prospective cohort of breast cancer patients. *Breast Cancer Res* 9(1): R6.
13. Easton D. F., Bishop D. T., Ford D. and Crockford G. P. (1993) Genetic linkage analysis in familial breast and ovarian cancer: results from 214 families. The Breast Cancer Linkage Consortium. *Am J Hum Genet* 52(4): 678-701.

14. Gullick W. J. (2009) The epidermal growth factor system of ligands and receptors in cancer. *Eur J Cancer* 45 Suppl 1: 205-10.
15. Hayes D. F., Isaacs C. and Stearns V. (2001) Prognostic factors in breast cancer: current and new predictors of metastasis. *J Mammary Gland Biol Neoplasia* 6(4): 375-92.
16. <http://www.cancer.gov>. (30.04.2012). "Understanding Cancer Series: <http://www.cancer.gov/cancertopics/understandingcancer/estrogenreceptors>."
17. Johnston S. R. and Dowsett M. (2003) Aromatase inhibitors for breast cancer: lessons from the laboratory. *Nat Rev Cancer* 3(11): 821-31.
18. Kirchhoff T., Kauff N. D., Mitra N., Nafa K., Huang H., Palmer C., Gulati T., Wadsworth E., Donat S., Robson M. E., Ellis N. A. and Offit K. (2004) BRCA mutations and risk of prostate cancer in Ashkenazi Jews. *Clin Cancer Res* 10(9): 2918-21.
19. Kreiger N., King W. D., Rosenberg L., Clarke E. A., Palmer J. R. and Shapiro S. (1991) Steroid receptor status and the epidemiology of breast cancer. *Ann Epidemiol* 1(6): 513-23.
20. Kwan M. L., Kushi L. H., Weltzien E., Maring B., Kutner S. E., Fulton R. S., Lee M. M., Ambrosone C. B. and Caan B. J. (2009) Epidemiology of breast cancer subtypes in two prospective cohort studies of breast cancer survivors. *Breast Cancer Res* 11(3): R31.
21. Lund M. J., Trivers K. F., Porter P. L., Coates R. J., Leyland-Jones B., Brawley O. W., Flagg E. W., O'Regan R. M., Gabram S. G. and Eley J. W. (2009) Race and triple negative threats to breast cancer survival: a population-based study in Atlanta, GA. *Breast Cancer Res Treat* 113(2): 357-70.
22. Nomura Y., Miura S., Koyama H., Enomoto K., Kasumi F., Yamamoto H., Kimura M., Tominaga T., Iino H., Morimoto T. and i wsp. (1992) Relative effect of steroid hormone receptors on the prognosis of patients with operable breast cancer. A univariate and multivariate analysis of 3089 Japanese patients with breast cancer from the Study Group for the Japanese Breast Cancer Society on Hormone Receptors and Prognosis in Breast Cancer. *Cancer* 69(1): 153-64.
23. Osborne C. K. (1998) Steroid hormone receptors in breast cancer management. *Breast Cancer Res Treat* 51(3): 227-38.
24. Pawlicki M., Ed. (2011). *Rak piersi - nowe nadzieje i możliwości leczenia* a-medica press.
25. Pieńkowski T. (2000) Czynniki predykcyjne u chorych na raka sutka. *Nowotwory* 50: 165-170.
26. Ramieri M. T., Murari R., Botti C., Pica E., Zotti G. and Alo P. L. (2010) Detection of HER-2 amplification using the SISH technique in breast, colon, prostate, lung and ovarian carcinoma. *Anticancer Res* 30(4): 1287-92.
27. Stevens K. N., Vachon C. M. and Couch F. J. (2013) Genetic Susceptibility to Triple-Negative Breast Cancer. *Cancer Res*.
28. Tavassoéli F. A. and Devilee P., Eds. (2003). *Pathology and Genetics of Tumours of the Breast and Female Genital Organs*. Lyon, IARC Press.

29. Thomas W., Caiazza F. and Harvey B. J. (2008) Estrogen, phospholipase A and breast cancer. *Front Biosci* 13: 2604-13.
30. Thorpe S. M., Rose C., Rasmussen B. B., Mouridsen H. T., Bayer T. and Keiding N. (1987) Prognostic value of steroid hormone receptors: multivariate analysis of systemically untreated patients with node negative primary breast cancer. *Cancer Res* 47(22): 6126-33.
31. Zatoński W., Didkowska J. and Wojciechowska U. (2012). Nowotwory złośliwe w Polsce w 2010 roku. Cancer in Poland in 2010. Warszawa, Centrum Onkologii-Instytut im. M. Skłodowskiej-Curie.

This work was supported by the statutory funds of the Ludwik Rydygier Collegium Medicum, Nicolaus Copernicus University.

Number of signs with spaces: 31 449

Maciej Kisiel¹, Dariusz Kacik², Małgorzata Konon-Kisiel³

¹Department of Urology, Provincial Specialist Hospital in Biała Podlaska
Head of Department :Henryk Konon, MD, PhD, Consultant Urological Surgeon

²Department of Anesthesiology, Provincial Specialist Hospital in Biała Podlaska
Head of Department : Jerzy Paluszkiewicz, MD

³Pope John Paul II State School of Higher Vocational Education in Biała Podlaska

Long-term results of the incision and resection of the bladder neck with bladder outlet obstruction based on the own material.

Odległe wyniki nacięcia i resekcji szyi pęcherza moczowego z powodu przeszkody podpęcherzowej w materiale własnym

Summary

Sclerosis of the bladder neck in many cases leads to a substantial obstacle to the emptying of the bladder. Treatments for disease are TUI-BN and TUR-BN.

Aim of this study is to compare the late results of both methods.

Retrospective analysis of 64 patients. In 38 patients, bladder neck incision was used. In 26 patients, respectively, resection of the bladder neck.

UD study analyzed after 3 and 6 months after surgery.

After 3 and 6 months in both groups reported a statistically significant increase in Q max (an average of 8ml/s and 8.5 ml / s, and 6, 5 and 8 ml / s)

After 3 and 6 months in both groups reported a small percentage of patients with BOO (16%, 15% and 16%, 19%). There was no statistically significant differences between the results of the treatment methods investigated. Transurethral incision of the neck Bladder (TUI-BN) seems to be a treatment of choice for BOO at the bladder neck.

Key words: bladder neck, sclerosis, incision,

Streszczenie

Stwardnienie szyi pęcherza w wielu przypadkach prowadzi do strukturalnej przeszkody podpęcherzowej w odpływie moczu. Leczenie zabiegowe prowadzi się poprzez TUI-BN oraz TUR-BN. Celem pracy jest porównanie wyników odległych zastosowania obydwu metod.

Retrospektywna analiza 64 pacjentów. U 38 pacjentów zastosowano nacięcie szyi pęcherza, u 26 pacjentów resekcję szyi pęcherza moczowego. Badanie urodynamiczne wykonywano po 3 i 6 miesiącach od zabiegu. Po 3 i 6 miesiącach w obu grupach zanotowano statystycznie istotny wzrost Q max (odpowiednio z 8 ml/s do 8,5 ml/s i z 6,5 ml/s do 8 ml/s). Po 3 i 6 miesiącach w obu grupach zanotowano mały procent pacjentów z BOO (odpowiednio 16%, 15% i 16% i 19%). Nie stwierdzono istotnych statystycznie różnic w analizowanych wynikach pomiędzy dwoma grupami pacjentów. Przezcewkowe nacięcie szyi pęcherza moczowego (TUI-BN) jako mniej inwazyjna wydaje się być metodą z wyboru w leczeniu przeszkody podpęcherzowej na poziomie szyi pęcherza u mężczyzn.

Słowa kluczowe: szyja pęcherza, stwardnienie szyi pęcherza, nacięcie.

Introduction.

Sclerosis, hypertrophy, bladder neck dysfunction are the modifications leading to incomplete opening of the urethra. Congenital bladder neck sclerosis (Marion's disease) is very rare. Acquired dysfunction of the bladder neck is due mostly to the development of scar tissue in the bladder neck due to chronic inflammatory processes taking place within the prostate and posterior part of the urethra and the surgical scar following open prostatectomy and transurethral resection of the prostate (TURP). (Sataa et al, 2009)

In the acquired bladder neck sclerosis dysuria, frequency, dribbling are dominating symptoms usually. Those symptoms are usually seen as an involuntary wetting, urinary urgency or recurrent urinary tract infection.

Sclerosis of the bladder neck in many cases leads to a substantial obstruction in emptying of the bladder. Some confirmation of the existence of bladder outlet obstruction (BOO) gives us a voiding cystometry. (Gidian-Joppe, 2008)

However, without videourodynamic investigation it is not possible to assess accurately the level of bladder outlet obstruction. In the absence of this option we must have recourse to additional findings as voiding cystography or cystoscopy. (Jocius KK et al, 2002)

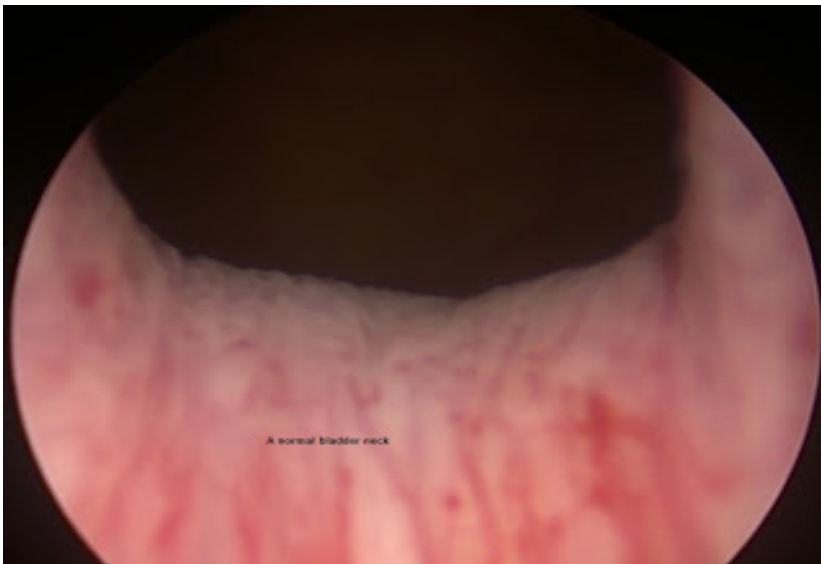


Fig. 1 Normal bladder neck. Cystoscopic view

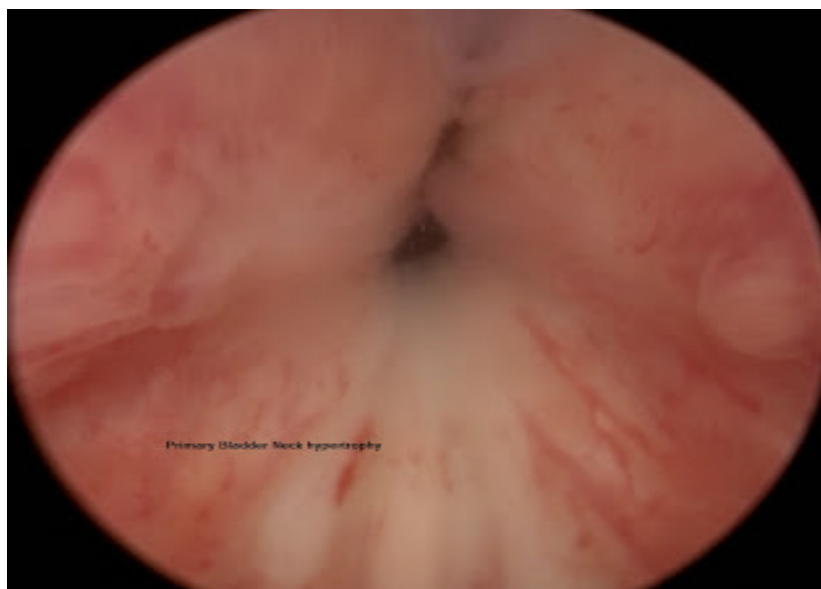


Fig. 2 Primary bladder neck hypertrophy. Cystoscopic view.

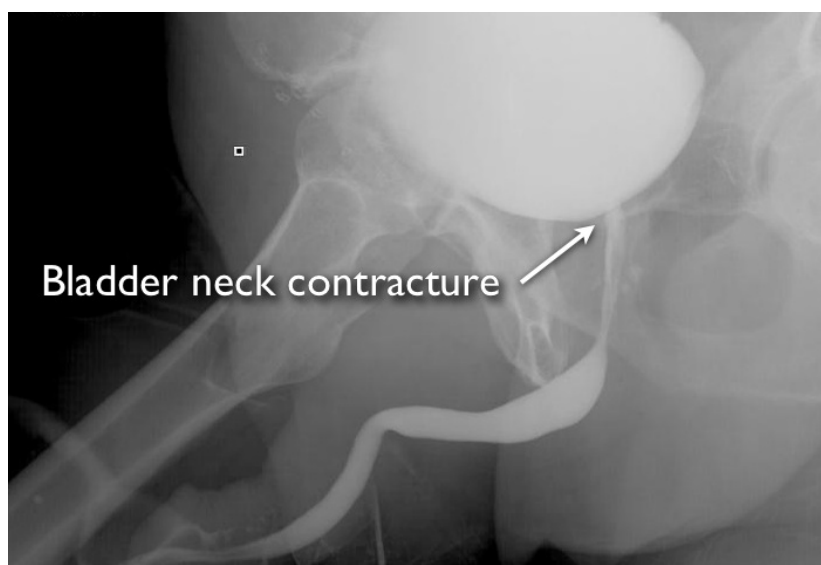


Fig.3. Bladder neck contracture in cystography.

Materials and methods.

The aim of the study is the comparison of the effectiveness of transurethral bladder neck incision (TUI-BN) and resection (TUR-BN) in the eradication of bladder outlet obstruction at the level of the bladder neck.

Sixty four patients who underwent transurethral incision (TUI-BN) or bladder neck resection (TUR-BN) in the years 2002 to 2009 were retrospectively analyzed in the Department of Urology WSS in Biała Podlaska. In 38 cases bladder neck incision were performed; 26 patients, respectively, had bladder neck resection

The patients were classified to the study based on urodynamic investigations and cystoscopy, which identified the presence of bladder outlet obstruction (BOO) . All patients did not respond to the pharmacological treatment.

All patients over 40 had their PSA levels determined before treatment. All of them underwent DRE and TAUS in order to exclude the obstruction directly related to the prostate adenoma.

The urodynamic study was performed at 3 and 6 months after surgery.

Tab. 1. Clinical material

	Transurethral incision of the bladder neck TUI-BN	Transurethral resection of the bladder neck TUR-BN
Number of patients	38	26
Age in years	27-55 mediana 34	22-61 mediana 38
Number of surgeons	3	3
Prostate volume (ml)	18-32 mediana 23	19-31 mediana 27
Qmax (ml/s)	6,5-10 mediana 8	4,2-11 mediana 6

TUI-BN was performed using electroresectoscope Ch No. 26 with Collings' cutting electrode. The line of cutting was carried out from the ureters orifices to the verumontanum at 5 and 7 o'clock.

TUR-BN was performed using electroresectoscope Ch No. 26 with the cutting loop electrode.

The resection range was selected based on subjective assessment of the operator.

The catheters were removed on the first day after surgery.

The patients were qualified to review by the urodynamic investigation after 3 months since operations with including criteria of negative results of urine culture.

Q max fluctuations were evaluated and the presence / absence of bladder outlet obstruction assessment in the pQ-plot ICS test.

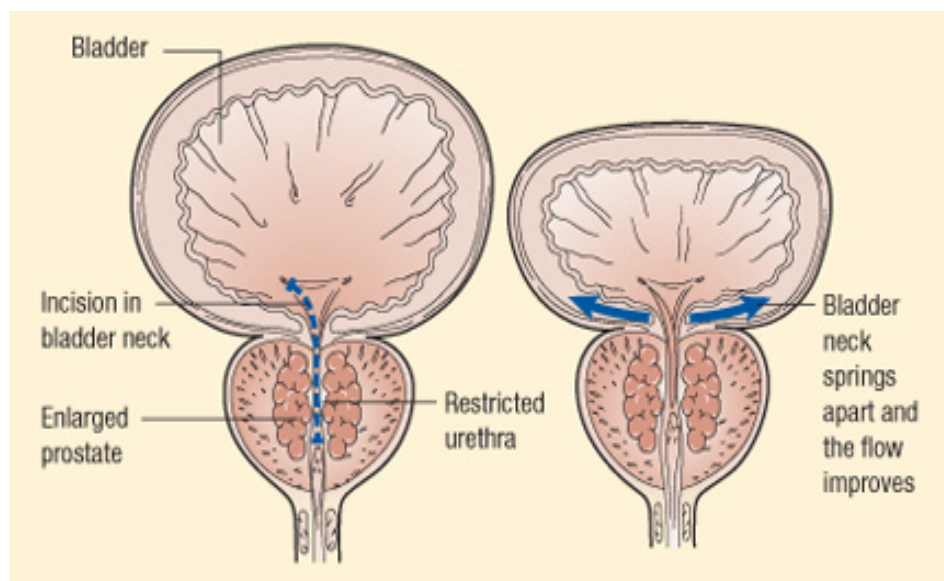


Fig.4 The scheme of incision of bladder neck.

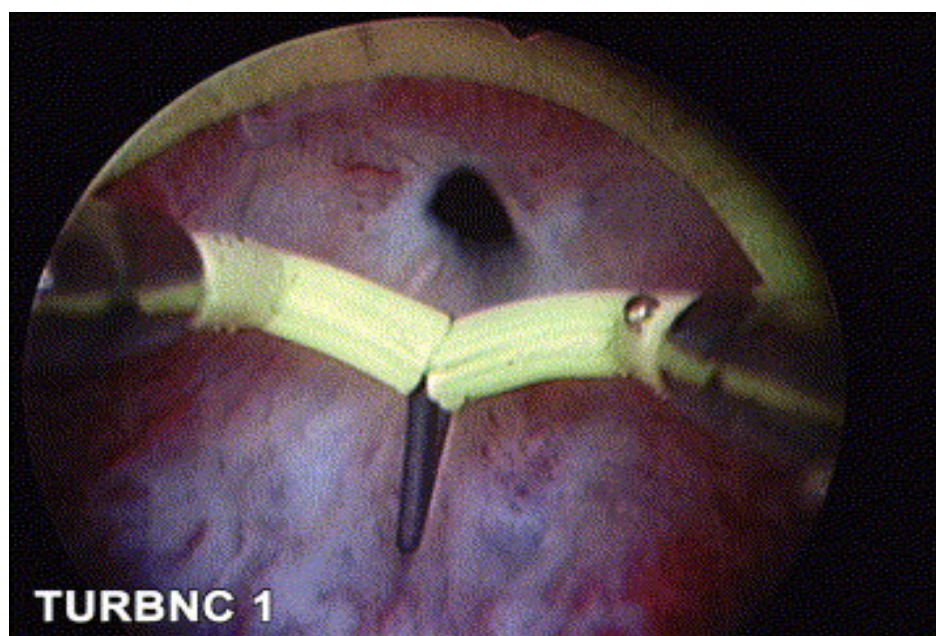


Fig.5. Collings' cutting electrode. Cystoscopic view.

Results

Three months-long assessment:

There was a statistically significant increase in Qmax in both groups of the patients.

Regarding TUI-BN group there was a Qmax increase observed from average of 8 ml / s to an average of 16 ml / s.

Regarding TUR-BN group there was a Qmax increase observed from average of 6 ml/ s to an average of 14, 5 ml / s

In the TUI-BN group urodynamic presence of BOO after 3 months of observation were found in 6 cases (16%).

In the TUR-BN group urodynamic presence of BOO after 3 months of observation were found in 4 cases (15%)

Six months-long assessment:

There was a statistically significant increase in Qmax in both groups of the patients.

TUI-BN group of the patients has averaged Qmax 14.5 ml / s.

TUR-BN group of the patients has averaged Qmax 14 ml / s.

In the TUI-BN group urodynamic presence of BOO after 6 months of observation were found in 6 cases (16%).

In the TUR-BN group urodynamic presence of BOO after 3 months of observation were found in 5 cases (19%).

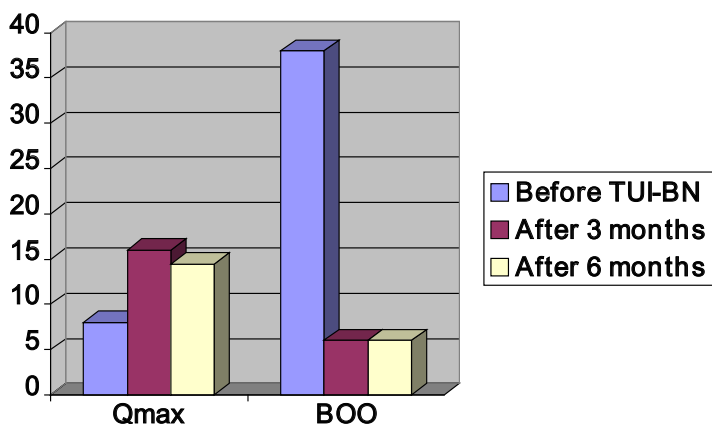


Fig. 6. Investigated urodynamic parameters in patients treated with TUI-BN

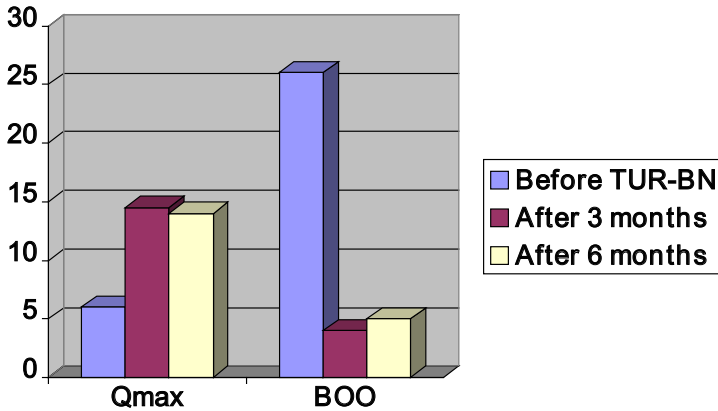


Fig.7. Investigated urodynamic parameters in patients treated with TUR-BN

Table 2. Comparison of urodynamics investigation group of patients treated with TUI-BN and TUR-BN after 3 months.

	TUI-BN	TUR-BN	significant statistical difference
Average Q max increase	8 ml / s	8.5 ml / s	no
BOO presence	16.00%	15.00 %	no

Table 3. Comparison of urodynamics investigation group of patients treated with TUI-BN and BN-TUR after 6 months.

	TUI-BN	TUR-BN	significant statistical difference
Average Q max increase	6.5 mL / s	8 ml / s	$p \approx 0.05$
BOO presence	16.00%	19.00%	$p \approx 0.05$

Discussion

Orandi distinguished four types of configurations of the neck and prostatic urethra, depending on the size of the prostate. With a prostate' weight up to 10 grams, the neck of the bladder is round and there are no signs of the parietal lobes of the prostate (type I P). As prostate grows the curtains symptom appearances (types II, III and IV) (. Orandi, 1987)

The most popular way to cut the bladder neck among the urologists is 5 and 5 o'clock cut from ureteric orifices to veromontanum and relatively deep into the surgical capsule of the prostate.

Although bilateral incision carries a high risk of reverse ejaculation, which, taking into account the relatively low age of the operated patients is quite unfavorable, but the quality of life including sexual life of patients after surgery is much higher than before. (Lourenco T et al., 2010)

The Incision of the neck at 12 o'clock proposed by Aboulker minimizes the risk of early ejaculation, but is not as effective considering BOO definitive treatment. (Aboulker P et al., 1964)

Conclusions

There were no statistically significant differences found in the results of treatment of bladder outlet obstruction between the TUI-BN and TUR-BN.

Transurethral bladder neck incision (TUI-BN) as a less invasive surgery treatment seems to be the method of choice.

Acknowledgments

Declaration of personal interests: none. Declaration of funding interests: none.

Bibliography

1. Aboulker P, Steg A. La divulsion de la prostate d'après observations 218. personnelles. J. Urol. Nephrol. 1964;70:337
2. Gidian-Joppe D. Review of urodynamics in urology. Urological Journal 2008 Aug;9(50):30-31
3. Jocius KK, Sukys D. Treatment of bladder neck obstruction (sclerosis): personal experience and literature review. Medicina. 2002; 38 Suppl 1:48-55.
4. Lourenco T, Shaw M, Fraser C, MacLennan G, N'Dow J, Pickard R . The clinical effectiveness of transurethral incision of the prostate: a systematic review of randomized controlled trials. World J Urol. 2010 Feb; 28 (1) :23-32.
5. Orandi A. Transurethral incision of prostate compared with transurethral resection of prostate in 132 matching cases. J. Urol. 1987;138, 810-815
6. Sataa S, Yassine N, Horch A. Bladder neck sclerosis after transurethral resection or surgical of the prostate: a report of 40 cases. Tunis Med. 2009 Dec;87(12) :810-3.

Number of signs with spaces: 22374

**Edyta Guty¹, Magdalena Kozimala¹, Małgorzata Dziechciaż^{1,2},
Luiza Balicka – Adamik³, Joanna Hłzecka⁴**

¹ Institute for Health Protection, State Higher School of Technology and Economic in Jarosław

¹Instytut Ochrony Zdrowia, Państwowa Wyższa Szkoła Techniczno-Ekonomiczna w Jarosławiu

²Non Public Health Care Institution “DAR” in Jarosław

²Niepubliczny Zakład Opieki Zdrowotnej “Dar” w Jarosławiu

³Department of Neurology of the Medical Center in Jarosław

³Oddział Neurologiczny, Centrum Opieki Medycznej w Jarosławiu

⁴Independent Neurological Rehabilitation Unit, Medical University of Lublin

⁴Samodzielna Pracownia Rehabilitacji Neurologicznej Uniwersytetu Medycznego w Lublinie

Assessment of functional capacity in patients with dementia. Ocena sprawności funkcjonalnej pacjentów z otępieniem.

Summary

Introduction. The physical performance is affected by many factors, health (systemic diseases, and organ) and socio-demographic characteristics (age, sex, education, place of residence).

The aim of this study was to assess changes in functional capacity of patients with dementia-ranking, Psychogeriatrycznym hospitalized.

The study used a method of diagnostic survey and measurement. The research was conducted in the Department of Psychiatry Psychogeriatrycznym Specialist Healthcare Team in Jarosław, in the period from October 2009 to February 2011. The study group consisted of 176 patients. Among the respondents were 112 women (63.64%) and 64 men (36.36%). Age of the patients ranged from 60 to 93 years.

Results. Length of hospital stay of patients ranged from 49 to 174 days. There was a decrease in functional capacity hospitalized. Particularly noticeable is the drop in performance after a week of hospitalization (2,375). However, in subsequent measurements, and gradually increases at the end of achieving the result is similar to the original.

Conclusions. Functional efficiency decreases with increasing severity of dementia. The reduction in functional results in the need to use third-party assistance in patient care conditions requires additional medical staff responsibilities.

Key words: dementia, efficiency funkcjonalną

Streszczenie

Wstęp. Na sprawność funkcjonalną ma wpływ wiele czynników zdrowotnych (choroby układowe i narządowe) i społeczno-demograficznych (wiek, płeć, wykształcenie, miejsce zamieszkania).

Celem pracy była ocena zmian sprawności funkcjonalnej pacjentów z postawionym rozpoznaniem otępienia, hospitalizowanych na oddziale Psychogeriatrycznym.

W badaniu wykorzystano metodę sondażu diagnostycznego i pomiar. Badania były prowadzone w Oddziale Psychogeriatrycznym Specjalistycznego Psychiatrycznego Zespołu Opieki Zdrowotnej w Jarosławiu, w okresie od października 2009 do lutego 2011 roku. Grupę badawczą stanowiło 176 pacjentów. Wśród osób badanych było 112 kobiet (63,64%) i 64 mężczyzn (36,36%). Wiek badanych mieścił się w przedziale od

60 do 93 lat.

Wyniki. Długość pobytu pacjentów w szpitalu wahał się od 49 do 174 dni. Zaobserwowano spadek sprawności funkcjonalnej u hospitalizowanych. Szczególnie widoczny jest spadek sprawności po tygodniu hospitalizacji (2,375). Natomiast w kolejnych pomiarach stopniowo wzrasta i na koniec osiągnięcia wynik zbliżony do początkowego.

Wnioski. Sprawność funkcjonalna spada wraz ze wzrostem zaawansowania otępienia. Obniżenie sprawności funkcjonalnej skutkuje koniecznością korzystania z pomocy osób trzecich a w warunkach opieki stacjonarnej nakłada na personel medyczny dodatkowe obowiązki.

Słowa kluczowe: otępienie, sprawność funkcjonalna

Introduction

In the assessment of elderly patients are used standardized international scales, which allow on one hand to determine the short and long term goals of care, on the other hand - offer the possibility of monitoring. This is called a comprehensive geriatric care. The main component of a comprehensive geriatric care is assessment of patient's efficiency, or ability to be independent from other persons in the performance of vital signs (Activities of Daily Living, ADL) and mobility, control of body functions, nutrition and hygiene of the body.

The physical performance is affected by many factors, health (systemic and organ diseases) and socio-demographic characteristics (age, sex, education, place of residence).

Aging process is often accompanied by multisystem pathology and emotional problems which may pose a risk limits, and even disability in performing activities of daily living. A thorough and multi-faceted analysis of the physical and psychosocial condition of elderly people is a measure to ensure the quality of care.

One of the conditions that increases the functional failure of dementia. Dementia is a disease that affects intelligence, memory, personality and emotional life of patients. It may occur in association with other diseases, and usually passes when the underlying condition is treated. However, it often happens that dementia is a major, independent health problem and is progressive. Dementia develops over several years, during which the patient is experiencing increasing problems with memory, is confused, and goes through personality changes. Even simple tasks at home can cause problems, which in turn leads to a situation where the patient needs more and more help from others.

Aim of the research

The aim of this study was to assess changes in functional capacity of patients with dementia, hospitalized in Psycho geriatric Ward.

Materials and methods

The study used a method of diagnostic survey and measurement. The survey used a questionnaire with data and socio-medical questions about established medical diagnoses. However, measurements were made using ADL scale (Activities of Daily Living), which assesses the patient's independence for the following tasks: bathing, dressing, toilet,

sphincter control, eating and mobility. Actions were assessed on a 0-1 scale. The patient is given one point for each task if it is able to be independently performed or 0 points, when it is not. The result of 0-2 points means that the patient is completely self-reliant and requires total care around the clock. Partly functional is the one that got 3-4 points and 5-6 points received fully operational patients. Assessment should be based on observation of the patient and not on the basis of the questions asked him. During the initial evaluation when the patient was admitted to the ward, the scale was filled on the basis of data obtained from family / carers. ADL scale is a standardized scale and generally available. Patients were also evaluated for the cognitive impairment of functions and the degree of dementia by means of the Mini-Mental scale (Mini-Mental State Examination - M-MSE). It contains six major tasks of checking the level of functioning of basic cognitive processes, such as: orientation in time and place, memory, attention and counting, recalling, language functions, constructional praxis. Number of points available was 30. 27-30 score is determined as being correct. Patients receiving a score of 24 to 26 points are characterized as having a cognitive disorder, but without dementia. A score below 24 points indicates that there may be dementia in the respondent's.

The testing was approved by the Ethics Committee of the Medical University in Lublin. Consent to participate in the study was obtained from the patients themselves or their carers, in the case of significant cognitive impairment.

For the description of the results were used the following statistics: the arithmetic mean, standard deviation (the most common measure of variability), median, minimum and maximum values.

Two as statistical tests were used, the Mann Whitney test and Wilcoxon test. Mann Whitney U test is nonparametric equivalent of t-test and is used to check whether the treatment groups come from different populations. It can also be used when the size of the group is small. In the description of the studies were used abbreviations relating to particular statistics: Z - value of Mann-Whitney test used for groups of size $n > 20$.

Wilcoxon test - nonparametric equivalent of t-test for variables linked. The study used an analysis of the differences between the two measurements related. The thesis uses the abbreviation referring to this test: Z - Wilcoxon value of the number of groups $n > 25$.

The study also used the following abbreviations relating to statistical analysis: N - number of patients, n - number of subgroups, p - level of significance. For a sufficient level of significance was set at $P < 0.05$. All statistical calculations were performed using the statistical package STATISTICA 6.0 PL.

Organization of the research

The research was conducted in the Psycho -Geriatric Department of Psychiatry Specialist Healthcare Hospital in Jaroslaw, in the period from October 2009 to February 2011. The study group consisted of 176 patients, of whom 119 had an established diagnosis of dementia and 57 of the control group - they have obtained over 24 points in MMSE scale. Among the respondents were 112 women (63.64%) and 64 men (36.36%).

Age of the patients ranged from 60 to 93 years. The arithmetic average age in this group was 74.67 years in standard deviation of 7.93. The median age was 75 years.

Age range from 60 to 65 years was represented by 30 patients (17.05%). At the age

of 66 to 70 years were 25 patients (14.20%). From 71 to 75 years were 34 respondents (19.32%). The most numerous age group was from 76 to 80 years, in which there were 42 respondents (23.86%). From 81 to 85 years were 29 patients (16.48%). At the age of 86 to 90 years were 14 patients (7.95%). More than 90 years had two patients (1.14%).

Among the respondents were 67 urban habitants (38.07%) and 109 village residents (61.93%).

Due to the education, the largest group were people with vocational education - there were 77 (43.75%). Primary education had 42 respondents (23.86%). Secondary education had 40 patients (22.73%). People with university degree were 17 (9.66%).

Most of the respondents came to the ward from the family home, where lived with the family - it concerned 108 of them (61.36%). Persons living alone before admission were one-third of the study group (59, 33.52%). A few people came out of nursing homes (4, 2.27%) and of care or nursing care and treatment centers (5, 2.84%).

During the research, four patients died (2.27%), three of whom came to the hospital from the family home, and one respondent from ASW / ZOL. 94 people returned to the family home (53.41%). To their homes returned 32 respondents (18.18%). For nursing homes went 4 people (2.27%), for 3 (1.70%) it was the return, one woman (0.57%) lived alone before hospitalization. After leaving the hospital of care or nursing care and treatment centers went 42 respondents (23.86%) - in the group four respondents were there before (2.27%), 1 (0.57%) went to the hospital from DPS another 11 (6.25%) from family houses, and 26 (14.77%) lived alone before.

Length of hospital stay ranged from 49 to 174 days. The arithmetic mean length of hospitalization was 79.57 with a standard deviation was equal to 9.29. The median was 80 days. Most - 70 patients (39.77%) were hospitalized for 76-80 or 81-85 days. Another 17 people (9.66%) spent in the hospital from 71 to 75 days. Over 85 days were hospitalized 9 patients (5.49%). For 10 patients (5.68%), length of hospital stay was less than 71 days.

The test results

On the basis of preliminary interviews with caregivers of persons approved at the ward, the degree of independence of the patient's vital signs (ADL) was evaluated by Katz scale. In fully functional at the time of adoption of the unit were 94 people (53.41%). Partially efficient there were 38 respondents (21.59%). Completely inefficient in terms of vital signs were 44 respondents (25.00%). During the test, measurements were made using 6 ADL scale. The first measurement was performed at admission, the second after a week of hospitalization, the third after four weeks, the fourth at 8 weeks, 5 w12 last week and on the patient's discharge from the ward.

Below in Table 1 is a detailed distribution of the results ADL scale.

Tab 1. The results of the measurements of ADL

Measurement	ADL scale points						
	0	1	2	3	4	5	6
initial (N=176)	21 (11,93%)	2 (1,14%)	21 (11,93%)	28 (15,91%)	10 (5,68%)	39 (22,16%)	55 (31,25%)
1 (N=176)	38 (21,59%)	5 (2,84%)	42 (23,86%)	54 (30,68%)	20 (11,36%)	15 (8,52%)	1 (1,14%)
2 (N=176)	5 (2,84%)	6 (3,41%)	50 (28,41%)	50 (28,41%)	40 (22,73%)	23 (13,07%)	2 (1,14%)
3 (N=175)	3 (1,71%)	(2,29%)	40 (22,86%)	30 (17,14%)	42 (24,00%)	54 (30,86%)	2 (1,14%)
4 (N=167)	3 (1,80%)	3 (1,80%)	34 (20,36%)	28 (16,77%)	16 (9,58%)	78 (46,71%)	5 (2,99%)
final (N=172)	3 (1,74%)	3 (1,74%)	33 (19,19%)	30 (17,44%)	16 (9,30%)	82 (47,67%)	5 (2,91%)

Calculations were also made for descriptive statistics of measurements, as illustrated in Table 2.

Tab 2. Descriptive statistics of ADL results

Measurement	the arithmetic mean	standard deviation	median
Initial - (N=176)	3,9375	2,0344	5
1 - (N=176)	2,3750	1,5734	3
2 - (N=176)	3,0852	1,2369	3
3 - (N=175)	3,5657	1,3196	4
4 - (N=174)	3,8263	1,4141	4
Final - (N=172)	3,8547	1,4004	5

In order to determine the dynamics of changes in the functional capacity of subjects the results obtained are shown graphically in Figure No. 1 There was a decrease in functional capacity of hospitalized. Particularly noticeable is the efficiency decrease after a week of hospitalization (2,375). However, in subsequent measurements it gradually increases and at the end of achieves similar result to the original.

Początkowy – initial, Nr – no, Końcowy – final, Średnia wartość ADL – Average ADL value

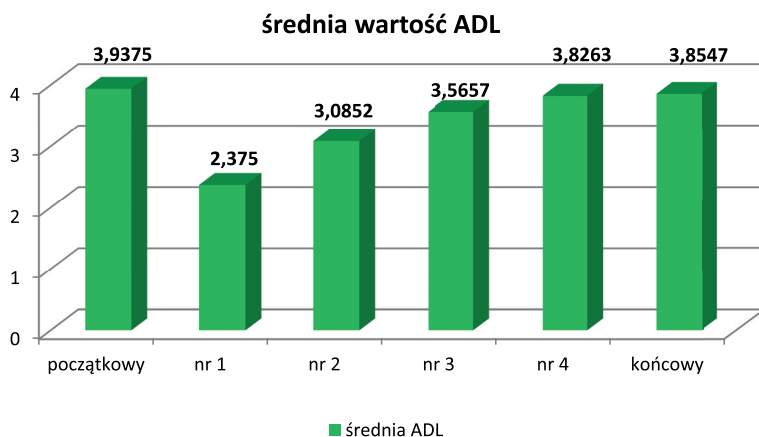


Fig. 1. Average values of measurement of Katz scale

In order to compare the differences between the ADL measurements were also made measurements of pair wise comparisons using the Wilcoxon test (nonparametric test for related measurements). Measurement No. 1, No. 2 and No. 3 differ on a statistically significant level with each other and with measurements: the initial and terminal 4. There were no significant differences between the measured initial and final 4. Results of the analyzes shown in the following table.

Tab. 3 Results of the comparison of measurements of functional capacity.

On.	Compared pair	N valid	Z	p
1	Initial vs no 1	176	9,2336	0,0000
2	Initial vs no 2	176	5,8602	0,0000
3	Initial vs no 3	175	2,6321	0,0085
4	Initial vs no 4	167	0,5959	0,5513
5	Initial vs final	172	0,7465	0,4554
6	No 1 vs no 2	176	7,7270	0,0000
7	No 1 vs no 3	175	9,2001	0,0000
8	No 1 vs no 4	167	9,3967	0,0000
9	Nr 1 vs final	172	9,5792	0,0000
10	No 2 vs no 3	175	6,7464	0,0000
11	No 2 vs no 4	167	7,7726	0,0000
12	No 2 vs final	172	8,0468	0,0000
13	No 3 vs no 4	167	4,8086	0,0000
14	No 3 vs final	172	5,1135	0,0000
15	No 4 vs final	167	0	–

ADL and gender

For each measurement using the U Mann-Whitney test there were compared the differences between the distribution of respondents by gender. There were no significant differences between men and women during the measurements: the initial and the No. 1. The results obtained by women in the assessment of functional capacity ADL scale were higher than men in the measurement results No. 2, No. 3, No. 4 and the final measurement.

Tab. 4 The results of comparison of the differences in the functional capacity of men and women

measurement	Women (K)		Men(M)		The value of statistics
	the arithmetic mean	standard deviation	the arithmetic mean	standard deviation	
Initial (K-112, M-64)	3,9107	1,9385	3,9844	2,2074	Z=0,7350 p=0,4623
no 1 (K-112, M-64)	2,5000	1,5480	2,1563	1,6057	Z=-1,5685 p=0,1168
no 2 (K-112, M-64)	3,2321	1,1777	2,8281	1,3039	Z=-2,1420 p=0,0322
no 3 (K-111, M-64)	3,7748	1,1885	3,2031	1,4604	Z=-2,4629 p=0,0138
no 4 (K-107, M-60)	4,0841	1,2821	3,6667	1,5290	Z=-2,8119 p=0,0049
Final (K-109, M-63)	4,0917	1,2659	3,4444	1,5322	Z=-2,5680 p=0,0102

ADL and age

Spearman's rank correlation has revealed a negative correlation between age and the results obtained in the ADL scale for each measurement.

Tab. 5 Performance of correlation analysis of the results for age and ADL

measurement	N	r_s	P
initial	(N=176)	-0,2935	0,0007
No 1	(N=176)	-0,3206	0,0000
No 2	(N=176)	-0,4003	0,0000
No 3	(N=175)	-0,4086	0,0000
No 4	(N=167)	-0,4432	0,0000
final	(N=172)	-0,4510	0,0000

ADL and place of residence

Comparison of differences using the Mann-Whitney test did not detect the existence of significant differences between urban and rural population of the results of the ADL.

Tab. 6 The results comparing differences in functional capacity between urban and rural population

Measurement	Village habitants (W)		Urban habitants (M)		The value of statistics
	the arithmetic mean	standard deviation	the arithmetic mean	standard deviation	
initial (W-109, M-67)	3,9817	2,0771	3,8657	1,9763	Z=0,5637 p=0,5730
No 1 (W-109, M-67)	2,3761	1,4580	2,3731	1,7567	Z=0,990 p=0,9211
No 2 (W-109, M-67)	3,1284	1,1394	3,0149	1,3871	Z=0,4692 p=0,6389
No 3 (W-108, M-67)	3,6111	1,2740	3,4925	1,3967	Z=0,4835 p=0,6288
No 4 (W-102, M-65)	3,8627	1,3427	3,7692	1,5286	Z=0,1740 p=0,8619
final (K-106, M-66)	3,8962	1,3233	3,7879	1,5243	Z=0,2362 p=0,8133

ADL and dementia

After five weeks of admission to the ward there has been assessed the degree of dementia scale using the Mini-Mental State Examination test. The arithmetic mean of the scale of the study was equal to 16.3295 (SD 7.9982) and median of 17 points. The results ranged from 0 to 29 points.

Based on the results of this study it was found that 119 patients (67.61%) achieved a result of testifying to dementia. The result of the lack of providing dementia received the remaining 57 patients (32.39%), who were the control group.

A detailed analysis of MMSE points to different levels of cognitive impairment and the related degree of dementia. The group without impairment involved 11 patients (6.25%). Light cognitive disorders, but without dementia was observed in 46 patients (26.14%). Light degree of dementia was diagnosed in 10 patients (5.68%). The average level of dementia was the most frequent in the group and referred to 68 cases (38.64%). Advanced dementia was found in 41 patients (23.30%).

Based on the final diagnosis in the group of subjects had a total of 113 cases of dementia (64.20% of the research group). Most often diagnosed vascular dementia was reported in 79 patients (44.89%). Unspecified dementia occurred in 20 patients (11.36%). Dementia of the Alzheimer's type was diagnosed in 9 patients (5.11%). In 5 patients (2.84%) had dementia in other diseases classified.

Earlier studies described by MMSE indicate in the group the presence of 119 patients (67.61%) with dementia. Final medical diagnosis suggest 113 patients with dementia (64.20%). This means that 6 patients (3.41% of the total test group), despite the absence of diagnosed dementia, were low enough for the MMSE scores to be recognized as a dull. Comparison of the difference between the terminal diagnosis and the identification of dementia based on the results of the scale using the Wilcoxon test showed no statistical significance of the difference ($Z = 1.0286$, $p = 0.3037$).

Statistical analysis showed a positive correlation between the MMSE score and the scores on the ADL scale.

Tab. 7 Performance of correlation of the MMSE results with ADL scale results

measurement	N	r_s	P
initial	(N=176)	0,3339	0,0000
No 1	(N=176)	0,5525	0,0000
No 2	(N=176)	0,6867	0,0000
No 3	(N=175)	0,6680	0,0000
No 4	(N=167)	0,6870	0,0000
final	(N=172)	0,6980	0,0000

Analysis by U Mann-Whitney test showed the differences between the group of patients without and diagnosed with dementia revealed a statistically significant difference in the results of the two groups for all measurements except for the initial measurement.

Tab. 8 The occurrence of dementia and ADL score

Measurement	The subjects with dementia			The subjects without dementia			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	119	3,6134	2,2926	57	4,6140	1,0816	$Z=1,6835$ $p=0,0923$
no 1	119	1,8824	1,5136	57	3,4035	1,1474	$Z=6,2139$ $p=0,0000$
no 2	119	2,6303	1,1340	57	4,0351	0,8444	$Z=7,1734$ $p=0,0000$
no 3	118	3,0932	1,3008	57	4,5439	0,6566	$Z=6,7323$ $p=0,0000$
no 4	112	3,3304	1,4230	55	4,8364	0,6601	$Z=6,2231$ $p=0,0000$
final	115	3,3478	1,4083	57	4,8772	0,5997	$Z=6,4832$ $p=0,0000$

ADL and comorbidities

The statistical analysis of U Mann-Whitney test revealed a statistically significant difference in the results of ADL due to co-occurrence of stroke.

Tab. 9 Diagnosis of stroke and ADL score

Measurement	Patients with stroke			Patients without stroke			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	13	3,5385	2,3315	163	3,9693	2,0136	Z=0,5770 p=0,5640
no 1	13	1,9231	1,6564	163	2,4110	1,5663	Z=1,0408 p=0,2980
no 2	13	2,3846	1,5021	163	3,1411	1,2012	Z=1,7224 p=0,0850
no 3	13	2,8462	1,5191	162	3,6235	1,2903	Z=1,7809 p=0,0749
no 4	13	3,0000	1,4720	154	3,8961	1,3917	Z=2,1235 p=0,0337
final	13	3,0000	1,4720	159	3,9245	1,3759	Z=2,1955 p=0,0281

Another Statistical Analysis of U Mann-Whitney test revealed no statistically significant differences in the results ADL due to the coexistence of hypertension, atherosclerosis, diabetes type II, heart disease and degeneration of the spine. The results are presented in the following tables.

Tab. 10 Diagnosed hypertension and ADL score

Measurement	The subjects without hypertension			The subjects without hypertension			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	84	3,9405	1,9961	92	3,9384	2,7980	Z=0,2147 p=0,8299
no 1	84	2,4167	1,5617	92	2,3370	1,5917	Z=0,2014 p=0,0,8404
no 2	84	3,0238	1,2609	92	3,1413	1,2187	Z=0,6398 p=0,5223
no 3	84	3,3810	1,3876	91	3,7363	1,2368	Z=1,6964 p=0,0898
no 4	80	3,6750	1,5490	87	3,9655	1,2709	Z=1,0171 p=0,3091
final	83	3,6747	1,5310	89	4,0225	1,2521	Z=1,3023 p=0,1928

Tab. 11 Diagnosed with generalized atherosclerosis and ADL score

Measurement	The subjects with generalized atherosclerosis			The subjects without generalized atherosclerosis			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	88	3,2728	2,1905	88	4,1477	1,8541	Z=0,9395 p=0,3498
no 1	88	2,2614	1,5047	88	2,4886	1,6400	Z=0,8817 p=0,3779
no 2	88	2,9886	1,1695	88	3,1818	1,3003	Z=0,9661 p=0,3340
no 3	88	3,5455	1,2215	87	3,5862	1,4187	Z=4312 p=0,6663
no 4	85	3,8235	1,2741	82	3,8293	1,5540	Z=0,3809 p=0,7032
final	86	3,8721	1,2630	86	3,8372	1,5329	Z=0,2037 p=0,8386

Tab. 12 Diagnosed with type II diabetes and the result of the ADL

Measurement	The subjects with type II diabetes			The subjects without type II diabetes			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	40	4,0500	1,9994	136	3,9044	2,0508	Z=0,3036 p=0,7614
no 1	40	2,7250	1,5189	136	2,2721	1,5798	Z=1,8887 p=0,0589
no 2	40	3,0750	1,2687	136	3,0882	1,2321	Z=0,2807 p=0,7790
no 3	39	3,5641	1,4472	136	3,5662	1,2864	Z=0,2958 p=0,7674
no 4	38	3,6316	1,5320	129	3,8837	1,3786	Z=0,7164 p=0,4730
final	39	3,6667	1,5275	133	3,9098	1,3621	Z=0,6948 p=0,4872

Tab. 13 Diagnosed with coronary heart disease (CHD) and ADL score

Measurement	The subjects with CHD			The subjects without CHD			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	5	3,0000	2,2361	171	3,9649	2,0289	Z=1,0018 p=0,3164
no 1	5	2,4000	1,8166	171	2,3743	1,5719	Z=0,1291 p=0,8973
no 2	5	2,8000	1,7889	171	3,0936	1,2236	Z=0,1514 p=0,8797
no 3	5	2,8000	1,9235	170	3,5882	1,2999	Z=0,9224 p=0,3563
no 4	5	3,4000	1,6733	162	3,8395	1,4094	Z=0,5540 p=0,5795
final	5	3,4000	1,6733	167	3,8683	1,3951	Z=0,5970 p=0,5505

Tab. 14 Diagnosed degeneration of the spine and the result of the ADL

Measurement	The subjects with spine degeneration			The subjects without spine degeneration			The value of statistics
	N	the arithmetic mean	standard deviation	N	the arithmetic mean	standard deviation	
initial	8	4,8750	1,2464	168	3,8929	2,0562	Z=1,1506 p=0,2499
no 1	8	3,2500	1,5811	168	2,3333	1,5656	Z=1,7401 p=0,0818
no 2	8	3,5000	0,9258	168	3,0655	1,2484	Z=1,0334 p=0,3014
no 3	8	4,1250	0,8345	167	3,5389	1,3342	Z=1,1144 p=0,2651
no 4	8	4,5000	0,9258	164	3,7925	1,4279	Z=1,3339 p=0,1822
final	8	4,5000	0,9258	159	3,8232	1,4139	Z=1,2797 p=0,2006

Discussion

Cognitive disorders and their severity cause progressive decline in functional capacity of people affected by it. Initially, this decline relates to complex life functions such as handling money, preparing meals, use of public transport. In a further period of helplessness occurs even when performing simple activities of daily living, such as washing, using the toilet or dressing, or even eating (Borowiak, Block 2008).

The reduction in functional efficiency results in the need to use the help of other people in residential care conditions imposed on the medical staff additional responsibilities resulting from the exercise by the patient or assist him in the performance of vital signs.

For people with cognitive impairment additional aggravating factor of the functional failure is hospitalization, as a change in the existing residential environment. A numb person in the new place has a severity of behavioral disorders, easily loses in the ward, has a problem with finding a toilet, while performing the process of washing of the body has sometimes aggressive behavior. In addition, drugs administered to patients mainly because of behavioral disorders, sleeping disorders and emotional lability may, especially in the morning, cause confusion, difficulty in mobility. In this study this phenomenon also occurred, after a week of hospitalization efficiency test got much worse. In subsequent measurements there was a significant improvement in results, most likely associated with easing of symptoms associated with hospital admissions and getting used to people hospitalized in new environmental conditions.

In terms of functionality it has been shown that patients without dementia were more likely to achieve higher scores in the ADL scale, which indicates that they were more functionally fit. However, those with a diagnosis of dementia were obtained significantly worse results on the basis which classified them into groups of patients independent or partially dependent. With the acquisition by patients due to lower MMSE, they also obtained poor results ADL scale. This phenomenon confirms the finding according to the functional efficiency of cognitive disorders.

It also has been confirmed in the literature that cognitive function decreases with the age.

Similar studies conducted by Tomaszewski et al with SPPB scale showed that in patients with dementia there is less physical ability compared with those without cognitive impairment (Tomaszewski et al 2010). The relationship between cognitive impairment and physical ability was documented by a study of Malmström et al (Malmstrom, 2005), Tabbarah et al (Tabbarah et al.2002) and Rosano et al (Rosano et al 2005). The research conducted by Tabbarah shows that cognitive impairment may lead to reduced walking and increased risk of falls (Tabbarah et al 2002).

Białachowska analyzed the level of functional capacity in patients with Alzheimer's disease with moderate dementia. The research showed that all test persons with dementia are dependent on the complex life functions (telephone, shopping, going out of the house, managing with money). For basic operations largest range of dependence was in laying in bed, waking up, eating, dressing, personal hygiene, using the toilet. The longest retained activity was in independent movement (Białachowska, 2010).

The study of Bońkowski and Klich-Rączka among ZOL patients showed that patients residing in the plant health care are much functional impaired, and the primary cause of severe and long-term functional impairment were the consequences of stroke and dementia syndromes (Bońkowski, Klich-Hand, 2007).

The relationship between performance on a AMTS (decreased mental ability test) scale and independence in ADL also analyzed Płaszewska-Żywko et al and pointed to the existing relationship. The lower the scores were, the worse was the functional efficiency (Płaszewska-Żywko et al. 2008).

There also has been analyzed the relationship between efficiency by ADL and the coexistence of other diseases in the study group. Positive correlations were obtained in only one case, it referred to a stroke.

Conclusions

1. Functional efficiency decreases with increasing severity of dementia.
2. The reduction in functional results in the need to use third-party assistance in patient care conditions requires additional medical staff responsibilities.

Bibliography

1. Białachowska A. (2010): Nieprawność funkcjonalna w umiarkowanym otępieniu w przebiegu choroby Alzheimera, *Geriatría*, 4, 5-9.
2. Bońkowski K., Klich-Rączka A. (2007): Ciężka nieprawność czynnościowa osób starszych wyzwaniem dla opieki długoterminowej, *Geront Pol*, 3, 97-102.
3. Borowiak E., Kostka T. (2008): Analiza sprawności funkcjonalnej osoby w starszym wieku. Rola pielęgniarstwa w zespole geriatrycznym, W: *Geriatría i pielęgniarstwo geriatryczne*, Wieczorkowska-Tobis K., Talarska D., Wyd. Lek. PZWL, 81-95.
4. Malmstrom T.K., Wolinsky F.D., Andresen E.M. et al (2005): Cognitive ability and physical performance in middle-aged African Americans, *J Am Geriatr Soc*, 53, 997-1001.
5. Płaszewska-Żywko L., Brzuzan P., Malinowska-Lipień I., Gabryś T. (2008): Sprawność funkcjonalna u osób w wieku podeszłym w domach pomocy społecznej, *Probl Hig Epidemiol*, 1, 62-66.
6. Rosano C., Simonsick E.M., Harris T.B. i wsp.(2005): Association between physical and cognitive function in healthy elderly. The Health, Aging and Body Composition Study, *Neuroepidemiology*, 24, 8-14.
7. Tabbarah M., Crimmins E.M., Seeman T.E.(2002): The relationship between cognitive and physical performance: MacArthur studies of successful aging, *J Gerontol Med Sci*, 57A, 228-235.
8. Tomaszewski K., Matusik P., Nowak J. i wsp.(2010): Otępienie a sprawność fizyczna pacjentów w podeszłym wieku mieszkających w wybranych domach opieki, *Gerontol Pol*, 2, 71-74.

Number of signs with spaces: 29 270

**Edyta Guty¹, Magdalena Kozimala¹, Małgorzata Dziechciaż^{1,2},
Luiza Balicka – Adamik³,**

¹Institute for Health Protection, State Higher School of Technology and Economic in Jarosław

¹Instytut Ochrony Zdrowia , Państwowa Wyższa Szkoła Techniczno-Ekonomiczna w Jarosławiu

²Non Public Health Care Institution “DAR” in Jarosław

²Niepubliczny Zakład Opieki Zdrowotnej “Dar”w Jarosławiu

³Department of Neurology of the Medical Center in Jarosław

³Oddział Neurologiczny, Centrum Opieki Medycznej w Jarosławiu

Factors influencing the occurrence of urinary incontinence in patients of psycho-geriatric ward

Czynniki wpływające na występowanie nietrzymania moczu wśród pacjentów oddziału psychogeriatrycznego

Summary

Introduction: Urinary incontinence (NTM) is a subjective symptom involving uncontrolled leakage of urine. It is considered a social disease, often concealed, causing many adverse changes in the functioning of the elderly.

Goal: Assessment of the problem of urinary incontinence among patients admitted to a psychogeriatric ward.

Materials and methods: Studies have been conducted in the psychogeriatric ward from October 2009 to February 2011. The study involved 176 patients. ADL scale was used and the analysis of the Charter of Patient's Nursing of psychogeriatric ward.

Results: The subjects ages ranged from 60 to 93 years. Patients in whom there is a problem of urinary incontinence during the first week of stay in the ward were 248, while the research group was ultimately 176 patients (46.93%) - in 72 patients (19.20%) resolved the problem of urinary incontinence. Patients with limited mobility were 37 people (21.02%), and another 6 were not able to move by themselves (3.1%). Regarding the pathology of muscle tone, has been found in 37.5%. Amblyopia was found in another 52 patients (29.55%), and blindness in 1 (0.57%). Only 38 people applied the glasses. Impaired balance were 90 respondents, and dizziness 41 (23.30%). Balance disorders occur together with dizziness in 11 patients, 6.25%). Another factor which urinary incontinence - disturbed sleep patterns - occurred in 73 patients (41.48%). Also determined based on the ADL scale efficiency and partially-disabled subjects were 38 patients (21.59%) and completely disabled in terms of basic vital signs were 44 respondents (25.00%).

Conclusions: Urinary incontinence was present in 46.93% of hospitalized patients. Many patients and their caregivers hide or do not admit to the occurrence of this ailment. Patients admitted to psychogeriatric ward were much burdened in terms of factors affecting the occurrence of the problem of urinary incontinence

Keywords: urinary incontinence, elderly

Streszczenie

Wprowadzenie: Nietrzymanie moczu (NTM) to objaw podmiotowy polegający na niekontrolowanym wycieku moczu. Jest uznawane za chorobę o charakterze społecznym, często ukrywaną, powodująca wiele niekorzystnych zmian w funkcjonowaniu osób starszych.

Cel: Ocena występowania problemu nietrzymania moczu wśród pacjentów przyjętych do oddziału psychogeriatрії.

Materiał i metody: Badania były prowadzone w Oddziale Psychogeriatrycznym w okresie od października 2009 do lutego 2011 roku. Badaniu poddano 176 pacjentów. Wykorzystano skalę ADL oraz analizę Karty Pielęgnowania Pacjenta Oddziału Psychogeriatrycznego.

Wyniki: Wiek badanych mieścił się w przedziale od 60 do 93 lat. Pacjentów u których wystąpił problem nietrzymania moczu w ciągu pierwszego tygodnia pobytu w oddziale było 248, natomiast grupę badawczą stanowiło ostatecznie 176 pacjentów (46,93%) – u 72 osób (19,20%) problem nietrzymania moczu ustąpił. W ograniczony sposób poruszało się 37 osób (21,02%), a kolejnych 6 nie poruszało się samodzielnie (3,1%). Odnośnie patologii w zakresie napięcia mięśniowego, występował ona u 37,5%. Niedowidzenie stwierdzono u kolejnych 52 pacjentów (29,55%), a ślepotę u 1 (0,57%). Tylko 38 osób stosowało okulary. Zaburzoną równowagę miało 90 badanych, a zawroty głowy 41 (23,30%). Zaburzenia równowagi występowały razem z zawrotami głowy u 11 pacjentów (6,25%). Kolejny czynnik nasilający nietrzymanie moczu – zaburzony rytm snu – wystąpił u 73 osób (41,48%). Określono też na podstawie skali ADL sprawność badanych i częściowo sprawnych było 38 badanych (21,59%) a całkowicie niesprawnych w zakresie podstawowych czynności życiowych było 44 badanych (25,00%).

Wnioski: Nietrzymanie moczu występowało u 46,93% pacjentów hospitalizowanych.

Wielu pacjentów, ich opiekunów ukrywa lub nie przyznaje się do występowania tej dolegliwości. Pacjenci przyjmowani do oddziału psychogeriatrycznego byli znacznie obciążeni pod względem czynników mających wpływ na występowanie problemu nietrzymania moczu

Słowa kluczowe: nietrzymanie moczu, osoby starsze

Introduction

In 2002 International Continence Society – ICS published a restated and updated report to standardise terminology of describing lower urinary tract function (Abrams 2002). According to which urinary incontinence is individual's symptom of involuntary urination.

Urinary incontinence (UI) can be acknowledged as social based disease (affecting 5 % of general population regardless of ethnic or cultural differences). Statistical data providing the frequency of occurrence of urinary incontinence varies among sources. In accordance with research carried among people between 20 and 29 seeking medical assistance concerning urinary incontinence, was mostly occurring with women and totalled 4,4 %. Percentage of people between 30 and 39 was higher and totalled 12 %, and for over 40 years of age increased to 25 %. It is estimated that for people over 70 years of age this problem concerns even 50 % of population. Based on the abovementioned data, there is relation between patients' age and intensification of occurrence of urinary incontinence (Szyszko-Perłowska 2006).

The problem is often not recognized as the patients consciously do not reveal this disorder, treating it as shameful or inevitable cause of ageing processes, doctors do not ask about it or other health related problems absorb their attention. It is estimated that the problem concerns approximately 25 – 30 % of the population of Poland (Radziszewski 2008).

Urinary incontinence is one of the elementary symptom in geriatrics. It is often caused by dementia, pneumonia or medicine intake (Ouslander1993). As it occurs, an estimated 15 – 30 % of people over 60 years of age living in their homes suffer from urinary incontinence of various intensification – the occurrence is always more frequent in women. The percentage is higher with patients residing in nursing homes and totals over 50 % (Peet 1995). Similar data is provided by Peet, claiming that frequency of occurrence of urinary incontinence for patients of hospitals or long-term care institutions reaches 50 – 70 % (Rechberger 2001).

Urinary incontinence is more common than any other chronic condition. It is estimated that 10 – 15 % of every society suffers from UI. Anyone can be at risk regardless of age or gender with frequency of occurrence of urinary incontinence increasing with age. High risk groups include women after childbirth and during menopause and the elderly.

Confirmed risk factors include: female gender and advanced age. With ageing of human body the bladder's capacity is reduced, post-void residual volume increases, involuntary bladder contractions are more frequent, physical activity is lowered and gender related changes take place. For women urinary flow tract from bladder is shortened and urethral retro-resistance pressure is lowered as a result of decreased muscle tonus of pelvis caused by reduced estrogens level in the blood. For man commonly known enlargement of the prostate leads to reduced detrusor contractility and urinary incontinence. Other factors include urinary tract infections, menopause, lack of physical activity after childbirth, operations of urogenial system, chronic diseases and intake of various medications (Pawlaczyk 2008, Villet 2003).

Causes of urinary incontinence may be divided into three categories: urologic – gynaecologic, neurologic and systemic changes.

Urologic and gynaecologic causes

- Urinary tract infections – with point of entry through urethra, caused by *Escherchia coli*, *Proteus*, *Pseudomonas aeruginosa*. Precipitating conditions of people of old age for urinary tract infections are: incontinence and urine retention, fixed catheter, disability, significantly reduced activity, serious disease, diabetes, insufficient hygiene, fecal incontinence.
- Calculi in bladder – urinary tract infections favour occurrence of calculus, urinary retention caused by urinary flow obstruction of upper urinary tract and post-void residual volume. Other favouring factors are: reduced physical activity, leaving disabled patient in sitting or supine position and secondary anatomic changes of urinary tract.
- Bladder cancers – bladder cancer is second most frequently occurring after prostate cancer. 2-3 times more frequent in men than women. Symptoms of bladder cancer: haematuria, painful urinary urgency and urination, polyuria. Massive haematuria may lead to blood clots blocking urinary flow. May lead to severe pains over pubic symphysis and around loins. Pain in loins area may also suggest tumour invasion into urethra orifices causing urinary obstruction in upper urinary tracts.

- Enlargement of the prostate – with age prostate enlarges. This process is intensified after 50 years of age. The fact of prostate enlargement is not troublesome itself but problematic symptoms depend of its size. It is important, though, that prostate houses urinary duct – urethra transporting urine from bladder. Enlarged gland presses against it and narrows its urethra openings. The effect are obstruction and slowdown of urination.
- Changes of upper urinary tract caused by radiotherapy of pelvic (treatment of cervical cancer, endometrial cancer) – atrophic changes of vascularity of lower urinary tract may lead to instability and areflexia of detrusor, urethra and fistula insufficiency, fibrosis. Post-radiation complications may occur after many, even thirty years after treatment.
- Lowered estrogens level in women – during menopause period frequency of occurring stress urinary incontinence increases. It is related to lowered level of estrogens, conditioning the state of epithelium of urethra and connective tissue. Thus, progressive atrophy of myofascial structures leads to functional and anatomical impairment in pelvis (Rechberger 2003).
- Iatrogenic causes – namely damage of urethral sphincter inflicted during removal of prostate or surgical procedures within pelvis.

Neurological causes

- Head injuries – most typical symptom of bladder impairment caused by frontal lobe damage is urinary incontinence with intensified urge urination and polyuria not related to dementia. Only insignificant number of patients have urinary retention or difficulty with initiating urination. Bladder related symptoms of people after brain trauma may be related to localization of damage in frontal lobe, impairment of cognitive functions, deficiency of adiurectic hormone or local changes in urinary tract resulting from long-term catheterisation.
- Brain tumours – resulting from pressure on brain structures where dysfunction of the nervous system, especially for areas where urination centre is localised. Dysfunction results in urination urgency or urine retention and complete suppression of urethral sphincter and detrusor.
- Parkinson's Disease – is often degenerative disorder of the central nervous system of unknown aetiology. First symptoms of urinary tract disorders are usual after few years of therapy, usually concurrent with adverse symptoms of L-dope treatment. Most common being detrusor's hyperreflexia. In accordance with scientific research, nucleus basalis impose inhibiting influence on urination process, thus loss of brain matter cause that dysfunctions. Complaints of urging urination and polyuria and urinary incontinence especially in the aspect of limited mobility pose serious therapeutic problem. Urination problems may also be a cause of adverse reaction to medicine intake (Skolmowska 2002).
- Diabetic and alcoholism neuropathy – neuropathy, damage to many mainly peripheral nerves are complications of diabetes mellitus or alcoholism. Apart from peripheral neuropathy mainly concerning limbs, there is also autonomic neuropathy concerning nerves of autonomic nervous system.

- Undergone strokes – in cerebrovascular accident due to sudden disturbance of blood supply to brain there is sudden functional impairment of the nervous system. In acute state, urinary retention was observed with 6 % of patients. After three months significant urinary dysfunction was observed with 53 % of researched patients. The most uncomfortable problem being often nocturnal incontinence (36 % patients) sudden urging urination (29 %) and difficulty of urination (25 %).
- Multiple sclerosis – causing impairment of various functions of neuronal pathways. Dysfunctions of the bladder may be the first symptom of the disease, but most commonly they develop with time. With deterioration of neurological state, the functioning of lower urinary tract worsens accordingly. Initially there is hyperactivity of detrusor which may be accompanied by detrusor – sphincter dyssynergia and detrusor insufficiency.

Systemic changes causing or intensifying urinary incontinence

- Dementia – may impair ability to recognize urinary urge. Patients suffering from dementia may have problems with using toilet.
- Depression and anxiety – may impair the bladder functionality. Patients may also not react properly to urinary urgency.
- Constipation – always causing excessive stretching of the final part of the digestive system. Constipated fecal matter press against the urinary bladder, thus reducing its capacity and irritate urinary bladder's walls. Moreover may also press against the urethra causing difficulty with ejection of urine from the urinary bladder. It leads to overfilling of bladder and involuntary loss of urine due to overflow.
- Obesity – scientifically proven risk factor for developing urinary incontinence, especially of stress type. Additional weight of abdominal wall increases intra-abdominal and bladder pressure, aggravates diaphragma pelvis causing overstretching and weakening of muscles and connective tissues of the pelvis wall.
- Chronically immobilized patients – forces the usage of fixed bladder catheter or other products of protection like disposable diapers for adults. This leads to loss of control over feeling urgency to urinate. Additionally immobilization contributes to urinary tract infections, calculi in the bladder, thus favouring urine retention and indirectly cause urinary incontinence. In this case mixed urinary incontinence is most frequently observed (Pawelczyk 2008).

The aim of work

The aim of work was to determine the occurrence of urinary incontinence among patients hospitalized on Psychogeriatric Ward, based on family and caregivers inquiries and describing factors influencing the occurrence of urinary incontinence (symptoms of urinary incontinence, used assisting means, motor skills, functioning of senses, describing psychical condition, places of residence and occurrence of co-existing diseases).

Materials and methods

The research was conducted in the Psychogeriatric Ward in the period of October 2009 to February 2011. At that time 375 patients were hospitalized, including 201 women (53,60 %) and 174 men (46,40 %).

To determine the occurrence of urinary incontinence and mobility of patients ADL (Activities of Daily Living) scale was used, thus assessing patient's independence in the following areas: bathing, dressing, toileting, continence, feeding and transferring. These activities are assessed in the scale of 0-1. Patients is granted one point for every activity he/she can do independently or 0 points if not. Granting 0-2 points means that patient is completely dependent and requires round-the-clock care. A person partially independent is one that was granted 3-4 points and fully independent 5-6 points. The assessment must be done based on the observations and not on the question asked. At preliminary assessment, upon admission to the ward, the scale was filled based on data provided by family/caregivers. ADL is a standardised and readily available scale.

Patients' medical documents analysis concerned the analysis of Psychogeriatric Ward Patient Treatment Chart, being an integral part of documents for patients hospitalised in the Psychogeriatric Ward. It was used to determine the probable causes of urinary incontinence in the research group apart from diagnosed dementia.

The ethical approval to perform research was granted by Bioethical Commission of Medical University in Lublin. The approval was granted by patients or patients' guardians in case of severe cognitive impairment.

The condition to be enlisted to the researched group was occurrence and preservation of the problem of urinary incontinence in the period of five weeks upon admission to hospital. The total number of patients with the problem of urinary incontinence within first week of admission to hospital was 248 (66.13 % of all hospitalized), but the final research group was narrowed to 176 patients (46.93 %) – and with 72 patients (19.20 %) the problem withdrew.

Results

The age of research subjects was between 60 and 93 years. The arithmetic mean in the group totaled 74.67 years with standard deviation of 7.93. The age median was 75. In the research group there were 67 residents of the cities (38.07 %) and 109 residents of villages (61.93 %).

Most patients came to ward directly from family homes, where they resided with family – 108 patients (61,36 %). People living on their own constituted a third of admissions (59; 33,52 %). Few people came from Welfare Centers (4; 2,27 %) and Nursery Centers or Nursery-Treatment Centers (5; 2,84 %).

In accordance with the interview, prior to admission to the ward no urological sets were used by 88 patients (50,00 %). Most frequent being disposable diapers for adults – 60 people (34,09 %) and urological pads – 23 patients (13,07 %). Among the researched patients 8 (4,55 %) used both disposable diapers and urological pads. External urinary catheters were used with 8 patients (4,55 %) whereas indwelling urinary catheters were used with 5 (2,84 %).

Based on initial interview no problems with urination were with 61 subjects (34,66 %). Most commonly indicated was urinary incontinence – 88 patients (50,00 %). Problematic urination was with 22 patients (12,50 %). Painful urge urination was with 6 patients (3,41 %) and 4 patients (2,27 %) were with urinary retention and 4 (2,27 %) with burning and itching sensation. The sum of given answers is higher than test group, as for 5 people (2,84 %) there were 2 difficulties and with another 2 people (1,14 %) there were 3 answers given.

Great majority of patients were ambulant – concerned 141 (80,11 %). Among admissions there were 27 seated (15,34 %) and other 8 (4,55 %) were bedridden patients.

Independent walking was with 71 patients (40,3 %). Some help with walking required 62 subjects (35,23 %). Limited walking was with 37 people (21,02 %) and other 6 could not walk independently (3,41 %).

Correct muscle tone was with majority of hospitalized patients – during interview was stated with 110 patients (62,50 %). Lowered muscle tone was with 36 people (20,45 %). Paresis was with 14 patients (7,95 %). Palsy was with 7 patients (3,98 %), tremor with 6 (3,41 %). Increased muscle tone was observed in 2 people (2,27 %). Among tested subject one person (0,57 %) had both lowered muscle tone and palsy. 123 subjects (69,89 %) had correct eyesight. Impaired eyesight was observed with 52 patients (29,55 %), blindness with 1 (0,57 %). In researched group 38 people were using corrective glasses (21,59 %). 98 patients (55,68 %) had correct hearing, impaired hearing was stated with 74 people (42,05 %). Among test subjects there were 4 deaf (2,27 %). 37 people (21,02 %) used hearing aids.

In researched group there were 56 people (31,82 %) with correct sense of balance. Balance disorders were observed with 90 subjects (51,14 %), lightheadedness with 41 (23,30 %). Balance disorders with lightheadedness were concurrent with 11 patients (6,25 %).

Great majority of research subjects (128; 72,73 %) were verbally communicative. Nonverbal communication was used by 16 patients (9,09 %). With 9 people (5,11 %) there were speech disorders such as aphasia. No contact was observed with 23 researched subjects (13,07 %).

Over one half (99; 56,25 %) had lowered mood. Average mood was observed with 50 people (28,51 %). 27 people (15,34 %) had above average mood.

Dividing test subjects by their awareness and state of mind there were 2 categories: with full awareness (156 people; 88,64 %), and showing signs of sleepiness (20, 11,36 %).

Correct circadian rhythm sleep was noted with 103 subjects (58,52 %). Sleep rhythm disorders was observed with 73 people (41,48 %).

Two most frequently observed behaviors and emotional reactions in patients were fear and anxiety – 63 cases (39,80 %). Depression was observed with 54 subjects (30,68 %). Apathy was observed with 33 people (18,75 %). Protest with 21 cases (11,93 %). Calmness with 11 patients (6,25 %). Over cheerfulness was observed with 8 people (4,55 %) and despair with 7 (3,98 %). 15 test subjects (8,52 %) had positive attitude towards his/her health condition. Half of the test group were indifferent towards his/her health condition (88; 50,00 %). 73 patients (41,48 %) had negative attitude.

Only 12 people were positive towards hospitalization (6,82 %). Indifference was observed in 92 cases (52,27 %). Negative attitude was noted with 72 subjects (40,91 %).

Based on the interview with family/caregivers Katz Index of Independence in Activities of Daily Living (ADL) was assessed. 94 people (53,41 %) were fully independent upon admission to hospital. Partly independent were 38 subjects (21,59 %). Fully dependent in activities of daily living were 44 patients (25,00 %).

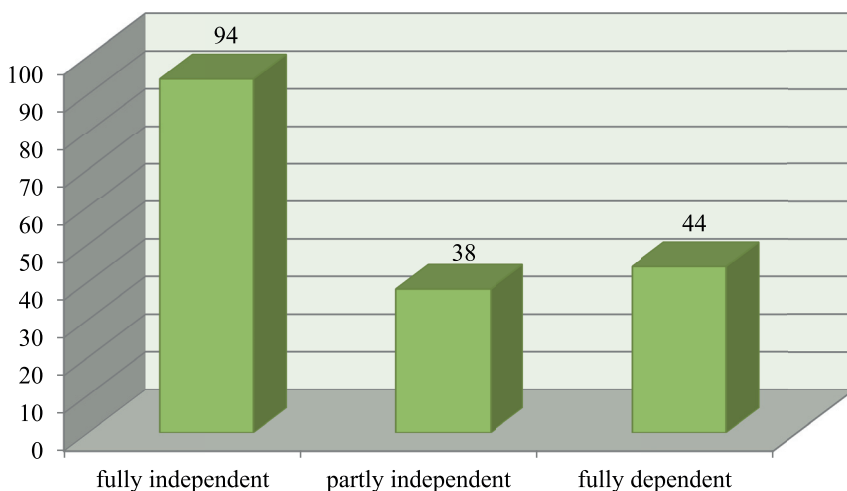


Fig.1. ADL results upon admission

Among 375 hospitalized patients of the ward there were 176 people (46,93 %) with permanent state of urinary incontinence. Temporary urinary incontinence was observed with 72 people (19,20 %). No urinary incontinence was observed with the rest of 127 patients (33,87 %).

Discussion

Essential activity of daily life connected with continence control is ability of independent or partly independent movement around the hospital ward. Based on the analysis of the interviews carried upon admission and data of Psychogeriatric Ward Patient Treatment Chart it was concluded that 37 people (21,02 %) had limited mobility and 6 (3,1 %) could not move independently. Considering muscle tone dysfunction – it occurred in 37,5 % cases. Impaired eyesight was stated with 52 patients (29,55 %), blindness with 1 (0,57 %). Only 38 people used corrective glasses. Sense of balance disorders were observed with 90 subject, lightheadedness with 41 (23,30 %). Balance disorders with lightheadedness were concurrent with 11 patients (6,25 %). Another factor intensifying urinary incontinence – sleep rhythm disorders – present with 73 people (41,48 %). Based on ADL scale, measuring independence of researched group, there were 38 partly independent patients (21,59 %), and 44 fully dependable in activities of daily living (25,00 %).

The research of the study indicate that patients upon admission to psychogeriatric ward were considerably burdened considering factors influencing the occurrence of urinary incontinence. It must be noticed that during preliminary interview only 88 people (50,00 %) admitted to urinary incontinence and problematic urination was with 22 patients (12,50 %). After five weeks upon admission to hospital the permanent state of urinary incontinence was with 176 people (46,93 %), temporary urinary incontinence was observed with 72 people (19,20 %). Result suggest that many patients, their caregivers conceal or do not admit to having this ailment. People who admitted to urinary incontinence in the

interview also indicated using urological products (diapers, pads, catheters). Information concerning urinary incontinence is very important upon admission as it may determine placing the patients near the toilets, assistance with transfer to and from toilet or necessity to use urological products. It must be remembered that urinary incontinence with limited independence resulting from coexistence of many factors contributing to this problem is often a cause of falls, thus increasing patient suffering and limiting his/her independence.

Regarding the frequency of admitting to the problem of urinary incontinence, similar results were acquired by other researches, namely 60 % of patients in United States of America and 43 % in Germany when not asked, never admitted to the problems of urinary incontinence voluntarily, often treating it as a symptom of ageing processes (Rechberger 2001, Yarnell et al 1981).

Wojsztel claims that frequency of occurrence of urinary incontinence among hospitalized patients in the old age is around 25 – 35 % (Wojsztel 2003), and in welfare nursing centers – 50 – 70 %. Carried research indicated that urinary incontinence was existent in 31,7 % of subject residing in cities and 46,8 % residing in villages (Wojsztel 2003, Wdowiak et al 2009).

Research carried by Wdowiak et al. assessing the quality of living in stationary long term care, the problem of urinary incontinence was present in 65,6 % of tested subjects. These disorders were more frequently indicated by patients of nursery-treatment centers – 80 % in comparison with welfare nursing centers – 61,9 % (Chloe 2001).

Other American research indicates that frequency of occurrence of urinary incontinence with people residing in welfare nursing centers is twice higher (60 % of residents) than with people of old age residing in their own homes (Bujanowska-Fedak et al 2002).

Urinary incontinence is one of the most frequent chronic diseases among women and in Poland itself there are approximately 4 – 6 million people suffering from it (Chloe 2001, Rechberger et al. 2005, Tołłoczko 2002).

Frequency of occurrence of urinary incontinence is also associated with physical and mental disability, which may explain the observed tendency of more frequent occurrence of this disorder in hospital wards and institutions of long term care (Peet 1995).

Conclusion

1. Urinary incontinence was observed with 46,93 % of hospitalized patients.
2. Many patients, their caregivers conceal or do not admit to having this ailment.
3. Patients upon admission to psychogeriatric ward were considerably burdened considering factors influencing the occurrence of urinary incontinence.

Bibliography

1. Abrams P., Cardozo L., Fall M i wsp. (2002) The standardization of terminology of lower urinary tract function: report the Standarisation Sub-committee of the International Continence Society, *Neurourol Urodyn*, 21:167-178.
2. Szyszko-Perłowska A., Wasilewska M., Rolka E. i wsp. (2006) Problemy kobiet z nietrzymaniem moczu, *Probl. Pielęg., PTP Warszawa*: 54-60.

3. Radziszewski P., Dobroński P.(2008) Nietrzymanie moczu, Wyd. Lek. PZWL, Warszawa.
4. Ouslander J.G., Palmer M.H., Rovner B.W. (1993)Urinary incontinence in nursing homes: Incidence, remission, and associated factors, J Am Geriatr Soc, 41:1083-1089.
5. Peet S.M., Castleden C.M., McGrother C.W.(1995) The management of urinary incontinence in residential and nursing homes for older people, Br Med J, 311: 1063-1064.
6. Rechberger T., Jakowicki A.J. (2001)Nietrzymanie moczu u kobiet, diagnostyka i leczenie Wyd. Bifolium, Lublin: 16-17.
7. Yarnell J.W., et al(1981) The prevalence and severity of urinary incontinence in women, J Epidemiol Community Health, 35: 71-73.
8. Wojsztel B.Z.(2003) Nietrzymanie moczu jako jeden z wielkich problemów geriatrycznych, Gerontol Pol,11: 9-13.
9. Wdowiak L., Stanisławek D., Stanisławek A.(2009) Jakość życia w stacjonarnej opiece długoterminowej, Med Rodz, 4: 49-63.
10. Chloe J.: (2011) Urinary incontinence: non surgical therapies, www.emedicine.com/med/topic3085.html. Data korzystania 23.04.2011
11. Bujanowska-Fedak M., Steciwko A.(2002) Nietrzymanie moczu – problem społeczny i interdyscyplinarny. Rola lekarza rodzinnego w rozpoznawaniu, leczeniu i profilaktyce nietrzymania moczu, W: Steciwko A.: Wybrane zagadnienia z praktyki lekarza rodzinnego, Tom 4 Nietrzymanie moczu – problem interdyscyplinarny choroby gruczołu krokowego, 33-42, Wyd. Continuo, Wrocław.
12. Rechberger T., Skorupski P., Postawski K.(2005) Nietrzymanie moczu - problem medyczny, socjalny i społeczny, W: Rechberger T., Jakowicki J.: Nietrzymanie moczu u kobiet, Patologia – diagnostyka – leczenie, Wyd. Bifolium, Lublin: 29-38.
13. Tołłoczko T.(2002) Nietrzymanie moczu – problem społeczny i kliniczny, Terapia, 3:4-6.
14. Pawlaczyk A.(2008) Przyczyny nietrzymania moczu, Kwartalnik NTM, 1(24):4-5
15. Rechberger T.(2003) Zmiany zanikowe w układzie moczowo-płciowym, Magazyn Pielęgniarki i Położnej,4:41.
16. Skolmowska E.(2002) Największy problem zdrowotny i pielęgnacyjny, Magazyn Pielęgniarki i Położnej, 5:21.
17. Villet R., Salet-Lizee D., Zafropulo M.(2003)Wysiłkowe nietrzymanie moczu u kobiet, Wyd. lek. PZWL.

Number of signs with spaces: 29 252

Dariusz Kacik¹

Maciej Kisiel²

¹Department of Anesthesiology and Critical Care of Provincial Hospital in Biała Podlaska

²Department of Urology of Provincial Hospital in Biała Podlaska

TUR syndrome - pathophysiology, symptoms, diagnosis and treatment.

Zespół poresekcyjny (TUR syndrom) - patofizjologia, objawy, diagnostyka i leczenie

Summary

Transurethral resection syndrome (TUR syndrome) is a rare but serious complication of endoscopic procedures. The underlying cause of its occurrence is unpredictable absorption into the bloodstream of the patient irrigating liquid, which is used to ensure good visibility of the operating field. The main symptoms are connected with cardiovascular disorders (hypo- and hyperkinetics) as well as respiratory system and central nervous system disorders. Fully symptomatic resection syndrome is life-threatening.

The development of endoscopic techniques in urology, gynecology, orthopedics using irrigation fluids has led to greater attention to the problem of resection syndrome. As has been shown that the greatest risk of this complication are loaded with transurethral resection of bladder tumors (TUR-T Trans Urethral Resection Tumor) and prostate (TURP Trans Urethral Resection Prostate), described as transurethral resection (TUR syndrome) and as the effect it has become a multidisciplinary problem. Causal and symptomatic treatment is conducted by a surgical physician specialist in close cooperation with the anesthesia. Knowing the exact etiopathogenesis particular emphasis should be put on minimizing the risk of its occurrence. The use of laser techniques, bipolar electrical systems, osmotic lavage fluid and continuous improvement of surgical techniques should be used to lower the risk.

Key words: resection syndrome, water intoxication, irrigation fluids

Streszczenie.

Zespół resekcji przezcewkowej (TUR syndrom) stanowi rzadkie, ale bardzo poważne powikłanie zabiegów endoskopowych z wykorzystaniem płynów płuczających. Podłożem jego wystąpienia jest niekontrolowane wchłanianie płynu płuczającego, służącego zapewnieniu dobrej widoczności pola operacyjnego. Główne objawy dotyczą układu sercowo-naczyniowego (hipo- i hiperkinetyka), układu oddechowego oraz centralnego układu nerwowego. Pełnoobjawowy zespół poresekcyjny stanowi zagrożenie dla życia pacjenta.

Rozwój technik endoskopowych w urologii, ginekologii, ortopedii z użyciem irygacji, doprowadził do zwrócenia większej uwagi na problem zespołu poresekcyjnego. Ponieważ wykazano, że największym ryzykiem wystąpienia tego powikłania obciążone są zabiegi resekcji przezcewkowej nowotworów pęcherza (TUR-T Trans Urethral Resection Tumor) i prostaty (TURP-Trans Urethral Resection Prostate), określono go nazwą zespołu resekcji

przezcewkowej(TUR syndrom). Stał się on problemem multidyscyplinarnym. Leczenie zespołu jest przyczynowe i objawowe, a prowadzone jest przez lekarza specjalności zabiegowej w ścisłej współpracy z zespołem anestezjologicznym. Znając dokładnie etiopatogenezę zespołu należy położyć szczególnie nacisk na działania minimalizujące ryzyko jego wystąpienia. Temu ma służyć wykorzystanie technik laserowych, bipolarnych obwodów elektrycznych, osmotycznych płynów płuczących oraz ciągle doskonalenie technik zabiegowych.

Słowa kluczowe: zespół poresekcyjny, zatrucie wodne, płyn płuczący

Introduction

TUR (transurethral resection) is a very important urological endoscopic diagnostic and therapeutic procedure. The urologist performs surgery with a resectoscope under visual control and visibility, which during surgery is provided thanks to a constant flow of irrigating liquid. The phenomenon of electroresection mono-and bipolar (the effect of cutting and coagulation) is used. A serious complication of TUR syndrome is associated with the absorption of irrigating liquid through the open vessel during operations, such as reported by the patient's discomfort, chest pain, blurred vision (visual acuity impairment, vision in blue), hypotension, nausea, vomiting, oliguria, loss consciousness. These are the so-called symptoms of water intoxication defined as a resection syndrome. The term water intoxication was first used by Wier in 1922. It involved a group of symptoms caused by systemic fluid overload and hyponatremia occurring during endoscopic procedures using liquid irrigants. Today, this problem affects patients undergoing transurethral resection of bladder tumors, prostate, diagnostic cystoscopy, percutaneous nephrolitotomy, cystolithotripsy, arthroscopic and endoscopic gynecological surgery using irrigation (transcervical resection of the endometrium-TCRE), endoscopic operations of rectal tumors. Research the last 20 years indicate that TUR syndrome concerns 1-8% of patients undergoing TURP (transurethral resection of the prostate). Mortality rate is at a level of from 0.2% to 0.8%.

A threat of TUR syndrome occurs after 15 minutes from the start of resection of the prostate and lasts up to 24 hours after surgery. This long period forces medical staff to focus on the patient during the intraoperative and postoperative phase not to overlook any of the symptoms. Quick diagnosis and initiation of treatment increases the patient's chances for recovery. The absorption of small amounts of fluid (1-2 liters) can easily be overlooked. Absorption of fluid on a large scale causes a dramatic clinical symptoms requiring intensive care. The resection syndrome (TUR syndrome) shows symptoms of heart failure irrespective of the type of wash liquid used, although it is most marked in the case of glycine, then the sorbitol, NaCl, mannitol. The effect of low osmolarity caused by excessive absorption of fluid is a life-threatening brain edema. It does not develop when physiological salt solution is used for irrigation. In this case, however, significant cardiovascular overload, resulting in pulmonary edema and acidosis may occur. Clinical effects of excessive fluid absorption depends on its speed, volume and the nature. TURP syndrome is caused by many factors, that arise by the action of an excess of irrigating liquid absorbed on the cardiovascular system, central nervous system and cellular metabolism. Multitude of prodromal symptoms may lull the doctor because they are variable and nonspecific.

Tab.1 Signs and Symptoms Attributed Transurethral Resection of the Prostate Syndrome by Major Physiologic System and Increasing Severity

Central nervous system	Cardiopulmonary	Hematologic and renal
Restlessness	Hypertension	Hyponatremia
Headache	Tachycardia	Hyperglycinemia
Confusion	Tachypnea	Intravascular hemolysis
Convulsions	Hypoxia	Hypoosmolality
Coma	Cyanosis	Acute renal failure
Visual disturbances	Pulmonary edema	Hyperammonemia
Blindness	Hypotension	Hyperkaliemia
Nausea/vomiting	Bradycardia	Hemolysis/ anemia
Twitches	Dysrhythmia	
	Shock	

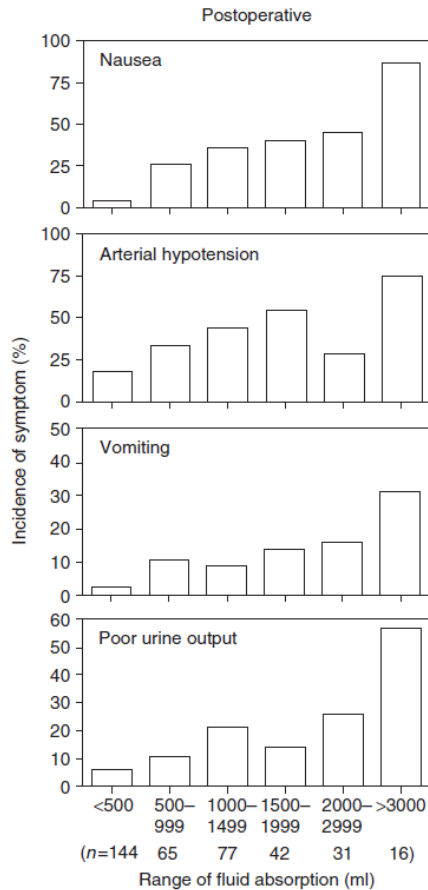


Fig.1 The incidence of nausea, arterial hypotension, vomiting and poor urinary output with increasing amounts of absorption of glycine 1,5% after TURP. The absorption was measured by etanol 1%.

Tab. 2 Factors That, Alone Or In Combination, Can Affect the Central Nervous System During Transurethral Resection of the Prostate

Drugs	Solute	Hypoxia
Benzodiazepine	Hyperammonemia	Congestive hesrt failure
Local anesthetic	Hyperglycinemia	High spinal anesthesia
Narcotic	Hypoglycinemia	Myocardial infartion
	Hyponatremia	Pulmonary edema
	Hypoosmolality	Sepsis

Pathophysiology

Pathophysiology of resection syndrome TURP is complex and therefore multisymptomatic. Understanding of this problem allows the identification of patients with the highest risk. The aim of introduction of solutions containing glycine, mannitol or sorbitol was to prevent intravascular hemolysis and not dissipate electric beam used to cut while using a resectoscope. However, the absorption of the irrigation fluids resulted in much more severe symptoms of central nervous system and cardiovascular system. Severe, life-threatening symptoms are related to the absorption of $> 3\text{--}4$ liters of fluid. Irrigation liquid is mostly absorbed directly into the bloodstream through a vein damage during electrosurgery. The pressure of irrigation fluid must exceed venous pressure ~ 1.5 kPa. This mechanism of absorption is common in the case of TURP and TCRE. Intraperitoneal absorption or retroperitoneal space absorption of irrigation fluid is also possible but only if the fluid pressure exceeds ~ 0.5 kPa. These types of disorders are more common in percutaneous surgery of kidneys.

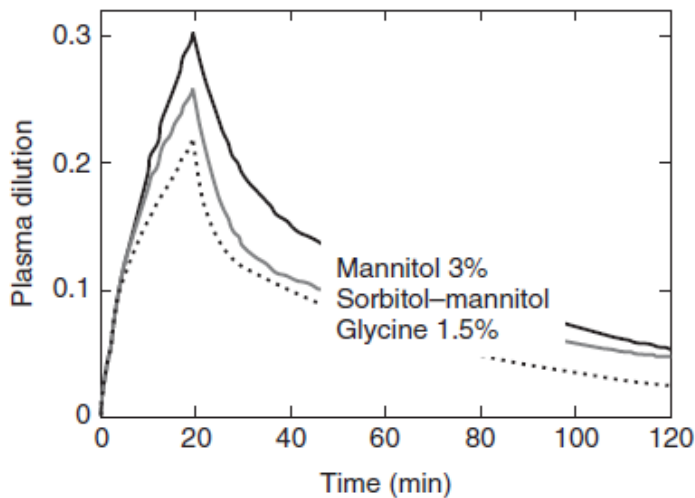


Fig.2 Computer simulation of the plasma dilution resulting from experimental infusion of 1,5 litre of three irrigating fluids for more than 20 min in 10 volunteers. There are only small differences between the fluids despite the differences in half-life of the solutes.

Fluid overload

The absorption of a small quantity of irrigating liquid is present in the majority of cases of TURP through the open prostate veins. Both hypertension and hypotension with reflexive tachycardia is noticeable within a short time after the start of treatment. It is due to a sharp increase in blood volume, which can reach a value up to 200ml/min. This is of great significance in patients with left ventricular heart failure, because it may lead to pulmonary edema. This symptom may not occur in the case of massive intraoperative bleeding. Absorption of the irrigating liquid is the cause of transient hypervolemia together with simultaneous increase of the central pressure, which regulates within the period of 15 minutes from the absorption. Negative symptoms such as shortness of breath, chest pain, pulmonary edema and anxiety may occur during the operation, when the patient is on the operating table. They can occur especially during surgical procedures in which there is not massive loss of blood.

The result of hypervolaemia is longer and more difficult hypokinetic phase, characterized by a low cardiac output, hypovolemia, and low blood pressure. Factors contributing to hemodynamic changes include osmotic diuresis and natriuresis, and together with glycine and sorbitol, intracellular water consumption. Impact on it may also have: hyponatremia, hypocalcemia, low osmolality, low body temperature and the release of prostete's endotoxin. Bradycardia causes a significant reduction in systolic blood pressure of up to 50-70 mm Hg, and is often the first sign signifying the possibility of occurrence of TUR. Pulmonary edema may also develop late, indicating that serum sodium concentration of <100 mmol / liter in combination with severe hipoosmolality.

Cardiac dysfunction resulting from an excess of water in the body of the patient, may cause cardiovascular collapse. In patients with an excessive amount of absorbed irrigation fluids, impairment of conduction, bradycardia, and ST segment depression and T wave depression may appear.

Dilution of plasma proteins rarely exceeds 25%, it may, however, achieve 40-50% in the severe case. Hyponatremia (<120 mmol / L) can cause muscle weakness, convulsions, epileptic seizures and anaphylactic shock. Often these symptoms are also accompanied by decreased osmolality by 10-25 mOsmol / kg. This is due to the fact that most of the irrigation fluids are hipoosmolar (200 mOsmol / kg).

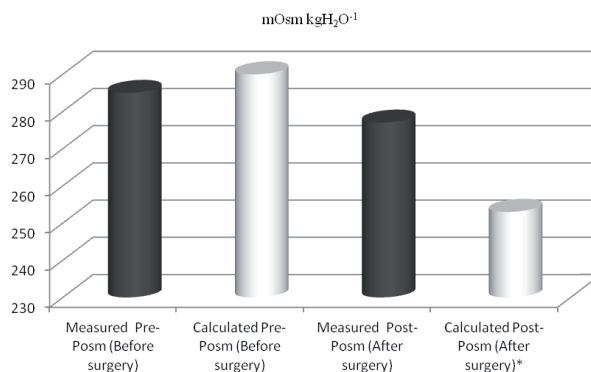


Fig.3 Mean and SD of pre- and post-Posm(measured and calculated Value) In hypo-Na group. Represents statistical significance($p<0,01$, paired t-test) between measured and calculated value.

Hyponatremia

Hyponatremia symptoms depend on the speed of reducing the level of sodium in the blood serum in proportion to the absorption. The decrease in sodium $> 120 \text{ mmol / L}$ causes severe symptoms of TURP. Lowering sodium causes the increases of the osmotic gradient between the intracellular and extracellular space. This causes the water permeation into the brain cells causing them to swell, increased intracranial pressure and neurological symptoms such as epileptic seizure, coma, respiratory failure, brain stem cavity features and death.

Hypoosmolality

Dysfunction of the central nervous system is not only caused by the hyponatremia, but also by severe plasma hypoosmolality. It causes a rapid decrease in levels of sodium, potassium and chloride in the brain tissue. Lowering the level of ions in the cell is to prevent the accumulation of cerebral edema, which is the main cause of death of the patient.

Hyperammonemia

Glycine in the intravascular space is metabolized to ammonia. Brain tissue has an enzyme system that converts glycine to CO_2 and ammonia, and the toxic effect causes neurological disorders (metabolic encephalopathy). They occur at the level of ammonia in the blood serum of $> 100 \text{ mmol / L}$ (normal range 10-35). The ideal irrigating fluid should be isotonic, non-hemolytic, electrically neutral, non-toxic, transparent, easy to sterilize and affordable. Such liquid does not exist. Each of them has potentially adverse effects.

Menagement of TURP Syndrome

The issue of TURP syndrome occurrence concerns both the urologist and anesthesiologist. They must work as a team. Most vulnerable to the onset of TURT or TURP are elderly people, and therefore with lower adaptive capacity of their organs. This concerns particularly renal function, heart and hormonal balance. Particular attention should be paid to monitoring the amount of irrigating liquid, as well as the liquid used intravenously by a team of perioperative anesthetic. Special attention should be paid to balance fluid therapy. We should also remember about expelled fluids and blood loss. Measurements of these parameters may, however, be inaccurate. One way to evaluate the quantity of the absorbed liquid is the addition of 1% ethanol to the irrigating liquid and monitoring its level in the exhaled air. It is a very useful method. It allows to detect the absorption of 75 ml of fluid in a period of 10 minutes. It is possible to use it in both procedures performed under regional anesthesia or general intratracheal, even in patients at lung diseases such as chronic obstructive pulmonary disease. A very useful method is the monitoring of central venous pressure (CVP). The absorption of 500 ml of liquid causes the increase of 2 mm Hg. Its measurement is, however, affected by the amount of blood loss.

Prevention

Operative time

It is widely believed that the maintenance of the surgery less than 1 hour prevents excessive fluid absorption during TURP. But repeatedly the massive absorption of irrigating fluid after only 15 minutes of operation have been documented. It is recommended that the operation time does not exceed 60 minutes. The risk of occurrence of TURP syndrome increases after 90 minutes of treatment.

Patient position on the operating table

It is not advisable to place the patient in the Trendelenburg position (20 degrees), since lowering the pressure in the open veins of the bladder and prostate cancer increases the risk of irrigating fluid absorption.

Fluid bag height

Optimum height placement of the bag with irrigating liquid over the the operating table is 60 centimetres. But there is no convincing evidence that compliance with this recommendation carries a reduced risk of TURP occurrence.

Low pressure irrigation

Performing TURP surgery with low-pressure flushing liquid can significantly reduce the occurrence of complications. This can be achieved through the use of irrigation with suprapubic trocar. It is more effective in combination with monitoring of intravesical pressure.

Bipolar TURP

Bipolar resectoscope as opposed to conventional monopolar TURP allows the use of saline as an irrigation liquid. In this way the risk of causing hyponatremia is reduced.

Laser prostatectomy

Laser prostatectomy performed green (green light laser) significantly reduces the risk of complications, as it causes tissue removal by evaporation and closes vessels, greatly reducing the absorption of fluid.

Treatment

Taking preventive measures is of invaluable importance and significance. However, the onset of TURP may require alternative ventilation, intensive symptomatic and casual treatment, and oxygen supplementation. Monitoring vital signs and correcting hemodynamic disorders should be implemented. Visual disturbances disappear spontaneously within 24 hours and do not require any treatment. Hypertension can be transient. Immediately taken appropriate action can interrupt cardiovascular collapse. Atropine, epinephrine and calcium should immediately be administered intravenously while bradycardia and hypotension occur. Although it is recommended to limit fluid intake, make sure the volume of plasma is sufficient. Correction of hyponatremia (level <120 mmol / L) should begin with the infusion of 3% NaCl solution (1000ml/24h). The level of sodium in the patient's body of

100mmol / L brings fatal consequences. However, the aggressive supplementation with sodium ions can cause myelinolysis. Therefore, the level of sodium in the blood serum should be supplemented at 1 mmol / L / h. Hyperglycinemia should be treated by infusion of a solution of magnesium, which is an antagonist of toxic metabolites. The primary indication for the intravenous administration of furosemide is to take control of pulmonary edema and the need to induce diuresis, when this does not occur. In fact, the administration of furosemide deepens hyponatremia and hypovolemia.

Anesthesia and TUR Syndrome

The recommended technique of anesthesia is conduction anesthesia. It allows, through permanent contact with the patient, to detect early signs of TUR. Through its antihypertensive effect it reduces the risk of pulmonary edema, but increases the absorption of irrigating liquid.

Conclusions

This work is aimed at understanding the physiology, diagnostic problems and rules of conduct in the TURP syndrome. Patient care in this, particular case is interdisciplinary. The multiplicity of symptoms does not allow for the creation of any algorithms. We attempt, however, to pay more attention to the issue of severe complications of endoscopic interventions during the times of the enormous growth in number of minimally invasive procedures. Noticing this problem may result in improving the quality and effectiveness of therapy while its omission could bring disastrous consequences.

Bibliography

1. Baron J.F., Bertrand M., Barre E., Godet G., Mundler O. et al (1991) Combined epidural and general anesthesia versus general anesthesia for abdominal aortic surgery. *Anesthesiology* 443- 444.
2. Bonica J.J.(1990) The management of Pain. Lea and Febiger, Philadelphia, USA, s.181-183.
3. Bullock J., Boyle J., Wang M.B.(2000) Fizjologia. Wydawnictwo Medyczne Urban & Partner. Wrocław, 1381-5.
4. Camu F., Lauvers M.H., Verbessem D.(1992) Incidence and ethiology of postoperative nausea and vomiting. *Eur. J. Anaesthesiology*, 1617-1621.
5. Christopherson R., Beattie Ch., Frank S.M., Norris E.J., Meinert C.M. et al(1993) Perioperative morbidity in patients randomized to epidural or general anesthesia for lower extremity vascular surgery. *Anesthesiology*, 47-49.
6. Falick Y.S., Smiler B.G.(1975) Is anticholinergic premedicatio nessesary *Anesthesiology*, 178-189.
7. Gustaffson L.L., Schildt B., Jacobson K.(1982) Adverse effects of extradural and intrathecal opiates: raport of a nationwide survey in Sweden. *Br. J. Anaesth.*, 197-213.
8. Hawary A., Muhtar K., Sinclair A.(2009) Transurethral Resection of the Prostate Syndrome Almost Gone but Not Forogotten- *Journal of Endourology*, www.ncbi.nlm.nih.gov/pubmed/19821694

9. Her C., Lees D.(1990) Preoperative predictors of the postoperative cardiac morbidity. *Anesthesiology* , .243-251.
10. Lavies N., Hart L., Rounsefell B., Runciman W.(1992) Identification of patient, medical and nursing staff attitudes to postoperative analgesia: stage 1 of a longitudinal study of postoperative analgesia. *Pain* , 448-457.
11. Mankikian B., Mesaros M., Laurence E., Simmoneau P.(1988) Epidural analgesia and respiratory dynamics. *Anesthesiology* , .317-368.
12. Morris R.H.(1971) Operating room temperature and the anaesthetized paralyzed patient. *Arch Surg*, s. 76-94.
13. Necek S.(1998) Wybór pomiędzy anestezją ogólną a analgezą przewodową. *Anestezjologia Intensywna Terapia*, 61-80.
14. Ocioszyński M.(1992) Wizyta przedoperacyjna i premedykacja. *Med. Sci. Rev.*, s.14-21.
15. Pestana C.(1979) Fluids an electrolytes in the surgical patients. *Williams and Wilkins*, Baltimore, 70-86.
16. Rackow E.C., Falk J.L., Fein I.A., et al.(1983) Fluid resuscitation in circulatory shock : a comparison of the cardiorespiratory effects of albumin, hetastarch, and saline solution in patients with hypovolemic and septic shock. *Crit. Care Med.*, 90-115.
17. Seymour D.G.(1994) Ocena ryzyka przedoperacyjnego. *Przegląd Nowości w Anestezjologii i Intensywnej Terapii*, t. 3, 61-65.
18. Wukitsch M.W., Petterson M.T.(1988) Pulse oximetry: Theory, technology and practice. *J Clin Monit*, 78-89.
19. Yeager M.P., Glass D.D., Neff R.K., Brinck-Johnsen T.(1987) Epidural anesthesia and analgesia in high risk surgical patients. *Anesthesiology*, t. 4, 57-72

Number of signs with spaces: 20 806

Anna A. Brożyna¹, Anna Gutowska¹, Cezary Jochym ski¹, Wiesława Windorbska², Ryszard Golda³, Wojciech Jóźwicki¹

¹Department of Tumor Pathology and Pathomorphology, Oncology Centre - Prof. Franciszek Łukaszczyk Memorial Hospital, The Ludwik Rydygier Collegium Medicum, Nicolaus Copernicus University, Bydgoszcz, Poland

¹Zakład Patologii Nowotworów i Patomorfologii, Centrum Onkologii im. Franciszka Łukaszczyka, Collegium Medicum im. Ludwika Rydygiera, Uniwersytet Mikołaja Kopernika, Bydgoszcz, Polska

²Department of Teleradiotherapy, Oncology Centre - Prof. Franciszek Łukaszczyk Memorial Hospital, Bydgoszcz, Poland

²Zakład Teleradioterapii, Centrum Onkologii im. Franciszka Łukaszczyka, Bydgoszcz, Polska

³Institute of Experimental Biology, Kazimierz Wielki University, Bydgoszcz, Poland

³Instytut Biologii Eksperymentalnej, Uniwersytet Kazimierza Wielkiego, Bydgoszcz, Polska

Epidermal growth factor receptor type 2 (HER-2) expression in gastric cancer – a correlation between clinical and histological features in patients at the Oncology Centre in Bydgoszcz

Ekspresja naskórkowego czynnika wzrostu typu 2 (HER-2) w raku żołądka - korelacja cech klinicznych i histologicznych u pacjentów Centrum Onkologii w Bydgoszczy

Summary

Gastric cancer is one of the most common tumours in Poland and it is often diagnosed at the advanced stage. Progression of the disease is the most important prognostic factor. It is assessed according to the TNM classification; however the prognosis in patients at the same clinical stage is often different. Therefore, in these cases there is a need to evaluate additional factors in order to determine the biological course of the disease. HER-2 (epidermal growth factor receptor type 2) expression is one of the prognostic predictors recently evaluated in the clinical studies. The first reports on HER-2 protein overexpression in gastric cancers were published in the late twentieth century, but its importance as a prognostic factor is still inconclusive and further research is needed. The aim of our study was to evaluate a relationship between the expression of HER-2 and microscopic features (histological type according to Lauren and WHO classification, grading, Ki-67 expression) in gastric cancers in 194 patients treated at the Oncology Centre in Bydgoszcz. HER-2-positive gastric cancers were more common in women than in men (11 (14.5%) versus 7 (5.9%) patients). The highest incidence of cancers with HER-2 overexpression was found in the group of tubular cancers (28.6%) and papillary cancers (14.3%). Among mucinous cancers and mucocellular carcinoma, HER-2 receptor overexpression was found in 2.6% and 5.9%, respectively. However, there was the highest percentage of HER-2 receptor overexpression (20.3%) in tumours classified by Lauren as intestinal. There was higher statistically significant ($p = 0.0021$) level of Ki-67 expression in the group of HER-2-positive cancers.

Summarize, evaluation of HER-2 expression in gastric cancers facilitates qualification of patients for the treatment with the anti-HER-2 antibody. The introduction of trastuzumab into gastric cancer therapy significantly improves survival in patients with HER-2 receptor overexpression. Furthermore, HER-2 overexpression in intesti-

nal and highly differentiated cancers, which are generally regarded as having a better prognosis, may be an independent risk factor for worse prognosis. This is comparable to diffuse or poorly differentiated cancers. Further research conducted on larger cohorts is needed to explain the reasons for such divergent results.

Key words: gastric cancer, epidermal growth factor receptor type 2, HER-2, predictive markers

Streszczenie

Rak żołądka jest jednym z najczęstszych nowotworów złośliwych w Polsce. Nowotwór ten rozpoznawany jest często w stadium zaawansowanym. Najważniejszym czynnikiem rokowniczym jest zaawansowanie, oceniane według klasyfikacji TNM, jednak rokowanie u chorych o tym samym stopniu zaawansowania klinicznego często jest różne. Z tego powodu dla określenia przebiegu biologicznego choroby w tych przypadkach potrzebna jest ocena dodatkowych czynników. Jednym z ostatnio ocenianych w badaniach klinicznych czynników prognostycznych i jednocześnie predykcyjnych jest ekspresja naskórkowego czynnika wzrostu typu 2, HER-2 (ang. Human Epidermal Growth Factor Receptor 2). Pierwsze doniesienia dotyczące nadekspresji białka HER-2 w rakach żołądka opublikowano pod koniec XX wieku, jednak jego znaczenie jako czynnika rokowniczego jest wciąż niejednoznaczne i konieczne są dalsze badania. Celem naszych badań była ocena zależności pomiędzy ekspresją HER-2 i cechami obrazu mikroskopowego guza (typ histologiczny według Laurena, według klasyfikacji WHO, gradingu, ekspresją Ki-67) w rakach żołądka u 194 pacjentów Centrum Onkologii w Bydgoszczy. HER-2-dodatnie raki żołądka znacznie częściej występowały u kobiet niż u mężczyzn (11 (14,5 %) versus 7 (5,9 %) pacjentów). Najwyższą częstość raków z nadekspresją HER-2 stwierdzono w grupie raków cewkowych (28,6%) oraz papilarnych (14,3%). W grupie raków śluzowych i śluzowokomórkowych nadekspresję receptora HER-2 stwierdzono odpowiednio w 2,6% i 5,9%. Natomiast w rakach sklasyfikowanych jako jelitowe według Laurena zanotowano najwyższy odsetek guzów wykazujących nadekspresję receptora HER-2 (20,3%). W grupie raków HER-2-dodatnich zaobserwowano wyższy, istotny statystycznie ($p=0.0021$) poziom ekspresji Ki-67.

Podsumowując, ocena ekspresji HER-2 w rakach żołądka stwarza możliwości terapii tych nowotworów. Wprowadzenie do terapii raka żołądka trastuzumabu, znacznie poprawia przeżycia pacjentów z nadekspresją receptora HER-2. Ponadto, nadekspresja HER-2 w rakach o typie jelitowym według Laurena oraz w rakach wysokozróżnicowanych, które są zazwyczaj uważane za nowotworowy o lepszym rokowaniu, może stanowić niezależny czynnik gorszego rokowania w wyżej wymienionych typach nowotworów, porównywanym do raków o typie rozlanym lub niskozróżnicowanych. Konieczne są dalsze badania, na większych grupach badanych, mające na celu wyjaśnienie przyczyn obserwowanych rozbieżnych wyników.

Słowa kluczowe: rak żołądka, naskórkowy czynnik wzrostu typu 2, HER-2, czynniki predykcyjne

Introduction

Gastric cancer is one of the most common tumours in Poland. According to American data, in the last five decades, the incidence of this cancer in the United States declined, but it still remains the second leading cause of death from cancer worldwide. Over half of all stomach cancers occur in developing countries. The highest incidence is in Japan, Korea, China, the countries of Central and South America (Chile, Colombia), Russia and

the former Soviet Union, where incidence rates are at the level of 45.5-77.9 per 100 000 inhabitants a year. As for incidence, stomach cancer is sixth in men and eleventh in women. As for mortality, it is the third in men and eighth in women. The incidence rate per 100000 inhabitants in Poland is 18.9 for men and 9.5 for women (Jastrzębski et al. 2010).

Approximately half of all cases of gastric cancer in the world are diagnosed at the early stage and the rest at the advanced stage. As in Poland there is no screening of this cancer, it is often diagnosed at the advanced stage (early gastric cancer in Poland is reported merely in 5-8% of cases). Intensive screening programs were implemented only in East Asian countries. This allowed the effective diagnosis of cancers at the early stage (Jemal et al. 2011).

Thirty five – forty percentage of tumours are located in the pre-pyloric part and in the pylorus (a downward trend), 25% in the body and 30-40% in the cardia (a rising trend). Gastric cancer usually spreads by implantation of cancer cells into the peritoneum via the intraperitoneal route (about 50%) or through the lymphatic system (approximately 27%) and by the bloodstream (around 23% of cases). Thus, metastases are formed in the liver, lungs and bones. The current studies evaluating the adjuvant treatment show no significant effect of radiotherapy and chemotherapy on the prognosis. Many studies covered the heterogeneous material, thereby losing their credibility. This does not facilitates reaching the agreement on the conditions of effective adjuvant therapy (Macdonald et al. 2001, Cunningham et al. 2006; Sastre et al. 2006).

Progression of the disease is the most important prognostic factor. It is assessed according to the TNM classification; however the prognosis in patients at the same clinical stage is often different. Therefore, in these cases there is a need to evaluate additional factors in order to determine the biological course of the disease. HER-2 (epidermal growth factor receptor type 2) expression is one of the prognostic predictors recently evaluated in the clinical studies. HER2 is a transmembrane tyrosine kinase receptor involved in the conduction of signals and aimed to induce growth and differentiation of cells. It regulates cell proliferation by activating transmission pathways such as cascade associated with mitogen-activated protein kinases (MAPK). For the hitherto unknown reasons, its quantity is increased on the surface of some tumour cells (overexpression). This intensifies divisions and uncontrolled tumour growth (Badache and Goncalves 2006; Ramieri et al. 2010).

HER-2 protein overexpression is found in different types of epithelial cancers, including 10-40% of breast cancers, both in situ and invasive. Amplification and overexpression of HER-2 multiply the number of HER-2 receptor monomers on the cellular surface. It was reported that over-expression of HER-2 in breast cancer is an indicator of a more aggressive disease. Amplification of the gene is a strong and independent factor associated with shorter recurrence time. It is also connected with shorter overall survival in patients with metastases to the lymph nodes. HER-2 changes co-occur with other prognostic factors such as histological grade, histological type, absence of oestrogen receptors (ER) and progesterone receptors (PR) and the lymph node involvement. The status of HER-2 in breast cancer decides on qualifying patients to the treatment with recombinant humanized antibody against HER-2, trastuzumab (Kraśnińska and Jassem 2003).

The first reports on HER-2 protein overexpression in gastric cancers were published in the late twentieth century (Park et al. 1989; Tokunaga et al. 1995). Overexpression is found in about 8-35% of patients with this cancer and some studies associate it with a worse prognosis (Takehara et al. 2002; Romiti et al. 2012). However, its importance as a prognostic factor is still inconclusive and further research is needed. The aim of our study was to evaluate a relationship between the expression of HER-2 and microscopic features (histological type according to Lauren and WHO classification, grading, Ki-67 expression) in gastric cancers in patients treated at the Oncology Centre in Bydgoszcz.

Material and methods

Patients

The study included 194 patients treated at the Franciszek Łukaszczyk Oncology Centre in Bydgoszcz in the years 2010-2013. The histological material taken from patients was tested using immunohistochemical assay (IHC) for HER-2 expression. Table 1 shows the characteristics of patients.

Immunohistochemistry and fluorescence in situ hybridization (FISH)

HER-2 expression was determined using immunohistochemistry on standard sections of 4-5 μm (prepared from the histological material settled in formalin and submerged in paraffin). The assay used rabbit polyclonal Parthway anti-HER-2/neu antibody (clone 4B5), designed to the semi-quantitative evaluation of histological preparations (Ventana Medical Systems, Incorporation, F. Hoffmann-La Roche Ltd). The system based on diaminobenzidine, ultraView Universal DAB Detection Kit (Ventana Medical Systems, Incorporation, F. Hoffmann-La Roche Ltd.) was used to visualize the immunohistochemical reaction. The assays were performed using a fully automated apparatus Ventana Benchmark Ultra (Ventana Medical Systems, Incorporation, F. Hoffmann-La Roche Ltd.).

Amplification of the HER-2 gene was detected by FISH in accordance with the manufacturer's protocol (PathVysion® HER-2 DNA Probe Kit, Abbott Molecular Inc., IL, USA). Deparaffinized standard sections were treated with 0.2 N HCl at room temperature and then pre-heated in pre-treatment solution, digested with protease, fixed in formalin and dried in a hybridizer. The following fluorescently labelled probes were applied on these formulations: LSI HER-2 - complementary to the HER-2 gene (labelled with marker SpectrumOrange™) and CEP 17 - complementary to satellite DNA located in the centromere of chromosome 17 (labelled with marker SpectrumGreen™), covered with a coverglass and subjected to 5-minute denaturation at 73°C and 21-hour (overnight) hybridization at 37°C. Next, the preparations were sealed in medium containing DAPI (marking the cell nuclei) and evaluated on the next day under a fluorescent microscope at magnification of 1000x.

The assessment of Ki-67 expression used 4-5 μm sections of tissue material settled in 10% buffered formalin and sunken in paraffin, which after heating at 60°C, deparaffinization and hydration in a series of decreasing concentration alcohol solutions were heated in the citrate buffer (pH 6) for 20 minutes in a microwave oven (650W). Next, the activity of endogenous peroxidase was blocked and sections were incubated with anti-Ki-67 (1:100) (Dako, Carpinteria, CA, USA) at room temperature. Antigen-

linked antibodies were visualized using the system EnVision™ Detection System, Peroxidase/DAB+ (Dako, Carpinteria, CA, USA), then cell nuclei were stained with hematoxylin and preparations were sealed in solid medium (Consul Mount; Thermo Fisher Scientific Inc. Waltham, MA, USA).

The evaluation of preparations

The expression of HER-2 receptor in gastric cancer was detected using immunohistochemistry and evaluated based on a four-point scale. Tumours were classified as HER-2-IHC-3+ (positive) when there was membrane expression detected (medium to strong), especially in the basolateral part of the cell. In gastroscopic specimens, expression occurred in at least 5 cancer cells, while surgical specimens contained at least 10% of tumour cells. HER-2-IHC-2+ status was indicated when total or partial membrane labelling (weak to moderate) involved more than 10% of cancer cells. HER-2-IHC 1+ status was declared in tumours where very weak membrane labelling (total or partial) occurred in more than 10% of cancer cells. There was no membrane labelling in tumours classified as HER-2-IHC-0 (negative) or it occurred in less than 10% of tumour cells (Olszewski and Olszewski 2010, Ruschoff et al. 2010).

HER-2 gene amplification detected using FISH was assessed by evaluating the ratio of HER-2 and CEP17 signals. The ratio more than 2.2 HER-2/CEP 17 indicated amplification. The FISH result showing the HER-2/CEP 17 ratio below 1.8 indicated a negative result (no amplification). The result of FISH tests HER-2/CEP17 from 1.8 to 2.2 was ambiguous.

Ki-67 expression was analyzed by assessing the percentage of gastric cancer cell nuclei that express the tested antigen.

Analysis of expression changes and statistical evaluation

Statistical analysis of the results was performed using program GraphPad Prism 5.00 (GraphPad Software, San Diego, CA). Statistically significant differences were examined using the non-parametric Mann-Whitney test; when $p < 0.05$ the results were accepted as significant.

Results

HER-2-positive gastric cancers were more common in women than in men (11 (14.5%) versus 7 (5.9%) patients). The mean age of patients in the group of HER-2-positive cancers was 62.2 years (from 36 to 84, median 65 years). Compared to the group of HER-2 negative patients, in this group median was slightly higher, but the reported differences were not statistically significant (see Table 2, Fig. 2, median 61-62 years).

The analysis also included distribution of HER-2 receptor expression in tumors grouped according to the WHO and Lauren classification. The highest incidence of cancers with HER-2 overexpression was found in the group of tubular cancers (28.6%) and papillary cancers (14.3%). Among mucinous and signet ring cancers, HER-2 receptor overexpression was found in 2.6% and 5.9%, respectively (Table 3, Fig. 3A-B). However, there was the highest percentage of HER-2 receptor overexpression (20.3%) in tumours classified by Lauren as intestinal (Table 3, Fig. 4A-B).

Furthermore, a relationship was observed between HER-2 overexpression and differentiation grade. There were significantly statistically higher incidence of HER-2 overexpression ($p=0.0048$) in well-differentiated cancers (Fig. 5). Statistical analysis showed an inverse correlation of HER-2 expression and tumor grade ($r = -0.2263$, $p = 0.0017$).

There was also a significant positive correlation between HER-2 receptor overexpression and the expression of cell proliferation marker Ki-67 ($r = 0.1909$, $p = 0.0053$). There was higher statistically significant ($p = 0.0021$) level of Ki-67 expression in the group of HER-2-positive cancers (Fig. 6).

Discussion

The expression of the receptor was found in nearly 10% of patients selected for this study at the Oncology Centre in Bydgoszcz. The expression differed depending on the histological type (type according to the Lauren and WHO classification), proliferation rate and a degree of differentiation.

The importance of HER-2 as a prognostic factor is still controversial. Some published data did not indicate the existence of a relationship between HER-2 expression in gastric cancers and overall survival or disease-free time (Aoyama et al. 2013, Zhou et al. 2013). At the same time, other researchers have observed worse prognosis in patients with gastric cancers and HER-2 overexpression (Park et al. 2006, Xie et al. 2009; Liu et al. 2012). Park et al. (2006) reported worse prognosis in patients with HER-2 amplification as well as worse 5-year survival (21.4% vs. 63%). In addition, Park et al. showed that HER-2 amplification, age and TNM staging were independent prognostic factors. The similar relationships were observed by Xie et al. (2009) who noted a correlation between HER-2 overexpression and poorer survival ($p < 0.001$). However, Liu et al. (2012) reported shorter 5-year survival in patients with intestinal type of gastric cancer and early gastric cancer with HER-2 overexpression compared to cancers with no overexpression (21% vs. 47%, $p = 0.027$; 29% vs. 60%, $p = 0.037$). Nevertheless, they found no such relationships in diffuse and mixed cancers.

Similar discrepancies are observed in the analysis of a relationship between HER-2 expression and pathomorphological features of gastric cancer.

Some researchers consider HER-2 expression in gastric cancers as a factor associated with such tumour characteristics as severity according to the TNM classification (depth of tumour invasion and the presence of metastases to the lymph nodes and distant metastases), histological type and a degree of differentiation. It should also be noted that other studies do not indicate the existence of such relationship (e.g.: Risio et al. 2003; Yan et al. 2011).

Some studies show higher incidence of HER-2 overexpression in the intestinal type (16%-87%) of stomach cancers than in the diffuse type (4-7%) (Uchino et al. 1993; Takehara et al. 2002; Gravalos and Jimeno 2008; Tafe et al. 2011, Yan et al. 2011; Gomez-Martin et al. 2012). Additionally, in their studies Uchino et al. (Uchino et al. 1993) found that HER-2 receptor overexpression was more often in papillary tumours or well- and medium-differentiated (14%) than in poorly differentiated or mucocellulare carcinoma (2%). It should be noted, however, that other researchers did not observe differences in the incidence of HER-2 overexpression and the type classified according to Lauren or the histological type (Sekaran et al. 2012; Tsapralis et al. 2012).

Similarly, Hayashi et al. (Hayashi et al. 2008) did not report worse prognosis in patients with HER-2 overexpression, although they found a relationship between overexpression and the type according to Lauren, with higher frequency of HER-2 overexpression in

the intestinal type (vs. diffuse type, $p = 0.007$). HER-2 overexpression did not depend on the clinical and pathological factors, depth of invasion, presence of metastasis or clinical stage. Yan et al. (2011) found a correlation between HER-2 overexpression and tumour infiltration depth, TNM, metastases to the lymph nodes and distant metastases ($p < 0.05$), but noticed no correlation between HER-2 overexpression and age, sex, type of differentiation or location.

Our studies reported no correlation between HER-2 overexpression and the age of patients. However, there was higher incidence of cancer HER-2-positive women (14.5% versus 5.9% for men). We have also observed, like other researchers, a higher rate of HER-2 overexpression in the intestinal type cancers according to Lauren compared to the diffuse type (20.3% versus 1.5%) and tubular and papillary type in comparison with the mucinous cancers and signet ring cancers according to the WHO classification (42.9% versus 8.5%) (Uchino et al., 1993; Takehara et al. 2002; Gravalos and Jimeno 2008; Tafe et al. 2011, Yan et al. 2011; Gomez-Martin et al. 2012).

Tafe et al. [2011] noticed statistically significantly higher incidence of HER-2 overexpression in moderately differentiated tumours compared to poorly differentiated tumours ($p < 0.001$). Similarly, our studies reported a negative correlation between HER-2 expression and a degree of differentiation. The highest incidence of overexpression HER-2 was observed in highly differentiated cancers (G1-25%, G2-14.9%, G3-2.8%).

Moreover, HER-2 overexpression was observed more frequently in cancers located in the esophagogastric junction than in the other parts of the stomach (25% vs. 9.5%, $p = 0.01$) (Gravalos and Jimeno 2008).

The literature lacks data discussing the Ki-67 expression in relation to HER-2 overexpression, although our results indicate that there is a positive correlation between the expression of these proteins. This may suggest that HER-2 overexpression stimulates proliferation through Ki-67 by activating and mobilizing signal transduction.

Conclusions

To sum up, we can conclude that even though the studies on HER-2 overexpression in gastric cancers have been conducted for over 25 years, the prognostic and predictive value of evaluating the expression of this receptor is ambiguous. Also, some study results seem to be controversial. At the same time, it should be noted that stomach cancer therapy is associated with a number of limitations and difficulties. The introduction of trastuzumab into gastric cancer therapy significantly improves survival in patients with HER-2 receptor overexpression. Furthermore, HER-2 overexpression in intestinal and highly differentiated cancers, which are generally regarded as having a better prognosis, may be an independent risk factor for worse prognosis. This is comparable to diffuse or poorly differentiated cancers. Further research conducted on larger cohorts is needed to explain the reasons for such divergent results.

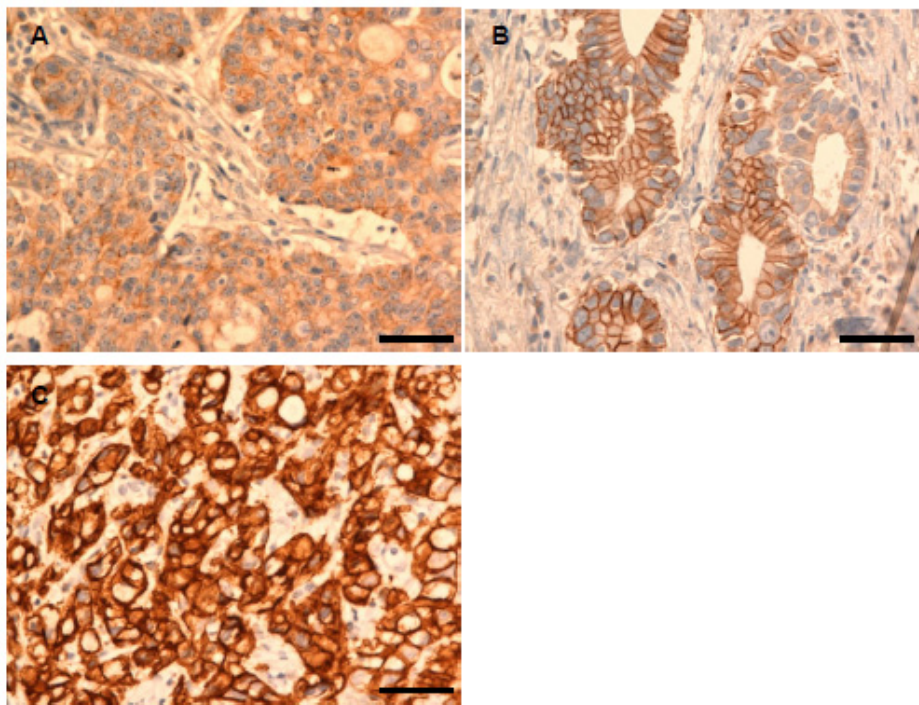


Fig. 1. A status of the HER-2 receptor in the sections labelled by immunohistochemistry in gastric cancers. A) HER-2 expression at 1+; B) HER-2 expression at 2+; C) HER-2 expression at 3+. The blue-violet nuclei are counterstained with hematoxylin. Scale bars - 50 μm.

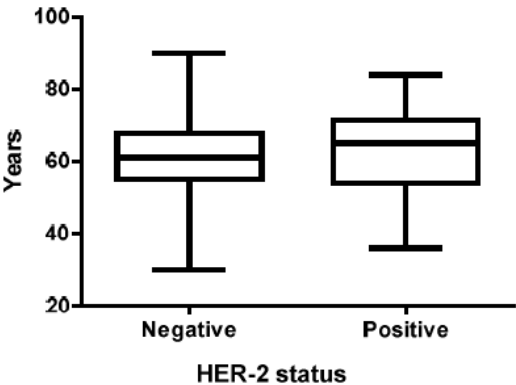


Fig. 2. The age of patients with HER-2-negative and HER-2-positive gastric cancers. Data present the median (horizontal line), 25th and 75th percentile (lower and upper limit of the rectangle) and the minimum and maximum (upper and lower vertical line) age of patients.

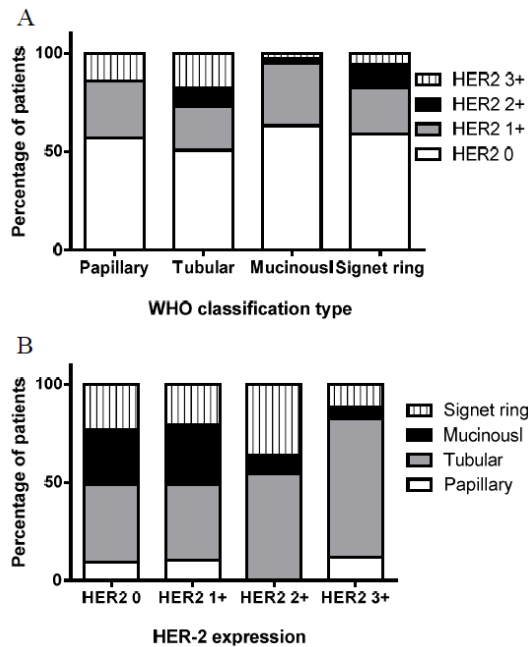


Fig. 3. HER-2 expression in gastric cancers classified according WHO classification.

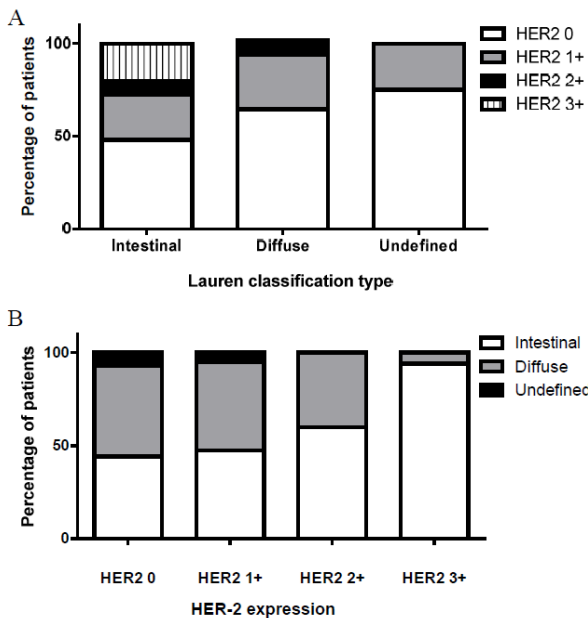


Fig. 4. HER-2 expression in gastric cancers classified according Lauren classification.

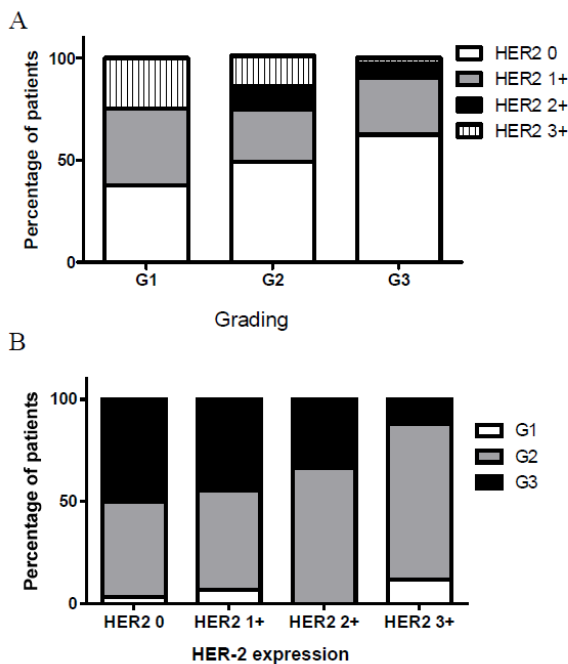


Fig. 5. HER-2 expression in gastric cancers classified according differentiation grade.

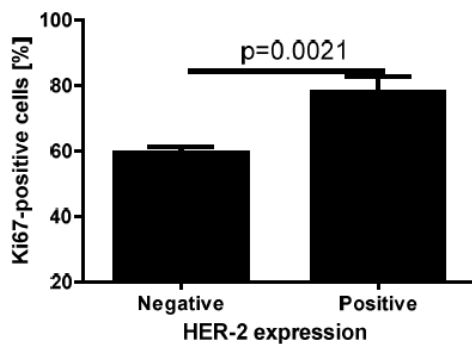


Fig. 6. Ki-67 expression in HER-2-negative and HER-2-positive gastric cancers.

Tab. 1. Clinico-pathomorphological gastric patients characteristic.

Gender	F M	n=76 n=118
Age [years]	F: Mean Median M: Mean Median	61,5 (32-84) 62 61,0 (30-90) 61
Grading*	G1 G2 G3	n=8 n=87 n=72
Lauren classification**	Intestinal Diffuse Unclassified	n=79 n=66 n=8
WHO classification***	Papillary type Tubular type Mucinous type Sygnet ring type	n=14 n=67 n=38 n=34

Due to very small gastroscopic samples or too small cancer area in sections:

* no data for 27 patients

** no data for 44 patients

*** no data for 45 patients

Tab. 2. HER-2 status in gastric cancer patients.

HER-2 status	Number of patients / percentage
HER-2-IHC-0	112 / 57,7
HER-2-IHC-1+	46 / 23,7
HER-2-IHC-2+	18 / 9,3
HER-2-IHC-3+	18* / 9,3

* HER-2 overexpression was confirmed in 16 patients using immunohistochemistry, and in 2 patients using FISH metod.

Tab. 3. HER-2 expression in gastric cancer patients classified according pathomorphological features.

Feature		Number of patients / percentage	
Age	≤ 50 r. ż.	HER2-negative HER2-positive	24/88,9 3/11,1
	>50 r. ż.	HER2-negative HER2-positive	152/91,0 15/9,0
Gender	F	HER2-negative HER2-positive	65/85,5 11/14,5
	M	HER2-negative HER2-positive	111/94,1 7/5,9
Grading	G1	HER2-negative HER2-positive	6/75 2/25
	G2	HER2-negative HER2-positive	74/85,1 13/14,9
	G3	HER2-negative HER2-positive	70/97,2 2/2,8
Lauren classification	Intestinal	HER2-negative HER2-positive	63/79,7 16/20,3
	Diffuse	HER2-negative HER2-positive	65/98,5 1/1,5
	Unclassified	HER2-negative HER2-positive	8/100 0/0
WHO classification	Papillary type	HER2-negative HER2-positive	12/85,7 2/14,3
	Tubular type	HER2-negative HER2-positive	55/71,4 12/28,6
	Mucinous type	HER2-negative HER2-positive	37/97,4 1/2,6
	Syngnet ring type	HER2-negative HER2-positive	32/94,1 2/5,9

Bibliography

1. Aoyama T., Yoshikawa T., Miyagi Y., Kameda Y., Shirai J., Hayashi T., Cho H., Oshima T., Yukawa N., Rino Y., Masuda M. and Tsuburaya A. (2013) Human epidermal growth factor receptor 2 (Her-2) and S-1 adjuvant chemotherapy in stage 2/3 gastric cancer patients who underwent D2 gastrectomy. *Surg Today*.
2. Badache A. and Goncalves A. (2006) The ErbB2 signaling network as a target for breast cancer therapy. *J Mammary Gland Biol Neoplasia* 11(1): 13-25.
3. Cunningham D., Allum W. H., Stenning S. P., Thompson J. N., Van de Velde C. J., Nicolson M., Scarffe J. H., Loftis F. J., Falk S. J., Iveson T. J., Smith D. B., Langley R. E., Verma M., Weeden S., Chua Y. J., et al. (2006) Perioperative chemotherapy versus surgery alone for resectable gastroesophageal cancer. *N Engl J Med* 355(1): 11-20.
4. Gomez-Martin C., Garralda E., Echarri M. J., Ballesteros A., Arcediano A., Rodriguez-Peralto J. L., Hidalgo M. and Lopez-Rios F. (2012) HER2/neu testing for anti-HER2-based therapies in patients with unresectable and/or metastatic gastric cancer. *J Clin Pathol* 65(8): 751-7.
5. Gravalos C. and Jimeno A. (2008) HER2 in gastric cancer: a new prognostic factor and a novel therapeutic target. *Ann Oncol* 19(9): 1523-9.
6. Hayashi M., Inokuchi M., Takagi Y., Yamada H., Kojima K., Kumagai J., Kawano T. and Sugihara K. (2008) High expression of HER3 is associated with a decreased survival in gastric cancer. *Clin Cancer Res* 14(23): 7843-9.
7. Jastrzębski T., Drucis K., Polec T., Biernat W. and Jaśkiewicz J. (2010) Ocena receptorów Her2 w raku żołądka. *Cancer Surgery* 1: 12-15.
8. Jemal A., Bray F., Center M. M., Ferlay J., Ward E. and Forman D. (2011) Global cancer statistics. *CA Cancer J Clin* 61(2): 69-90.
9. Kasińska L. and Jassem J. (2003) Kliniczne znaczenie zaburzeń HER-2 w raku piersi z uwzględnieniem metod ich oznaczania. *Nowotwory Journal of Oncology* 53: 68-73.
10. Liu W., Zhong S., Chen J. and Yu Y. (2012) HER-2/neu overexpression is an independent prognostic factor for intestinal-type and early-stage gastric cancer patients. *J Clin Gastroenterol* 46(4): e31-7.
11. Macdonald J. S., Smalley S. R., Benedetti J., Hundahl S. A., Estes N. C., Stemmermann G. N., Haller D. G., Ajani J. A., Gunderson L. L., Jessup J. M. and Martenson J. A. (2001) Chemoradiotherapy after surgery compared with surgery alone for adenocarcinoma of the stomach or gastroesophageal junction. *N Engl J Med* 345(10): 725-30.
12. Park D. I., Yun J. W., Park J. H., Oh S. J., Kim H. J., Cho Y. K., Sohn C. I., Jeon W. K., Kim B. I., Yoo C. H., Son B. H., Cho E. Y., Chae S. W., Kim E. J., Sohn J. H., et al. (2006) HER-2/neu amplification is an independent prognostic factor in gastric cancer. *Dig Dis Sci* 51(8): 1371-9.
13. Park J. B., Rhim J. S., Park S. C., Kimm S. W. and Kraus M. H. (1989) Amplification, overexpression, and rearrangement of the erbB-2 protooncogene in primary human stomach carcinomas. *Cancer Res* 49(23): 6605-9.
14. Ramieri M. T., Murari R., Botti C., Pica E., Zotti G. and Alo P. L. (2010) Detection of HER2 amplification using the SISH technique in breast, colon, prostate, lung and ovarian carcinoma. *Anticancer Res* 30(4): 1287-92.

15. Risio M., De Rosa G., Sarotto I., Casorzo L., Capussotti L., Torchio B., Aglietta M. and Chiecchio L. (2003) HER2 testing in gastric cancer: molecular morphology and storage time-related changes in archival samples. *Int J Oncol* 23(5): 1381-7.
16. Romiti A., Di Rocco R., Milione M., Ruco L., Ziparo V., Zullo A., Duranti E., Sarcina I., Barucca V., D'Antonio C. and Marchetti P. (2012) Somatostatin receptor subtype 2 A (SSTR2A) and HER2 expression in gastric adenocarcinoma. *Anticancer Res* 32(1): 115-9.
17. Sastre J., Garcia-Saenz J. A. and Diaz-Rubio E. (2006) Chemotherapy for gastric cancer. *World J Gastroenterol* 12(2): 204-13.
18. Sekaran A., Kandagaddala R. S., Darisetty S., Lakhtakia S., Ayyagari S., Rao G. V., Rebala P., Reddy D. B. and Reddy D. N. (2012) HER2 expression in gastric cancer in Indian population--an immunohistochemistry and fluorescence in situ hybridization study. *Indian J Gastroenterol* 31(3): 106-10.
19. Tafe L. J., Janjigian Y. Y., Zaidinski M., Hedvat C. V., Hameed M. R., Tang L. H., Hicks J. B., Shah M. A. and Barbashina V. (2011) Human epidermal growth factor receptor 2 testing in gastroesophageal cancer: correlation between immunohistochemistry and fluorescence in situ hybridization. *Arch Pathol Lab Med* 135(11): 1460-5.
20. Takehara Y., Mizuta Y., Isomoto H., Ohnita K., Yoshimura M., Nakamura T., Takeshima F., Omagari K., Murase K., Murata I., Taniyama K. and Kohno S. (2002) Influence of *Helicobacter pylori* infection on in vitro responsiveness of gastric fundus to agonists and to stimulation of enteric nerves in Mongolian gerbils. *J Gastroenterol* 37(8): 589-95.
21. Tokunaga A., Onda M., Okuda T., Teramoto T., Fujita I., Mizutani T., Kiyama T., Yoshiyuki T., Nishi K. and Matsukura N. (1995) Clinical significance of epidermal growth factor (EGF), EGF receptor, and c-erbB-2 in human gastric cancer. *Cancer* 75(6 Suppl): 1418-25.
22. Tsapralis D., Panayiotides I., Peros G., Liakakos T. and Karamitopoulou E. (2012) Human epidermal growth factor receptor-2 gene amplification in gastric cancer using tissue microarray technology. *World J Gastroenterol* 18(2): 150-5.
23. Uchino S., Tsuda H., Maruyama K., Kinoshita T., Sasako M., Saito T., Kobayashi M. and Hirohashi S. (1993) Overexpression of c-erbB-2 protein in gastric cancer. Its correlation with long-term survival of patients. *Cancer* 72(11): 3179-84.
24. Xie S. D., Xu C. Y., Shen J. G., Jiang Z. N. and Wang L. B. (2009) HER 2/neu protein expression in gastric cancer is associated with poor survival. *Mol Med Rep* 2(6): 943-6.
25. Yan S. Y., Hu Y., Fan J. G., Tao G. Q., Lu Y. M., Cai X., Yu B. H. and Du Y. Q. (2011) Clinicopathologic significance of HER-2/neu protein expression and gene amplification in gastric carcinoma. *World J Gastroenterol* 17(11): 1501-6.
26. Zhou F., Qiu W., Sun L., Xiang J., Sun X., Sui A., Ding A. and Yue L. (2013) Clinical significance of nucleophosmin/B23 and human epidermal growth factor receptor 2/neu expressions in gastric cancers. *APMIS*.

This work was supported by the statutory funds of the Ludwik Rydygier Collegium Medicum, Nicolaus Copernicus University.

The number of characters with spaces: 31 938

Renata Gładka¹, Elżbieta Malecka²

¹ The Medical University of Silesia, Medical Department, doctoral study

¹ Śląski Uniwersytet Medyczny w Katowicach, Studium Doktoranckie Wydziału Lekarskiego

² The Jerzy Kukuczka Academy of Physical Education in Katowice, Higher School of Strategic Planning in Dąbrowa Górnicza

² Akademia Wychowania Fizycznego im. Jerzego Kukuczki w Katowicach; Wyższa Szkoła Planowania Strategicznego w Dąbrowie Górniczej

Stroke prevention as practiced by nurse professionals in the Silesian Voivodship

Stosowanie profilaktyki udaru mózgu przez grupę zawodową pielęgniarek w województwie śląskim

Summary

The level of society's knowledge relating to the stroke and the appropriate ways of its prevention is still unsatisfactory. A complex approach to the stroke prevention (encompassing diet, physical activity, pharmacotherapy) addressed to the people belonging to the high-risk groups is one of the most significant tasks for the health care sector professionals, including nurses. The goal of the paper is to establish a dependency between: nurse seniority and their place of employment from the one side and the level of nurses' knowledge in the subject of stroke prevention and their involvement in the process of gaining and expanding this knowledge by participating in courses, trainings and lectures from the other side; between a particular component of the lifestyle in the form of physical activity and its share in the stroke prevention practices. Material and methods: The research has been conducted within the area of the Silesian Voivodship. 268 persons have participated in the survey. The research utilized the polling method. Nonparametric chi-squared test has been applied to verify significant differences between variables. Summary of the results and conclusions: The knowledge of the stroke prevention aspects among nurse professionals in the Silesian Voivodship is satisfactory. Senior nurses are more inclined to recommend and control preventive activities undertaken by patients. They also more frequently participate in preventive programs than the nurses with less working experience. The nurses who are physically active much more frequently recommended this form of prevention to patients and controlled its performance. This was not the case for the nurses who had not engaged in physical activity.

Key words: stroke, prevention, nurses, physical activity

Streszczenie

Poziom wiedzy w społeczeństwie na temat udaru mózgu oraz właściwych sposobów zapobiegania jego wystąpieniu jest wciąż niski. Profilaktyka udaru mózgu u osób o nim zagrożonej z zastosowaniem podejścia kompleksowego (dieta, aktywność fizyczna, farmakoterapia) jest jednym z istotniejszych zadań pracowników służby zdrowia,

w tym między innymi pielęgniarek. Celem pracy jest określenie istnienia związku pomiędzy: stażem pracy i miejscem pracy pielęgniarek a znajomością zagadnień dotyczących profilaktyki udaru mózgu oraz zaangażowaniem w zdobywaniu i poszerzaniu wiedzy w tej tematyce poprzez uczestnictwo w kursach, szkoleniach i wykładach; wybraną składową stylu życia pielęgniarek jaką jest aktywność fizyczna, a jej udziałem w profilaktyce udaru mózgu.

Materiał i metody: Badanie zostało zrealizowane na terenie województwa śląskiego. Przebadano 268 osób. W badaniu została zastosowana metoda sondażowa. Dla potrzeb weryfikacji obecności istotnych różnic między zmiennymi został zastosowany nieparametryczny test chi kwadrat. Podsumowanie wyników i wniosków: Znajomość zagadnień dotyczących profilaktyki udaru mózgu w grupie pielęgniarek w województwie śląskim jest na poziomie zadowalającym. Pielęgniarki z długim stażem pracy częściej zalecają i kontrolują podejmowane przez pacjenta działania profilaktyczne oraz uczestnictwo w programach profilaktycznych w porównaniu do pielęgniarek z krótkim stażem pracy. Pielęgniarki, które same podejmowały aktywność fizyczną, zdecydowanie częściej zalecały i kontrolowały ją u pacjentów, niż pielęgniarki, które nie podejmowały aktywności fizycznej.

Słowa kluczowe: udar mózgu, profilaktyka, pielęgniarki, aktywność fizyczna

Introduction

One of the most troubling health problems within modern societies is the stroke and its long-lasting consequences. According to the WHO's definition, the stroke is a set of clinical symptoms characterized by a sudden occurrence of focal or generalized disturbances in the brain activity having no other cause than a vascular disorder and persisting, unless earlier resulting in death, for over 24 hours.

Poland has a yearly count of stroke incidence of 60 000. Due to the high death rate strokes are commonly perceived as life threatening situations. The decisively higher death and disability rates than these observed in other countries contribute to a significant stroke-related problem observed in Poland (Ryglewicz, 2000). A research conducted in the European countries foresees an increase in the stroke incidence of almost 40 % within the period of the next 20 years (Truelsen, Piechowski-Jozwiak, Bonita, 2006).

The most significant non-modifiable stroke factor is the age. Ischemic stroke incidence increases with age, especially among people who are over 55 years old. From this age the risk of suffering a stroke is doubled with every consecutive decade. For the people who are below 85 the stroke incidence is higher among males. This pattern is reversed for those over 85 (Petrea, Beiser, 2009). In the aging society the stroke will have an increasingly higher influence on the state of health and on the socio-economic conditions (Świat, 2010). In terms of the modifiable risk factors, the highest importance is ascribed to the arterial hypertension. It significantly increases the risk of stroke. Systolic blood pressure persistently occupying the upper ranges of the norm (systolic blood pressure in the range of 120-140 mmHg, diastolic blood pressure in the range of 80-90 mmHg) carries a risk of a stroke almost twice as high as the normal blood pressure (Seshadri, Beiser, Kelly-Hayes, 2006).

The level of knowledge on the stroke and the appropriate ways of its prevention is still low within the society, which leads to belittling the symptoms and negligence of the prevention. From the economic perspective, prevention belongs to the most effective and most beneficial ways of combating diseases (Knypl, 2000). Prevention definition according to WHO describes the process as all the activities aimed at preventing diseases through early discovery and treatment.

Stroke prevention is becoming the most important activity within the field of controlling vascular diseases of the brain. Its goal is to prevent the development of the stroke risk factors, to limit their numbers, and secure control once they have occurred (Nowacki, Bajer-Czajkowska, 2008). Stroke prevention can be divided into:

- primary stroke prevention, focused on diagnosis and treatment of the conditions perceived as risk factors for the stroke incidence.
- secondary stroke prevention, which should be applied in case of the people who have suffered a stroke and is intended to minimize the risk of recurrence. Main elements of the secondary prevention include: changing the lifestyle, as well as treatment and modification of the risk factors (Siebert, Nyka, 2007).

A complex approach to the stroke prevention (encompassing diet, physical activity, pharmacotherapy) for the people belonging to the high-risk groups is one of the most significant tasks for the health care sector professionals, including nurses. Correct realization of the task requires a suitable knowledge of the topic, as well as motivation to undertake the mentioned activities which quite often transgress the usual scope of responsibilities or consume additional time resources. Knowledge in the scope of health-determining factors, mainly lifestyle, constitutes an essential element in the process of shaping health-supporting attitudes (Gacek, 2011).

Patient education should be conducted on the occasion of every contact between the patient and Health Care services. The highest success rate of the prevention can be achieved when the prevention activity is addressed to young people facing high risk levels in terms of various diseases, including the stroke. The first step of the well managed prevention should be the discovery of individuals belonging to the groups threatened with a higher risk of suffering a stroke. Within the Health Care structures currently in force in our country this task is largely attributed to family physicians (Knypl, 2000). The effectiveness of the preventive actions is also conditioned by the appropriate control measures. Control frequency can be increased by nurses who stay in contact with patients on a more regular basis than physicians and are not restricted by appointments.

Promoting the knowledge on the stroke prevention and its treatment is a priority set out by the European Stroke Initiative (EUSI), an action undertaken by the World Health Organization.

Polish National Health Program for the years 2007 - 2015 assumed decreasing the incidence and premature morbidity caused by cardiovascular diseases, including strokes. Focused around promotional and preventive activities, the National Health Program is realized by multiple social organizations and it sees the health care professionals as the key players in the process. Respective groups of medical professions whose representatives stay in a direct contact with patients should play a decisive role in the realization of these goals, especially in terms of the stroke prevention. Realization of all the professional activities by physicians and nurses, including health promotion and prevention, requires

not only an appropriate level of knowledge, but first and foremost a set of suitable life attitudes and activities. These are essential to build the role models, stimulate interest in health and develop one's responsibility for the health of their own and others (Warchoń-Sławińska, Włoch, 2003). One of the most important factors influencing the correct psychological and physical development of children and teenagers, as well as the health and life condition of the adults is physical activity (Chabros, Charzewska et al., 2008).

Society expects from the representatives of medical professions patterns of physical activity that are worth following (Muszałik, Kędziora – Kornatowska, et al., 2007). These special groups of medical professions exercise the ability of multidirectional influence, that is the ability to promote health and health education, to prevent, to sustain society's health condition on a desired level (Brodzińska, Modzelewska, et al.2010).

Study goal

The goal of the research is to evaluate dependencies between:

- nurse seniority and their place of employment from the one side and their level of knowledge in the subject of stroke prevention and the involvement in the process of gaining and expanding this knowledge by participating in courses, trainings and lectures from the other side.
- particular component of the lifestyle in the form of physical activity and its share in the stroke prevention practices

Material and method

The research has been conducted in 2012 within the area of the Silesian Voivodship. 268 people have been surveyed. This group comprised 261 women and 7 men who are active in the nurse profession. Individuals participating in the research were employed in: municipal hospital, voivodship hospital, clinic, health centers – Non-public Health Care Centre (Niepubliczny Zakład Opieki Zdrowotnej, NZOZ) or Health Maintenance Centre (Samodzielny Publiczny Zakład Opieki Zdrowotnej, SPZOZ). Results have been presented on a percentage scale.

The research project secured anonymity and confidentiality for all of its participants. Participation in the research was voluntary.

Method

The research utilized the polling method. For this purpose the authors have composed a survey questionnaire. The survey comprises 59 questions, most of which are closed or one-choice questions. The initial part of the survey includes questions on age, sex, educational background, work experience, place of employment, physical well-being, job satisfaction. The second part consists of questions on the types of the undertaken physical activity, diet, used stimulants. The third part of the survey comprises questions on the widely understood prevention aspects, including stroke prevention and the frequency of recommending preventive actions to the patients, as well as on the participation in the stroke-related courses and trainings.

A database has been composed from the received answers, which was then used in further analysis. Nonparametric chi-squared test, ANOVA variance analysis, Kruskal-Wallis test have been applied to verify significant differences between variables. The applied statistical significance level was $p < 0,05$.

Research results overview

To the question asking to point the correct definition of the primary prevention (Fig.1) decisive majority of nurses (from 84% to 100% in the respective groups) provided the correct answer - B (primary prevention is intended to reduce the incidence of a disease. This is achieved by supporting health through the reduction of risk factors or propagation of factors reducing vulnerability to a disease e.g.: through the improvements in nourishment, physical condition). All the nurses possessing a work experience of more than 31 years highlighted the correct answer - B. The nurses working in the profession less than 10 years (13,6%) selected the incorrect answer - C (is intended to reduce the duration of the disease or to slow down its progress, as well as to prevent complications). Only 11,6% of those surveyed with the working experience of 21-30 years selected the incorrect answer A (is intended to limit the incidence of persistent disease consequences. It comprises activities aimed at reducing the frequency of injuries and disabilities). The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=13,91$; $df=6$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses' working experience.

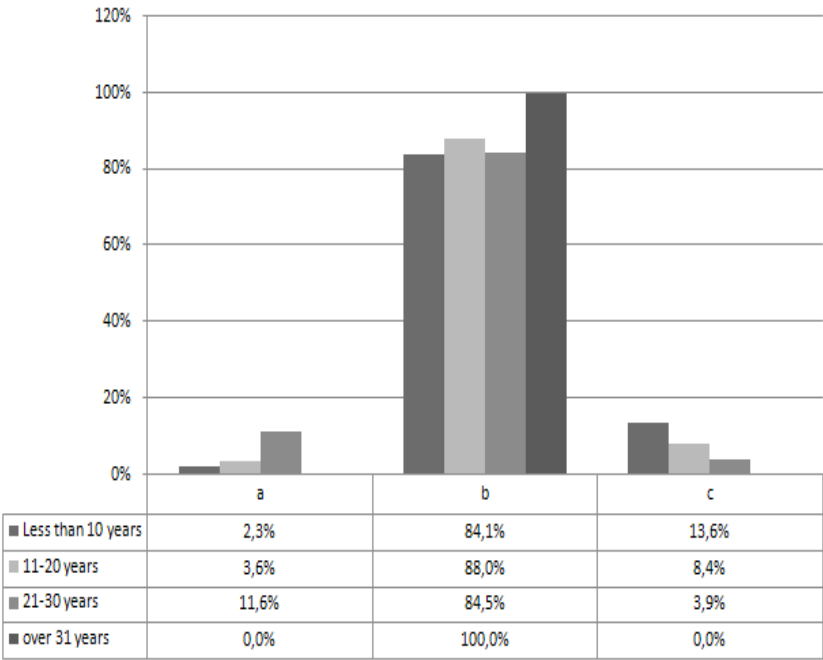


Fig.1. Knowledge of the health prevention definition as provided by the nurses with a particular level of working experience

In case of the question asking to highlight the most precise stroke definition (Fig. 2) the most frequently selected answer was the correct answer - A (it is a set of clinical symptoms characterized by a sudden occurrence of focal or generalized disturbances in the brain activity having no other cause than a vascular disorder and persisting, unless earlier resulting in death, for over 24 hours). Providing the correct answer was most problematic for the nurses with the working experience of less than 10 years, only 56,8 % of them highlighted the answer A. Approximately 23% of the nurses belonging to this group selected answer - B (it is a set of clinical symptoms characterized by a sudden occurrence of focal or generalized disturbances in the brain activity which cease completely within 24 hours since their occurrence and have no other cause than a vascular disorder) and approximately 21% selected the answer - C (it is a set of brain activity disturbances persisting for over 24 hours which have no other cause than a vascular disorder). The most numerous group, over 85%, among the surveyed with the working experience of 11-20 years selected the answer - A. The chi-squared test ($\chi^2=16,44$; $df=6$) $p<0,05$. The frequency of answers to this question is significantly related to the working experience.

The highest level of knowledge of the definition was presented by the nurses employed by the Voivodship Hospital (84,9%) and by the Non-public Health Care Centers (80%). The percentage of those possessing the knowledge of the most precise definition amounts to 60% in case of the emergency aid workers, 63,1% in the municipal hospital, and over 70% in the Health Maintenance Centers. The chi-squared test ($\chi^2=18,00$; $df=8$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses place of employment.

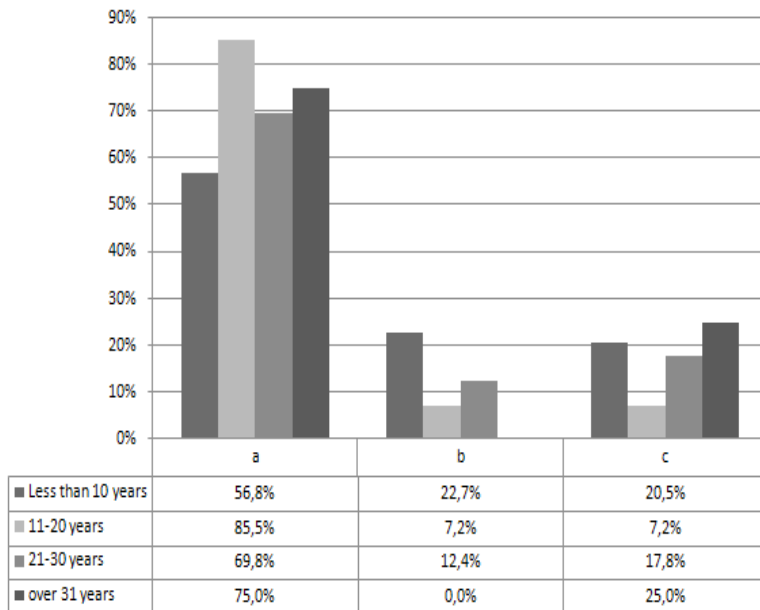


Fig.2. The knowledge of the stroke definition among the nurses with a particular level of working experience

The nurses with the working experience of 11-20 years most frequently participated in trainings, courses or lectures in the stroke subject area, of whom: 9,6% in the last year, 7,2% in the last 2 years and 6% in the last 3 years. Nurses with the working experiences of over 31 years (33,3%) constituted a very numerous group of participants in trainings, courses or lectures which took place in the last 3 years. The highest percentage of the respondents did not participate in trainings, courses or lectures at all. The chi-squared test ($\chi^2=29,61$; $df=12$) $p<0,05$. The frequency of answers to this question is significantly related to the working experience.

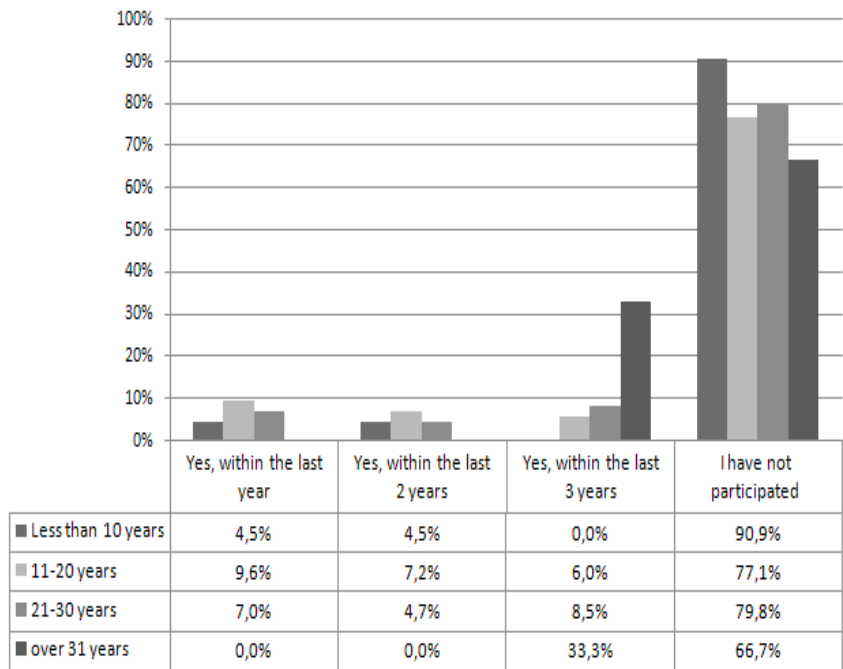


Fig.3. Participation in trainings, courses and lectures on the stroke treatment and prevention according to the nurses' working experience

The nurses with the working experience of over 31 years constituted the largest (66,7%) of all the surveyed groups which controls patient's physical activity during every conversation. The highest percentage (45,5%) of the nurses who do not control patient's physical activity has a working experience of less than 10 years. The chi-squared test ($\chi^2=20,78$; $df=6$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses' working experience.

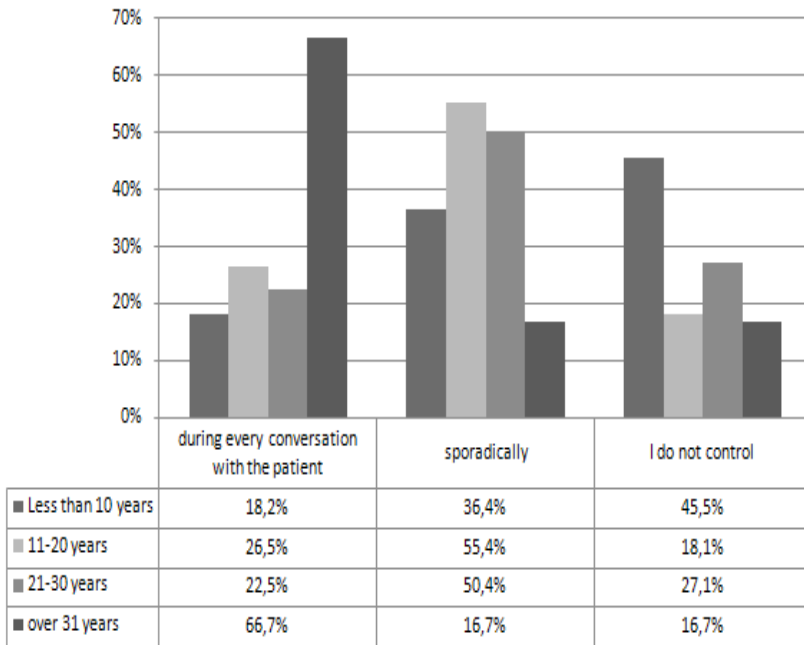


Fig.4. Control of patient's physical activity according to the nurses seniority

In terms of physical activity, the dose most frequently recommended by nurses was 1-2 hours of daily activity (Fig.5). However the largest group of those selecting this answer was constituted by the nurses with a working experience of over 31 years (50%). Amount of physical activity adjusted to the requirements was recommended by the nurses with a working experience of less than 10 years (15,9%). A very numerous group of the surveyed had no opinion on the recommended dose of the physical activity. The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=33,65$; $df=12$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses' working experience.

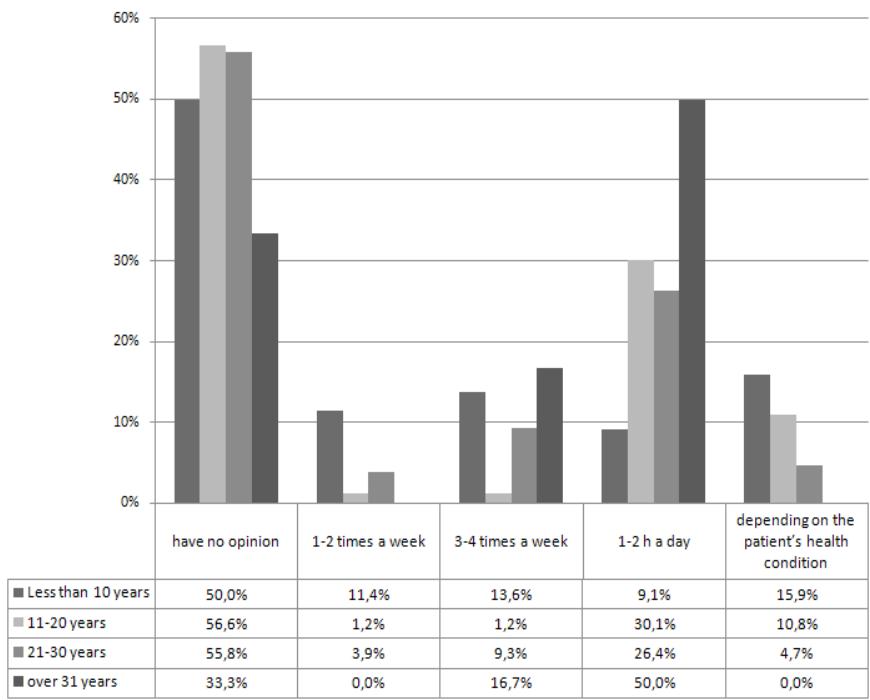


Fig.5. Nurses' working experience and the assessment of recommended weekly dose for the patient's physical activity

In case of the question on the amount of energy expenditure for the patients participating in the stroke prevention (Fig. 6), the most frequently selected answer was "I have no opinion" for each of the analyzed nurse groups. Nurses with the working experiences of over 31 years (33,3%) highlighted that the amount of energy expenditure will depend on the patient's health condition (33,3%). The chi-squared test ($\chi^2=29,61$; $df=12$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses' working experience.

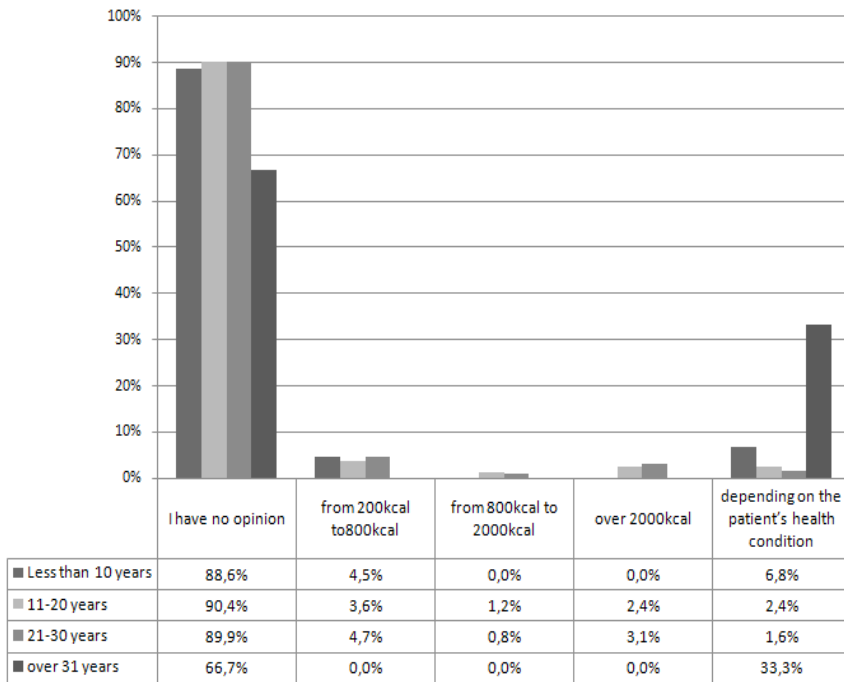


Fig.6. Recommendations for the amount of energy expenditure for the patients covered by the stroke revention as conditioned by to the nurses working experience

In all of the places of employment pointed out below (Fig.7) nurses recommend to their patients participation in the prevention programs with the frequency adjusted to the requirements, which constitutes the highest percentage of the provided answers (over 50%). Participation in the prevention programs is recommended during every conversation with the patient by 10% of the respondents working in the respective places of employment with the highest number in the Non-public Health Care Centers (11,4%). The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=26,09$; $df=12$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses place of employment.

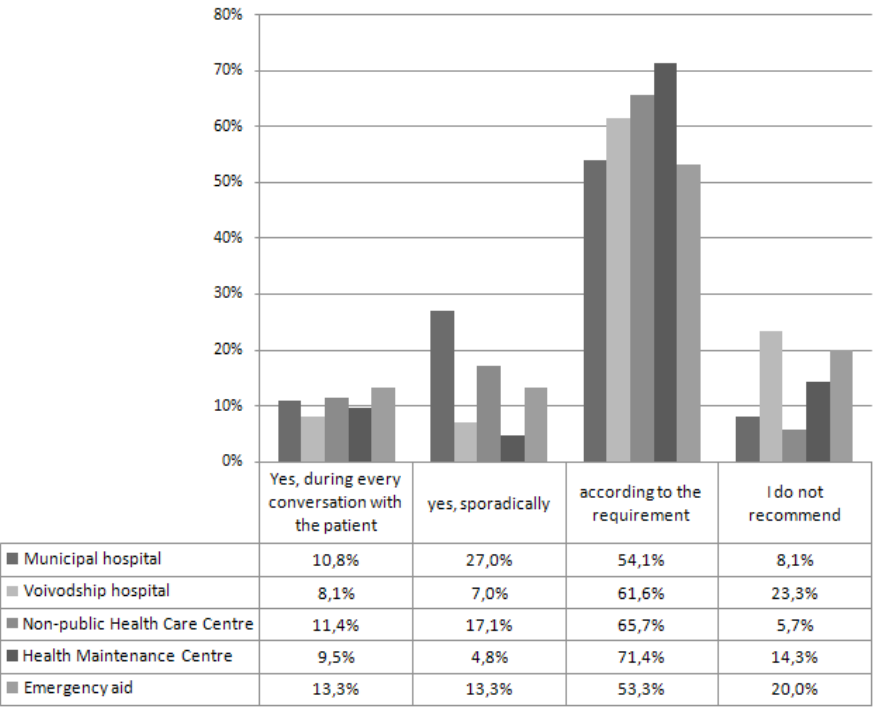


Fig.7. Recommendations for the patients' participation in the prevention programs

The timeframe for patient's submission in a specialized treatment centre since the moment of first presenting stroke symptoms most frequently declared by nurses was maximum 12 hours (Fig. 8), a very high percentage of those in favor of this answer belonged to the group of nurses employed in the emergency aid sector (53,3 %). The answer "as soon as possible" was also frequently selected by nurses, especially those employed by municipal hospitals (55,3%) and the voivodship hospital (59,1%). The answer "within an hour since the presentation of symptoms" was most frequently selected by the nurses employed in the Health Maintenance Centers (15,4%). The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=35,86$; $df=20$) $p<0,05$. The frequency of answers to this question is significantly related to the nurses place of employment.

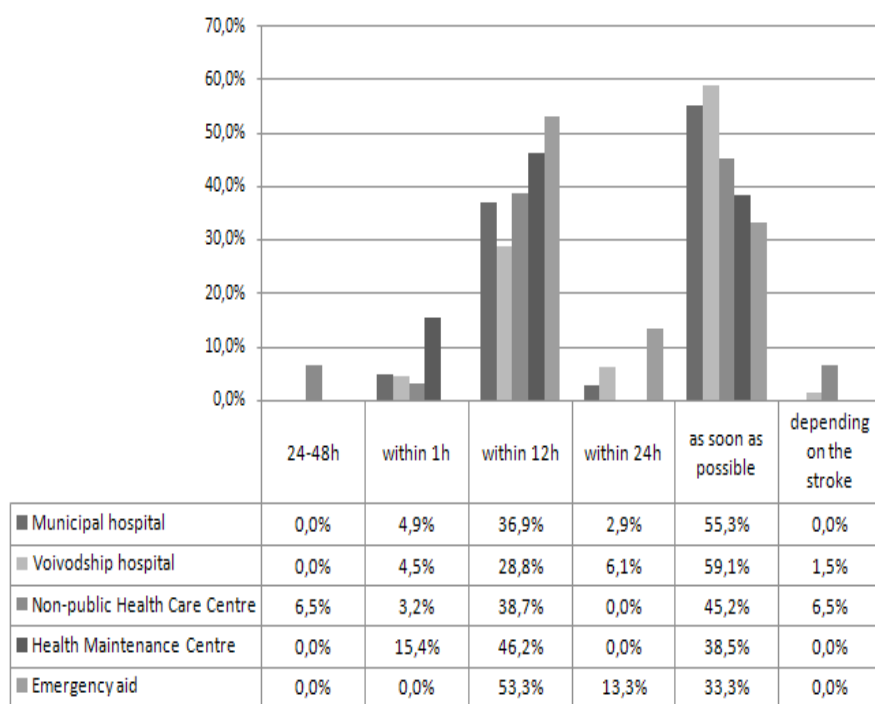


Fig.8. The timeframe for patient's submission in a specialized centre since presenting stroke symptoms

The nurses who undertook physical activity on a daily basis (Fig.9) recommended physical activity to patients during every conversation (51,5%) or as required (39,4%). The nurses who did not undertake physical activity were also not occupied with recommending physical activity (27,1%). The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=37,98$; $df=3$) $p<0,05$. The frequency of answers to this question is significantly related to the undertaken physical activity.

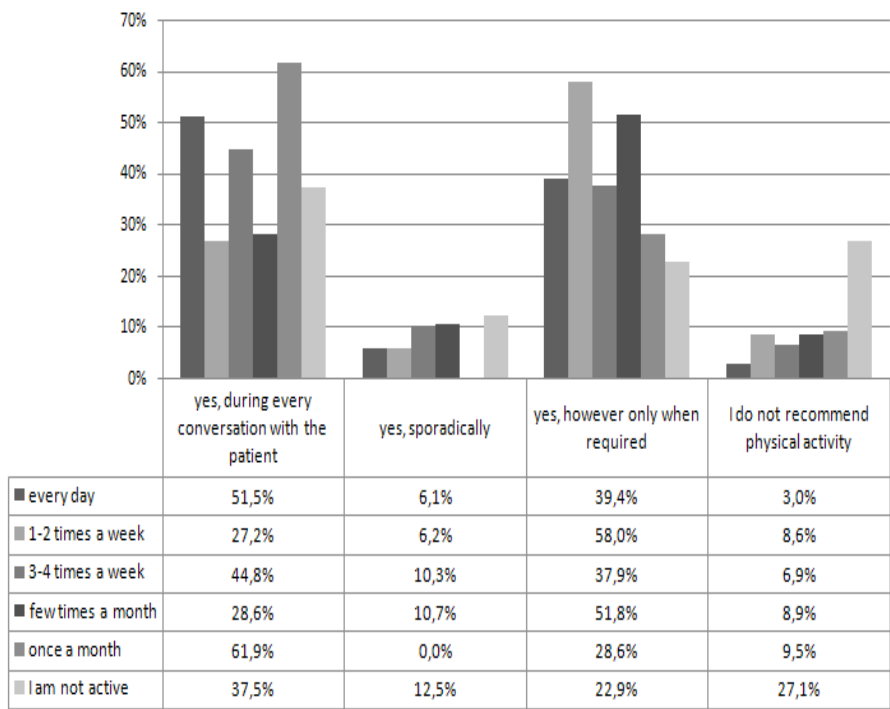


Fig.9. Frequency of the physical activity undertaken by nurses and its recommendation to patients

The nurses who recommended physical activity to patients during every conversation much more frequently declared significant influence of physical activity on man’s health (Fig.10). A very high percentage of the provided answers can be noted in the grade range 5 to 10 (where 10 signifies the highest grade). The chi-squared test ($\chi^2=45,11$; $df=27$) $p<0,05$. The frequency of answers to this question is significantly related to the subjective evaluation of the influence physical activity exercises upon health.

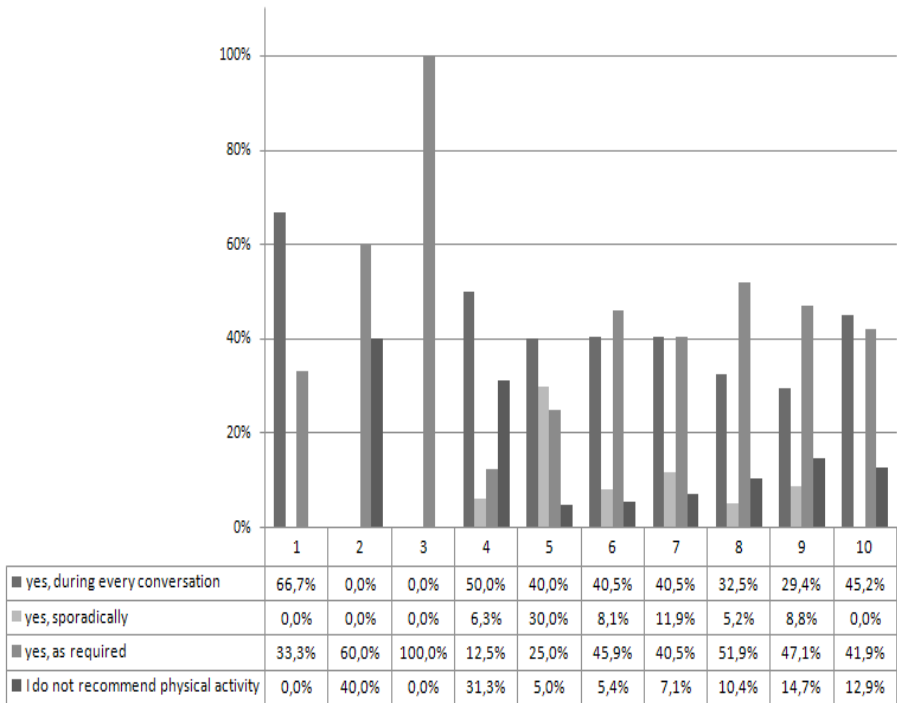


Fig.10. Subjective evaluation of the influence physical activity exercises upon health and recommending physical activity to patients.

The nurses who evaluated the influence of physical activity on health as very significant (grades 9,10 on the scale), controlled physical activity among patients during every conversation (Fig.11). On the other hand the nurses who evaluated the influence of physical activity on health as low (grade 3 on the scale) also did not control it among patients. The chi-squared test (χ^2) analysis demonstrated significant differences in the answers to this question ($\chi^2=31,00$; $df=18$) $p<0,05$. The frequency of answers to this question is significantly related to the subjective evaluation of the influence physical activity exercises upon health.

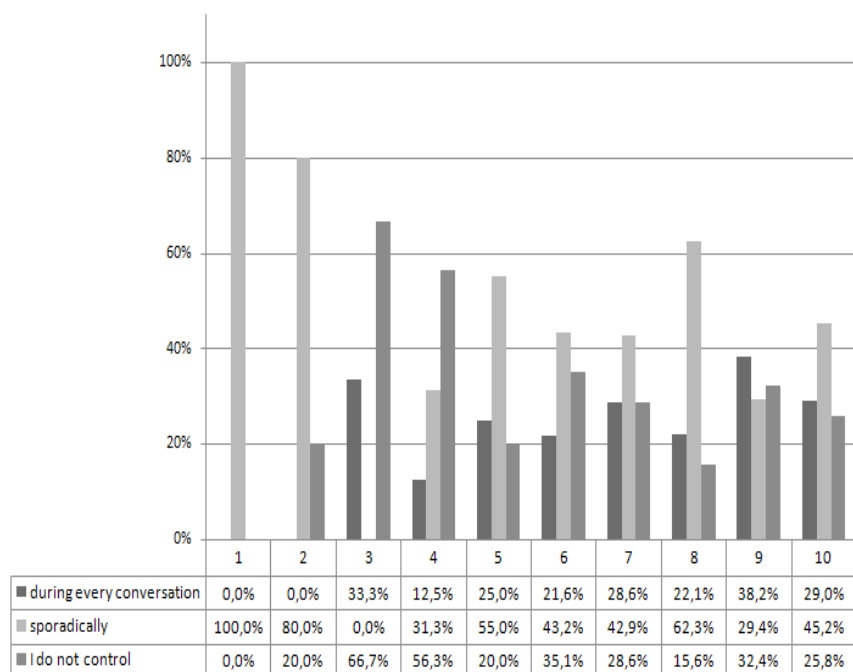


Fig. 11. Subjective evaluation of the influence physical activity exercises upon health and the control of patients' physical activity.

Discussion

According to the Nurse and Midwife Professions Act (Polish Journal of Laws *Dziennik Ustaw* 2011 No. 174, item 1039, art.4 p.1), performance of the nurse profession focuses on the provision of health services, especially in the scope of:

- 1) recognizing patient's health conditions and needs;
- 2) recognizing patient's nursing problems;
- 3) planning and performing the nursing care over a patient;
- 4) self-reliant provision of timely services in the scope of prevention, diagnosis, treatment and rehabilitation, as well as medical emergency activities;
- 5) physician's orders realization in the scope of diagnostic, treatment and rehabilitation processes;
- 6) adjudicating in terms of the type and scope of the nursing and caring services;
- 7) health education and promotion.

In line with the above nurses form the most suitable group within the whole of medical personnel in terms of engaging patients to undertake preventive actions, particularly in the light of the fact their contact with patients is more frequent than this of the physician. Moreover, nurses' knowledge on the prevention activities is of a high level, as proved by the results of the above research. It is evident in the conducted study that nurses possess a significant knowledge in the field of educational activities pertaining to stroke

prevention. Over 80% of the surveyed nurses, regardless of the working experience, were able to highlight the primary prevention definition (Fig. 1). Additionally, they presented a satisfactory level of familiarity with the precise stroke definition (Fig. 2), as well as remained attentive to the importance of physical activity as an aspect of life (Fig. 4).

Majority of nurses could specify the approximate timeframe between the occurrence of stroke symptoms and the moment a person is to be transported to a specialized centre (Fig. 8), providing the answer “as soon as possible” or “within an hour”. Time is a very important factor in the stroke progression and it may contribute to saving a patient’s life as well as to reducing the stroke consequences. Patient who has suffered a stroke requires an urgent treatment within hospital environment, preferably in specialized units, stroke-specialized sub-departments. Numerous patients suffer intense disturbances of the basic physiological activities. Quick assessment of the patient’s condition and immediate application of a suitable treatment are the only possible ways of stopping and sometimes even reversing the process (Fiszer, Palasik, 2006).

An important element of the educational initiative is subjecting medical personnel, including family physicians and nurses, to training in the scope of the standards in the approach to the patients with an increased risk of developing vascular diseases of the Central Nervous System, also in terms of diagnostic and therapeutic activities (Kozera, Świerkocka-Miastkowska, et al., 2007). The surveyed nurses demonstrated a willingness to participate in the stroke-related courses, trainings and lectures (Fig. 3). The highest level of involvement was observed among the nurses with the longest working experience.

Presently 4 main problems can be differentiated which are encountered by the medical personnel in relation to the society’s knowledge of chronic diseases:

- existing knowledge relates only to the most serious threats - and these are easy to be ignored as they constitute distant prospects and occur only in extreme cases,
- lack of knowledge on the less severe consequences, progressive development of the disease and how it contributes to the gradual degradation of the organism, successively attacks multiple organs, and thereby impairs the overall bodily functions; this ignorance leads to belittling one’s health condition and the need to receive regular treatment
- lack in awareness of the fact the appropriate conduct, complying to the medical personnel’s recommendations may improve the health condition, delay disease development
- lack of knowledge on the positive results of complying to recommendations (Kardas, 2010).

The main goal of the patients’ education is to provide them with the essential information on the disease, its progression and complications, and in the case of chronic diseases which contribute to stroke incidence - application of effective controlling mechanisms. The goal of the educational programs addressed to the patient society is to promote an active participation in the treatment and conscious health-related decisions. The key role may be played by the promotion and support of the activities beneficial to health, including lifestyle modifications (Kozera, Świerkocka-Miastkowska, et al., 2007). Conducting and undertaking suitable prevention activities by medical personnel, first and foremost the nurses, is of a high importance.

The years 2003 - 2008 marked the period for implementing the National Program for the Prevention and Treatment of Cardiovascular Diseases POLKARD which was focused around the cardiovascular diseases, including the diseases of the brain vessels. The program encompassed activities in the field of prevention, diagnosis and treatment of circulatory diseases, equipment audit, health care standards and monitoring the transformations taking place in Poland. The neurological part of the National Program for the Prevention and Treatment of Cardiovascular Diseases POLKARD for the years 2003-2008 continued the work of the National Program for the Stroke Prevention and Treatment. Presently the Polish National Health Fund (Narodowy Fundusz Zdrowia, NFZ) realizes numerous preventive programs addressed to the people from the risk groups and mainly aimed at early disease discovery. However, the problem of stroke prevention has not been differentiated from the prevention programs managed by NFZ, some of its aspects can be found in the program for the prevention of circulatory and tobacco-related diseases. Thus the more significant meaning can be ascribed to the medical personnel's individual involvement in the stroke prevention activities. The conducted research proves the recommendations to participate in numerous prevention programs are provided during every conversation between nurses and their patients (10 % of respondents in each specified place of employment) and according to the current requirements (over 50% in the respective places of employment) (Fig. 7).

In order to correctly stimulate the development of the whole organism, physical activity should be the man's companion throughout the whole life. Medical care on a high level is not a sufficient alternative in combating diseases since a regular physical activity minimizes the risk (Adamczyk, Boguszewski, et. al., 2011). Limited physical activity, as well as fat-rich diet may be traced back to the childhood and adolescence. Their adult life consequences include myocardial infarction or stroke (Knypl, 2000). There is a deficiency in physical activity within the Polish society, the passivity phenomenon becomes increasingly frequent. In a nation-wide survey 29% of teenagers declared spending 4 hours a day on watching television and more than 31,7% used computer for at least 2 hours a day. Insufficient physical activity and inappropriate diet result in such consequences as the increase in overweight and obesity incidence, which may constitute a beginning to the incidence of serious diseases (Chabros, Charzewka et.al. 2008). Negative consequences of an unhealthy lifestyle affect both men and women alike, albeit at a different age.

Stroke prevention should include a recommendation to undertake regular, limited physical activity, at least twice a week for approximately 30 minutes (Świerkocka-Miastkowska, Kozera, et al., 2007). According to Strepikowska and Buciński a regular, moderately intense physical exercise is recommended in the form of 30-minute daily sessions (Strepikowska, Buciński, 2009). Beneficial are also dynamic exercises such as e.g. bicycle riding or swimming. The scope and the intensity should be adjusted to an individual patient (Świerkocka-Miastkowska, Kozera, et al., 2007). In the conducted research nurses most frequently recommended unrealistic daily dose of physical activity amounting to 1-2 hours (Fig.5). It can be noted the nurses who undertake physical activity themselves and who believe physical activity influences human health condition recommend it to patients (Fig. 9, 10) and control its performance (Fig. 4, 11).

It is important that the stroke prevention practice adjusts the daily portion of calory intake to the energy intake requirements, which allows to avoid overweight or contributes to its reduction (Swierkocka-Miastkowska, Kozera, et al., 2007). Balanced, low-fat and vitamin-reach diet is one of the significant elements in the prevention of numerous diseases. The people who are aware of how important it is to implement a balanced diet and physical activity into the process of disease prevention are more inclined to lead a health-supporting lifestyle (Waśkiewicz, 2010). It may be disturbing to note, that a significant majority of nurses participating in the research had no opinion on the subject of recommended energy expenditure (Fig. 6) or found it difficult to provide an answer to this question.

In the healing, recovery and caring activity the health service personnel, apart from fulfilling their fundamental professional obligations, should also stimulate the promotion of an active lifestyle among patients and act as role models to promote the desired health-supporting habits. However, if the health care personnel do not realize and do not pursue a healthy lifestyle themselves, they fail at becoming the creators of the widely understood health (Lewandowska, Korabiewska et al., 2008).

Conclusions

1. The knowledge of the stroke prevention aspects among nurse professionals in the Silesian Voivodship is satisfactory.
2. Nurses in the Silesian Voivodship demonstrate a willingness to participate in courses, trainings, and lectures on the topic of stroke prevention.
3. Senior nurses are more inclined to recommend and control preventive activities undertaken by patients, as well as more frequently participate in preventive programs as compared to the nurses of lesser seniority.
4. The nurses who undertook physical activity themselves much more frequently recommended it to patients and controlled its performance as compared to the nurses who did not engage in physical activity.

Bibliography

1. Adamczyk J., Boguszewski D., Debrzak-Adamczyk I., Ochal A., (2011), Aktywność i sprawność fizyczna fizjoterapeutów; *Zdrowie Publiczne*, 121(4), 344-349
2. Brodzińska M., Modzelewska K., Stachowska M., Talarska D., (2010), Stratyfikacja czynników determinujących opinię o jakości świadczeń w zakresie kompetencji pielęgniarki podstawowej opieki zdrowotnej. *Doniesienia wstępne; Problemy Higieny i Epidemiologii* 2010; 91(2): 303-307
3. Chabros E, Charzewska J., Rogalska-Niedźwiedź M., Wojszczyk B., Chwojnowska Z., Fabiszewska J., (2008), Mała aktywność fizyczna młodzieży w wieku pokwitania sprzyja rozwojowi otyłości; *Problemy higieny i epidemiologii*; 89(1).
4. Fiszer U., Palasik W., (2006), Udar mózgu i stan padaczkowy – neurologiczne stany zagrożenia życia, *Postępy Nauk Medycznych* 4/2006, 127-131

5. Gacek M., (2011), Zachowania żywieniowe i aktywność fizyczna w grupie lekarzy; *Problemy Higieny i Epidemiologii* 2011, 92(2): 254-259
6. Kardas P., (2010), Nieprzestrzeganie zaleceń terapeutycznych na świecie i w Polsce W: *Polskiego pacjenta portret własny-raport o przestrzeganiu zaleceń terapeutycznych przez polskich pacjentów*; Fundacja na Rzecz Wspierania Rozwoju Farmacji i Medycyny, Pentor Research International, Polpharma, 2010, 25-37.
7. Knypl K. (2000) , Profilaktyka – przeszłość, teraźniejszość, przyszłość, *Medycyna Rodzinna* 2/2000, 27-28
8. Kozera G., Świerkocka-Miastkowska M., Gąsecki D., Nyka W., Siebert J., (2007), Edukacja chorego z udarem, *Via Medica*, Gdańsk 2007, 97-103
9. Lewandowska M., Korabiewska I., Smolis-Bąk E., Białoszewski D., Rongies W., (2008), Zachowania zdrowotne wśród fizjoterapeutów; *Zdrowie – Kultura Zdrowotna – Edukacja*, AWF i S w Gdańsku, 2008 r., t. II: 139-143
10. Muszaliak M., Kędziora – Kornatowska K., Marzec A., Klawe J., (2007), Analiza zachowań zdrowotnych, samooceny oraz zagrożeń zdrowia pielęgniarek studiujących zaocznie; *Problemy Higieny i Epidemiologii* 2007, 88(3): 354-359
11. Nowacki P., Bajer-Czajkowska A., (2008), Profilaktyka wtórna niedokrwiennego udaru mózgu w świetle medycyny opartej na dowodach; *Polski Przegląd Neurologiczny*, 2008, tom 4, nr 3
12. Petrea RE, Beiser AS, Seshadri in et al., (2009), Gender differences in stroke incidence and poststroke disability in the Framingham heart study; *Stroke* 2009; 40: 1032-1037
13. Ryglewicz D., Hier D.B., Wiszniewska M., Cichy S., Lechowicz W., Członkowska A., (2000), Ischemic strokes are more severe in Poland than in the United States; *Neurology*. 2000 Jan 25;54(2):513-5.
14. Seshadri S, Beiser A, Kelly-Hayes M. (2006) The lifetime risk of stroke: estimates from the Framingham Study. *Stroke* 2006; 37: 345-350
15. Siebert J., Nyka W. M., (2007), Udar mózgu. Postępowanie diagnostyczne i terapia w ostrym okresie udaru; *Via Medica*, Gdańsk 2007
16. Strepikowska A., Buciński A., (2009), Udar mózgu – czynniki ryzyka i profilaktyka; *Postępy Farmakoterapii*, Tom 65, nr.1, 2009
17. Świat M., (2010), Udar w wieku podeszłym – odmienności; *Postępy Nauk Medycznych* 4/2010, s. 277-281
18. Świerkocka-Miastkowska M., Kozera G., Gąsecki D., Nyka W., Siebert J., (2007), Czynniki ryzyka i prewencji udaru mózgu, *Via Medica*, Gdańsk 2007, 97-103
19. Truelsen T, Piechowski-Jozwiak B, Bonita R., (2006), Stroke incidence and prevalence in Europe: a review of available data; *European Journal of Neurology*, 2006, 13: 581-598.
20. Warchoł-Sławińska E., Włoch K., (2003), Zachowania zdrowotne pielęgniarek; *Zdrowie Publiczne* 2003; 113(1/2): 156-159
21. Waśkiewicz A., (2010), Jakość żywienia i poziom wiedzy zdrowotnej u młodych dorosłych Polaków – badanie WOBASZ; *Problemy Higieny i epidemiologii*, 91(2): 233-237

Number of signs with spaces: 37 036

Alicja Karwowska¹, Marek Gacko², Anna Milewska³, Jan Karczewski¹

¹Zakład Higieny i Epidemiologii
Uniwersytet Medyczny w Białymstoku
Department of Hygiene and Epidemiology
Medical University of Białystok

²Klinika Chirurgii Naczyń i Transplantacji
Uniwersytet Medyczny w Białymstoku
Department of Vascular Surgery and Transplantation
Medical University of Białystok

³Zakład Statystyki i Informatyki Medycznej
Uniwersytet Medyczny w Białymstoku
Department of Statistics and Medical Informatics
Medical University of Białystok

Epidemiological analysis of potential risk factors for abdominal aortic aneurysms - preliminary results.

Analiza epidemiologiczna potencjalnych czynników ryzyka występowania tętniaków aorty brzusznej – wyniki wstępne.

Summary

Abdominal aortic aneurysms are an important clinical problem due to both increasing the frequency of their occurrence and the occurring complications threatening the immediate loss of life. Risk factors for abdominal aortic aneurysm are: older age, sex, inherited tendencies, genetic predisposition, Ehlers Danlos syndrome, smoking, alcohol consumption, hyperlipidemia, atherosclerosis, hypertension, caucasian race, chronic obstructive pulmonary disease, ischemic heart disease.

The aim of the study was the assessment of the dietary habits and healthy and unhealthy behaviors of patients with abdominal aortic aneurysms and identify potential risk factors for this disease.

The investigated group consisted of all patients of Department of Vascular Surgery and Transplantology of Clinical Hospital of the Medical University in Białystok, diagnosed with an abdominal aortic aneurysm over the past 12 months. Assessment of the dietary habits and health behaviors of patients was carried out by using a diagnostic survey with an anonymous questionnaire, based on the recommendations of the Institute of Food and Nutrition and Cardiology Institute in Warsaw.

Half of people surveyed were overweight, and 15% were obese. Patients' BMI correlates with the size of the aneurysmal extension and the number of comorbidities. Only a small percentage of patients apply the principles of proper nutrition and admits that changing negative habits took place only after a diagnosis of the disease. Most people diagnosed with abdominal aortic aneurysm is or was addicted to nicotine and consumed alcohol in increasing quantities. All cases of abdominal aortic aneurysm coexisted with additional chronic disease entities. Most often reported were hypertension, atherosclerosis and heart failure.

Key words: abdominal aortic aneurysm, risk factors, healthy behaviours

Streszczenie

Tętniaki aorty brzusznej stanowią ważny problem kliniczny, zarówno ze względu na coraz większą częstość ich występowania jak i na występujące powikłania zagrażające bezpośrednią utratą życia. Uważa się, że czynniki ryzyka tętniaka aorty brzusznej to m. in.: starszy wiek, płeć, skłonności dziedziczne, uwarunkowania genetyczne, zespół Ehlersa Danlosa, palenie tytoniu, spożywanie alkoholu, hiperlipidemia, miażdżycza zarostowa tętnic obwodowych, nadciśnienie tętnicze, rasa biała, przewlekła obturacyjna choroba płuc, choroba niedokrwienna serca.

Celem pracy było poznanie zwyczajów żywieniowych i zachowań pro- i antyzdrowotnych pacjentów z tętniakami aorty brzusznej oraz wskazanie potencjalnych czynników ryzyka tego schorzenia.

Badaniem objęci zostali wszyscy pacjenci Kliniki Chirurgii Naczyń i Transplantacji Szpitala Klinicznego Uniwersytetu Medycznego w Białymstoku ze zdiagnozowanym tętniakiem aorty brzusznej przebywający w Klinice w ciągu minionych 12 miesięcy. Ocena zwyczajów żywieniowych i zachowań zdrowotnych pacjentów została przeprowadzona metodą sondażu diagnostycznego za pomocą kwestionariusza anonimowej ankiety konstrukcji własnej, powstałego w oparciu o zalecenia Instytutu Żywności i Żywienia oraz Instytutu Kardiologii w Warszawie.

U połowy ankietowanych stwierdzono nadwagę, a u 15% otyłość. Wskaźnik BMI chorych koreluje z wielkością poszerzenia tętniakowego i ilością chorób współistniejących. Jedynie niewielki odsetek chorych stosuje się do zasad prawidłowego żywienia i przyznaje, że zmiana negatywnych nawyków żywieniowych nastąpiła dopiero po zdiagnozowaniu choroby.

Większość osób ze zdiagnozowanym tętniakiem aorty brzusznej jest lub była uzależniona od nikotyny i spożywała alkohol w zwiększonych ilościach. Wszystkie przypadki tętniaka aorty brzusznej współistniały z dodatkowymi przewlekłymi jednostkami chorobowymi. Najczęściej stwierdzane były nadciśnienie, miażdżycza i niewydolność krążenia.

Słowa kluczowe: Tętniak aorty brzusznej, czynniki ryzyka, zachowania zdrowotne

Introduction

Abdominal aortic aneurysm (AAA) this is a baggy or spindly limited expansion of the aorta below the renal arteries in excess of at least 50% of the normal size of the artery. In practice it is a widening of the main artery above 30 mm (Johnson et al., 1991). Over 95% of the AAA are located below the renal arteries. Abdominal aortic aneurysms are an important clinical problem due to both increasing incidence and the occurring complications threatening the immediate loss of life. Aneurysms occur in about 2.5% of the human population. Aneurysm rupture is the cause of about 0.8% of all deaths in the world. Population-based studies in Europe have shown that the death rate from the disease is still high even in countries with a well developed health care system, despite the use of more sensitive diagnostic techniques (Peters i wsp., 2007; Svensjo i wsp., 1996).

Risk factors for abdominal aortic aneurysm can be divided into two groups. They are: independent agents, for example: older age, sex, inherited tendencies, genetic predisposition, Ehlers Danlos syndrome, Caucasian race. The second group are factors that can be modified, for example: smoking, alcohol consumption, hyperlipidemia, atherosclerosis, hypertension, chronic obstructive pulmonary disease, ischemic heart disease (Brady et al., 2004; Vega de Ceniga et al. 2006).

Unhealthy behaviors make up the lifestyle, that indeed, in more than 50%, determines the human health. Unhealthy habits can exacerbate the natural degenerative body changes, including those that occur in the arterial vessels. Accumulation of harmful effects of risk factors in a period of time and more frequent exposure promotes the degenerative changes, and therefore the risk of it increases with age.

Smoking is an important environmental factor having a negative impact on human health and is likely to play an important role in the progression of arterial changes. It is the source of many toxic substances, including nicotine, nitrosamines, cyclic hydrocarbons, heavy metals, nitric oxide, acetone, cyanide, ammonia, benzene, formaldehyde, vinyl chloride, radioactive elements. Smoking is a major source of cadmium that incriminates blood vessels and cumulates in blood. Exposure to tobacco smoke increases incidence of ischemic heart disease. It has a mitogenic effect on vascular smooth muscle cells, causes hypoxia and generates at the same time oxidative stress that contributes to the process of the destruction of tissues and cells that is important in the case of cells building the artery wall. It is estimated that smokers are four times more likely to initiate the aneurismal process. Aortic aneurysm is diagnosed approximately 8 times more common among active smokers and 3 times more common among ex-smokers than non-smokers. Smoking cigarette for a year increases the risk of an aortic aneurysm by up to 4%. In examined tobacco smokers it is claimed that increased elastolitic activity with reduced antiproteolytic activity at the same time initiates and significantly enhances the development of aneurysm (Lindhold et al., 2001).

Observance of the principles of proper nutrition, diet balanced in terms of energy and nutrients determines the proper functioning of the body. Unhealthy, rich in fat, causing hyperlipidemia diet significantly burdens the cardiovascular system and contributes to the generation of atherosclerotic lesions that damage the structure of the blood vessels making them more susceptible to deformation. For the element initiating aneurismal changes shall be deemed the deposition of fatty deposits that cause excessive load on the walls, which in turn hardens them and induces hypoxia. Accumulation of homocysteine (the source of which is food is the amino acid that is the product of the methionine demethylation) can lead to irregularities in the construction of the vessel wall and the same to aortic aneurysm enlargement. The accumulation of homocysteine in the walls of the arteries may have toxic effects and lead to abnormalities in the structure of the vessel wall, dissection, fibrosis and distortion of the arteries; it also causes excessive proliferation of smooth muscle cells of the artery. (Lindhold et al., 2001).

A properly balanced diet containing among others vitamins, provides a correct metabolism and homeostasis of the body's internal environment. Antioxidant vitamins - A, C and E play important functions in organism, for example a protective antioxidant role (Michota-Katuliska, 2000). Vitamin C is involved in the synthesis of collagen, which is essential for pathogenesis of aneurysm, and also facilitates the absorption of iron. In addition, stimulates the immune system, the metabolism of lipids and participates in the biosynthesis of catecholamines. Vitamin C deficiency leads to damage in the blood vessels, spontaneous bleeding, formation of ecchymoses beneath the skin and hinders wound healing. What is more, causes joint and muscle soreness, swelling of the limbs, weakness, and reduction of physical exercise capacity. In terms of prevention of cardiovascular disease, the role of vitamin C seems to be not to overestimate (Jacob, Sotoudeh, 2002; Rutkowski et al., 2010).

An important factor in the development of aneurysm is hypertension. It increases the risk of developing structural and functional changes in vascular system. In people with long-term illness incidence of aneurysm may increase more than two-fold. Blood pressure affecting the abdomen section of the aorta wall is always higher than in the other sections of the aorta. High blood pressure causes the increase in stress in the wall of the aneurysm, accelerates its expansion and increases the risk of rupture. High blood pressure also increases the processes leading to the degradation of collagen and elastin.

An important issue when discussing risk factors is undoubtedly the presence of comorbidities, that additionally burdens organism and hinders the regenerative processes of the body. High risk of aneurysm incidence is also the effect of chronic inflammation with lymphocytes, plasmacytes, monocytes and macrophages predominated, which is a consequence of bacterial infections, for example in the course of heart disease. Inflammatory cells are the source of proteolytic enzymes that degrades extracellular matrix proteins and results in the formation of an aneurysm. Secondary infection with bacteria can also initiate rupture of the aneurysm. Also important is the role of the infection of *Helicobacter Pylori* and *Chlamydia Pneumoniae*. Other micro-organisms that can play a role in the pathogenesis of aneurysm is Herpes Simplex Viruses and Cytomegalovirus. They can initiate processes associated with elastin degradation.

Another important risk factor of AAA is genetic predisposition. A high percentage of patients has a positive family history in terms of this disease. The cause of the lesions is considered gene mutations responsible for structural construction of the aorta. These mutations may cause the disappearance of various proteins of the aorta and disturb the balance in the hemostatic process. The cause of congenital aneurysm is considered genetically conditioned diseases such as Marfan syndrome and Ehlers-Danlos syndrome. In the majority of patients predisposition to the development of aneurysms is multigenic. Genetic factor is an independent risk factor, it occurs in about 25% related people with abdominal aortic aneurysm (Singh et al., 2001).

Expanding abdominal aortic aneurysm often does not cause any symptoms. This fact significantly impedes early diagnosis and effective treatment for this disorder. For this reason, such a large role in reducing the incidence of abdominal aortic aneurysms is attributed to prevention of this disorder consisting of minimizing negative impact of modifiable risk factors.

Material and research methods

The investigated group consisted of all patients of Department of Vascular Surgery and Transplantology of Clinical Hospital of the Medical University in Białystok, diagnosed with an abdominal aortic aneurysm over the past 12 months. This group comprised 20 people-19 men and 1 woman.

The assessment of the dietary habits and health behaviors of patients was carried out by using a diagnostic survey with an anonymous questionnaire, based on the recommendations of the Institute of Food and Nutrition and Cardiology Institute in Warsaw. The survey questionnaire consisted of 4 parts (68 questions). The first part included questions about demographic data of the patient, where they were asked of age, sex, residence, education. Dietary habits before the period of hospitalization were

analyzed in the second part. Part three dealt with health behaviors, for example: physical activity, smoking of cigarettes, alcohol consumption, and part four concerned abdominal aortic aneurysm and comorbidities.

Respondents have been informed about the purpose of the test and the anonymity of the data obtained and of the possibility of withdrawal of consent for a further part in the test without giving reasons on each stage of the duration of the test. For the implementation of the project the local Ethics Committee on the Medical University of Białystok approval has been obtained.

The aim of the study was the assessment of the dietary habits and healthy and unhealthy behaviors of patients with abdominal aortic aneurysms and identification of potential risk factors for this disease.

An overview of research results

In the test group, the majority were men. The age of respondents was in the range of 47 to 84 years. average age amounted to 68.5 years (SD 9.40). The most numerous was the group aged 60-69 years, 45% of respondents. The least the presence of an aneurysm was observed in the age group below 49 years.

Half of those surveyed were overweight-BMI above 25 and at 15% of obesity. This indicator was correlated with the size of the aneurismal extension and the number of comorbidities. The vast majority of patients lived less than 20 thousand residents have basic education or basic vocational training and by most of his life doing the hard work. Detailed description of the test group is set out in Tab. 1.

Tab. 1. Characteristics of the test group.

Feature		Number of respondents (n)	%*
Age	40-49	1	5
	50-59 (avg 58.0)	2	10
	60-69 (avg 65.2)	9	45
	70-79 (avg 74.4)	5	25
	>80 (avg 83.0)	3	15
	TOTAL (avg 68.5)	20	100
BMI**	<18.50	0	-
	18.50 – 24.99 (avg 23.3)	7	35
	≥ 25.00 (avg 27.9)	10	50
	≥30.00 (avg 35.6)	3	15
	Total (avg 20.4)	20	100

Place of residence	< 20000 residents	11	55
	>20000 < 50000	1	5
	>50000 < 150000	2	10
	>150000	6	30
Education	Basic and/or vocational basic	9	45
	Secondary	8	40
	Higher	3	15
Professional activity	Yes	5	25
	Unemployed	0	0
	Retired	11	55
	Pension	4	20
Work done for most of one's life	Intellectual work	7	35
	Intellectual-physical work	3	15
	Physical	10	50

* - percentage of respondents.

** - according to WHO - http://apps.who.int/bmi/index.jsp?introPage=intro_3.htm

Another part of the survey questionnaire included questions concerning the dietary habits. Seventy-five percent of respondents say that they eat regular meals (Tab. 2), and 60% of them say that they consume 4 meals a day: breakfast, lunch, dinner and supper. Unfortunately, most of the respondents admit they began to take care of their nutrition hygiene only after the disease was diagnosed. For breakfast, which eat 100% of the people interviewed, mostly white bread was eaten (83% of those polled), ham (60%) and dairy products - milk, cheese, semi-fat cottage cheese (72%). Lunch consisted of mostly fruits (apples, bananas) – 87% of eating this meal. For dinner, respondents consumed mainly food containing pork - 80% of the people interviewed, poultry 75% and beef 30%. For the second dish mostly potatoes were added - 90% of patients. Salad with fresh vegetables was eaten by only 40% of the polled. Seventy percent of patients said they prepare lunch menu, using full-fat products. Afternoon tea, which was eaten by only 20% of hospitalized included fruit – 75% and sweets and sweet bread - 25%. For dinner (100% of respondents) were given the mostly dairy products - 74% of those polled. Unfortunately, 15% said that their dinner contained of fat meat dishes. Seventy percent of the interviewers snack between meals. These are mostly salty snacks and sweets (tab. 3). Unfortunately, only 15% of patients eat daily fresh fruits and vegetables rich in vitamin C (tab. 2), such as cranberries, kiwi, citrus fruits, black currant tomatoes, pepper, and parsley.

Most people surveyed complement detrimental effect on their health of a high supply of white sugar used to sweeten beverages – 60% of the respondents. A significant group of people sweetened them up with three tea spoons. For a sweetened drinks such as Cola, soda, fruit juice reach 45% of those polled, and still mineral water in amount of 1.5-2 liters per day - 30%.

Tab. 2. The selected health behavior

Feature	Regular meals consumption			Consumption of Vitamin C rich fruits and vegetables		Physical activity				
	Yes	No	Rarely	Yes	No	None	Once a week	Twice a week	4-5 times a week	6-7 times a week
Number	15	5	0	3	17	9	4	4	3	0
%	75	25	-	15	85	45	20	20	15	-

Respondents were also asked about their health behavior concerning the frequency of alcohol consumption, cigarette smoking, or taking physical activity. Thirty-five percent of respondents strongly abused alcohol (daily intake). In an AAA patients group there has been no abstainers -Tab. 3. The most frequently chosen alcohols were vodka and beer (respectively to 85% and 45% of those polled). Cigarettes smoked more than half of the surveyed, 40% quit after the aneurysm was diagnosed, and only one person (female) has never smoked cigarettes.

Until hospitalization active lifestyle led 55% of respondents. Most of them worked in the garden/the field -73%. The preferred active form of relaxation was walking.

Tab.3. The selected anti-health behaviour

Feature	Snacking between meals				Alcohol intake					Smoking		
	No	Carbohydrate-rich foods	Products containing large amounts of salt and fats	Fruits/vegetables	None	Occasionally	Once a week	A few times a week	Daily	Yes	Ex-smoker	Never
Number	6	13	14	5	0	5	3	5	7	11	8	1
%	30	65	70	25	0	25	15	25	35	55	40	5

Tab. 4. Health behaviors and the size of the aneurysmal expansion and co-morbidities.

Feature		The size of aneurysmal extension (average and SD)	n	The number of co-existing diseases				
				None	1-2		≥ 3	
					n	%*	n	%*
Alkohol intake	Rarely	73,25 (22.56)	12	0	5	41.7	7	58.3
	> 2 times a week	81.58 (16.12)	8	0	4	50.0	4	50.0
Smoking	Never	60 (-)	1	0	1	100.0	-	-
	Yes	85.36 (19.21)	11	0	4	36.4	7	63.6
	Ex-smoker	70.75 (13,31)	8	0	3	37.5	5	62.5

* - percentage of consuming alcohol rarely/ >2 a week; and percentage of non-smokers, smokers and ex-smokers

All patients were diagnosed with at least one co-existing disease. **Most frequently diagnosed chronic** diseases were hypertension, atherosclerosis, and heart failure (70%, 65% and 60%). The least frequently stated diseases were kidney and gastrointestinal tract diseases - the two cases. None of the patients was diagnosed with reduced blood pressure. The relationship between the frequency of alcohol consumption, cigarette smoking and co-existing diseases shows Tab. 4.

The average size of the aneurysmal enlargement was 78.25 mm (SD 18.85) and correlated with increased consumption of alcohol and tobacco addiction – Tab. 4.

Discussion

Age is one of the main factors predisposing to abdominal aortic aneurysm. Since the majority of aneurysms of this part of the aorta are asymptomatic it is very difficult to determine the average age at which the first lesions appear. Despite the use by researchers of different definitions of the aneurysm, in most studies the increase in the frequency of their occurrence in people over 60 years of age was observed. Screening ultrasound showed the presence of AAA in 4.4% of people aged 40-75. In the autopsy and screening epidemiological studies prevalence among people under 60 years of age is less than 1 percent. AAA occurs in about 3% of men aged 60-65, 6% aged 65-74 and 9% aged 75 and older. In people over 80 years of age prevalence increases rapidly and reaches a plateau level (Simoni et al, 1995; Pateci et al, 1995).

Abdominal aneurysms are diagnosed up to eight times more often in men than in women. This predominance depends on the age group. Incidence of AAA in men increases rapidly after age 55. The highest incidence among women i.e. 4.5% was found in the population over 90 years of age. Ratio of male to female patients between the ages of 60 to 64 years is 11: 1. Statistical studies on mortality records also showed higher mortality in men than women (Lilienfeld et al, 1987).

Association of obesity with the presence of abdominal aortic aneurysm is not completely proven, but Stackelberg and co-workers on the basis of population-based studies conducted in Sweden found that the risk of AAA was 30% higher for individuals with increased waist circumference than those with normal size waist. It was also shown that the risk of AAA was increasing by 15% along with the increase of waist circumference for each 5 cm. In

these studies, there was no clear relationship between body mass index and the prevalence of abdominal aortic aneurysm, however, the relationship of abdominal obesity in the incidence of the disease was proven (Stackelberg et al, 2013). Golledge and colleagues have also noted a positive correlation between anthropometric indicators of obesity, such as waist circumference and the waist-hip ratio with the size of aortic dilatation. They argue that this relationship is particularly evident in cases where the extension is more than 40 mm. They also show the dependence of serum adiponectin and resistin, and no connection of leptin with the aneurysmal extension (Golledge et al, 2007).

Overweight and obesity is closely associated with abnormal eating habits of the patients. Eating food products containing high amounts of saturated fatty acids and salt contributes to an increased risk of cardiovascular disease, and thus the dredging of the disease and worse prognosis after surgery (Golledge et al, 2007).

Not without significance is the fact of interaction of several risk factors at the same time. Especially when the exposure is chronic. Back in the 50's of the twentieth century were conducted prospective studies that have shown a high correlation between the formation of abdominal aortic aneurysm and smoking and high blood pressure, or these two factors simultaneously. In patients with AAA smokers were 85%. (Johnson, Scobie, 1988).

Jozwiak and colleagues in their study also confirm the association of smoking with risk of cardiovascular disease. They claim that nearly 80% of smoking respondents reported hypertension, and most of the patients with hypertension are ex-smokers (Jozwiak, Szmagaj, 2012). This fact and its possible connection with the development of an aneurysm suggest the results of this work, where the majority of the respondents declared that either now or in the past were addicted to tobacco. In studies on the pathogenesis of atherosclerosis and abdominal aortic aneurysm Pallazouli et al also confirm the connection of the presence of nicotine addiction with aneurysmal abnormalities (Pallazouli et al, 2008).

A heavy burden for patients with abdominal aortic aneurysm is the coexistence of additional diseases. The majority of patients with AAA tend to fall for a few disease entities. In patients with diagnosed AAA coronary heart disease was found in 33% to 68% of patients (Cronenwett et al, 1995), impaired cerebral circulation in 20% of people, and with symptoms of chronic lower limb ischemia in 25% of patients. Hypertension may also contribute to the formation of aneurysms, mainly by permanent mechanical deformation of the aortic wall. The forces which arise as a result of high blood pressure cause a violation of the structural integrity of the aortic wall, which in combination with other factors, leads to abnormalities of the aorta and can also cause the aneurysm (Tilson, 1992).

In this paper only the preliminary results were presented. The continuation of the research will identify unhealthy behaviors that contribute to the onset and development of abdominal aortic aneurysm. This could contribute to the formulation of recommendations aimed at reducing negative effects of factors that predispose to the disease, especially those at greatest risk. Education in the field of the negative effects of unhealthy behaviors and avoiding them could improve the prognosis of the patient in the course of therapy and improve postoperative recovery.

Conclusion

1. Excessive body weight is associated with the presence of an abdominal aortic aneurysm. Half of people surveyed were overweight, and 15% were obese. Patients' BMI correlates with the size of the aneurysmal extension and the number of comorbidities.
2. Only a small percentage of patients apply the principles of proper nutrition and admits that changing negative habits took place only after a diagnosis of the disease.
3. Patients consume few products that are a source of vitamin C, which is attributed to the protective antioxidant effect and participates in the synthesis of collagen, which is important for the pathogenesis of aneurysm.
4. Most people diagnosed with abdominal aortic aneurysm is or was addicted to nicotine and consumed alcohol in increasing quantities. These patients had an increased diameter of the aneurysmal enlargement compared to those consuming less alcohol and non-smokers.
5. Increased body weight and unhealthy behavior, such as smoking, alcohol abuse and improper eating habits can be the effect of ignorance about their dangers and lead to the formation and progression of abdominal aortic aneurysms.
6. All cases of abdominal aortic aneurysm coexisted with additional chronic disease entities. Most often reported were hypertension, atherosclerosis and heart failure. This suggests that the cooccurrence of these diseases takes part in the intensity of the progression of degenerative changes and the formation of aortic aneurysm.

Bibliography

1. Brady A.R., Thompson S.G., Fowkes F.G., Greenhalgh R.M., Powell J.T.; UK Small Aneurysm Trial Participants. (2004) Abdominal aortic aneurysm expansion: risk factors and time intervals for surveillance. *Circulation*, 110:16-21.
2. Cronenwett J.L., Murphy T.F., Zelenock G.B., Whitehouse W.M. Jr, Lindenauer S.M., Graham L.M., Quint L.E., Silver T.M., Stanley J.C. (1995) Actuarial analysis of variables associated with rupture of small abdominal aortic aneurysms. *Surgery*, 98:472-483.
3. Golledge J., Clancy P., Jamrozik K., Norman P.E. (2007) Obesity, adipokines, and abdominal aortic aneurysm: Health in Men study. *Circulation*, 116:2275-2279.
4. Jacob R. A., Sotoudeh G. (2002) Vitamin C function and status in chronic disease. *Nutrition in Clinical Care*, 5:66-74.
5. Johnston K.W., Rutherford R.E., Tilson M.D., Shah D.M., Hollier L., Stanley J.C. (1991) Suggested standards for reporting on arterial aneurysms. *Journal of Vascular Surgery*, 13:452-458.
6. Johnston K.W., Scobie T.K. (1988) Multicenter prospective study of nonruptured abdominal aortic aneurysms. Population and operative management. *Journal of Vascular Surgery*, 7: 69-81.
7. Józwiak P., Szmagaj A. (2012) Charakterystyka zachowań zdrowotnych mężczyzn po 50 roku życia w Poznaniu w odniesieniu do czynników ryzyka występowania chorób sercowo-naczyniowych. *Przegląd Lekarski*, 10:934-939.

8. Lilienfeld D.E., Gunderson P.D., Sprafka J.M., Vargas C. (1987) The epidemiology of abdominal aortic aneurysms: mortality trends in the United States 1951-1980. *Arteriosclerosis*, 7:637-643.
9. Lindholt J.S., Heegaard N.H., Vammen S., Fasting H., Henneberg E.W., Heickendorff L. (2001). Smoking, but not lipids, lipoprotein(a) and antibodies against oxidised LDL, is correlated to the expansion of abdominal aortic aneurysms. *European Journal of Vascular and Endovascular Surgery*, 21:51-56.
10. Michota-Katulska E. (2000) Antyoksydanty – wybrane aspekty zdrowotne. *Żywność, Żywnienie a zdrowie*, 3:333-337.
11. Palazzuoli A., Gallotta M., Guerrieri G., Quatrini I., Franci B., Campagna MS, Neri E, Benvenuti A, Sassi C, Nuti R. (2008) Prevalence of risk factors, coronary and systemic atherosclerosis in abdominal aortic aneurysm: comparison with high cardiovascular risk population. *Vascular Health Risk Management*, 4:877-883.
12. Pateci M.I., Hardam D.T., Fisher C.M. (1995) Current view on the pathogenesis of abdominal aortic aneurysms. *Journal of American College of Surgeons*, 181: 371-382.
13. Peters A. C., Van Landeghem B. A., Graafsmas S. J., Kranendonk S. E., Hermus, A. D., Blom, H. J., Den Heijer, M. (2007) Low vitamin B6, and not plasma homocysteine concentration, as risk factor for abdominal aortic aneurysm: a retrospective case-control study. *Journal of Vascular Surgery*, 45:701-705.
14. Rutkowski M., Grzegorzczak K., Malinowska K. (2010) Witaminy A, C i E – rola ich działania antyoksydacyjnego w prewencji ontogenezy. *Problemy Terapii Monitorowanej*, 21:251-257.
15. Simoni G., Pastorino C., Perrone R., Ardia A., Gianrossi R., Decian F., Cittadini G. Jr, Baiardi A., Bachi V. (1995) Screening for abdominal aortic aneurysms and associated risk factors in a general population. *European Journal of Vascular and Endovascular Surgery*, 10:207-210.
16. Singh K., Bønaa K.H., Jacobsen B.K., Bjørk L., Solberg S. (2001) Prevalence of and risk factors for abdominal aortic aneurysms in a population-based study: The Tromsø Study. *American Journal Epidemiology*, 153:236-244.
17. Stackelberg O., Björck M., Sadr-Azodi O., Larsson S.C., Orsini N., Wolk A. (2013) Obesity and abdominal aortic aneurysm. *British Journal of Surgery*, 100:360-366.
18. Svensjö S., Bengtsson H., Bergqvist D. (1996) Thoracic and thoracoabdominal aortic aneurysm and dissection: An investigation based on autopsy. *British Journal of Surgery*, 83:68-71.
19. Tilson M.D. (1992) Aortic aneurysms and atherosclerosis. *Circulation*, 85:378-379.
20. Vega de Céniga M., Gómez R., Estallo L., Rodríguez L., Baquer M., Barba A. (2006) Growth rate and associated factors in small abdominal aortic aneurysms. *European Journal of Vascular and Endovascular Surgery*, 31:231-236.

Number of signs with spaces: 30 654

**Gustaw Wójcik^{1,3}, Jolanta Piskorz², Teresa Stawińska¹,
Barbara Sokółowska⁴, Włodzimierz Bulikowski¹**

¹ Department of Rehabilitation, Physiotherapy and Balneotherapy, Medical University of Lublin.

² Anaesthesiology and Intensive Care Unit - Zofia Tarnowska from the Zamoyskis
Provincial Hospital in Tarnobrzeg.

³ Department of Imaging Diagnosis - Zofia Tarnowska from the Zamoyskis
Provincial Hospital in Tarnobrzeg.

⁴ Health Institute - State School of Higher Education in Biała Podlaska

Diagnostic methods used in detecting aortic aneurysm

Metody diagnostyczne stosowane w wykrywaniu tętniaków aorty

Summary

In highly industrialised countries diseases of the circulatory system are at the top of the list of civilizational diseases. Among them one of the most important health problems are degenerations of artery vessels leading to aneurysms. Higher blood pressure and local weakening of vessel walls fosters its pathological dilation. A dilation by 50% with respect to the correct diameter of the aorta bears the name of aneurysm. Due to their shape aneurysms are divided into fusiform aneurysms and saccular aneurysms. Majority of them are detected by accident when performing an abdominal or chest ultrasound. If there is a problem with estimating the diameter of the aneurysm, it is recommended that a CAT scan using a radiocontrast agent or a magnetic resonance be performed. Medicals include ultrasound, X-ray of the abdominal cavity, and, if in doubt, CAT scan and magnetic resonance.

Key words: aortic aneurysm, imaging diagnosis, medical examination

Streszczenie

W krajach wysoko uprzemysłowionych choroby układu krążenia znajdują się w czołówce chorób cywilizacyjnych. Wśród nich jednym z ważniejszych problemów zdrowotnych są zwyrodnienia naczyń tętniczych prowadzące do powstawania tętniaków. Wzrost ciśnienia krwi i miejscowe osłabienie ściany naczynia sprzyja jej patologicznemu poszerzeniu. Powiększenie o 50% w stosunku do prawidłowej średnicy aorty nosi nazwę tętniaka. Ze względu na kształt tętniaki dzieli się na wrzecionowate i workowate. Większość z nich jest wykrywana przypadkowo, przy okazji wykonywania badania USG jamy brzusznej czy klatki piersiowej. W przypadkach trudności w ocenie średnicy tętniaka zaleca się wykonanie TK z użyciem środka cieniującego lub MR. Do badań kontrolnych zalicza się wykonanie USG, przeglądowego rtg jamy brzusznej, a w wątpliwych przypadkach TK i MR.

Słowa kluczowe: tętniak aorty, diagnostyka obrazowa, badanie przedmiotowe

Introduction

Aortic aneurysms belong to relatively frequent diseases which may pose a serious hazard to one's health and life. Aneurysm is a local, incorrect dilation of the light of the aorta by at least 50% with respect to the healthy aorta. Aortic aneurysms occur in the thoracic or abdominal part of the body, or may occur simultaneously in both parts, creating a thoracic abdominal aneurysm. Due to their shape aneurysms are divided into fusiform aneurysms and saccular aneurysms. The frequency of occurrence of this pathology increases as the population gets older. They occur nine times more frequently in men than women, especially in tobacco smokers [Kuivaniemi, Elmore 2012]. Aortic aneurysms usually affect elderly people but are also observed in younger persons. Undetected and not treated, they may be a cause of numerous complications and even death.

Early identification of patients at risk of aortic aneurysm is very important since it makes it possible to start treatment before clinical symptoms of degeneration of the aorta become visible. A clear growth in the rate of detection of aortic aneurysms can be observed in recent years. Maybe this is associated with an ever better access to diagnostic tests and with better knowledge of the medical personnel itself concerning the possibilities, sensitivity and ways of using various examination methods which may contribute to the detection of pathologies of the vessels.

The basic problem associated with the treatment of patients in which aortic aneurysms have been detected is determination of the best moment when a surgery should be performed. The death rate in planned surgeries ranges between 1 and 10%, and in emergency surgeries it reaches even 75%. These disproportions show how important it is to detect them early and then to monitor the pace of dilation of aneurysms.

The aim of this paper is to present diagnostic methods, thanks to which aortic aneurysms may be detected before they are confirmed by clinical symptoms.

Symptoms and diagnosis of aortic aneurysms

Usually dilation of aortic aneurysms is spread over time and gives no symptoms. It happens that the first symptom is a dramatic course of aortic dissection. Aneurysms of thoracic aorta may be a cause of chest pains, aortic insufficiency, and, in consequence, a cause of heart failure. Aneurysms of thoracic aorta may cause dysphonia as a result of constriction of the recurrent laryngeal nerve, recurrent bronchitis, cough, dyspnoea, haemoptysis, dysphagia, may also be the cause of superior vena cava syndrome [Elefteriades, 2008].

A pulsating tumour in the abdomen could be felt using a palpation in almost every patient suffering from aortic aneurysm [Botta and co-authors, 1983]. Dilation of the aneurysm may cause pain in the lumbosacral area, similar to sciatica. Other symptoms include pain in the abdomen, radiating down to thighs, urinary bladder and inguinal region. Growing aneurysms hardly ever constrict the inferior vena cava or one of the iliac veins, causing tumefaction of the lower limbs. They sporadically constrict the ureter, causing albuminuria or haematuria. Symptoms which make it possible to detect the aortic pathology early do not appear in all patients and are characteristic only for 5-10% of subjects [Elefteriades, 2008].

Aneurysms grow faster the bigger they are. Their growth disturbingly increases the risk of rupturing, especially in patients with hypertension and chronic obliterative lung disease. A frequent symptom of rupturing of an aneurysm is sudden pain in the lumbar region, radiating towards the abdomen and the crotch. A haematoma of the scrotum and/or around the anus is a typical symptom of rupture of the aneurysm as a result of blood seeping into the retroperitoneal space. These symptoms occur several and even a dozen hours after retroperitoneal rupture. When the pressure in the tight retroperitoneal space exceeds the pressure in the aorta, autotamponade occurs and pain usually alleviates or even recedes [Woźniak, Noszczyk 2000]. Aneurysms may also rupture into the peritoneal cavity. The subject has a strong stomach ache then, and symptoms of a hypovolemic shock appear several minutes later. There are also aortic ruptures into the duodenum, whose symptoms include massive bleeding from the digestive system. Ruptures of the aneurysm into the inferior vena cava as a complication of a vein implant are rare [Botta and co-authors, 1983].

As for inflammatory aneurysms, one may observe an excessive thickening of the aortic wall with an inflammatory infiltration into the surrounding tissues. A symptom is pain in the abdomen, higher body temperature, high ESR, increased leucocytosis. The concentration of urea and creatinine in the blood may also increase. Additionally, swelling in the pelvic and lower limb area may be observed in the subjects. Nausea and emesis often occur [Cencora, 1994; Michalak 1993]. Mycotic aneurysms, caused by staphylococci or salmonella, are ever more rare. Subjects with mycotic aneurysms may have symptoms typical of symptomatic aneurysm, high fever and increased leucocytosis often occur. Embolizing aneurysms may be observed in unique cases. They are rare (1-3%). They may cause limb ischaemia, and when thrombi clod the light of the aorta in the toes, they are a cause of sudden pain in the toes, which turn grey or navy blue.

Some authors point to co-existence of abdominal aneurysms and hernia, which may be associated with the pathology of the connective tissue [Woźniak and Noszczyk 2000].

A physical examination constitutes the basic diagnostic tool. The abdomen and limbs should be palpated carefully in subjects in whom an aortic aneurysm is suspected. This makes it possible to detect pulsating areas and lack of pulse in the circumference. Palpation does not increase the risk of an aneurysm rupturing [Lederle and Simel 1999]. The palpating method is rather effective, nonetheless, its value diminishes in case of obese patients.

Aortic aneurysms are frequently detected by accident while performing examinations for other diseases. Approx. 15% of aortic aneurysms is detected during radiological examinations. Radiological assessment of aortic aneurysms is based on non-invasive methods such as medical X-ray imaging, classical or transesophageal echocardiography (TEE), CAT scan or magnetic resonance as well as invasive methods such as: aortography or digital subtraction angiography [Calka, 2000].

On a chest X-ray thoracic aneurysms may give an image of a limited tumorous mass in a projection of the mediastinum, which may even lead to the top of the lung [Meier and co-authors, 1993]. They may also take on a form of a mediastinal enlargement or result in an image of double aortic arch. Characteristics which make it possible to detect aneurysms on an X-ray image include excessive calcification of the aortic walls and its curvilinear regression.

Urography – by performing an X-ray examination with an intravenous radiocontrast agent it may be possible to detect a blockage of the urethra and its displacement caused by dilating aneurysm.

In some cases of particularly complicated anatomy of the vessels and in the event of a planned surgery, an invasive method such as arteriography may prove necessary. Arteriography is a radiological examination consisting in imaging the light of the aortic vessel after introduction of contrast material through a catheter inserted into an artery. The aim of this method is to assess anomalies taking place in the vessels being examined. Should an aneurysm be detected, it makes it possible to determine its anatomical structure but not its size or diameter.

When small, aneurysms usually do not cause any pain. They are frequently detected during routine examinations, during ultrasound examination of the abdominal cavity or during diagnosis of other diseases. Screening ultrasound examinations show that abdominal aortic aneurysms occur at 4.4% of people aged between 40 and 75, however, they are detected 3 to 8 times more often in men than women. An ultrasound examination shows a dilation of the vessel with calcifications in the wall and with the presence of thrombi in its light.

An excellent examination of the abdominal aortic aneurysms is the B-mode ultrasound, which is a part of the Duplex ultrasound or real-time ultrasound examination. They do not pose a risk for the patient and are the least expensive examination. The accuracy of the Duplex ultrasound examination depends on the skills of the examining person, especially in detecting small abdominal aortic aneurysms [Ellis and co-authors, 1991]. Turbulent blood flow dominates in the Doppler mode. An ultrasound examination is recommended because it is a non-invasive, inexpensive and commonly available method.

In case of preliminary diagnosis as well as for the purpose of monitoring the development of the aneurysm, the preferred imaging methods, the so-called “gold standard”, are currently a CAT scan and magnetic resonance. A multi-detector row spiral CT with a radiocontrast agent is a method of a relatively low invasiveness in comparison to arteriography and a very sensitive method of diagnosing aneurysms [Rubin and co-authors, 2000]. Computed tomography is used mainly in pre-operative classification of aneurysms, whose aim is to measure the maximum lateral size and to assess the relation of the aneurysm to the surrounding anatomical structures. When performing endovascular surgeries it is extremely important to precisely measure the diameter and length of the aneurysm neck. Potential curvatures and presence of thrombi in the light of the aorta as well as the presence of curvatures and arcuations in hip arteries are examined. 3D reconstructions are used ever more frequently in computed tomography with radiocontrast agents since they facilitate the process of qualifying patients for endovascular techniques or open surgeries [Broeders and Blankenstein 1999].

Computed tomography is the most effective method of detecting ruptures of aneurysms, while indicating the presence of a fluid collection on the aorta.

A computed tomography examination has a high diagnostic value but due to the use of X-rays and large volumes of radiocontrast agents, it poses a certain burden to the health of the patients. In this case an alternative is a magnetic resonance examination. Unfortunately this method is also burdened by certain flaws, the largest one being

a longer duration of the examination in comparison to a computed tomography. However, continuous development of technology makes it possible to obtain ever better images of vessels in magnetic resonance, including images of kidney arteries. It should be assumed that continuous development of technology will increase the future usefulness of magnetic resonance in diagnosing aneurysms and that the precision of the images obtained using this method will be similar to that obtained in spiral computed tomography [Ludman and co-authors, 2000].

As regards examinations of blood vessels using magnetic resonance, we are talking about magnetic resonance angiography (angio-MR or MRA). Blood vessels may be imaged with or without the use of radiocontrast agents. One of the methods where no radiocontrast agent is used is time-of-flight (TOF) angiography. This method makes it possible to reduce the signal of stationary tissues while simultaneously strengthening the signal from inflowing blood. However, in case of slow blood flows as well as in case of large thrombi, this technique is burdened by flaws associated with changes in the intensity of the signal. In this technique it is difficult to differentiate between turbulent and laminar flow.

Another method used in magnetic resonance without radiocontrast agents is phase-contrast (PC) angiography in which maps of the blood flow are obtained, where the intensity depends on the blood velocity. This method significantly better reduces the signal of stationary tissues, and the images have a much better resolution. In PC angiography it is easy to distinguish a thrombus from a flowing blood.

Despite of quite good methods visualizing the vessels without radiocontrast agents, the most accurate examination is considered to be MR angiography with intravenous administration of paramagnetic contrast agent.

This MRA is completely non-invasive when using non-contrast methods since it uses a constant magnetic field and radio waves which are harmless to the human body. In MR examinations it takes a long time to gather data. The examination may last even 1 hour.

CAT scans and MR examinations are performed before planned surgeries for the purpose of precisely assessing the disturbed anatomical relationships of the aneurysm to the correctly functioning part of the vessel. It should be remembered that these examinations are definitely most expensive and bear a risk associated with Roentgen radiation and intravenous administration of a radiocontrast agent, which may result in anaphylactoid reaction. Anaphylactoid shock is a non-allergic, general, systemic reaction to exposure to a specific stimulus in a dosage tolerated by healthy persons. Immunological mechanisms do not participate in non-allergic reactions, that is why the shock may occur during the first exposure to the given radiocontrast agent, regardless of the quantity of the agent administered intravenously. Direct administration of the agent into the blood circulation causes immediate degranulation of mast cells and basophils and release of histamine. In case of radiocontrast agents administered parenterally, reactions may occur within a few seconds. Clinical symptoms differ in degree of severity and cover the skin, eyes, airways, alimentary tract, cardiovascular system and central nervous system [Korenblat and co-authors, 1999].

“EUS-guided angiography” is a method which constitutes a modern approach to diagnostic and therapeutic interventions in the vascular system. Initially this method was used in the diagnosis of oesophageal varices. Currently studies are being conducted

on using this method in the diagnosis and treatment of aortic aneurysms. This method requires administering a large volume of agent improving the contrast of the image since it makes it possible to shorten the time needed to visualise the vessel. The blood velocity in large vessels is associated with the administration of larger volumes of radiocontrast, which constitutes the main limitation of this diagnostic method [Priscilla 2007].

In the event of a suspicion of an inflammatory aneurysm, a scintigraphic examination is required since isotopic examinations are the best method of detecting hidden inflammatory foci. Scintigraphy is used ever more frequently in the diagnosis of inflammatory states occurring within the area of vascular prostheses and grafts. Marked leukocytes of the patient, which are a natural element of his immunological system and participate in the inflammatory processes taking place in the body, are used to conduct the examination. That is why in this examination one may observe a collection of the markers in areas affected by the inflammation. The flaw of this examination is the fact that the marked leukocytes are disseminated by blood and are naturally captured by some of the organs, especially by the liver and the spleen, which hinders the interpretation of the images.

Until now blood tests played a less important role in diagnosing acute abdominal aortic aneurysms. Weber and co-authors describe a 100% dependence of the growth of D-dimers in persons suspected of having an aortic aneurysm. The level of D-dimers in those cases exceeded 0.5 µg/ml in all persons who later underwent an emergency surgery of the abdominal aorta. The sensitivity of that test in this case is 100%, and its specificity reaches up to 68.6% [Weber and co-authors, 2003].

An increase in the level of C-reactive protein and lactate dehydrogenase can be observed in some patients. Also, there is an increase in the myosin heavy chain of the smooth muscle in an immunoenzymatic method, although this test is currently not in wide use. Suzuki and co-authors came to a conclusion that a negative D-dimer result may be useful in ruling out an acute aortic aneurysm [Suzuki and co-authors, 1996].

Carefully conducted physical examinations and appropriately matched imaging examinations allow for an early detection of aortic aneurysms and for an appropriately early surgical intervention.

Once diagnosed, aneurysms should be continuously monitored. The frequency of the check-ups should depend on the diameter of the aorta and the pace at which it is dilating.

Conclusions

Diagnosis of aortic aneurysms is constantly developing. Previous methods are being improved and new ones are being developed. Imaging diagnosis techniques presented in this paper, based on computed tomography and magnetic resonance, provide the most precious information about the anatomical conditions of the aneurysm, indicating the diameter of the light of the aorta, its external layer and size of the thrombus. These examinations are usually performed before planned surgical procedures as well as during follow-up examinations after grafting of vein implants. Considering the fact that the aforementioned examinations are one of the most expensive ones, diagnosis using these methods has certain limitations.

Ultrasound examinations are least expensive diagnostic methods but their accuracy is not as precise as that of computed tomography and magnetic resonance.

Urography, as an examination using a radiocontrast agent, may be just as useful in diagnosing aneurysms as a chest X-ray. These are least invasive examinations but they show only indirect symptoms of aneurysms, without the possibility to make any measurements.

The most invasive examinations are aortography and digital subtraction angiography since they are associated with introduction of contrast material through a catheter inserted directly into an artery.

Blood tests are becoming promising as regards diagnosis of aneurysms. Increase in D-dimers, C-reactive protein and lactate dehydrogenase is not specific enough to be able to conclude the presence of aneurysms on their basis. Meanwhile, a negative D-dimer result may be useful in ruling out an acute aortic aneurysm.

Bibliography

1. Botta G. C. et al. Abdominal aortic aneurysms. *J. Cardiovasc. Surg.*, 1983,24 , 484.
2. Broeders I.A., Blankenstein J.D. Preoperative imaging of the aortoiliac anatomy in endovascular aneurysm surgery. *Semin Vasc Surg.* 1999;12:306-14.
3. Całka K., Bojarski B., Jaźwiec P. and co-authors: Tętniak rozwarstwiający aorty piersiowej z krwawieniem do jamy opłucnej. *Przegl. Lek.* 2000; 57:1.
4. Cencora A., Morawiecki T., Szumilak A. W sprawie po operacjach zapalnych tętniaków aorty brzusznej w ostrej fazie choroby. *Pol. Przegl. Chir.*, 1994, 66, 598
5. Elefteriades J. A. Thoracic aortic aneurysm: Reading the enemy's playbook. *Curr Probl Cardiol*, 2008; 33: 203-277.
6. Ellis M., Powell J.T., Greenhalgh R.M. Limitations of ultrasonography in surveillance of small abdominal aortic aneurysms. *Br. Jour. Surg.*, 1991;78:614-6.
7. Korenblat P., Lundie M.J., Dankner R.E., et al. A retrospective study of epinephrine administration for anaphylaxis: how many doses are needed? *Allergy Asthma Proc.* 1999; 20: 383-386.
8. Kuivaniemi H; Elmore JR. Opportunities in abdominal aortic aneurysm research: epidemiology, genetics, and pathophysiology. *Ann Vasc Surg*, 2012; 26 (6): 862-70
9. Lederle FA, Simel DL. The rational clinical examination: does this patient have abdominal aortic aneurysm? *JAMA* 1999; 281:77-82.
10. Ludman C.N. et al. Feasibility of using dynamic contrast-enhanced magnetic resonance angiography as the sole imaging modality prior to endovascular repair of abdominal aortic aneurysms. *Eur J Vasc Endovasc Surg*, 2000;19:524-30.
11. Meier R., Marianacci E., Costello P. et al. 3D image reconstruction of right subclavian artery aneurysms. *J. Comput. Assist. Tomogr.* 1993; 17: 887-890.
12. Michalak J. and co-authors Wyniki leczenia tętniaków zapalnych jamy brzusznej. *Wiad. Lek.*, 1993,46, 384
13. Priscilla M. et al. EUS-guided angiography: a novel approach to diagnostic and therapeutic interventions in the vascular system. *Gastrointest End*, 2007; 66(3), 587-591.
14. Rubin G.D. et al. Cost identification of abdominal aortic aneurysm imaging by using time and motion analyses. *Radiology*, 2000;215:63-70.

15. Suzuki T, Katoh H, Watanabe M, et al. Novel biochemical diagnostic method for aortic dissection: results of a prospective study using an immunoassay of smooth muscle myosin heavy chain. *Circulation*, 1996; 93:1244-1249.
16. Weber T, Hogler S, Auer J, et al. D-dimer in Acute Aortic Dissection. *Chest*, 2003; 123(5) 1375-1378.
17. Woźniak W., Noszczyk W. Tętniak aorty brzusznej. *Przew Lek* 2000, 5: 48-51.

Number of signs with spaces: 23 263

Paweł Kozłowski¹

¹Department of Clinical Chemistry, Oncology Center-Maria Skłodowska-Curie Institute in Warsaw

¹Zakład Chemii Klinicznej, Centrum Onkologii-Instytut im. Marii Skłodowskiej-Curie w Warszawie

**Venous thromboembolic disease
– potentially life-threatening clinical problem.**

**Żylna choroba zakrzepowo-zatorowa
– potencjalnie groźny dla życia problem kliniczny.**

Summary

It is estimated that in Poland deep vein thrombosis affects approx. 60.000 people while pulmonary embolism about 34.000. Both are potentially life-threatening. Nowadays risk factors for venous thromboembolism are well known. Diagnosis of deep vein thrombosis and pulmonary embolism starts with evaluation of patient's clinical condition and likelihood of those diseases. Further diagnostic investigation depends on the size of this probability. Heparins and oral anticoagulant drugs (coumarin derivatives) play main role in treatment of venous thromboembolism.

Key words: deep vein thrombosis, pulmonary embolism, Well's score, D-Dimers, primary prevention, secondary prevention

Streszczenie

Częstość występowania w Polsce żylną choroby zakrzepowo-zatorowej szacuje się na około 60 tysięcy zachorowań na zakrzepicę żył głębokich oraz około 34 tysiące zachorowań na zatorowość płucną rocznie. Jest to choroba potencjalnie groźna dla życia. Obecnie dobrze znane są czynniki ryzyka, które sprzyjają rozwojowi choroby zakrzepowo-zatorowej. Diagnostyka zakrzepicy żył głębokich i zatorowości płucnej rozpoczyna się od oceny stanu klinicznego pacjenta, oraz oszacowaniu klinicznego prawdopodobieństwa wystąpienia tych chorób. Dalsze postępowanie diagnostyczne jest uzależnione od wielkości tego prawdopodobieństwa. Leczenie żylną choroby zakrzepowo-zatorowej oparte jest głównie na zastosowaniu heparyn oraz doustnych antykoagulantów (pochodnych kumaryny).

Słowa kluczowe: zakrzepica żył głębokich, zatorowość płucna, skala Wellsa, D-Dimery, profilaktyka pierwotna, profilaktyka wtórna

Introduction

The term of venous thromboembolic disease (VTE) is deep vein thrombosis (DVT) and pulmonary embolism (PE) which stands for its dangerous complication. A few facts about DVT and PE makes these diseases a serious problem and a major challenge for modern medicine. The first is prevalence. It is estimated that in Poland every year DVT affects approx. 60.000 people, PE approx. 34.000. These estimates are based on epidemiological data from the United States and Western European countries (Zawilska et al. 2012; Gutknecht et al. 2007). The incidence of VTE increases with age. The majority of the cases (approx. 70%) applies to people over 60 years old (Zawilska et al. 2012). In the group of people between 85 and 89 years the incidence of VTE is about 12 times higher in comparison with a group of people under 40 years (Gutknecht et al. 2007). It is associated with a greater number of the risk factors for this disease in the elderly group. Venous thromboembolism, pulmonary embolism in particular, encumbers with high mortality rate. The occurrence of thrombus in the pulmonary vessels causes difficulty in blood flow, which leads to an increase of pressure in the pulmonary vessels and a huge load of the right ventricle. It is estimated that in the United States the mortality rate due to PE is greater than 15% during the first 3 months from diagnosis. The prevalence of this complication is assessed more than 1 case per 1000 population per year. It is said that at least 50.000 deaths per year are caused by PE (Goldhaber et al. 2003). In 2008 the European Society of Cardiology defined the risk of early death due to PE as the probability of death caused by PE during a hospitalization or within 30 days of admission to a hospital. To assess the size of this risk three criteria were proposed: clinical symptoms (occurrence of shock or hypotension), symptoms of dysfunction of the right ventricle (enlargement of ventricular, hypokinesia or overload in echocardiography, increase of NT-pro-BNP (N-terminal prohormone of brain natriuretic peptide)), and symptoms of myocardial damage (increased troponin). All patients, who during the course of acute PE appear a shock or hypotension, were qualified to a high risk of early death owing to PE. The risk in this group is more than 15% and these patients represent 5-10% of all patients with acute PE. The patients who present symptoms of the right ventricular dysfunction or symptoms of myocardial damage or both criteria at the same time, were qualified to the intermediate-risk group of early death due to PE amounts to 3-15%. The patients who do not experience any of the above criteria are the low-risk group of less than 1% (Kostrubiec et al. 2010). The mortality which is a result of PE can be reduced owing to apply of DVT prophylaxis and early implemented appropriate treatment.

Another, the most common complication of DVT, is the post-thrombotic syndrome. It develops in 20-50% of the patients with a history of DVT (Khan, 2006). Its main symptoms such as chronic pain, swelling, heaviness, are caused by chronic venous insufficiency. In the serious cases skin ulceration may appear. Because of the high prevalence and significant aggravation in the quality of life and chronic nature, post-thrombotic syndrome is a serious clinical problem.

Risk factors

Venous thrombosis arises from an imbalance between the pro- and antithrombotic processes. Various phenomena and clinical situations as the risk factors for DVT may contribute to this. Their action causes three basic phenomena, which were described in 1856 by Rudolf Virchow: changes in the blood, changes in blood vessel walls and blood flow changes. The most inner layer of the blood vessel wall is the endothelium. The accurate endothelium has a number of mechanisms that inhibits blood clotting, which gives it the antithrombogenic features. These mechanisms include the presence on the surface of endothelial endogenous heparinoids (heparan sulfate and dermatan sulfate) and thrombomodulin – thrombin receptor which takes part in the activation of protein C. The endothelial cells also produce and release a variety of substances such as: tissue plasminogen activator (t-PA), tissue factor pathway inhibitor (TFPI), prostacyclin I_2 (PGI_2) and nitric oxide. Under the influence of inflammation and damaging action of hypoxia, drugs and toxins, endothelial cells lose most of these mechanisms and start to demonstrate some prothrombotic potential. In addition to the elimination of antithrombotic properties of endothelium, another phenomenon contributing to the development of venous thrombosis is a change in blood fluxion. The driving force of the moving blood in the veins of the lower limbs to the heart are primarily the leg spasms while walking or running. During the muscle contraction the blood is “squeezed” into the heart direction, and during the muscle diastolic the venous valves prevent from a back blood flow. In the situation of prolonged immobility caused by i.e. the nature of the work, long flights, patients undergoing prolonged surgeries, paralysed patients, there is a stagnation of blood in the deep veins of the lower limbs. This stagnation causes hypoxia of endothelial cells which turn into the loss of its antithrombotic properties. The third element of the Virchow’s triad is change in the blood. The concept of this is a series of apparitions that can be divided into congenital and acquired. The congenital includes, among others: genetically determined deficiency of natural inhibitors of blood coagulation – antithrombin, protein C and protein S, resistance to activated protein C associated with the mutations in the gene encoding factor V (factor V Leiden), the mutation G20210A of the prothrombin gene causing increased concentration of the plasma prothrombin, or genetically determined deficiency of the methylenetetrahydrofolate reductase (MTHFR), resulting in elevated concentration of plasma homocysteine which leads to damage of the endothelial cells. The adverse changes in hemostasis, may have an acquired character, are also favourable to make clots. They are closely related to the age of the patient, his health and the occurrence of various diseases, his lifestyle and physical activity. The most important risk factors for VTE to this group are: patient age, cancer, VTE in an interview, varicose veins of the lower limbs, stroke, septicemia, severe injuries, major surgery, pregnancy and confinement, use of oral contraception and hormone replacement therapy, hospitalization, prolonged immobilization, obesity, smoking. The approximate incidence of DVT in association with individual risk factors in patients who are not undergoing anticoagulation prophylactic presents Tab.1 (Zawilska et al. 2012).

Tab.1 The approximate incidence of DVT associated with risk factors in patients who are not undergoing thromboprophylaxis.

Risk factors	The approximate incidence of DVT (%)
Hospitalization of a patient who moves on his own	0-10
Small surgery on a patient who moves on his own	0-10
Cancer	5-50
Bedridden patient's hospitalization	10-40
General operation such as gynaecology, urology and neurology	15-40
Ischemic stroke	20-50
Surgery in a patient with cancer	25-60
Hip or knee arthroplasty	40-80
Fracture of the proximal femur	40-80
Severe trauma	40-80
Acute spinal cord injury	60-80
Patients requiring intensive care	10-70

The relation between venous thromboembolism and cancer is very strong and fairly well understood. It was described in 1865 by Armand Trousseau. He observed the cases of travelling phlebitis in patients with cancer. In fact, VTE is one of the most common complications of not only the cancer itself, but also of the treatment: oncological surgery, chemotherapy and radiotherapy. The risk of VTE in patients with cancer is about 4-7 times higher than in the general population (Chojnowski 2012; Wun 2009). It increases further during the treatment and disease progression. It is potentially life-threatening complication and is the second most common cause of the death in this group of patients (Chojnowski et al. 2012; Khorana, 2010). The episode of VTE may be a prodromal symptom of latent cancer (also called latent cancer, lat. carcinoma occultum). According to various reports within two years after appearance of the episode of DVT cancer is diagnosed in 7% up to 20% of patients (Stanisławiak 2008; Wojtukiewicz 1998). Despite the fact that the occurrence of idiopathic DVT increases the likelihood of the presence of tumour, it is not recommended to perform a very detailed diagnostic procedures to detect cancer. These procedures can be limited to basic research in the frequently occurring cancers: chest X-ray, abdominal ultrasound examination, gynaecological examination and mammography, per rectum examination (including prostate in men), and also basic laboratory tests such as hem-occult test (Stanisławiak 2008; Wojtukiewicz 1998). The presence of VTE in patients with cancer significantly worsens the prognosis.

The relation between hormonal contraceptives and an increased risk of VTE is known since the sixties of the twentieth century. It is estimated that taking the second generation preparations is associated with approx. 2-fold increased risk of VTE in comparison to the population of women not taking hormonal contraception. Taking the third generation preparation increases the risk of up to 4-fold (Plu-Bureau 2013; Sandset 2013). It is calculated that the risk of an episode of DVT is the highest in the first five years after the

start of the therapy. If woman is receiving hormonal contraception, and additional risk factors favouring the occurrence of VTE are present (i.e. antiphospholipid syndrome, genetic risk factors, obesity, etc.), the risk of VTE episode is several times higher (Plu-Bureau et al. 2013).

The pregnancy and confinement are mentioned as risk factors for VTE. The risk of deep vein thrombosis in pregnancy is increased 4-5 fold. The largest is in the third trimester and its growth is observed from the first trimester. Further, a huge increase of the DVT risk is observed in the postnatal period. In the first week after birth the risk increases approx. 100 fold over the next five weeks is 60-80 factor of the risk of the pre-pregnancy (Cannegieter et al. 2013). One of the reasons for such a high increase of the risk of thrombotic disease is fact, that during pregnancy, especially before birth blood coagulation process are activated, which is to provide much more efficient inhibition of bleeding caused by the confinement.

Obesity is nowadays a common risk factor. It is associated with decreased physical activity which adversely affects the cardiovascular system. In addition, a number of mechanisms of hemostasis is shifted to the prothrombotic processes primarily through inhibition of the fibrinolytic system in obese people (Szepański 2007). An obesity is not often the sole risk factor but is only co-factor. This obviously increases the overall risk of DVT.

Diagnosis of venous thromboembolism

If VTE is suspected, clinical condition of the patient and the likelihood of tromboembolic complications should always be taken into account. The clinical symptoms or lack of them are not a reliable indicator of presence or absence of disease. It is estimated that approx. 60-70 % of the cases of deep vein thrombosis are asymptomatic (Gutknecht et al. 2007). The clinical symptoms of DVT are very diverse. The most important includes: pain which location and severity does not always match with the location and expansiveness of the disease. In addition, swelling limbs and its warming, redness and tenderness of the skin and knot affection on the course of deep vein are also observed.

In order to assess the clinical probability of DVT and PE can use the Wells score can be used (Tab. 2 and Tab. 3).

Tab. 2 The Wells score to estimate the probability of clinical DVT (Wells et al. 2003)

Clinical symptoms and medical history	scores
Active cancer	+1
Current paralysis, weakness, recent lower limb immobilization	+1
Recent immobilization in bed more than 3 days or major surgery within the last 4 weeks	+1
Topical achiness	+1
Entire leg swollen	+1

Swelling in the ankle of affected limb (limb ankle girth higher by at least 3 cm from the healthy ankle)	+1
Pitting oedema	+1
Visible superficial veins of collateral circulation	+1
Equally to or more likely diagnosis other than DVT	-2
Clinical probability of DVT	total
Small probability	=<0
Moderate probability	1-2
Large probability	>=3

Tab.3 The Wells score to estimate the clinical probability of PE (Klok et al. 2008)

Clinical symptoms and medical history	scores
Lower extremity oedema and the pain in the course of deep vein	+3
Frequency of heart rate >100/min	+1,5
Immobilization in bed for at least 3 next days or surgery in the past four weeks	+1,5
Documented DVT or PE in the past or in an interview	+1,5
Haemoptysis	+1
Active cancer	+1
Equally or more likely other diagnosis than PE	-3
The clinical probability of PE	total
Small probability	<2
Moderate probability	2-6
Large probability	>6

The Wells Score is used to assess the clinical probability of DVT and takes into account the most common risk factors that elaborates thrombotic disease. Patients can be divided into three groups low, medium and high clinical probability of DVT by means of that score. The assignment of the patient to a particular group defines further diagnostic conduct. It must be carried out very carefully and thoughtful. The concentration of D-Dimer has to be determined in patients with a low clinical probability of DVT. At his work, Wells and his colleagues (Wells et al. 2007) examined whether the result of D-Dimer level below the cut-off value (500ng/ml) can safely rule DVT out. According to the researchers in the group of the patients with a low clinical probability of DVT, the result of D-Dimer level below 500 ng/ml can safely rule thrombosis out and opt out of further diagnostics (ultrasound examination). In this study, a group of the patients with a low clinical probability of DVT (601 patients) were randomly divided into two groups. In 317 patients the concentration of D-Dimer was assessed and in 284 was not, but only ultrasound examinations was performed. Ninety-nine patients had the concentration of D-Dimer greater than 500 ng/ml (positive). DVT was confirmed only in 14 patients and 85 patients had no disease. Two hundred and eighteen patients had

negative D-Dimer result (below 500 ng/ml). Further to the basis of this result and a low clinical probability of DVT, they resigned from the further diagnostics. In this group of patients during the subsequent 3-month follow-up ascertained only 2 cases of VTE. The negative predictive value of D-Dimer (probability of disease when the result is below the cut-off point) determined by the authors was 96,1%. It should be noted that in their work to evaluate D-Dimer concentration a latex agglutination based method of “moderate” sensitivity was used. Despite that, authors obtained a very high negative predictive value. They also expressed the belief that using tests of “high” sensitivity (tests based on immunoassay enzyme reactions), the negative predictive value would be even higher. In the case of the patients with the clinical probability of DVT assessed as medium or high, it is necessary to implement deeper diagnosis, even despite receiving the result of the D-Dimer concentration below 500 ng/ml. Wells score presented in table 3, as well as Geneva Score, may be useful in assessment of the clinical probability of PE. A study comparing the Geneva criteria and Wells criteria in conjunction with the determination of the concentration of D-Dimer exhibited that they are equally useful. Likewise, Wells criteria allow safe exclusion of pulmonary embolism in the patients with estimated probability of pulmonary embolism as low or moderate and the level of D-Dimer below 500 ng/ml (Klok et al. 2008). It has to be noted that the concentration of D-Dimer above 500 ng/ml do not favour the recognition of DVT or PE. In the group of patients with moderate or high probability of VTE or in the patients with low likelihood and values of D-Dimer above 500 ng/ml, the diagnosis should include vivid studies. The ultrasound examination and compression test are the most frequently made. It consists of pushing the vessel by the head of the camera. If the vessel is free of venous thrombosis, it will collapse under embrace. Magnetic resonance is also a valuable examination. It allows you to visualize the veins especially those that are difficult accessible to ultrasound examination. Other vivid examinations, but rarely used are contrast venography and impedance plethysmography.

Treatment and prevention

The treatment of DVT and PE is based on unfractionated heparin (UFH) or low molecular weight heparin (LMWH) at therapeutic dosages. Heparin is not the fibrinolytic medicine, so it does not dissolve a clot. Its purpose is to prevent the accretion of thrombus. Selection of the type of heparin, dose and time of application depends on many factors, notably the severity of the disease, its location, the clinical condition and the coexistence of one or more risk factors of VTE. After the end of heparin therapy it may be necessary to include oral anticoagulants (coumarin derivatives – acenocoumarol and warfarin) for a certain period or lifelong. The usage of medicines may be difficult for both the patient and the physician. The coumarin derivatives are characterized by a narrow therapeutic index which means that the difference between the very low dose (not causing the desired effect) and too large dose (causing an excessive effect – risk of bleeding) is minor. The use of coumarin derivatives requires laboratory monitoring.

Primary VTE prevention is to prevent the development of the disease. Secondary VTE prevention is to prevent the recurrence of DVT or PE. The methods of prevention can be divided into physical and pharmacological. The physical methods consist of primarily

assisting blood circulation in the veins of the lower limbs. For this purpose the graduated compression stockings or pneumatic compression devices squeezing legs are used. The graduated compression stockings are often used in the patients who are to undergo a surgery, due to the fact that as a consequence of each major surgery is completely or very substantial immobilization of the patient for some period of time. The pharmacological methods rely on using appropriate medication. In the primary prevention the LMWH is used most often. The secondary prevention is based on not only UFH heparin but also on oral anticoagulants. Choosing the right type of prophylaxis and the duration depend on a number of variables. This takes into account the risk of recurrence of VTE. This risk is associated with the occurrence in a patient of generally recognized risk factors for VTE. There are Polish guidelines of the type and duration of prophylaxis and treatment of VTE established by a team of the experts chaired by prof. Zawilska (Zawilska i wsp 2012). These guidelines cover a very wide range of clinical situations and discuss in detail about these proceedings.

Summation

Venous thromboembolism is a major health problem for the general population. It is quite frequently occurring disease potentially life threatening and its diagnosis can be difficult. The complications of VTE under the form of thrombotic syndrome may permanently impair the quality of the patient's life. The diagnosis of VTE, treatment and its complications is very expensive. At the same time this disease can be very effectively prevented. It is necessary to raise awareness of thromboembolic disease, in particular the risk factors and the occurrence of the effective methods of prevention.

References

1. Cannegieter S.C., Frits R.R. (2013) Pregnancy and travel-related thromboembolism. "Thrombosis Research" 131(1): 55-58
2. Chojnowski K., Treliński J. (2012) Profilaktyka żylną choroby zakrzepowo-zatorowej u chorych na nowotwory złośliwe. „Onkologia w Praktyce Klinicznej” 8(3): 105-112
3. Goldhaber S.Z., Elliott C.G. (2003) Acute pulmonary embolism: Part I Epidemiology, pathophysiology and diagnosis. „Circulation” 108: 2726-2729
4. Gutknecht P., Łuszczynska-Nitka G., Siebert J. (2007) Żyłna choroba zakrzepowo-zatorowa w praktyce lekarza rodzinnego. „Forum Medycyny Rodzinnej” 1(2): 115-123
5. Kahn S.R. (2006) The post-thrombotic syndrome: the forgotten morbidity of deep venous thrombosis. "Journal of Thrombosis and Thrombolysis" 21(1): 41-48
6. Khorana A.A. (2010) Venous thromboembolism and prognosis in cancer. "Thrombosis Research" 125: 490-493
7. Klok F.A., Kruisman E., Spann, J., Nijkeuter M., Righini M., Aujesky D., Roy P.M., Perrier P., Le Gal G., Huisman M.V. (2008) Comparison of the revised Geneva score with the Wells rule for assessing clinical probability of pulmonary embolism. "Journal of Thrombosis and Haemostasis" 6: 40-44

8. Kostrubiec M., Pruszczyk P. (2010) Zasady leczenia wstępnego i wtórnej profilaktyki przeciwzakrzepowej w zatorze tętnicy płucnej. „Hematologia” 1: 126–135
9. Plu-Bureau G., Mantelet L.M., Hugon-Rodin J., Canonico M. (2013) Hormonal contraceptives and venous thromboembolism: an epidemiological update. “Best Practice & Research Clinical Endocrinology & Metabolism” 27: 25-34
10. Sandset P.M. (2013) Mechanisms of hormonal therapy related thrombosis. “Thrombosis Research” 131(1): 4-7
11. Stanisławiak J., markowska J. (2008) Powikłania zakrzepowo-zatorowe w przebiegu choroby nowotworowej. „Współczesna Onkologia” 12(2): 56-60
12. Szczepański M. (2007) „Zakrzepica żył głębokich i zakrzepowe zapalenie żył powierzchownych”. Warszawa. PZWL (wyd. II): 26
13. Wells P.S., Anderson D.R., Rodger M., Forgie M., Kearon C., Dreyer J., Kovacs G., Mitchell M., Lewandowski B., Kovacs M.J. (2003) Evaluation of d-Dimer in the diagnosis of suspected deep-vein thrombosis. “New English Journal of Medicine” 349: 1227-12335
14. Wojtukiewicz M., Rucińska M. (1998) Zakrzepica żył głębokich a nowotwory utajone. “Onkologia Polska” 1(2): 93-97
15. Wun T., White R.H. (2009) Epidemiology of cancer-related venous thromboembolism. “Best Practice & Research Clinical Haematology” 22: 9-23
16. Zawilska K., Jaeschke R., Tomkowski W., Mayzner-Zawadzka E., Nizankowski R., Olejek A., Pasierski T., Torbicki A., Undas A., Jawień A., Gajewski P., Sznajd J., Brożek J. (2012) Polskie wytyczne Profilaktyki i leczenia żyłnej choroby zakrzepowo-zatorowej. Aktualizacja 2012. „Medycyna Praktyczna” 10-11 (wydanie specjalne)

Number of signs with spaces: 24 545

Anna Kręgiel¹, Marlena Zakrzewska¹

¹Independent Neurological Rehabilitation Unit, Medical University in Lublin

¹Samodzielna Pracownia Rehabilitacji Neurologicznej Uniwersytetu Medycznego w Lublinie

Stroke – pain and shoulder dysfunction

Udar mózgu – ból i dysfunkcja barku

Summary

Strokes are one of the most important problems of modern medicine and are third leading cause of death in many developed countries. Complications of stroke are an important determinant of quality of life and often determine the patient's survival. Complications are to be considered in two groups. The first group of complications is cerebral and the second group involves systemic complications. A common complication concerning musculoskeletal is shoulder pain. The pain, according to many researchers, occurs in 16-80% of patients after a stroke, which proves that this is a major problem in the treatment and rehabilitation of these patients.

Key words: stroke, hemorrhagic stroke, ischemic stroke, shoulder pain, shoulder dysfunction, hemiplegia, hemiparesis.

Streszczenie

Udary mózgu stanowią jeden z najważniejszych problemów współczesnej medycyny i stanowi trzecią przyczynę zgonów w wielu rozwiniętych krajach. Powikłania udaru mózgu stanowią ważny czynnik decydujący o jakości życia, a często decydują o przeżyciu chorego. Powikłania należy rozpatrywać w dwóch grupach. Pierwsza grupa powikłań, to powikłania mózgowe, a druga grupa to powikłania ogólnoustrojowe. Częstym powikłaniem dotyczącym narządu ruchu jest ból barku. Ból, według wielu badaczy występuje u 16-80% chorych po przeżytym udarze mózgu, co dowodzi, że jest to istotny problem w leczeniu i rehabilitacji tej grupy pacjentów.

Słowa kluczowe : udar mózgu, udar krwotoczny, udar niedokrwienny, ból barku, dysfunkcje barku, porażenie połowicze, niedowład połowiczy.

Stroke epidemiology

Cardiovascular diseases, which include heart attacks and brain vascular diseases (ch. n. m) are an important social value because they are the most important cause of death in our population. Strokes are the third leading cause of death in most countries and the leading cause of permanent disability of people over 40 years of age. The frequency rate, in some parts of the world, is compared to coronary heart disease and other vascular diseases. According to WHO, stroke is defined as a “sudden occurrence of focal or generalized cerebral dysfunction lasting more than 24 hours or resulting in death in the absence of other apparent reasons of vascular origin”. Therefore, Stroke is a complication of a known or unrecognized cardiovascular disease.

Because of strokes, each year 4.5 million people die in the whole world. The number of strokes per year in the United States is 400,000, in Germany 127,000, in Britain 89,000 and in France 78,000. In Poland, the records are about 70,000 new cases per year and the mortality rate is at a level between 66 - 108 per 100 000 people. In other European countries this number is similar but mortality caused by stroke's complications and the level of disability after stroke are much lower. In developed countries such as Switzerland and Finland a decrease in the number of new cases and in mortality because of a stroke is recorded. It is believed that widely implemented preventive measures, improvement of life style and the reduction of risk factors affect this state of affairs. It is assumed that the increased frequency of strokes and their cultural, biological, and social consequences during the next 25 years will continue to grow. The increase of stroke's modifiable risk factors and aging of the population in the countries of Central - Eastern Europe, including Poland, may contribute to the increased frequency of strokes.

Strokes are a major cause of disability, depression, dementia and huge spending on treatment and secondary prevention incurred by the health service. Epidemiological studies have shown that the total annual cost of treating one patient with stroke in Poland is around 60 000 PLN. In the USA total annual costs associated with strokes are around \$400 billion. In the UK the treatment of all patients consumed 5% of the health budget expenditure. In Australia the total cost of treatment per patient is 33 658 USD and in Sweden 79 000 USD.

Stroke statistical data do not always provide accurate information. Reports on mortality are much easier to obtain than data concerning morbidity. However, stroke is a common and widespread problem and increasing morbidity rate and mortality from strokes in Poland is highly disturbing. (Kuźdżał i wsp. 2011; Kwolek, 2011)

Stroke pathogenesis

Stroke is a disorder caused by a sudden loss of blood supply to the brain. This can be caused by ischemia, when one of the vessels supplying blood to the brain is suddenly blocked or by bleeding from a ruptured blood vessel. The life of brain tissue is dependent on the permanent transfer of blood providing basic and essential nutritional products. If there is a blockage or disruption of the artery, with no other routes of blood flow, the brain region, that was supplied by the damaged vessel, is destroyed. In short it can be said, that the causes of stroke are the changes at the level of the micro- and macro-circulation that form a chain of cellular and molecular changes.

The most common form of stroke is a ischemic stroke, ie. cerebral infarction, making 80% of all stroke incidents. A hemorrhagic stroke, in other words cerebral hemorrhage accounts for 10% of all strokes. Subarachnoid hemorrhage occurs in 6% of stroke incidents and the remaining 4% falls to other less defined forms of stroke.

The underlying cause of ischemic stroke is stopping or reduction of arterial perfusion. The reasons for blood flow reduction include:

- discrepancy between perfusion pressure and the structure of the vessel,
- a blood clot in a intracranial or before cranial vessel against atherosclerosis,
- embolism with material from other major cerebrovascular vessels, carotid and other coming from the heart, lungs and peripheral vessels.

Among hemorrhagic strokes there can be distinguished two types: primary (80%) and secondary (20%). The hypertension is associated with more than half of the primary hemorrhages and amyloid angiopathy affects about 30% of primary hemorrhagic strokes. Secondary hemorrhagic stroke can be caused by: a cerebral vessel defect (aneurysm, angioma), ischemic stroke, iatrogenic causes associated with thrombolytic treatment, cancer, trauma, venous thrombosis or brain endometriosis. Depending on the location of the effusion in the area of central nervous system, hemorrhagic strokes are divided into: lobar, brain, capsular and bridges.

Sometimes it happens that the symptoms of a stroke occur even a few years before becoming ill. To such conditions, according to WHO, we can include: reversible ischemic neurological deficit (RIND) and transitional ischemic attack (TIA). RIND defines symptoms lasting more than 24 hours but completely retiring within seven days. TIA occurs with some or all of stroke symptoms that resolve within 24 hours. Both TIA and RIND suggest significant heart and cerebrovascular diseases and are generally a herald of a full stroke.

Blood supply to the brain is done by four main vessels: two internal carotid arteries and two vertebral arteries. These two pairs of major blood vessels, integrated by connecting vessels, arrange on the lower surface of the brain and form a cerebral arterial circle – called A Willis Circle. From this place, through smaller blood vessels, the blood is being distributed throughout the brain. Cerebral arteries roll about 15% of total blood capacity, leading 20% of oxygen used by the body the central nervous system. Cerebrovascular diseases, which almost always are caused by hypertension and atherosclerosis are the basis for thrombotic and embolic strokes. Patients diagnosed with symptoms of cerebral hypoxia already have far-reaching damage to the vascular endothelium. In addition, in such cases, on the background of atherosclerotic, wall clots may occur in vessels. This type of pathological process significantly affects the vessel patency and function and increases the frequency of strokes. (Kuzdzał i wsp. 2011; Kwolek, 2011; Mazur i wsp. 2010).

Storke's risk factors

Stroke's risk factors are divided into three groups: non-modifiable, modifiable – certain and modifiable - probable (Table 1).

Tab. 1. Stroke's risk factors

Non-modifiable	Modifiable – certain	Modifiable - probable
Age	Hipertention	Overweight and obesity
Male	Smoking	Low physical activity
Race	Diabetes	Alkohol abuse
An aggravating family history	Carotid artery stenosis	Hyperhomocysteinemia
Socioeconomic status	Atrial fibrillation	Coagulation disorders
	Hyperlipidemia	HRT and oral contraceptives

- Hypertension is the main modifiable factor among stroke's risk factors. Many studies have shown that in people with high blood pressure the occurrence of a stroke is 3-4 times more frequently. In addition, if patient with hypertension also has myocardialopathy, the risk of a stroke increases to 8.8. In case of borderline hypertension occurrence (140-159 mm Hg/90-94 mm Hg) the risk of a stroke increases by 40%. In turn, with consistent high blood pressure ($\Rightarrow$ 160mmHg / $\Rightarrow$ 95mmHg), a chance for stroke's occurrence increases 3-6 times. Also, a high normal blood pressure (120-139mmHg/80-89mmHg) is a risk factor for stroke's occurrence. It should be noted that hypertension has the greatest impact on the ability of stroke occurrence up to 45 years old. Then, with the age this risk is reduced because the age is becoming a non-modifiable and primary risk factor. Benefits from pressure reduction, in stroke prevention, are achieved by lowering the pressure by 10/5mm Hg, wherein the optimum value of the pressure is below 120/80 mm Hg. According to Mac-Mahon's analysis, properly treated hypertension reduces the stroke's incidence and mortality by 40% (pressure drop by 11/6 mm Hg lasting for two years). A large percentage of untreated (approximately 30%) and undetected (about 20%) hypertension is detected among people with strokes. Patients diagnosed with hypertension a systematic and effective therapy, that includes both pharmacological and non-pharmacological action, is obligatory. The treatment should lead to lowering the blood pressure below 140 mm Hg / 90 mm Hg.

- Heart diseases are another major risk factor for stroke occurrence. During atrial fibrillation in the area of left atrium there appear blood stasis and the formation of thrombus, which can become an embolic material. According to the Framingham's analysis, atrial fibrillation increases the risk of strokes 5 times. Having myocardial infarction, in 1-5% of patients, is the cause of ischemic stroke, which usually occurs within five days after the attack. In patients with dilated cardiomyopathy the risk for a stroke occurrence is 3-11% per year. Foramen patent ovale can become a passage for embolic material produced in the peripheral veins. Permeable forament ovale is present in 40% of patients with undiagnosed cause of ischemic stroke. Also hemodynamic disturbances which result in the weakening of cardiac output lead to ischemic regions of the brain on the border of vascularization in the area called "last meadow". Other heart conditions that increase the risk of stroke occurrence include: valvular heart diseases and endocarditis.

- Narrowing of the internal carotid artery associated with atherosclerotic changes is a factor in about 20% of ischemic strokes. In patients with asymptomatic stenosis, endarterectomy produces positive results as long as the stenosis does not exceed 60%, the risk of surgery is less than 3% and stable heart disease is stated. In symptomatic carotid stenosis, the best benefits from surgery are achieved when the stenosis is about 70-99%, in other cases, the number of strokes and deaths is minimally reduced.

- Antithrombotic prophylaxis based mainly on moderate exercise and pharmaceutical treatment reduces the frequency of cardioembolic congestions. Main indications for anticoagulant therapy include: atrial fibrillation, valvular defects, patent foramen ovale, obesity, coronary heart disease and hypertension.

- Diabetes is a major risk factor for stroke occurrence. It is concluded that mainly when combined with other factors, in particular with hypertension, it increases the risk of stroke twice. As an independent agent, mellitus diabetes increases the risk of stroke in women 2,2 times and in men 1.8 times. Proper treatment of diabetes leads to a reduction of stroke and other medical complications.

- Dyslipidemia is an important risk factor for stroke occurrence. Too high level of total cholesterol and triglyceride with simultaneous decrease of HDL-cholesterol fraction leads to cerebral atherosclerosis and coronary atherosclerosis. According to Kwolk, the amount of cholesterol exceeding 280 mg% increases the risk of ischemic stroke 2.5 times. A positive correlation exists only between mortality due to ischemic stroke and high cholesterol level. In turn, the cholesterol level below 160 mg% results in a 3 times increased risk of hemorrhagic stroke. It should be also noted that this applies only to men with diagnosed hypertension and undoubtedly results from the weakening of vessel walls. In case of hyperlipidemia an important issue is to regulate lipid metabolism. LDL should be at a level not exceeding 130 mg/dl, at the same time with higher HDL level of 20% of the total fraction cholesterol, triglyceride level should be below 150 mg / dl. In addition, in order to achieve and maintain normolipidemia, daily physical activity, proper diet and weight control should be applied. In some cases, despite keeping the rules on nutrition and physical activity, it is necessary to include pharmacological treatment in order to normalize cholesterol levels in the body.

- Obesity, particularly the abdominal type is considered to be one of risk factors. In men aged 35-65 years and women over 50 years of age, BMI (body mass index) above 30 kg/m² increases the risk of stroke 1.5 times. Prevention of obesity by a daily 60-minute physical activity and proper low-calorie diet significantly improves the patient's health status. In some extreme cases, the treatment of obesity requires the use of pharmacotherapy and surgical intervention.

- Smoking is the undisputed risk factor for stroke occurrence. Among women aged 25-45 years, smoking triples the risk of a stroke. According to Donnan, quitting smoking decreased the risk of ischemic stroke by 10 years, yet after that the threat was still noticeable. Kawachi and his colleagues found that smoking leads to irreversible damage to the vascular walls and thus contributes to the formation of atherosclerotic lesions.

- Consumption of alcohol in amounts greater than 60 g per day increases the risk of a stroke estimated at 1.6-1.8 times. The use of alcohol irregularly in large quantities is also not recommended. According to some researchers, a small amount of alcohol (<15 g / day for females and <30 g / day for males) can help to reduce the risk of stroke occurrence. This is most likely because of lowering fibrinogen levels and reducing HDL cholesterol.

- Physical activity has a beneficial effect on the functioning of the body and reduces the risk of a stroke. In stroke prevention it is important to maintain a regular exercise at least three times a week for 20-30 minutes at a time. Dynamic exercises are recommended, however static exercises and strength sports are not appropriate. The intensity and type of activity should be individually selected to the needs of the patient. Positive effects of physical activity include: reduction of systoles during exercise and rest periods, reduction of myocardial oxygen demand, which also reduces the risk of acute myocardial ischemia, development of collateral circulation, improved myocardial blood supply, reduction of adrenergic activity, reduction of systolic and diastolic pressure, positive effect on carbohydrate and lipid metabolism, alleviating of anxiety and endorphin release, improvement of your mood.

- The diet has a significant impact on the functioning of the whole body. Among the

dietary recommendations, in the stroke prevention, low-sodium diet, carbohydrate restriction and also lipid lowering diet involving reduction of saturated fatty acids and cholesterol consumption are significant. The consumption of polyunsaturated fatty acids, soy isoflavones, protein, plant sterols and fiber is also recommended. In the case of hyperhomocysteinemia ($> 16 \text{ mmol / l}$), leading to the creation of strokes, it is suggested to consume folic acid and of vitamins B6 and B12.

- Hormone therapy related to use of oral contraceptives increases the risk of stroke occurrence. Large doses of estradiol present in the I generation drugs significantly increase the risk for a stroke. Newer generation drugs, that have lower levels of estradiol, probably are not a specific risk factor for stroke occurrence but they are not recommended for women with diabetes, a history of thromboembolic incidents, migraines and who smoke cigarettes. HRT (hormone replacement therapy) is also associated with an increased risk of stroke occurrence.

- Age has a significant effect on the frequency of stroke occurrence and mortality caused by strokes. The age of over 55 brings with every decade the risk of getting a stroke. In addition, age has a significant effect on mortality. Regardless of the type of a stroke, the risk of death increases by about 3% per year between 20 and 92 years of age.

- Male sex predisposes to a higher frequency of stroke occurrence. Men to women ratio is respectively 1,3-1,0. However, the number of strokes among women is higher when they exceed the age of 65. This situation is probably associated with a longer than in the case of men average life expectancy.

- Black population predispose to a higher frequency of stroke occurrence. The probable reason for this situation is the fact that in this race, unlike other, the occurrence of hypertension and diabetes is more common.

- Genetic factors significantly affect the frequency of stroke occurrence, the clinical course of disease and mortality. Currently, it is stated the there is a possibility of family occurrence of a stroke. Also inheriting of risk factors says about the importance of genetic background in stroke's pathogenesis.

Tested and known stroke's risk factors do not fully explain the occurrence of this disease and do not explain the fact that the presence of risk factors does not necessarily lead to a stroke. In addition, it should be remembered that the simultaneous occurrence of a number of risk factors increases the risk of a stroke. (Błaszczuk, 2008; Kwolek, 2011; Kwolek, 2003; Mazur i wsp. 2010)

CLINICAL SYMPTOMS OF A STROKE

Stroke is a condition that results in generalized or focal changes in brain function lasting for more than 24 hours. The focal symptoms include neurological dysfunction associated with specific brain regions. In generalized disorders consciousness disorders are observed.

Localization evaluation of ischemic stroke. Cerebrovascular disorders refer to a specific area of vascularity: 1. Front - the area vascularized by the internal carotid arteries, 2. Back - the area vascularized by the vertebral arteries basal 3. The whole of the brain - the area of front and back vascularization.

Front cerebral circulation disorders – clinical symptoms:

- hemiplegia or hemiparesis,
- Agnosia, abnormal behavior,
- Aphasia,
- Hemi hypoesthesia,
- Pseudobulbar dysphagia,
- Monocular visual disturbances,
- Amblyopia hemiparesis.

Back cerebral circulation disorders – clinical symptoms:

- Dizziness and spinning sensation,
- Nausea, vomiting,
- Weakening of hearing, tinnitus,
- Seizures of incidence,
- Gait disturbance,
- Bulbar dysphagia,
- Double vision
- Feeling of dark and wavy items,
- Scotoma,
- While having the brainstem - impaired consciousness.

In case of cardiac pathology for the whole brain, there are clinical signs typical of both circulatory disorders front and back.

Localization evaluation of hemorrhagic stroke.

Supratentorial hemorrhagic strokes – clinical symptoms:

- Hemiparesis changing into the paralysis,
- Aphasia,
- Swelling of the brain hemispheres changing into swelling of the brain stem - increasing neurological deficits, increasing intracranial pressure, headaches, vomiting, consciousness disorders on ischemic brain stem.

Infratentorial hemorrhagic strokes – clinical symptoms:

- Motor coordination and balance disorders,
- Headaches, dizziness, nausea - intracranial narrowness syndrome,
- Double vision,
- Brain stem failure- disorders of consciousness or changes in heart rate and blood pressure, disorders of stem respiratory functions.

Failure of the brainstem (ITC) is one of the most important clinical syndromes in medicine. It often occurs in a hemorrhagic stroke and much less in ischemic stroke. The occurrence of ITC in any disease or injury shows the disturbance of the organism's homeostasis and it always is a threat to the patient's life. Irreversible cessation of brain stem function means human's death. Impaired consciousness is ITC's main signal, which lead to the lowering of the activity called consciousness. Ischemic brain stem is always accompanied by disturbances of consciousness. (Kalinowski i wsp. 2009; Kwolek, 2011; Kwolek, 2003; Mazur i wsp. 2010)

Clinical picture of a stroke

WHO defines stroke as the most common neurological clinical syndrome. Depending on the pathogenesis, extension and location of the stroke, general patient's condition before the stroke and the process of treatment and rehabilitation, the clinical picture of a stroke can vary from patient to patient. However, specific features that characterize the different types of strokes can be highlighted.

A characteristic symptom of a stroke is sensory paralysis referring to the superficial and deep sense. Since it runs differently in each patient, it is impossible to provide specific periods of this state. However, it can be said that the most common type of paralysis is the mixed one (sensorimotor) and isolated forms of sensory or motor ones are rare. Motor hemiparesis is characterized by a couple of basic stages. Initially, it has a limp character, then by reversing of the paralysis and the emergence of global movements (synergies, isolated movements) spasticity is maximally increased (Ashworth's scale - 4) and after that the muscle tone is normalized. This cycle can be completed at each stage, so each patient's paralysis image may look differently. This recovery scheme as described by Brunnström (Fig. 1).

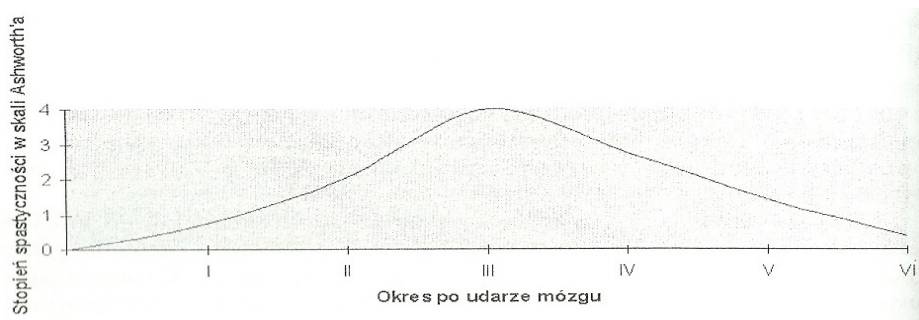


Fig.1. Motor hemiparesis by Brunnström.

The possibility of walking and moving of upper limbs is mainly dependent on the severity of a stroke. Patients with extensive stroke or with a stroke in its first stadium can initial only reflexes, which, however, can not be used operationally. In later stage primitive reactions occur, dependent on the patient's will, which are generated when the patient expresses the intention to move. These are muscle synergies produced by a simple formula, that is why muscle strength, regardless the need, is the same. The movement control involved, in many patients, is so weak that they can start the movement only in specific and beneficial for patient's situations (for instance on lying on their back). Lower limb, due to the small cortical representation, has simple and discreet primitive patterns, so many patients recover the ability to walk. Patients are able to use the flexion formula for walking and rectifier formula for walking and standing. Upper limb movement synergies impede or prevent the execution of precise movements, especially when the wrong treatment establishes them. Double cortical innervation of the trunk muscles prevents these muscles from paralysis and a noticeable body asymmetry is the result of paresis and paralysis of the upper and lower limb.

Hemiparesis shocks are often accompanied by other complications of the musculoskeletal system. They arise mainly from the nature of a stroke, immobility, rehabilitation introduced too late or neglected nursing, and they include: subluxation in the shoulder joint, contractures in shoulder complex, contractures in elbow and arm joints, rotation of the entire lower limb, contracture in the hip joint, hyperextension of the knee joint and varus foot. In addition, there occur, heavy in the treatment, periarticular ossification, local osteoporosis, muscle atrophy of central origin and pain syndromes. Other complications can often be found there, especially in cardiovascular, respiratory, and urinary tract and the digestive systems.

Other consequences and complications of a stroke are cognitive function disorders (gnostic). Aphasia is a common consequence of a damage to the dominant hemisphere of the brain. It may be accompanied by other mental disorders such as alexia (inability to read), akalkulia (inability to count) and agraphia (inability to write). In addition, there may occur impairment of concentration and attention, memory, designing, thinking, planning, weight and shape recognition, identification of one's own body and one's body sides. Apraxia (inability to perform duties of well-known before stroke's occurrence for example: getting dressed) and "hemiparesis neglect syndrome", which manifests itself in not recognizing and forgetting about infected or paretic side of the body are also common symptoms. It should also be noted that a depression is also a common post stroke disorder. It applies to about 30% of patients, in particular it is observed in patients with a stroke within the dominant hemisphere of the brain.

Cognitive impairment and depression make it extremely difficult and sometimes even prevent the normal process of treatment and rehabilitation. Therefore, it is necessary to conduct various forms of rehabilitation and education in order to restore disturbed patient's activities and to adapt the patient to new circumstances. Only a comprehensively performed treatment gives the greatest chance of success in the course of rehabilitation. (Błaszczuk, 2008; Kalinowski i wsp. 2009; Kwolek, 2011; Mazur i wsp. 2010)

A shoulder of a hemiplegic

A very common complication arising in patients after having a stroke is a shoulder and arm pain. According to many studies, a shoulder pain affects between 16% and 80% of patients after a stroke. Such a large range of data is due to a number of factors that have an influence the occurrence of pain and shoulder dysfunction, and they include: patient's age, the type of a stroke, measurement's time, the state of muscle tension, the type of physical activities used before the stroke, the type of work performed and other. Hemiplegia painful shoulder problem is mainly due to nursing negligence and rehabilitation introduced too late. Disorders in biomechanics and functioning of shoulder complex prolong the rehabilitation process, discourage patients and become a cause of their frustration and fear, which has a negative impact on the overall quality of patient's life.

Shoulder pains are often caused by: changes in the rotator cuff, muscle spasticity, subluxation of the humeral head, reflex sympathetic dystrophy, complex regional pain syndrome, inflammation of the periarticular tissues, joint capsule contracture and degenerative changes. Additional causes may be iatrogenic factors resulting from improper care and of rehabilitation negligence and error.

The initial cause of pain and dysfunction of the shoulder complex is the damage of muscles included in the rotator cuff. The main task of these muscles is to stabilize the humeral head. The muscles of the rotator cuff, as a result of overlapping congestions and microtraumas, weaken and stretch, which can cause damage to the muscle tissue continuity. The mechanism of “pulling” present in the upper limb in hemiplegic patients causes degeneration and ischemia distal cone, strains muscles and destabilizes the joint. The head being deprived of the protection, at the time of raising the side, rises to the top, which as a consequence leads to elevation and humeral head and to subluxation.

Another problem occurs when it comes to spasticity. Spasticity occurs as a consequence of a damage to the central motor neuron, leading to a weakening or exclusion of inhibitory activity of pyramidal tract. At the same time there occurs the advantage of excitatory mechanisms of centers located below, leading to an increased activity of the gamma system, which manifests itself as an increased reactivity muscle on stretching. In the case of spasticity paretic limb mobility is made difficult or even impossible. Increased muscle tension covering the whole upper limb leads to the necessary placement of a limb in two ways. Brunnström and Levitt distinguished, in the area of upper limb, two characteristic, pathological synergisms:

1. Flexion: flexion, dissuasion, external rotation at the shoulder joint, elbow flexion, forearm inversion, wrist and fingers flexion,
2. Erectile: Extension, adduction, internal rotation of the shoulder joint, elbow extension, the conversion of the forearm, hand extension.

Spasticity due to excessive muscle tension can cause pain while resting, it can also cause a pain of trailers (entezopatia). Furthermore, increased tension of muscles rotating the blade downwards (parallelogram, scapula) and muscles rotating the limb internally (subscapular, major pectoralis, biceps muscle of the arm, teres major muscle, shoulder muscle) increase the risk of occurrence of a conflict of carpal impingement region. Subacromial space is the area around the shoulder limited from the above by a shoulder lad, raven-shoulder ligament, raven shoulder appendix and shoulder – collarbone joint and from the bottom by the humeral head with a nodule greater. In this area there is located a subacromial bursa, the muscles of the rotator cuff and the tendon of a long head of the biceps. The average range of this space is from 1 to 1.5 cm. The purpose of the subacromial bursa is to facilitate the movement of sliding for structures located in it's vicinity. The bursa inflammation causes severe pain and impairs blade's work responsible for the proper movement of the scapular-humeral joint.

Another common problem in paralysis and paresis is complex regional pain syndrome “shoulder-hand”, described by Steinbrocker. This syndrome is one of the types of reflex sympathetic dystrophy of the upper limb, which clinical symptoms are triggered within the first year after having a stroke. Reasons for complex regional pain syndrome occurrence are not fully recognized. It is believed that they may be the result of impaired biomechanics of the shoulder joint. This syndrome is characterized by the presence of pain combined with trophic changes in the ligament, muscle and capsular systems. Stimuli causing the disease process are derived from a variety of affected by a disease or damaged tissues. These stimuli stimulate peripheral receptors and cause vasomotor disturbances. Very often the first pathological stimuli is lasts for very short

period, yet long enough to trigger another pathological stimuli, whereby a vicious cycle of vegetative arousal is created. Sympathetic dystrophy stimulus, that began the dystrophy, does not decrease but increases and triggers hyper-sympathetic condition. The arising ischemia increases the pain, this in turn increases the sympathetic reflex and thus forms a pathological sympathetic reflex pain. In hemiplegia, the overlapping micro damages within the richly innervated tissues of the shoulder complex are a stimulus provoking peripheral receptors and these in turn generate vasomotor disorders.

According to many researchers, co-existing degenerative changes of the shoulder joint, in patients with a history of stroke, make the pain and shoulder dysfunctions worse. Moreover, as the result of prolonged immobilization, inflammation or large degeneration there may occur painful joint capsule's contractures. This condition makes the neurological rehabilitation difficult. It also prolongs the recovery time and affects the quality of patients' lives. A properly conducted shoulder diagnostic, which takes account of existing degenerative and inflammatory changes, facilitates the introduction of the optimal rehabilitation program in order to return the lost of the upper limb function as fast as possible.

An important reason for the emergence and intensification of shoulder pain is also a careless caring for patient, especially in the acute phase, when the patient is immobilized. Laxity and lack of sense favor the occurrence of periarticular tissues injuries. No proper positional positions do not protect the shoulder against damages and contractures of infected limb. Also improperly designed sets of exercises can provoke excessive soft tissues strain leading to their failure. A significant issue is also the proper selection of orthopedic supply. The use of the right equipment reduces the formation of abnormal movement patterns, prevents the occurrence of contractures and injuries and facilitates patient's daily activities. (Cieśla i wsp. 2006; Kwolek, 2011; Mazur i wsp. 2010; Pop i wsp. 2006; Pop i wsp. 2010)

Prevention and shoulder's therapy

The earliest introduction of rehabilitation in the process of treatment of patients with stroke plays a crucial role and influences the obtained results. Often it's early implementation is more important than run after years of rehabilitation. Also the proper taking care of the patient is crucial for the further course of treatment. The scope of nursing activities involves, in the initial phase of a stroke, apart from the usual duties, also the correct positioning of the patient preventing bedsores and contractures. Turning the patient connected with the change of position is made in every 2-3 hours, taking into account placing the patient on his back, on both healthy and sick side and on the stomach. Indirect placement providing an innervative balanced of all muscle groups best fosters relaxation of muscles showing a tendency to contractures, reduces spasticity and builds a convenient starting position for passive movements representing the beginnings of re-education movement activities.

The process of the improvement in patients with paralysis is determined by the severity of stroke and its symptoms. The patient's condition may be very different, ranging from slight movement disorders to severe paresis and paralysis, loss of consciousness, cardiovascular and respirator insufficiency. The patient, in the early period, should be in

correct positions while lying down and sitting. They allow to maintain proper tension, create the best conditions for the prevention of contractures, increase the sense of security and are a source of afferent stimuli. Principles of good patient's position should be carried out for 24 hours and the patient should not stay in one position for longer than 2-4 hours. The position should be comfortable and chosen in a such way that it facilitates the process of recovery of motor function. While the patient is laying on the paralyzed side, the shoulder of paretic upper limb should be placed in pronation. Then, the paretic upper limb is flexed and internally rotated at the shoulder joint, elbow joint in flexion or extension, forearm in supination, hand laid loosely. In case of laying on the non-paralyzed side, paretic upper limb is in flexion or in an intermediate position with shoulder blade in pro traction or retraction. At each position an external rotation at the shoulder joint must be maintained. While laying on the back, the upper limb is in slight retortion and flexion and it is supported on pillows or a wedge in an intermediate setting. Elbow joint is bent or straight. Hand is in functional position. In a seating position, the upper limbs should be placed on a table or countertop mounted to the wheelchair. Supports can also be used and placed under paralyzed upper limb. The support is particularly important in patients with shoulder subluxation or with a threat of occurring of such subluxation to the frail limb.

Recreating the motion of the upper limb is a difficult and long process. The complex anatomy of the shoulder joint in the absence of motor control and reduced muscle tension causes the danger of subluxation in the joint and the emergence of painful shoulder syndrom. Not using the limb, lack of exercise the full extent, the appearance of primitive synergistic movements generate restrictions in mobility in the form of joint contractures. The first main component of rehabilitation is the correct care and the use of compounded positions. Then, the task of rehabilitation is to maintain or recreating the shoulder joint motion and to restore its activity. For this purpose, various forms and methods of improvement are used. Passive movements, step-passive, mobilization of shoulder and upper limb and self-supported movements are the basic forms of the paretic upper limb improvement. The front supine position with support on forearms, supported kneeling and sitting and standing positions with supported back of the arms create the conditions for exercises involving the support on the paretic limb and for motor-controlled study. The use of approximation and the induction of reflex extensor muscle tension eases the task and the stabilization of position. Exercises in the closed kinematic chain, for the paralyzed upper limb, re-educates spastic muscle tension and along with correct postural reactions enable recreation of a selective work of paralyzed limbs. It is necessary to remember that the condition for the restoration of hand's function is an early master of shoulder and elbow joints movement control with a level of muscle tension being close to normal. Another step of restoration of upper limb and hand movement consists of exercises on grip and handling functions. This activity is related to a free movement of the arm in space with muscle tension close to normal and the ability to maintain a stable position in various positions. It is important that, along with the recovery of hand's motor control, exercises also include action tasks resulting from basic self-service actions.

The presented main guidelines and directions of kinesitherapy of patients with upper limb paresis after a stroke aiming the restoration of lost functions must also be supplemented by exercises in intermediate positions, which are a part of normal human physical activity. Recovering of even partial independence in daily life activities is

extremely motivating for the patient and confirms the motor potential and the possibility of full independence. Kinesitherapy in patients who went through a stroke is primarily based on the performance of individual exercises but patients, who can perform active intentional movements and are able to walk independently should participate in the forms of group exercises that improve general physical conditions.

The foundation for rehabilitation in people having a stroke history is kinesitherapy and that it why so much space has been devoted in this work. However, it should be noted, that the essence of physiotherapeutic proceeding, is associated behavior including kinesitherapy (including the neuro educational methods), physical therapy, biofeedback and the use of properly selected orthopedic supply. The effect of all actions taken should aim primarily to undo the pain and to reverse shoulder dysfunction and to restore the functionality of the paretic upper limb. (Cieśla i wsp. 2006; Guzik, 2010; Kwolek, 2011; Pop i wsp. 2005; Pop i wsp. 2006; Pop i wsp. 2010; Żyluk i wsp. 2006)

Conclusions

1. Stroke is the cause of motor deficits, cognitive and emotional-personality disorders that limit the independence of the patient.
2. Shoulder pain is a common complication and it is found in 16-80% of patients undergoing a stroke.
3. Among the factors influencing the occurrence of shoulder pain are: the patient's age, increased muscle tension and the damage to soft tissues in the area of shoulder joint.
4. Proper upper limb position in the early period of illness and effective kinesitherapy have a positive impact on preventing shoulder complex dysfunctions.

Bibliography

1. Kwolek A. (2003) Rehabilitacja medyczna. Wydawnictwo Medyczne Urban & Partner, s. 13-50.
2. Cieśla W., Pilawski A. (2006) Zespół bolesnego barku hemiplegia. Rehabilitacja w praktyce, nr 2, s. 16-18.
3. Pop T., Dudek J., Drużbicki M., Zajkiewicz K. (2006) Wpływ zmian zwyrodnieniowych w stawie ramiennym u chorych po udarze mózgu na powrót funkcji kończyny górnej. Ortopedia traumatologia Rehabilitacja, nr 6, s. 658-662.
4. Pop T., Kwolek A. (2005) Przyczyny dysfunkcji stawu barkowego u chorych po udarze mózgu. Przegląd Medyczny Uniwersytetu Rzeszowskiego, 1, s. 45-48.
5. Żyluk A., Żyluk B. (2006) Ból i ograniczenie ruchomości w kończynie górnej u chorych po udarze mózgu. Wiadomości Lekarskie, nr 3-4, s. 227-231.
6. Guzik A. (2010) Nowe kierunki w fizjoterapii osób po udarze mózgu. Przegląd Medyczny Uniwersytetu Rzeszowskiego i Narodowego Instytutu Leków w Warszawie, nr 4, s. 401-409.
7. Pop T., dziedic A., Łach-Pop K. (2010) czynniki wpływające na częstość występowania bólu barku u pacjentów po udarze mózgu. Fizjoterapia Polska, nr 2, s. 103-112.

8. Kuźdzał A., Riran T. (2011) Atlas rehabilitacji ruchowej Tom II. Rehabilitacja po udarze mózgu. Wyd. Forum. s. 1-25.
9. Błaszczyk B., Czernecki R., Prędoła-Panecka H. (2008) Profilaktyka pierwotna i wtórna udarów mózgu. *Studia Medyczne*, nr 9, s. 71-75.
10. Mazur R., Książkiewicz B., Nyka W. (2010) Udar mózgu w praktyce lekarskiej. *Via Medica*. S. 5-40, 81-113, 130-178.
11. Kolek A. (2011) rehabilitacja w udarze mózgu. Wydawnictwo uniwersytetu Rzeszowskiego. S. 18-30, 32-103, 128-225.
12. Kalinowski P., Laskowska S., Pelc M. (2009) Fizjoterapia w chorobach naczyniowych centralnego układu nerwowego. *Wyższa Szkoła Zarządzania i Administracji w Zamościu*, nr 1, s. 19-38.

Number of signs with spaces: 42 580

Ewa Rudnicka – Drożak¹, Justyna Natora^{1,2}, Ewa Dutczak², Robert Sambor²

¹Department of Expert Medical Assistance Lublin

¹Zakład Kwalifikowanej Pomocy Medycznej UM Lublin

²Workshop of Occupational Therapy by Blind and Sand –blind Children’s Help Association „Hope” Radom

²Warsztat Terapii Zająciowej przy Stowarzyszeniu Pomocy Dzieciom Niewidomym i Niedowidzącym „NADZIEJA” Radom

The epidemiology of multiple sclerosis, the potential factors causing and affecting the course of the disease.

Epidemiologia stwardnienia rozsianego, potencjalne czynniki wywołujące i wpływające na przebieg choroby.

Summary

Multiple sclerosis ([Lat.](#) sclerosis multiplex MS) is a chronic, inflammatory and autoimmune disease of the central nervous system. However, the etiologic factor that initiates the inflammatory and immune response leading to demyelination and, consequently, to the onset of MS still remains unknown. The disease usually begins between 20 and 40 years old, although there are cases among children and elderly. The disease occurs mainly in white race. MS affects nearly two times more women than men. The largest number of cases occurs in the central part of North America, northern Europe, New Zealand and South - Eastern Australia. Poland belongs to the zone of high risk disease.

The etiology of MS is complex and may involve many different factors. The causes of the disease are sought in genetic factors as well as in environmental factors such as viral infections, bacterial infections. Observations indicate that the occurrence of MS is related to latitude, exposure to sunlight, vitamin D, place of birth and migration. It is possible that MS can be affected by factors such as pollution, geological structure, diet, smoking cigarettes. The paper presents the epidemiology of MS and potential factors causing MS and affecting the course of the disease.

Key words: multiple sclerosis, epidemiology, genetics, environmental factors

Streszczenie

Stwardnienie rozsiane (sclerosis multiplex, SM) jest przewlekłą, zapalną, autoimmunologiczną chorobą ośrodkowego układu nerwowego. Nadal jednak pozostaje nieznany czynnik etiologiczny, który zapoczątkowuje reakcję zapalno-immunologiczną prowadzącą do demielinizacji, a w konsekwencji do wystąpienia objawów SM. Choroba najczęściej rozpoczyna się między 20 a 40 rokiem życia, choć zdarzają się przypadki zachorowań już w wieku dziecięcym, a także w wieku późnym. Choroba występuje głównie u rasy białej. Kobiety chorują prawie dwa razy częściej od mężczyzn. Największa liczba zachorowań ma miejsce na obszarze środkowej części północnej Ameryki, północnej części Europy, Nowej Zelandii i południowo – wschodniej Australii. Polska należy do strefy wysokiego zagrożenia chorobą.

Etiologia SM jest złożona i może wiązać się z wieloma różnymi czynnikami. Przyczyn choroby poszukuje się w czynnikach genetycznych, badane są również czynniki środowiskowe takie jak infekcje wirusowe, bakteryjne. Obserwacje

wskazują, że wpływ na występowanie SM ma szerokość geograficzna, ekspozycja na światło, witamina D, miejsce urodzenia i migracje. Możliwe, że na SM mają wpływ też takie czynniki jak zanieczyszczenie środowiska, budowa geologiczna, diety, palenie papierosów. W pracy przedstawiono epidemiologię SM oraz potencjalne czynniki wywołujące SM i wpływające na przebieg choroby.

Słowa kluczowe: stwardnienie rozsiane, epidemiologia, genetyka, czynniki środowiskowe

Introduction

Multiple sclerosis (Lat. multiple sclerosis, MS) is a chronic, inflammatory disease of the central nervous system (CNS) with the demyelination - degenerative substructure and still unexplained (Peterson, et al, 2007). The essence of the disease is multifocal damage to the nervous tissue and destructive multi-phase process, with periods of exacerbation and remission, which is clinically manifested by diverse neurological symptoms.

Currently, there are four types of the course of MS that can be distinguished:

- relapsing-remitting (R-R)
- primary progressive (PP)
- secondary progressive (SP)
- progressive – relapsing (P-R)

Approximately 85% of MS patients begins with relapsing - remitting form (Zakrzewska-Pniewska, 2010). It is characterized by the occurrence of clinically distinctive moves, which are defined as a new neurologic deficit lasting less than 24 hours. At the end there is total or partial relief of symptoms. There is not seen any exacerbation in the remission of that distinctive moves.

Relapses occur with very individual rate, approximately 1 or 2 per year. There are also long periods of remission, when relapses do not occur but can also occur in a few throws per year (Selmaj, 2005).

Approximately 30% of patients have secondary progressive course of MS. In the analysis of the natural history of the disease it has been shown that in about half of patients the initial R - R course changes into SP. This form of MS is characterized by decay of relapses and constant progression of the disease.

The progressive relapsing type of MS occurs simultaneously with its clear progression between relapses (Zakrzewska-Pniewska, 2010). A separate course has a primary progressive type, in which the onset of the disease has no throws and neurological deficit of the disease gradually increases. This form of MS involves 20% of the cases and is usually associated with a late age of developing the disease (Selmaj, 2005).

There are several forms of the disease which differ from the typical course. These include mild form of MS, which is characterized by the absence of significant neurological dysfunction in the 15 years since its beginning.

The malignant form of MS or rapidly progressive (Schilder disease) is characterized by a rapid onset and rapid progression of severe neurological symptoms.

Another variant of MS is inflammation of the optic nerves and spinal cord, known as Devic's disease. It is characterized by the occurrence of spastic paraparesis and blurred vision. It is characterised by quickly recurring throws but there are also cases of a mild (Selma, 2005).

The initial symptoms of MS can include two types of symptoms:

- CIS (Clinically isolated syndrome), which is defined as the occurrence of a single symptom of CNS involvement (75% of cases) or more symptoms simultaneously. Clinically CIS may be manifested as an optic neuritis and Benedikt syndrome or set of single-core symptoms or multi-focal supratentorial structures involvement. Regardless of the type of CIS symptoms risk of developing full symptomatic SM is 45 - 85%. In the patients with CIS with changes in MRI suggesting MS, the risk of MS was 85% and in the presence of protein in the cerebrospinal fluid - until 96% of cases.
- originally a progressive set of symptoms (IP, insidious progression) is a beginning in approximately 15% of patients who then develop a primary progressive form or relapsing-progressive MS. Neurological symptoms in these cases appear and grow unnoticed (primary progressive form) or occur as throws of variable intensity of signs against a clear progression of the disease (progressive – relapsing form) (Zakrzewska-Pniewska, 2010).

The MS consist of many symptoms, some of the symptoms are common and characteristic of the disease, others are rare and unusual.

The most common symptoms are: pyramidal paresis, sensory disturbances, impaired coordination, bowel control, visual acuity (inflammation of the retrobulbar optic neuritis), dizziness, nystagmus, diplopia, dysarthria known also as a fatigue syndrome and cognitive deficit.

Due to very different dynamics of the symptoms and course of MS, there is no single laboratory test or a clinical test that would be sufficient to bring a certain diagnosis. To diagnose MS it is necessary to obtain objective evidence of sclerosis in time and space typical demyelinating lesions of the disease and to exclude other possible causes of the condition. The current diagnostic criteria according to McDonald's modified by POL-MA include the role of research in studio in the diagnosis of MS, particularly magnetic resonance imaging (MRI), cerebrospinal fluid examination, assessment of the presence of oligoclonal bands and IgG index, and visual evoked potentials, VEP (visual evoked potentials) (Ziółkiewicz et al, 2011).

Epidemiology

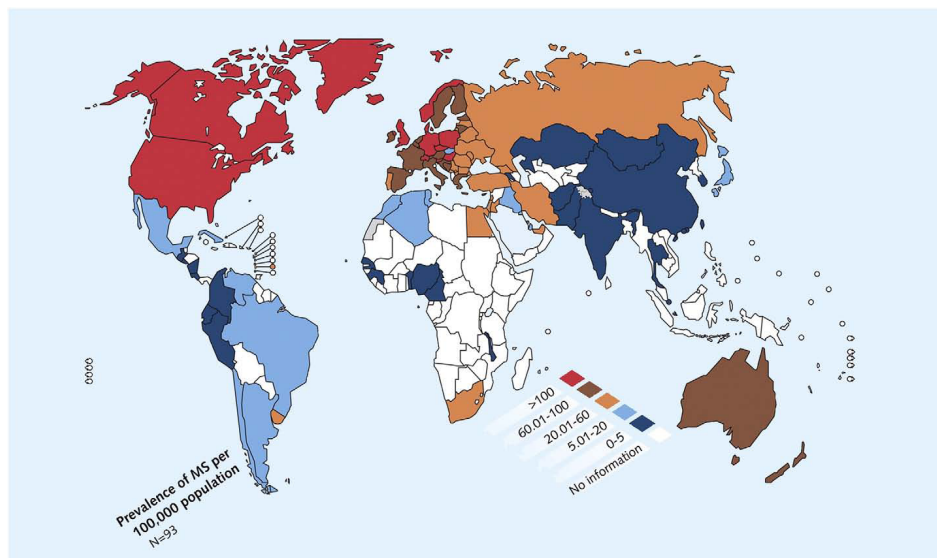
The total number of people living with MS across the world is estimated at 2 - 2.5 million (Milo et al, 2010).

The disease usually starts between 20 and 40 years of age. Rare disease starts before the age of 16 (2.4 - 4.4% of the total) and the 50 (10% of all cases) (Pierzchała et al, 2009). If the disease occurs before the age of 16 is defined as children's form of MS.

Women suffer more often than men, a ratio of 2:1. MS is very common among the Caucasoid race and much less common among the Negroid and mongoloid race (Selmaj, 2006).

Multiple sclerosis is characterized by uneven geographical distribution. There is a high correlation between disease incidence and latitude. Incidence of MS increases with increasing of latitude. In the northern hemisphere areas of high prevalence rate are those occurring between 44° and 64° latitude, and moderate risk areas are located between 32° and 44° (Selma, 2006). A similar situation occurs in the southern hemisphere. The highest incidence occur in cool and temperate climates.

Prevalence rate in the world ranges from 15 to 180 per 100 000 people (Uchman, et al), the highest is in the middle of the North America, the northern and central parts of Europe, New Zealand and South - Eastern Australia.



Differentiation of MS prevalence in the world

Source: Atlas Multiple Sclerosis Resources In The World, 2008

In northern European countries such as the United Kingdom, the number of cases is 100 - 112 people per 100 000 inhabitants (Rosiak et al, 2012). The lack of reference to the geographical area was observed in Italy, where the prevalence is as high as in Germany. Despite the geographical conditions similar to areas at high risk such a correlation does not exist in Japan, which has a low incidence - 1.4 / 100 000 inhabitants (Rosiak et al, 2012). Various factors of prevalence were observed in areas which are located in short distances - Sicily (54/100, 000) and Malta (8/100, 000) (Pierzchała et al 2009).

Due to uneven incidence of MS on the Earth it is quite difficult to estimate the average incidence of MS in the world.

Based on epidemiological data available from 1966 through 2007 incidence rate of MS per 100 000 inhabitants can be estimated at 3.6 (95% confidence interval (95% CI) 3.0 - 4.2) among women and 2.0 (95 % CI 1.5 - 2.4) among men (Alonso, et al, 2008).

In this study it was found that the highest incidence rates - standardized to the age of the population - were observed in Seinajoki (Finland) in the years from 1977 to 1993 and they amounted to 10.3 (women) and 6.2 (men) / 100 000 inhabitants. Large increase in incidence was also found in Sicily e.g. Caltanissetta from 1999 to 2002, it was 12.4 (women) and 7.0 (men) / 100 000 population (Alonso, et al, 2008).

In Europe and the United States, the incidence is 3 - 5 cases per 100 000 inhabitants (Zakrzewska-Pniewska, 2010).

Epidemic outbreaks (called clusters) are geographically limited areas in which the incidence of MS high. On the basis of epidemiological studies it was found that these areas are Scandinavia, Iceland, the Shetland Islands and the Faroe Islands (Zakrzewska-Pniewska, 2010).

The Orkney and Shetland prevalence rate reached the highest value in the world, reaching 258/100000 inhabitants (Potemkowski, 2001).

Poland is among the countries with high prevalence. The number of people suffering in our country is unknown which is caused by the lack of the statistics.

In Poland, there was no epidemiological research covering the whole country, given the prevalence rate is different and ranges from 45 to 92 per 100 000 inhabitants (Uchman et al, 2012).

The estimated data indicates 1300 to 2100 new cases per year in Poland, the majority of women to men 2:1 (Potemkowski, 2009).

On the basis of analyzing the epidemiology of MS conducted in Lublin (prevalention day is scheduled for 31.12.1997) prevalence rate was calculated for the entire population of patients in the city in 57.3 / 100, 000, for the ill women 74.3 / 100 000, for ill men 37.9 / 100 000. The ratio of women patients and male patients was 2,24:1. The incidence rate in 1990-1995 was 1.7/100 000, for the population of ill patients / 100, 000 for women 2.05 / 100, 000, for men 1.31 / 100 000. The average age of onset of MS in the general population was calculated at 30.1 years (30.4 years for women, men 29.9 years). Early disease occurred at 5-year-old girl and 52-year-old woman (Łabińska et al 2004).

Prevalence rate for Leszno in 1981 was 117.12 / 100 000, in 1991 for Gniezno 89.3 / 100 000, in 1992 for Szczecin 81.26 / 100 000 inhabitants (Łabińska et al, 2004).

Studies conducted in selected areas of Poland (1995), on the border of the former voivodships of szczecinskie and gorzowskie, show a seat of SM, where prevalence rate was 110.54 and it was twice as high than in eight control regions. Prevalence rate of women 141,24 / 100 000 was almost twice as high as men 79.74 / 100 000. For other areas, this ratio stood at 61.14 / 100 000 women and 44.29 / 100 000 men (Potemkowski, 2001).

The first nationwide study on a large scale was a multicenter pilot study (according to the estimates were included in the 18% of patients with MS) which the demographic profile of patients was analyzed, medical history of MS, disability, comorbidities, diagnostic methods and treatments used. The data obtained about 3581 patients, 2494 women (69.6%) and 1030 men (28.8%) - sex ratio: 2.4 : 1. The mean age was 40.7 ± 11.9 years. The monofocal beginning was noted in 80.8% of cases, frequently indicated was the location of supratentorial faults (36.1%), then were taken optic nerves (26.5%) and spinal cord (29.1%). The disease took an average of 10.2 ± 8.8 years (range 0,04-53 years), and from the first symptoms to diagnosis was passing an average of 2.6 years. Familial SM was observed in 6.4% of cases. Relapsing – remitting form of MS patients was 70.5%, secondary progressive - 16.8%, primary progressive 8.45, 2.55 au diagnosed with “mild” SM (Kułakowska et al, 2010).

Data on the prevalence and incidence of MS among children is mixed. This data is largely retrospective or based on an analysis of the adult population, and it is difficult to accurately assess the risk of both disease and its incidence to children. According to the latest estimated prevalence of MS among children for about 2 to 10/100, 000 annually. Analysis of a large

population of patients with MS showed that in 2 - 10% of all patients, the disease began before age 18. About 3 to 10% of cases begins in childhood and adolescence, less than 2% below 10 years of age and in 3% of the average of between 8 - 14 years of age. Examining 49 children with onset before age 6 was found that more than 10% of them onset occurred between 10 and 23 months of age. MS in children is three times more common in females, the male advantage is only seen in children under 10 years of age (Wilczek, 2010).

Immunopathogenesis of MS

Currently, there is widespread belief that the development of MS occurs as a result of a pathological activation of the immune system. An important role in the development of MS is attributed to specific for myelin proteins autoreactive CD4 + T cells. The activity of these subpopulations of CD4 + T cells in the central nervous system can affect the pathology and clinical course of MS (Zawada, 2012). CD4 + subpopulation of patients with MS is characterized by inflammation after the process Th1 cytokine profile, over-expression of encoding genes proteins and anti-apoptotic molecules deficient synthesis of interferon beta. It is believed that the CD4 + T-cell activation may occur in parallel by two mechanisms: non-specific activation of the inflammatory process associated infections and the specific activation by an infectious agent by the similarity of the antigen (molecular mimicry) (Zakrzewska-Pniewska, 2010). Activated T cells have the ability to move through the blood-brain barrier, infiltration of the CNS, proliferate in response to antigen specific stimulation repeated then activated microglia and other immune cells through the release of pro-inflammatory cytokines, which leads to demyelizational-axonal damage (Yong et al, 2010). Potential triggers of MS and affect the course of the disease.

The etiology of MS is not fully understood. Research on the detection of the cause of the SM showed no specific causative agent of disease.

Many studies have shown that genetic factors play a role in the development of MS. Demonstrated a higher incidence of cases of MS in relatives of patients with MS than in the general population. In first-degree relatives the risk is 10-20 times higher in relation to the population risk, and for second-degree relatives about 3 times larger. The present study identified a number of genes associated with susceptibility to MS. The most important relationship between the presence of SM and genes of the HLA class II and above all by the presence of HLA allele DRB1 * 1501 (Sospedra, et al, 2005).

It is believed that an important role in the development of MS remain infection, probably viral nature. They may be involved in the initiation of disease with genetic factors and lead to the development of an autoimmune reaction resulting in the formation of demyelination, and clinical symptoms. Observations indicate a strong relationship between viral infections and deterioration of the SM (Losy, 2009).

For viruses suspected of compounds with the development of human SM exchanged herpes virus 6 (HHV-6), Epstein-Barr virus (EBV), varicella zoster (VZV) and human endogenous retroviruses (HERV).

HHV-6 is a human herpes virus type 6. It is responsible for two entities: a sudden rash in children (also called a three-day illness) and mononucleosis-type syndrome in adults. The virus is widespread - over 95% of people (usually in childhood) is infection of HHV-6. MS patients found to have high titer antibodies against HHV-6.

Epstein-Barr virus (EBV) causes infectious mononucleosis. EBV virus is very common in our population. People with SM probably suffered previously mononucleosis, and higher antibody titers against EBV is associated with an increased risk of developing MS. Elevated levels of these antibodies are detected many years before the onset of MS.

Chickenpox is caused by VZV (herpes virus varicellae). After an illness varicella virus takes hidden the form. When it comes to lowering the immune system it can lead to reactivation of the virus and the development of shingles. Epidemiological studies of the areas where the occurrence of MS has increased in recent decades have shown a high incidence of zoster in patients who later developed MS. It is also suggested that the human endogenous retroviruses may be the causative agents of diseases characterized by inflammation, and activation of macrophages, as it happens in MS (Zawada, 2012).

Vitamin D is an important compound of regulating the immune system. Vitamin D deficiency caused by insufficient exposure to sunlight increases the risk of developing MS. The need for vitamin D is about 5 µg per day. About four fifths of the dose is synthesized in the body when exposed to sunlight, and the fifth the dose should come from a diet.

Studies of vitamin D concentrations in serum of patients with MS show that the level is decreased in most patients. It has been shown while young healthy person observing, that in those patients who had a concentration of 25-OH D3 than or equal to 99.2 nmol/l risk was about 62% lower compared to those in whom the level of 25-OH D3 was less than 63,3 nmol/l (Ascherio, 2010). Studies conducted in Canada involving children from the first group of MS symptoms (clinical isolated syndrome - CIS), shown at 100% of children decreased levels of 25-OH D3 in serum. Through years of observation vitamin D3 was used in children. In 16% of the patients to the development of MS in them had lower levels of serum vitamin than other people (Pierzchała et al, 2009). The assumption linking vitamin D deficiency and the risk of MS is consistent with the observed geographical distribution of the disease. People living above the 40 parallel of northern and southern hemispheres, are at risk of deficiency of solar radiation and thus reduce the level of vitamin D. It is in these areas have the highest incidence.

Epidemiological studies have shown that an important role in SM is taken by place of birth and time of migration. Migrants at the age of 15 remain prone to the disease characteristic of the place of their birth. Conversely, migrants from the age of 15, which have a tendency to disease characterised by migration. It is suggested that those born in spring more likely to be ill than those born in the autumn.

Important environmental factors that may influence the occurrence of MS are geological conditions. The presence in soil and drinking water of heavy metals: cobalt, molybdenum, barium, copper oxide, chromium may predispose to collapse MS. The risk of MS is increased in people living in areas rich in peat. It was hypothesized by which heavy-metal compounds or mixtures of aromatic compounds can form haptens body proteins that cause autoimmune reactions. Similarly, can act aromatics, nitrophenols contained in the resin of coniferous trees (Rosiak et al, 2012).

During pregnancy, the incidence of relapses decreased 3 times, respectively, compared with the period before pregnancy. The deterioration was observed during the first three months after birth.

The results suggest that unsaturated fatty acids have a positive effect on the course of MS, while receiving large amounts of saturated fatty acids, may increase the risk of developing MS. A role in the diet is attributed to vitamin D, its adoption is associated with a lower incidence of MS, as well as a less activity of disease.

The role of macro- and micronutrients, antioxidants, various vitamins is not confirmed unequivocally. The only malnutrition may exacerbate the disease. The use of special diets (avoidance of polyunsaturated fatty acids) is a procedure that supports and supplements the treatment.

Other factors which can provoke or affect on MS can be pollution, hormones, smoking cigarettes.

Results

Multiple sclerosis is a complex disease of unknown etiology. Number of patients worldwide is estimated at 2 - 2.5 million. Women have a higher prevalence of MS than men. In Poland, there was no epidemiological research covering the whole country. The prevalence rate is mentioned in different ways and ranges from 45 to 92 per 100 000 inhabitants. SM development involves overlapping immune factors, genetic and environmental factors. Information shown above illustrates how complicated medical problem MS is. The research on these factors that provide new information, bring us closer to understanding the mechanisms of the growth of MS.

Bibliography

1. Alonso A., Hernán MA. (2008) Temporal trends in the incidence of multiple sclerosis: a systematic review. "Neurology" 71: 129-135.
2. Ascherio A. (2010) Witamin D deficiency as a risk factor. Multiple Sclerosis 16: S7-S39.
3. Kułakowska A., Drozdowski W., Bartosik-Psujek H., Stelmasiak Z., Mitosek-Szewczyk K., Hożejowski R. (2010) Wybrane aspekty epidemiologiczne stwardnienia rozsianego w Polsce – wieloośrodkowe badanie pilotażowe. „Neurologia i Neurochirurgia Polska” 44(5): 443-452.
4. Losy J. (2009) Rola czynników immunologicznych i zapalnych w patogenezie stwardnienia rozsianego. "Polski Przegląd Neurologiczny" 5(4): 159-165.
5. Łabińska A., Stelmasiak Z. (2004) Wybrane epidemiologiczne aspekty stwardnienia rozsianego w populacji miasta Lublin. "Neurologia i Neurochirurgia Polska" 38(5): 361-366.
6. Milo R., Kahana E. (2010) Multiple sclerosis: Geoepidemiology, genetics and the environment. "Autoimmunity Reviews" 9: A387-A394.
7. Peterson LK, Fujinami RS. (2007) Inflammation, Demyelination, Neurodegeneration and Neuroprotection in the Pathogenesis of Multiple Sclerosis. "Journal of Neuroimmunology" 184: 37 - 44.
8. Pierzchała K, Kubicka K. (2009) Rola czynników środowiskowych w patogenezie stwardnienia rozsianego. "Wiadomości lekarskie" LXII,1: 37- 41.

9. Potemkowski A.(2001) Analiza epidemiologiczna ogniska stwardnienia rozsianego na terenie byłego województwa szczecińskiego. "Przegląd Epidemiologiczny" 55(3): 331- 341.
10. Potemkowski A.(2009) Stwardnienie rozsiane w Polsce i w świecie. "Aktualności Neurologiczne" 9: 91-97.
11. Rosiak K., Zagożdżon P. (2012) Czynniki środowiskowe w epidemiologii stwardnienia rozsianego. "Problemy Higieny i Epidemiologii" 93(4): 627-631.
12. Selmaj K. (2005) Stwardnienie rozsiane – kryteria diagnostyczne i naturalny przebieg choroby. "Polski Przegląd Neurologiczny" 1(3): 99 –105.
13. Selmaj K. (2006) Stwardnienie rozsiane. Wyd. Med. Termedia, Poznań: 10 -105.
14. Sospedra M, Martin R. (2005) Immunology of multiple sclerosis. "Annu. Rev. Immunol." 23: 683-747.
15. Uchman D., Kochanowski J., Baranowska B. (2012) Stwardnienie rozsiane – terażniejszość i przyszłość – sukcesy i porażki. "Postępy Nauk Medycznych" supl. 3: 22-26.
16. 16.Wilczek A. (2010) Stwardnienie rozsiane u dzieci: objawy kliniczne, diagnostyka, różnicowanie i leczenie. "Neurologia Dziecięca" 37(19): 75-82.
17. Yong VW, Marks S. (2010) The interplay between the immune and central nervous systems in neuronal injury. "Neurology" 74 (suppl 1): S9-S16.
18. 18.Zakrzewska-Pniewska B. (2010) Podstawy diagnostyki i leczenia stwardnienia rozsianego. Via Medica Gdańsk: 3-26.
19. Zawada M. (2012) Potencjalne czynniki patogenne w stwardnieniu rozsianym (SM). "Postępy Hig Med Dosw" 66: 758-770.
20. Ziółkiewicz J, Kaźmierski R. (2011) Ewolucja kryteriów diagnostycznych stwardnienia rozsianego. „Neuroskop” 13: 112-119.

Number of signs with spaces: 21 118.

Chapter II

Transplantation of organs according to the survey of public opinion

Transplantacja narządów
w świetle badań opinii publicznej

**Edyta Letka-Paralusz¹, Anna Kukiela², Marta Brożyna³
Karolina Sobczyk⁴, Karolina Jędrzyk⁵**

¹Department of Public Health, Medical University of Silesia

¹Doktorantka, Katedra i Zakład Zdrowia Publicznego, Śląski Uniwersytet Medyczny w Katowicach,

²Department of Environmental Medicine and Epidemiology, Medical University of Silesia

²Doktorantka, Katedra i Zakład Medycyny i Epidemiologii Środowiskowej, Śląski Uniwersytet Medyczny w Katowicach

³Department of Social Sciences, Medical University of Silesia

³Doktorantka, Katedra Nauk Społecznych, Śląski Uniwersytet Medyczny w Katowicach

⁴Department of Woman's Health, Medical University of Silesia

⁴Doktorantka, Katedra Zdrowia Kobiety, Śląski Uniwersytet Medyczny w Katowicach

⁵ Doctoral Studies at the Faculty of Health Sciences, Medical University of Silesia

⁵Doktorantka, Studium Doktoranckie Wydziału Nauk o Zdrowiu Śląskiego Uniwersytetu Medycznego w Katowicach

The level of education as a determinant of awareness in the field of organs transplantation in the selected populations

Poziom wykształcenia jako czynnik determinujący świadomość z zakresu transplantacji narządów w wybranych populacjach

Summary

Transplantation is a procedure of cells, tissues or organs transfer within a single or between two bodies. The main problem of transplant medicine is a shortage of organs both in Poland and Europe that may be caused by the lack of people awareness in the field of transplantation related issues. The purpose of this study is to assess the knowledge of investigated population on this topic and also the attempt to answer the question: has the level of education an impact on respondents' awareness in the field of organs transplantation? Author's questionnaire contains 31 questions and was conducted in a group of 800 people living in the Province of Opole, Silesia and Lower Silesia. It was found that the level of respondents' knowledge on organs transplantation is satisfactory as well as the level of education affects to a statistically significant extend the respondents' knowledge. The higher the education, the greater awareness on the issues related to organs transplantation.

Keywords: transplantation, organ donor, education, awareness

Streszczenie

Transplantacja jest zabiegiem przeniesienia komórek, tkanek lub narządów w obrębie jednego organizmu lub między dwoma organizmami. Głównym problemem medycyny transplantacyjnej jest niedobór narządów występujący zarówno w Polsce, jak i w Europie, czego powodem może być brak świadomości społeczeństwa z zakresu zagadnień związanych z przeszczepianiem narządów. Celem pracy jest ocena wiedzy badanej populacji z zakresu transplantacji narządów oraz próba odpowiedzi na pytanie, czy poziom wykształcenia ma wpływ na świadomość ankietowanych w zakresie przeszczepiania narządów. Autorski kwestionariusz zawierający 31 pytań przeprowadzono w grupie 800 osób

zamieszkałych w województwie opolskim, śląskim oraz dolnośląskim. Ustalono, że poziom wiedzy respondentów z zakresu transplantacji narządów jest zadowalający oraz, że poziom wykształcenia w statystycznie istotny sposób wpływa na wiedzę respondentów z zakresu przeszczepiania organów. Im wyższe wykształcenie tym większa świadomość z zakresu zagadnień związanych z transplantacją narządów.

Słowa kluczowe: transplantacja, dawca narządów, wykształcenie, świadomość

Introduction

In Poland one person dies every five days waiting for organ donor. The reason of death is not the lack of treatment but a low number of organs for transplants. One donor can save the lives of up to four people and make next four longer. The number of transplants around the world is growing every year but the awareness of people is still very low. The term transplantation means the transfer of cells, tissues or organs within a single or between two bodies. Transplantation is an intensively expanding part of medicine which creates a unique opportunity to avoid death and allows millions of patients to live without the burden of chronic disease (Noszczyk, 2004).

The level of education is one of the most important factors in the development of human capital. The results of many epidemiological studies have proved that education is an important determinant of health as well as health related awareness and behavior. Although transplantation - as a field of medicine - is safe, effective and sometimes the only way to treat patients with end-stage organ failure, it faces many problems (Enderle, 2002). Its main problem is a shortage of organs that occurs both in Poland and Europe. The reason for that may be a lack of people awareness on issues associated with transplantation. Considering the size of problem which is a low number of transplanted organs it appears necessary to assess the knowledge in this field of the selected population (Rowinski, 2004).

People's attitude towards organs transplantation in Poland has been regularly monitored for several years. Numerous studies among adults on people's attitude towards organ transplant from a deceased person have been already performed.

Materials and methods

The survey was conducted among a random sample of people, age 18 to 65, living in the Province of Opole, Silesia and Lower Silesia. Research group consisted of 800 people, 522 women and 278 men, with the average age of 29.3 years. Participation in the study was completely voluntary and anonymous.

The research tool used in the study was the author's questionnaire containing 31 questions. The assessment of correlation in statistical analyzes was performed by chi-square test. All analyzes were made at a statistical significance level of $p=0.05$. To assess the correlation strength a V-Cramer measure was calculated. For each statistic a number of degrees of freedom and the level of statistical significance "p" - calculated for each chi-square test, were given. If the character * stands by the level of significance, it means that for one degree of freedom a chi-square statistic with Yates' correction was calculated, which is a necessary condition for one degree of freedom.

Results

The majority of study population were women (65%) (Fig. 1).

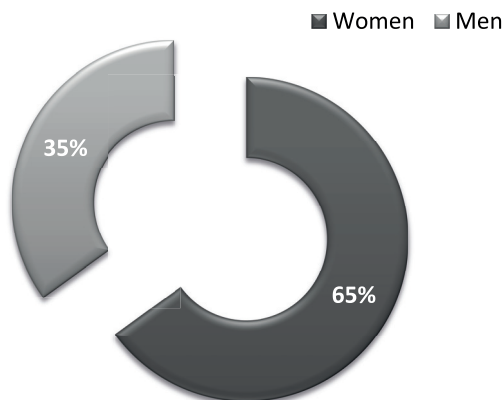


Fig. 1. Sex of respondents.
(Source: own research)

The major part of the study group were people aged 18-30 (71%). Nineteen percent of respondents were 31-45 years old. The smallest group consisted of people over 45 years of age (10%) (Fig. 2).

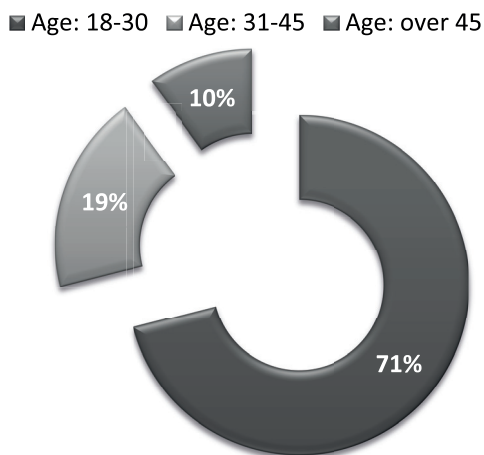


Fig. 2. Age of respondents.
(Source: own research)

Dominant group of respondents were people with secondary (45%) and higher education (40%). Vocational education was declared by 8% while primary education by 7% of respondents (Fig. 3).

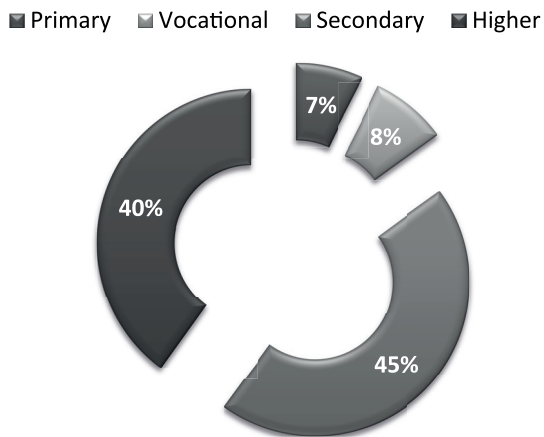


Fig. 3. Education of respondents.

(Source: own research)

The most of respondents (91%) know what the organs transplantation is. They are also able to give a correct definition of this term (Fig. 4).

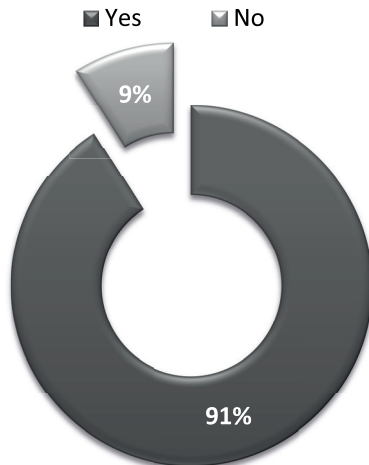


Fig. 4. Respondents' answer to the question: Do you know what the organs transplantation is?

(Source: own research)

Statistically relevant correlations

In a question: Do you know what the organs transplantation is? a statistically relevant correlation between the answer and a level of education was found. With the growth of education level we observe an increase of the correct answer to the above mentioned

question (Chi-square = 25.148 df=3, $p<0.001$ $V=0.177$) (Tab.1).

Tab. 1. Do you know what the organs transplantation is? * Education

			Education				Total
			Primary	Vocational	Secondary	Higher	
Do you know what the organs transplantation is?	Yes	% with education	86.2%	76.1%	90.2%	95.0%	90.6%
	No	% with education	13.8%	23.9%	9.8%	5.0%	9.4%
Total		% with education	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: own research)

Transplantation of organs from living donors.

Nearly 40% of respondents believe that both kidneys, the entire liver, heart and both lungs can be transplanted from a living person. 51% of respondents know that in ex vivo transplant one kidney, part of the liver or lobe of a lung is taken. 11% of respondents have no knowledge in this field (Fig. 5).

- Kidney, part of the liver, lobe of the lung
- Both kidneys, entire liver, heart and both lungs
- I don't know

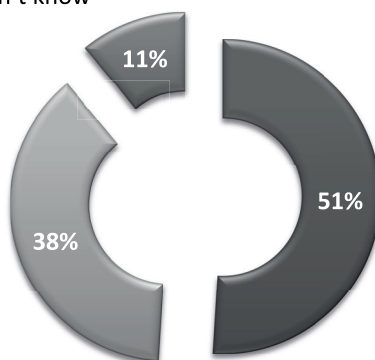


Fig. 5. Respondents' answer to the question: What kind of organs can be transplanted from a living person?

(Source: own research)

Statistically relevant correlation

In a question: What organs can be transplanted from a living person? a statistically relevant correlation between the answer and a level of education was found. With the growth of education level we observe an increase of the correct answer to the above

mentioned question (Chi-square = 26.359 df=6, p<0.001, V=0.182) (Tab.2).

Tab. 2. What organs can be transplanted from a living person? * Education

			Education				Total
			Primary	Vocational	Secondary	Higher	
What organs can be transplanted from a living person?	one kidney, part of the liver, lobe of the lung	% with education	41.4%	31.3%	49.7%	58.0%	50.9%
	kidneys, liver, heart, lungs	% with education	53.4%	47.8%	39.9%	31.7%	38.3%
	I don't know	% with education	5.2%	20.9%	10.4%	10.3%	10.9%
Total		% with education	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: own research)

Cancer vs organ transplantation

■ Can't be a donor ■ Can be a donor ■ I don't know

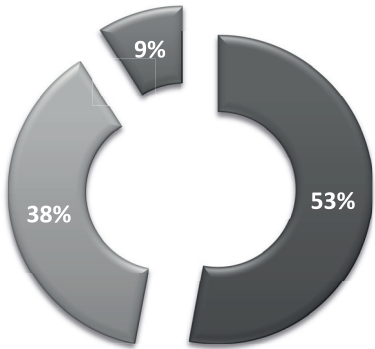


Fig. 6. Respondents' answer to the question: Do you think that a person with cancer can be an organ donor ? (

Source: own research)

The majority of respondents (53%) know that cancer is an absolute contraindication to being an organ donor while 38% of them are of the opposite opinion, 9% of respondents were not able to answer the above question (Fig. 6).

Statistically relevant correlation

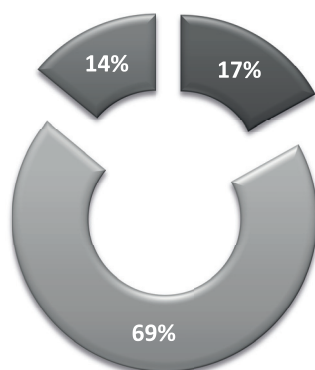
In a question: Do you think that a person with cancer can be an organ donor ? no statistically significant correlation between the answer and a level of education was found (Chi-square = 7.440, df=6, p=0.282, V=0.096).

HIV, HCV vs organ transplantation

The most of respondents (69%) believe that HIV or HCV infected person can be an organ donor for transplantation. The correct response in this regard was given by 17% of them who indicated that HIV or HCV infection is an absolute contraindication to being a donor.

Lack of knowledge in this field was declared by 14% of respondents (Fig. 7)

■ Can't be a donor ■ Can be a donor ■ I don't know



Statistically relevant correlation

In question: Do you think that a a HIV or HCV infected person can be an organ donor? no statistically significant correlation between the answer and a level of education was found (Chi-square = 9.670, df=6,p=0.139, V=0.110).

Declaration of will

The majority of respondents (55%) can correctly define the term of declaration of will. Frequently reported definitions are:

- „written consent for organ donation after death”
- „written consent for own organ donation after death in order to transplant them to those who need it”
- „a personal statement on agreement for organ donation after death” 45% of respondents declare a lack of knowledge in this field (Fig. 8).

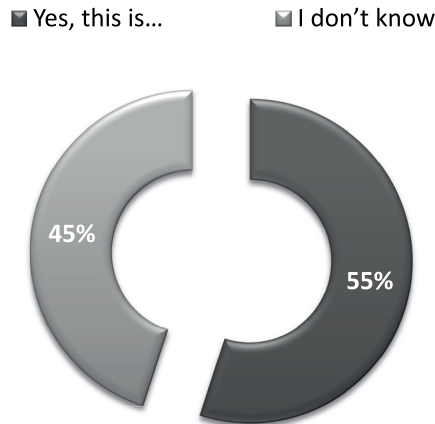


Fig. 8. Respondents' answer to the question: Do you know what the declaration of will is ?
(Source: own research)

Statistically relevant correlation

Tab. 3 Do you know what the declaration of will is? * Education

			Education				Total
			Primary	Vocational	Secondary	Higher	
Do you know what the declaration of will is?	Yes, this is ...	% with education	37.9%	16.4%	55.1%	67.1%	55.4%
	I don't know	% with education	62.1%	83.6%	44.9%	32.9%	44.6%
Total		% with education	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: own research)

In a question: Do you know what the declaration of will is? a statistically significant correlation between the answer and a level of education was found. People with higher education (67,1%) more often than those with secondary, vocational and primary education could give the correct definition of this term (Chi-square = 66.006, df=3, p<0.001, V=0.287) (Tab. 3).

The objection to organ donation after death.

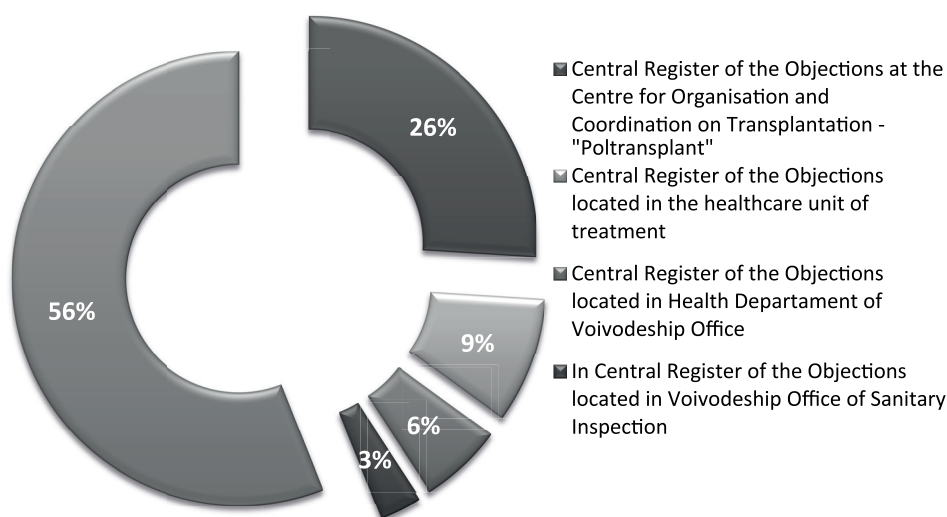


Fig. 9. Respondents' answer to the question: Where can you report the objection to organ donation?
(Source: own research)

The most of respondents (56%) don't know where they can report an objection to organ donation in case of their death, 26% of them gave a correct answer saying that this objection is reported to the Central Register of the Objections at the Centre for Organisation and Coordination on Transplantation - "Poltransplant", but 9% of respondents wrongly believe that the objection to organ donation shall be notified to the Central Register of the Objections located in the healthcare unit of their treatment (Fig. 9.)

Statistically relevant correlation

In a question: Where can you express an objection to organ donation? a statistically significant correlation between the answer and a level of education was found. Respondents with vocational education more often than other people admitted lack of knowledge in this field (Chi-square = 74.817, df=12, $p < 0.001$ V=0.306) (Tab. 4).

Tab. 4. Where do you think you can express an objection to organ donation? * Education

			Education				Total
			Primary	Vocational	Secondary	Higher	
Where do you think you can express an objection to organ donation?	In Central Register of the Objections located in Health Department of Voivodeship Office	% with education	5.2%	1.5%	7.3%	6.3%	6.3%
	In Central Register of the Objections located in Voivodeship Office of Sanitary Inspection	% with education	5.2%	3.0%	2.8%	1.9%	2.6%
	In Central Register of the Objections at the Centre for Organisation and Coordination on Transplantation	% with education	10.3%	6.0%	20.2%	39.8%	26.1%
	In Central Register of the Objections located in the healthcare unit of their treatment	% with education	6.9%	4.5%	11.0%	8.8%	9.3%
	I don't know	% with education	72.4%	85.1%	58.7%	43.3%	55.8%
Total		% with education	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: own research)

Financial compensation for organ donation

The majority of respondents (55%) gave the correct answer to the question: Do you think that financial compensation for organs donation in Poland is legal? They indicated that it is not in accordance with the Polish law. With regard to 36% of respondents a lack of knowledge on that issue was reported, 9% of respondents indicated the wrong answer saying that financial compensation for organs donation in Poland is a lawful practice (Fig. 10).

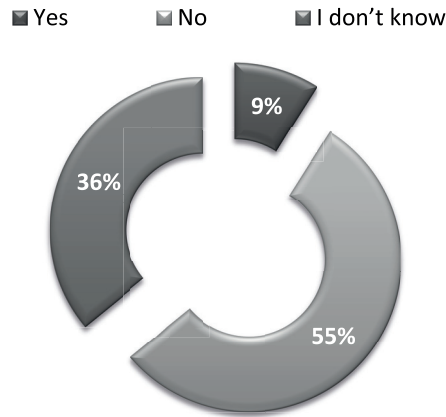


Fig. 10. Respondents' answer to the question: Do you think that financial compensation for organs donation is a lawful practice in Poland? (Source: own research)

Statistically relevant correlation

In a question: Do you think that financial compensation for organs donation for the purpose of transplantation is a legal practice in Poland? a statistically significant correlation between the answer and a level of education was found. Respondents with higher education could most often answer correctly (Chi-square = 27.569, df=6, $p<0.001$, $V=0.186$) (Tab. 5).

Tab. 5 Do you think that financial compensation for organs donation for the purpose of transplantation is a legal practice in Poland? * Education

			Education				Total
			Primary	Vocational	Secondary	Higher	
Do you think that financial compensation for organs donation for the purpose of transplantation is a legal practice in Poland?	Yes	% with education	20.7%	9.0%	7.3%	7.5%	8.5%
	No	% with education	34.5%	40.3%	55.9%	61.1%	55.1%
	I don't know	% with education	44.8%	50.7%	36.8%	31.3%	36.4%
Total		% with education	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: own research)

Knowledge on legislation in the field of organs transplantation

The majority of respondents (76%) don't know the legal regulations on organ transplantation while 24% of them admitted to be familiar with this law (Fig. 11).

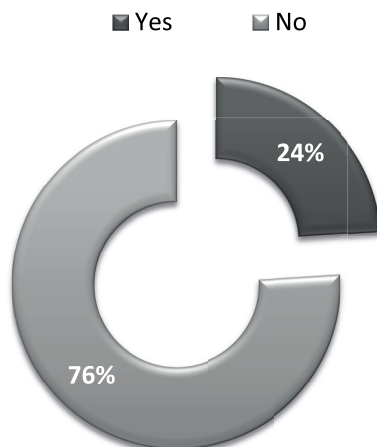


Fig. 11. Respondents' answer to the question: Do you know the Polish law on organs transplantation ?
(Source: own research)

Statistically relevant correlation

In a question: Do you know the Polish law on organs transplantation? a statistically significant correlation between the answer and a level of education was not found (Chi-square = 6.279, $df=3$, $p=0.099$, $V=0.089$).

The law on organs transplantation

Knowledge on the transplantation law was reported by 28% of the respondents who pointed out a presumed consent – no objection during life – as a requirement for organ donation, 29% of those who declared knowledge on this legislation gave wrong answer saying that no objection during life and family's consent enable organ transplantation. Twenty two percent of respondents believe that the necessary condition for taking organs from deceased person is his consent during life. Wrong answer was given also by 17% of respondents who said that taking organs from deceased person requires a consent of potential donor during his life and family's agreement after his death as well, 4% of questionnaires who declared earlier the knowledge on transplantation law also answered poorly as they indicated that according to this law a consent of family members of the deceased is the only condition for taking organs.

Statistically relevant correlation

In a question: What are in your opinion legal provisions on organs removal from the deceased person in Poland? a statistically significant correlation between the answer and a level of education was not found (Chi-square = 6.279, $df=3$, $p=0.099$, $V=0.089$).

Discussion

Transplantation medicine, as no other medical specialty, faces a number of very difficult moral, ethical and legal problems. In many countries, including Poland, there is still a big resistance to organ donation for transplant. The main problems of

transplantology in this country are a little willingness to donate organs after death, as well as opposition of family of deceased persons. Although the second one is not legally binding, it is usually the reason why physicians resign to take organs. Is it the result of a lack of awareness that human, who agrees to donate organ after his death, proves Christian charity that saves the lives of others? (Osiecki J., Religia Z., 2009).

The term transplantation means a method of treatment in which a surgical transfer of tissue or organ to the human body cavity is performed. The vast majority of respondents (91%) gave the correct definition of organ transplantation. People with higher education, more often than other people, show their knowledge on this issue.

Organs for transplant can be obtained from a deceased or living donor. In second case, the recipient is usually a relative of donor. The most often transplanted organs are:

- kidney
- lung lobe
- part of a liver

According to research on transplantation procedures, performed by Szczepanski and Pawlica, 72% of respondents don't know which organs can be transplanted. The survey showed that the majority of respondents correctly indicated that a living person can be a donor of a kidney, part of the liver and lung lobe. Definitely better knowledge in this field have residents of cities with a population over 50 thousand people and those with higher education. 38% of respondents believe that a living person can donate both kidneys, entire liver, heart and lungs that is considered as unacceptable. In this matter a question may arise: does the answer of 306 respondents comes from their distraction or from their belief that it is acceptable to take from a living person also a heart, kidneys and both lungs (Pawlica B., Szczepański M., 2003).

The donor must be of high health condition. There are many contraindications to the organ transplantation, such as the majority of cancer diseases and virus infections. Absolute contraindication is the presence of a malignant tumor with the exception of primary brain tumor, basal cell carcinoma and cervical cancer "in situ". The majority of respondents know that cancer is an absolute contraindication to being an organ donor; women are more aware of this. However 305 of them think that a person with cancer can donate his organ for transplantation. Absolute prohibition on organs removal for transplantation concerns HIV-positive individuals at high risk of AIDS infection, HBV-positive persons in case of recipient not infected with HBV as well as HCV-positive persons in case of recipient not infected with HCV. 551 people of the study group said that HIV-positive or HCV-positive person can be a donor. 14% of the respondents declared lack of knowledge in this field. Only 136 people are aware that a person infected with HIV or HCV can't donate organs for transplant.

The growing problem of current transplantation in Poland is trade of human organs by so-called paid donors. Advertisements for sale of human organs can be more frequently found in internet. Prices range from a few to tens of thousands of polish zloty (PLN). People increasingly offer to sell every internal organ without which a man can live on. The main reason of these activities are financial problems. Organ donors don't reflect on the possible consequences of the surgery and criminal responsibility. All international organizations (World Health Organization, Council of Europe, European Parliament), governments of

most countries as well as medical and scientific associations unanimously condemn organ donation for money and any attempts to trade them. Polish law explicitly prohibits not only organ donation for money, but also all advertising and brokering activities. Most respondents had knowledge in this field - 441 people found that organ trafficking is in Poland illegal. Lack of knowledge on this topic was declared by 36% respondents while 9% of them are convinced about the admissibility of organ donation due to material benefits.

The issue of transplantation is regulated in Poland by the Law of 1. July 2005 on preservation, storage and transplantation of cells, tissues and organs. According to this Law a legal permission for taking cells, tissues, organs from the deceased exists if this person didn't express an objection during life. However, because of ethical considerations and customs, doctors feel the need to inform family about their intention to take organs from their deceased relative.

The logic of solution on so called presumption of consent is based on the assumption that no objection is understood as the acceptance for taking an organ. Survey performed by Public Opinion Research Center (CBOS) proves that three-fifths of Poles (60%) don't know the law on organ donation existing in their country. One in four (24% - 7 points less than in 2005) incorrectly indicates that it is a rule that requires active consent, and only one in six (16% - 6 points more than in 2005) responds correctly saying that it is a principle of presumed consent. Similar results were presented by Pawlica and Szczepanski in their research which shows that 70% of respondents have no knowledge on the transplantation law (230) (Act 2005). On the basis of this study it can be concluded that 76% of respondents don't know the law on organ transplantation. Knowledge in this field was declared by 24% of persons surveyed. Among those declaring this knowledge only 28% of them indicated presumed consent as a condition for taking organs from deceased persons. 29% are convinced that the condition for removal of organs from deceased person is no objection of potential donor during his life and a consent of family after his death.

The declaration of will is an information document in which an adult declares a will to donate organs, tissues or cells for the purpose of transplantation in case of his death. The CBOS research shows that less than half of the respondents (45%) have heard on the declaration of will while slightly more (52%) didn't come in contact with information on this issue. Knowledge on the existence of such written declaration depends on education – better educated respondents have heard more often about it. The study showed that more than half of the respondents (55%) know what a declaration of will is and can give a correct definition of this term. Reason for the changes that have occurred in this field, in comparison to a study conducted by CBOS, may be a great interest of media on organ transplantation that has led to many actions promoting transplantation in society (CBOS Report, 2011).

According to Polish law, expressing opposition to organ donation need to be reported to the Central Register of the Objections at the Centre for Organisation and Coordination on Transplantation located in Warsaw. Szczepanski and Pawlica study shows that 70% of respondents don't know about the existence of this Register. Similar conclusions can be made on the basis of our research. More than a half of respondents (56%) don't know where to report an objection to organ donation in case of their death. Persons with vocational education and living in cities with up to 50 thousand inhabitants have minimal knowledge in this field (Pawlica B., Szczepański M., 2003).

Conclusions

- The level of respondents' knowledge on organs transplantation is satisfactory
- The level of education has a statistically significant impact on respondents' knowledge in the field of organs transplantation. The higher the education, the greater awareness on issues related to organs transplantation.

Bibliography

1. Enderle J., Fizia Z., Guzy A. (2002) Znajomość zagadnień współczesnej transplantologii wśród uczniów szkół średnich, *Annales Academiae Medicae Silesiensis suplement*, s. 247-253.
2. Feliksiak. M., (2012), Postawy wobec przeszczepiania narządów. Centrum Badania Opinii Społecznej s.1-12
3. Noszczyk W. (2004) Podstawy przeszczepiania narządów. [w:] Chirurgia, tom II. Wydawnictwo Lekarskie PZWL, s. 35-48.
4. Osiecki J., Religia Z. (2009) Człowiek z sercem w dłoni. Prószyński i S-ka. s.
5. Pawlica B., Szczepański M. (2003) Dar życia i jego społeczny kontekst. Zabiegi transplantologiczne w świadomości społecznej. Wyższa Szkoła Zarządzania i Nauk Społecznych w Tychach, s. 107.
6. Rowiński W. (2004) Aspekty przeszczepiania narządów w Polsce. Historia, stan obecny i perspektywy [w:] Transplantologia Kliniczna, Wydawnictwo Lekarskie PZWL, str. 60-65.
7. Ustawa z dnia 1 lipca 2005 r. o pobieraniu, przechowywaniu i przeszczepianiu komórek, tkanek i narządów, Dz.U.05.169.1411.

Number of signs with spaces: 26334

**Edyta Letka-Paralusz¹, Anna Kukielczak², Marta Brożyna³,
Karolina Sobczyk⁴, Karolina Jędrzysek⁵**

¹Department of Public Health, Medical University of Silesia

¹Doktorantka, Katedra i Zakład Zdrowia Publicznego, Śląski Uniwersytet Medyczny w Katowicach,

² Department of Environmental Medicine and Epidemiology, Medical University of Silesia

²Doktorantka, , Katedra i Zakład Medycyny i Epidemiologii Środowiskowej, Śląski Uniwersytet Medyczny w Katowicach

³Department of Social Sciences, Medical University of Silesia

³Doktorantka, Katedra Nauk Społecznych, Śląski Uniwersytet Medyczny w Katowicach

⁴Department of Woman's Health, , Medical University of Silesia

⁴Doktorantka, Katedra Zdrowia Kobiety, Śląski Uniwersytet Medyczny w Katowicach

⁵ Doctoral Studies at the Faculty of Health Sciences, Medical University of Silesia

⁵Doktorantka, Studium Doktoranckie Wydziału Nauk o Zdrowiu Śląskiego Uniwersytetu Medycznego w Katowicach

Has Poland already overcome a resistance to transplantation? Public opinion about organ transplantation.

Czy w Polsce pokonano już niechęć do transplantacji? Opinie społeczne dotyczące przeszczepiania organów.

Summary

Transplantation is a very important and rapidly growing part of medicine that can save or prolong the patient's life or improve its quality. Public awareness and approval for organ transplantation in Poland is increasing. However the removal of organs from deceased still doesn't work well enough.

The aim of the study was to investigate the social aspect of transplantation (attempt to explore the main factors determining the opinion of people surveyed on organ transplantation).

A survey was conducted among residents of three provinces: Opole, Silesia and Lower Silesia. The study involved 800 people, age 18-70, with the average age of 29.3 years. The assessment of correlation in statistical analyzes was performed by chi-square test (χ^2) at a significance level of $p=0.05$.

The largest group were people aged 18-30, residents of large cities with secondary or higher education, Roman Catholics. Over 80% of respondents are proponents of transplantation, but only 67.1% declare a willingness to donate organs after death. A statistically relevant correlation between gender and place of respondents' residence and their attitude toward transplantation was found. Women and people living in cities with more than 50.000 inhabitants reported more often acceptance for organ transplantation. The research proved that age doesn't affect the attitude toward transplantation. The main reason for opponents of organ transplantation was a lack of confidence to the doctors involved in medical procedure of organ transplantation (67% of opponents).

The results of this study are similar to the extensive research conducted by Public Opinion Research Center (CBOS). A growing social acceptance for transplantation medicine is observed every year in Poland. Unfortunately the number of people who need an organ transplant is also growing. In 2012 in Poland only 50% of

people waiting for a kidney or liver transplant received this organ. The reason for the insufficient number of transplants is a low number of organ donors. The Poltransplant Report shows that nearly one in ten potential donor is excluded because of family or prosecutors opposition or their own beliefs. On one hand there is a general acceptance and declaration for organ donation, but on the other - a number of concerns surrounding those who will face the possibility of organ donation to the people who need it.

It was found that gender and place of residence are factors that largely determine the attitude of people toward transplantation.

Keywords: transplantation, public opinion

Streszczenie

Transplantologia jest bardzo ważną, dynamicznie rozwijającą się dziedziną medycyny, która pozwala ratować, przedłużyć życie pacjenta lub poprawić jego jakość. W Polsce wzrasta świadomość społeczna i aprobatą do przeszczepiania narządów, ale z różnych powodów pobieranie narządów od zmarłych nie funkcjonuje wystarczająco skutecznie.

Celem badania było poznanie społecznego aspektu transplantacji (próba poznania głównych czynników determinujących przekonania badanej zbiorowości osób odnośnie transplantacji narządów).

Badanie ankietowe (metodą sondażową) zostało przeprowadzone wśród mieszkańców 3 województw: opolskiego, dolnośląskiego i śląskiego. Badaniem objęto grupę 800 osób w wieku od 18 do 70 roku życia, a średnia wieku badanych wyniosła 29,3 lat. W analizach statystycznych do oceny zależności wykorzystano test chi-kwadrat (χ^2), na poziomie istotności $p=0.05$.

Najliczniejszą grupę stanowiły osoby znajdujące się w przedziale wiekowy od 18 do 30 lat, mieszkańcy dużych miast, z średnim bądź wyższym wykształceniem, wyznania rzymsko-katolickiego. Ponad 80% respondentów jest zwolennikiem transplantacji, ale jedynie 67,1% deklaruje chęć swoich oddania organów po śmierci. Stwierdzono istotną statystycznie zależność pomiędzy płcią i miejscem zamieszkania respondentów a postawą wobec transplantacji. Kobiety i osoby zamieszkujące miasta powyżej 50 tys. mieszkańców częściej deklarowały akceptację dla przeszczepiania narządów. W wyniku badań okazało się, iż wiek nie wpływa na postawę wobec transplantacji. Spośród przeciwników transplantacji narządów 67% ankietowanych jako powód podaje brak zaufania do lekarzy zajmujących się transplantacją organów.

Wyniki niniejszej pracy są zbliżone do obszernego badania przeprowadzonego w tym zakresie przez CBOS, z każdym rokiem w Polsce wzrasta społeczna akceptacja medycyny transplantacyjnej. Niestety, liczba osób wymagających przeszczepu również stale rośnie. W Polsce tylko 50% osób oczekujących na przeszczep nerki lub wątroby w 2012 roku dostało ten narząd. Powodem niewystarczającej liczby operacji jest niska liczba dawców organów. Ze sprawozdania Poltransplantu wynika, iż prawie co dziesiąty potencjalny dawca jest wykluczany z powodu sprzeciwu rodziny, prokuratury czy własnych zastrzeżeń. Z jednej strony mamy powszechną akceptację i deklarację gotowości oddania narządu, z drugiej – szereg obaw towarzyszących osobom, które staną przed możliwością oddania narządu potrzebującym.

Stwierdzono iż płeć i miejsce zamieszkania należą do czynników w dużej mierze determinujących postawę osób wobec transplantacji.

Słowa kluczowe: transplantacja, opinia społeczna,

Introduction

Transplantation is a very important and rapidly growing field of science which requires profound interest and understanding of the transplant (Scislo *et al*, 2013). It involves a transplant of organs from a living or deceased donors (Noszczyk, 2004) that allows to save or prolong patient's life or improve its quality (Rowiński *et al*, 2004). It is connected with a number of ethical problems. With the increase of awareness and adaptation to this relatively new method of treatment, fears and concerns on organ transplants should be gradually reduced. Organ transplants performed in order to save the life or health are in Poland almost commonly approved. Public Opinion Research Centre (CBOS 2012) conducts research in the field since 1994 and already then more than 80% of adults surveyed expressed their support for the transplantation of organs from deceased persons. In 2011 that figure amounted to 96%. However, for some reasons, taking organs from deceased doesn't work well enough. On one hand, it may be caused by defective medical or organizational procedures at hospitals, on the other hand the objection of family is still a real problem. It is not legally binding but in practice it is the reason why physicians resign to remove organs. (CBOS 2012)

Aim of the study

The aim of the study was to investigate the opinion of respondents on transplantation and to answer the question: Do factors such as age, gender and place of residence have an impact on the opinion in the field of organ transplantation?

Materials and methods

The survey was conducted among residents of provinces: Opole, Silesia and Lower Silesia. It was aimed at people aged 18-70 (average age of a total study population - 29.3 years). Research group consisted of 800 people, 522 women and 278 men. Participation in the study was completely voluntary and anonymous. Method performed in this research was a survey. Author's anonymous questionnaire containing 31 questions was used.

The assessment of correlation in statistical analyzes was performed using chi-square test (χ^2) at a significance level of $p=0.05$. To assess the correlation strength a V-Cramer measure was calculated that showed a moderate value. Furthermore, for each statistic a number of degrees of freedom and the level of statistical significance "p" - calculated for each χ^2 test, were given.

Results

The vast majority of the respondents of the study group were women. People surveyed were of age 18-70 but the major part of respondents were those aged 18-30. Dominant group of respondents were citizens of big cities with secondary or higher education. Vast majority of surveyed declared to be Roman Catholics, and the division of them in terms of marital status was almost equal. Detailed socio-demographic data are included in Table 1.

Tab. 1. Socio-demographic structure of study group (N=800).

Socio-demographic data	Name of variable	Value of variable	
		N	Percentage (%)
Gender	Woman	522	65%
	Men	278	35%
Age	18-30	572	71%
	31-45	151	19%
	Over 45	77	10%
Place of residence	Village	217	27%
	City with up to 50.000 inhabitants	271	34%
	City with over 50.000 inhabitants	312	39%
Education	Primary	58	7%
	Vocational	67	8%
	Secondary	346	45%
	Higher	319	40%
Marital status	Single	407	51%
	Married	393	49%
Religion	Roman Catholics	711	89%
	Other/irreligious	89	11%

(Source: own research)

Only 34% of respondents believe to have enough information on organ transplants while 56% of them think that their knowledge in this field is not sufficient. Ten percent of respondents have no opinion on the subject.

Tab. 2. Respondents' attitude toward organ transplantation by gender (N=800).

Question: Are you for/against organ transplantation ?	Gender		Total
	Woman	Men	
For	84.3%	79.1%	82.4%
Against	2.3%	6.5%	3.8%
No opinion	13.4%	14.4%	13.8%
$\chi^2=9.146$ df=2 p=0.01 V=0.107			

(Source: own research)

Table 2 presents respondents' attitude toward organ transplantation. Among 800 respondents, 660 people are proponents of organ transplantation, 110 respondents have no opinion on the subject and 30 people are strongly opposed to organ transplants. Women are more often advocates of transplantation. A statistically significant correlation between gender and the attitude toward transplantation was found ($p < 0.05$).

Tab. 3. Respondents' attitude toward organ transplantation by place of residence (N=800).

Question: Are you for/against organ transplantation ?	Place of residence			Total
	Village	City (up to 50.000 inhabitants)	City (over 50.000 inhabitants)	
For	77.0%	79.6%	88.8%	82.4%
Against	3.7%	5.5%	2.2%	3.8%
No opinion	19.3%	14.9%	9.0%	13.8%
$\chi^2 = 17.084$ $df = 4$ $p = 0.002$ $V = 0.146$				

(Source: own research)

Table 3 shows percentages with regard to respondents' residence. The largest group of people supporting organ transplantation are those living in cities with more than 50.000 inhabitants. Among those undecided the biggest group are people living in rural areas. A statistically significant correlation between the place of residence and attitude toward transplantation was found ($p < 0.05$). A correlation between age of respondents and attitude toward organ transplantation was analyzed and presented in Table 4. Statistically significant differences ($p > 0.05$) were not found.

Tab. 4. Respondents' attitude toward organ transplantation by age (N=800).

Question: Are you for/against organ transplantation ?	Age (in years old)			Total
	18-30	31-45	over 45	
For	82.9%	82.1%	80.5%	82.5%
Against	3.5%	2.0%	9.1%	3.8%
No opinion	13.6%	15.9%	10.4%	13.8%
$\chi^2 = 8.398$ $df = 4$ $p = 0.078$ $V = 0.102$				

(Source: own research)

Among the opponents of organ transplantation, 67% of them (20 people) give, as a reason for that, a lack of trust to the doctors involved in organ transplantation. The next 13% (4 persons) say that their objection is caused by the little knowledge in this field. Another 13% (4 person) indicate their religion as a reason for opposition to organ transplant, 7% of opponents (2 persons) consider transplantation as a modern form of cannibalism.

Tab. 5. Respondents’ attitude toward organ transplantation by gender (N=800).

Question: Would you agree to donate your organs after death for the purpose of transplantation?	Gender		Total
	Woman	Men	
Yes	69.5%	62.6%	67.1%
No	4.6%	10.8%	6.8%
I don’t know, I have never thought about it	25.9%	26.6%	26.1%
$\chi^2= 11.654$ df=2 p=0.003			V=0.121

(Source: own research)

Tab. 6. Respondents’ attitude toward organ transplantation by place of residence (N=800)

Question: Would you agree to donate your organs after death for the purpose of transplantation ?	Place of residence			Total
	Village	City (up to 50.000 inhabitants)	City (over 50.000 inhabitants)	
Yes	63.6%	62.0%	74.0%	67.1%
No	7.4%	9.2%	4.2%	6.8%
I don’t know, I have never thought about it	29.0%	28.8%	21.8%	26.1%
$\chi^2=13.031$ df=4 p=0.01			V=0.128	

(Source: own research)

Respondents were asked about their willingness to donate organs after death. The vast majority of respondents, exactly 537 people, declare willingness to donate their organs for the purpose of transplantation in case of their death while more than 50 surveyed wouldn’t agree for that and 209 of respondents have never thought about it. It should be noted that 82.5% of the respondents are proponents of transplantation, but only 67.1% declared their willingness to donate organs after death. Near 7% of respondents wouldn’t agree to donate organs after death for the purpose of transplantation, but only 3.8% of surveyed declared to be opponents of organ transplantation. More women than men would be willing to give organs after death (Table 5). A statistically significant correlation between respondents’ gender and the consent for organs donation for transplantation after death was found

($p<0.05$). The residents of cities with population of over 50.000 inhabitants would agree to donate organs after death more often (74%) than people living in cities with less than 50.000 citizens (62%) and rural areas (63.4%). In addition, a statistically significant correlation ($p<0.05$) between the place of respondents' residence and a consent for organs donation after death was found (Table 6). Taking into account the age of the respondents, it can be said that people aged 31-45 would be willing more often to give organs for transplantation. The analyzes showed that no statistically significant correlation ($p>0.05$) between the age of respondents and consent for organs donation for transplantation after death was found (Table 7).

Tab. 7. Respondents' attitude toward organ transplantation by age (N=800).

Question: Would you agree to donate your organs after death for the purpose of transplantation ?	Age (in years old)			Total
	18-30	31-45	over 45	
Yes	66.4%	70.9%	64.9%	67.1%
No	6.8%	4.6%	10.4%	6.8%
I don't know, I have never thought about it	26.7%	24.5%	24.7%	26.1%
$\chi^2=3.224$ $df=4$ $p=0.521$ $V=0.063$				

(Source: own research)

Tab. 8. Respondents' attitude toward organ transplantation by gender (multi-choice question, N=800).

Question: Would you agree to donate one of your kidneys, part of a liver or lung, during your life, to a person who need it ?	Gender		Total
	Woman	Men	
Yes, to a family member	86.0%	74.5%	81.3%
Yes, to a close person (not blood-related)	1.7%	2.9%	50%
Yes, to a stranger	0.2%	1.1%	12%
Not to anyone mentioned above	1.9%	7.6%	3.9%
To other person	0%	0.4%	3.9%
I don't know	10.2%	13.7%	12%
$\chi^2=25.678$ $df=5$ $p<0.001$ $V=0.179$			

(Source: own research)

Tab. 9. Respondents' attitude toward organ transplantation by place of residence (multi-choice question, N=800)

Question: Would you agree to donate one of your kidneys, part of a liver or lung, during your life, to a person who need it ?	Place of residence			Total
	Village	City (up to 50.000 inhabitants)	City (over 50.000 inhabitants)	
Yes, to a family member	81.6%	80.4%	83.7%	82.0%
Yes, to a close person (not blood-related)	0.9%	2.2%	2.9%	2.1%
Yes, to a stranger	0.5%	0.4%	0.6%	0.5%
Not to anyone mentioned above	2.3%	6.3%	2.9%	3.9%
To other person	0.0%	0.4%	0.0%	0.1%
I don't know	14.7%	10.3%	9.9%	11.4%
$\chi^2=13.89$	df=10	p=0.178	V=0.132	

(Source: own research)

Nine percent of respondents have a declaration of will. Among 730 persons without such declaration, 40% of them argue that they don't know where to get this document, 29% of respondents (229 people) explain not having declaration of will with other reasons. Interestingly, 28% of respondents don't have a declaration because they have never heard of it and only 3% don't have it because of their negative attitude toward organ transplantation. In addition, 730 respondents who don't have such declaration, were asked about willingness to sign this document, 49% of them (360 people) have expressed readiness to sign it while 314 people (43% of respondents) couldn't at the moment make a decision on signing or not signing the document (option "I don't know"). Eight percent of respondents (56 people) don't want to sign a declaration of will. Little over 80% of respondents (651 people) declared to donate one of their kidneys, part of a liver or lung to a family member. Half of respondents (401 people) would agree to donate an organ during life if a person in need was a no blood-related friend, while 12% of them (96 people) don't know if would decide for this. Twelve percent of respondents (96 people) are ready to donate organs during life to a stranger, 2% of respondents (31 people) declare that they would offer their organs during life for a persons other than these mentioned above and next 2% of respondents (31 people) wouldn't agree to donate organs during their life.

A statistically significant correlation (Table 8) between gender and the respondents' consent for organ donation during life was found. Women, more likely (86%) than men (74.5%), declare to donate one of their kidneys, part of a liver or lung to a family member ($p < 0.05$).

A statistically significant correlation (Table IX) between place of residence and respondents' consent for organ donation during life was not found ($p > 0.05$).

A statistically significant correlation (Table X) between age and respondents' consent for organ donation during life was not found ($p > 0.05$).

Tab. 10. Respondents' attitude toward organ transplantation by age (multi-choice question, N=800)

Question: Would you agree to donate one of your kidneys, part of a liver or lung, during your life, to a person who need it ?	Age (in years old)			Total
	18-30	31-45	over 45	
Yes, to a family member	82.2%	81.5%	81.8%	82.0%
Yes, to a close person (not blood-related)	2.6%	1.3%	0.0%	2.1%
Yes, for a stranger	0.7%	0.0%	0.0%	0.5%
Not to anyone mentioned above	3.5%	2.6%	9.1%	3.9%
To other person	0.2%	0.0%	0.0%	0.1%
I don't know	10.8%	14.6%	9.1%	11.4%
$\chi^2=12.814$ $df=10$ $p=0.234$ $V=0.127$				

(Source: own research)

The majority of respondents (65% – 521 people) said that financial compensation wouldn't be for them an incentive to make a decision about becoming an organ donor, 21% of respondents (169 people) couldn't at the moment express their opinion on this topic and 110 of 800 respondents are ready to give their organs for transplant for financial reward.

Tab. 11. Respondents' attitude toward organ transplantation by gender (N=800).

Question: Would the financial compensation be for you an incentive to donate an organ or its part for the purpose of transplantation ?	Gender		Total
	Woman	Man	
Yes	11.5%	18.0%	13.8%
No	67.8%	60.1%	65.1%
I don't know	20.7%	21.9%	21.1%
$\chi^2=7.364$ $df=2$ $p=0.025$ $V=0.177$			

(Source: own research)

Tab. 12. Respondents' attitude toward organ transplantation by place of residence (N=800).

Question: Would the financial compensation be for you an incentive to donate an organ or its part for the purpose of transplantation ?	Place of residence			Total
	Village	City (up to 50.000 inhabitants)	City (over 50.000 inhabitants)	
Yes	14.7%	14.0%	12.8%	13.8%
No	63.1%	66.1%	65.7%	65.1%
I don't know	22.1%	19.9%	21.5%	21.1%
$\chi^2=0.855$	df=4	p=0.931		V=0.033

(Source: own research)

Men, more likely than women, would agree to donate their organs for financial compensation (Table 11). A statistically significant correlation between gender and respondents' opinion on financial compensation, that could be an incentive to donate organs for the purpose of transplantation, was found. The results of analysis on respondents' place of residence (Table 12) proved that no statistically significant correlation was found between the place of residence and the opinion on financial compensation – as an incentive to organ donation ($p>0.05$). People with age over 45 years predominatingly declare that the financial reward is not the motivator for organ donation (Table 13). In addition, a statistically significant correlation between age and respondents' opinion was found ($p<0.05$).

Tab. 13. Respondents' attitude toward organ transplantation by age (N=800)

Question: Would the financial compensation be for you an incentive to donate an organ or its part for the purpose of transplantation?	Age (in years old)			Total
	18-30	31-45	over 45	
Yes	14.3%	13.2%	10.4%	13.8%
No	64.5%	60.3%	79.2%	65.1%
I don't know	21.2%	26.5%	10.4%	21.1%
$\chi^2=9.992$	df=4	p=0.041		V=0.112

(Source: own research)

Less than 40% of respondents (319 people), answering the question: Did media reports published in Poland have an impact for your attitude toward organ transplantation?, said that they don't know any reports in this field, 38.8% of the respondents (310 people) answered that these reports didn't affect their attitude to organ transplantation. In the opinion of 17.6% of respondents (141 people) media events have changed their attitude toward organ transplantation from positive to negative while 3.7% of respondents (30 people) said that these events only made them more convinced in their negative attitude toward organ transplants.

Discussion

Organ transplantation have been already performed to more than 20.000 Poles. Number of people who received an organ is growing by 1.500 every year. The most often transplanted organ are kidneys which in 2012 were transplanted to 1136 people. The number of organ transplants in Poland is increasing every year which is connected with availability of funds dedicated to this part of medicine and employment of transplant coordinators. According to Polish law no objection is tantamount to consent for organ donation, except of minors, for which a legal guardian is a decision-making person. According to Mr Ryszard Kozłowski - President of the Association "Gift of Life", Poland has achieved in the last year a better results in efficiency of transplantation in comparison to the average of EU countries. Unfortunately, the number of people requiring a transplant is still increasing. In 2012 in Poland, only 50% of people waiting for a kidney or liver received the organ. According to the Poltransplant only 30% of people have received a heart transplant. The reason for the insufficient number of transplants surgeries is a low number of organs donor. The Poltransplant report shows that in the period 2006-2011 every year nearly one in ten potential donor was excluded because of family or prosecutors objection or their own beliefs. The current situation should be improved through a program "Partnership for transplantation" that is implemented since 2009 by the Polish Union of Transplantation Medicine (Rowinski *et al*, 2004).

On 23. January 2013 in Białystok a conference "Transplantation as a gift of life – medical, legal and ethical aspects" was held during which detailed statistics on transplants performed between 1966-2012 were presented. According to analizys 400 people are waiting for heart transplant. High attention was paid to research conducted by CBOS in 2011 on attitude of Poles toward organ transplantation. Presented results were similar to those of our project. More than 90% of respondents have a positive attitude toward transplantation medicine. Good evidence for that is a number of notifications of potential bone marrow donors, which currently amounts to more than 123.000 people. To increase a number of transplants a lot of work and effort of many institutions must be done. It concerns especially local governments (owners and supervisors of hospitals), hospitals' directors, medical staff, Church as well as schools and universities that educate young generations. Organs transplantation still raises a lot of emotions among people as it contains ethical, cultural and moral aspect connected with life and death. People often treat transplantation as waiting for a death of another human being. We should remember that one donor can save the lives of up to four people. An important aspect in life of Poles is fact that transplantation medicine is supported by the Catholic Church. Since 2001 a program for transplantation is implemented with a budget of 450 million PLN. It will go on education, training in the field of transplantation, specialized equipment, development of transplant coordinators' network and many other investments. The program will be conducted until 2020. (Antoszkiewicz *et al*, 2009; Guzowski, 2013)

Conclusions

1. A statistically significant correlation between gender and place of residence and the respondents' attitude toward transplantation was found ($p < 0.05$),
2. Research results show that age doesn't determine the attitude of respondents toward transplantation (no statistically significant differences were found)
3. The main reason for non-acceptance of organ transplantation is a lack of trust to the doctors.

Bibliography

1. Antoszkiewicz K., Czerwiński J., Małanowski P. (2009) Pobieranie i przeszczepianie narządów w Polsce. *Biuletyn Poltransplantu*, 1(17), s.5-15.
2. Feliksiak. M., (2012), Postawy wobec przeszczepiania narządów. Centrum Badania Opinii Społecznej s. 1
3. Cymerman I. (2007) Doświadczenia jakości życia po przeszczepie – perspektywa fenomenologiczno-hermeneutyczna, wydawnictwo Uniwersytetu Warmińsko-Mazurskiego w Olsztynie, Olsztyn, s. 61-62.
4. Guzowski A. (2013) Szansa dla transplantacji. *Medyk Białostocki* nr 115, s. 14
5. Noszczyk W. (2004) Podstawy przeszczepiania narządów,. [w:] *Chirurgia* tom II. Wydawnictwo Lekarskie PZWL, Warszawa, s. 138-140
6. Rowiński W., Wałaszewski J., Pączek L. (2004), *Transplantologia kliniczna*, Wydawnictwo Lekarskie PZWL, Warszawa, s. 21-22
7. Scisło L., Patryka E., Walewska G. i wsp. (2013) Attitudes and knowledge of rural and urban inhabitants about organ transplantation. *Hygeia Public Health*, 48 str. 40

Number of signs with spaces: 27 425

