MILITARY PHYSICIAN

Military Physician

Quarterly
Official Organ of the Section of Military Physicians at the Polish Medical Society
Oficjalny Organ Sekcji Lekarzy Wojskowych Polskiego Towarzystwa Lekarskiego
Scientific Journal of the Military Institute of Medicine
Pismo Naukowe Wojskowego Instytutu Medycznego
Published since 3 January 1920
Number of points assigned by the Polish Ministry of Science and Higher Education (MNiSW) – 6

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Print
TECHNET, Kraków

Circulation: 700 copies

Price PLN 14

ISSN 0024-0745

For many years, “Military Physician” has been indexed in the Polish Medical Bibliography (Polska Bibliografia Lekarska), the oldest Polish bibliography database.

The primary version of the "Military Physician" quarterly is its electronic version (www.lekarzwojskowy.pl)

The journal is financed by the Military Medical Chamber

Translation, proofreading and DTP of the English version by Skrivanek Sp. z o.o.

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2. Before publication, each article is reviewed by 2 independent reviewers while maintaining anonymity.

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6. Each article should include the following:

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Author's or Authors' (max. 10 people) first and last names, including academic degrees, full name of affiliated institute (institutes), head of the institute (academic degree, first and last name), below an abstract (up to 15 lines) with keywords in Polish and another abstract with keywords in English, corresponding author, his/her postal address with postal code, telephone (fax) and e-mail address.

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The list of references should include only those publications that were used by the Author and should be limited to 20. All references should be cited in the text and the numbers of references should be put in square brackets. In order to avoid errors, titles should be copied from medical databases.

7. The paper should be accompanied by: a) author's request to publish the paper with a declaration that the article has not been published before and not simultaneously submitted to any other journal, b) approval of the head of the clinic, head of the department or head of the institute in which the research has been conducted, and in case of a study carried out in several centres — approval of all of them, c) Declaration of Conflict of Interest, and d) acknowledgements, if applicable.

8. The Editorial Board reserves the right to correct nomenclature and stylistic errors as well as to introduce abbreviations without consultation with the Author.

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For reasons beyond the control of the Editorial Board and the Publisher, the memoirs on Prof. Bronisław Stawarz MD, PhD published in issue 3/2017 contained no information on the authors of the article, who are: Prof. Henryk Zieliński MD, PhD and Rafał Jedynak MD – Department of Urology, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine

SPIS TREŚCI

2017, tom 95, nr 4

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SPIS TREŚCI

HISTORIA MEDYCYNY I WOJSKOWEJ SŁUŻY ZDROWIA

THE IMPACT OF AIR POLLUTION ON OUR HEALTH – A SCIENTIFIC PAPER COMPETITION

MILITARY INSTITUTE OF MEDICINE
and
POLISH FEDERATION OF ASTHMA, ALLERGY AND COPD PATIENTS ORGANISATIONS

announce the competition
"DUM SPIRO, SPERO"

for the best scientific papers on the impact of air pollution on health, published in 2017 in a foreign or domestic journal.

The competition is open to physicians, engineers, specialists in environmental protection. The studies should be conducted on people and include measurements or estimates of both air pollution and their influence on health. The winners will be awarded recognition statuettes and cash prizes.

The paper submission deadline is 31 January 2018. The award ceremony will be held during the 8th "DUM SPIRO, SPERO" scientific conference in honour of Brig. Gen. Assoc. Prof. Wojciech Lubiński MD, PhD, which will take place on 20 April 2016 at the Military Institute of Medicine.

Air pollution and the diseases of the respiratory and the cardiovascular systems are the cause of an increasing number of health issues in Poland. Each year over 50,000 people die prematurely due to breathing polluted air. Subsequent DUM SPIRO, SPERO conferences develop the awareness of the importance and necessity of finding a solution. Acts against smog, research programmes and ultimately the particular decisions of each of us, living in Poland, can influence the atmosphere that we breathe.

This is why we are inviting to participate in the conference and the competition not only physicians and epidemiologists, but also the community of people of from science and technology, as it is only together that we can change the reality.

The Terms and Conditions of the "DUM SPIRO, SPERO" Competition for the award of the Military Institute of Medicine and the Polish Federation of Asthma, Allergy and COPD Patients Organizations are available on the websites of the Military Institute of Medicine and the Federation:

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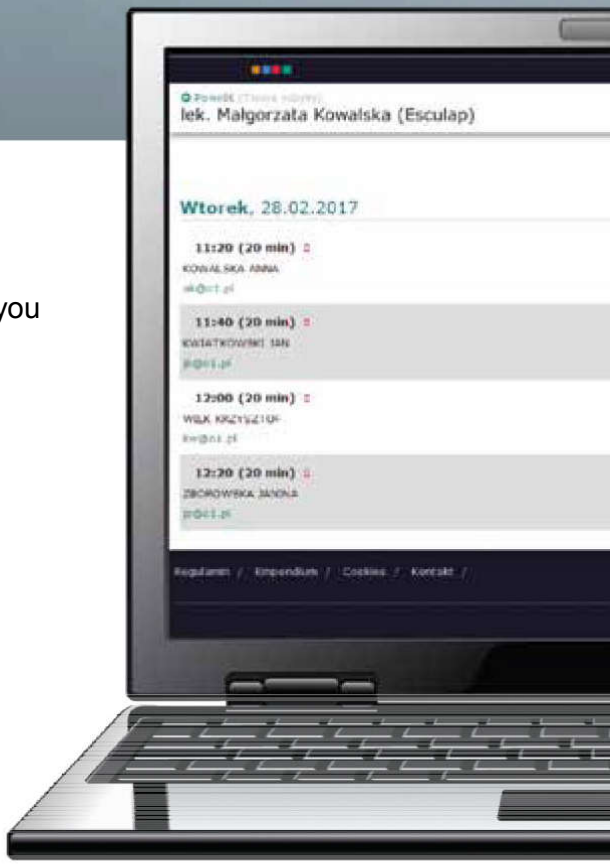

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Optimism and self-efficacy as basic resource factors in chronic disease

Optymizm i poczucie skuteczności jako podstawowe zasoby osobiste w chorobach przewlekłych

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Abstract. The aim of the study is to specify essential predictors that co-determine the manner in which patients deal with different chronic diseases and which constitute personal resources affecting the quality of life during the difficult time of illness. Studies regarding patients representing five groups of chronic diseases indicate unambiguously that optimism and the sense of self-efficacy are factors which highly differentiate them, according to the assessment of their quality of life. Contrary to pessimism and lack of confidence in one's own agency, optimism and the sense of self-efficacy support health-oriented and disease prevention behaviours and, in the event of illness, actively participate in the treatment process and increase the level of hope regarding the prognosis. Optimists, both healthy and ill, better assess the quality of their lives while their sense of self-efficacy increases significantly with increases in the assessment of the quality of life. The level of optimism and the sense of self-efficacy are affected neither by the duration of the illness nor the patient's age. The optimism level slightly decreases in patients in the first few years of illness, but later returns to the level seen in healthy people. Statistically insignificant differences related to the assessment of self-efficacy concern patients with ischaemic heart disease whose sense of self-efficacy is the highest. Patients with asthma had the lowest sense of self-efficacy.
Key words: chronic diseases, quality of life, optimism, self-efficacy

Streszczenie. Prezentowane badania mają za zadanie określenie istotnych predyktorów współdecydujących o sposobie radzenia sobie w chorobie przewlekłej, stanowiących istotne zasoby osobiste określające jakość życia w trudnych latach choroby. Badania pacjentów reprezentujących pięć grup chorób przewlekłych wskazują jednoznacznie, iż optymizm, podobnie jak poczucie własnej skuteczności, stanowią czynniki bardzo silnie różnicujące badanych podzielonych pod względem oceny ich jakości życia. W przeciwieństwie do pesymizmu i braku wiary we własną sprawczość, optymizm i poczucie skuteczności wspomagają podejmowanie działań prozdrowotnych i profilaktycznych, a w sytuacji choroby uczestniczą aktywnie w procesie leczenia i odznaczają się wyższym poziomem nadziei w zakresie rokowań. Optymiści, zarówno zdrowi, jak i chorzy, lepiej oceniają jakość swojego życia, a poczucie skuteczności osób badanych zdecydowanie się zwiększa wraz z poprawą oceny jakości życia. Na poziom optymizmu i poczucia skuteczności nie wpływa ani czas trwania choroby, ani wiek pacjentów. Nieznaczne obniżenie poziomu optymizmu następuje u chorych w pierwszych latach trwania choroby, ale potem wraca on do poziomu typowego dla osób zdrowych. Nieistotne statystycznie różnice w zakresie oceny własnej skuteczności dotyczą chorych z chorobą niedokrwienną, których poczucie skuteczności jest największe. Grupą z najniższym poczuciem skuteczności są chorzy na astmę.
Słowa kluczowe: choroby przewlekłe, jakość życia, optymizm, poczucie skuteczności

Delivered: 31/05/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 335–339

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Introduction

Optimism and the sense of self-efficacy are personal resources which significantly determine the quality of life in both healthy and ill individuals, especially the chronically ill in terms of the latter. Optimism promotes creative, tolerant, generous and non-defensive thinking [1, 2]. Its role in coping with difficult situations is beyond dispute, and there are two hypotheses to explain this role. One perceives optimism as a general, positive expectation regarding the future – it will be mostly positive, cheerful, and abundant in pleasant experiences and success [3]. According to the other hypothesis, optimism is an individual style of interpreting life events: failures are temporary, cannot have much influence on our lives, and we are not at fault for them. Optimism is an important element of our personal resources. It helps us to pursue success, and to maintain the achieved level of satisfaction with oneself and one's life [1]. The results of empirical studies [4, 1] are generally consistent with the common-sense approach: optimists find their lives easier, they are more likely to maintain a good mood in difficult situations, have less problems coping with illness, and their treatment is more effective, primarily due to their expectations and positive attitude towards the received therapeutic methods, as well as to their chances of recovery. Optimists do not give in to doubts. Pessimists, on the other hand, are prone to experience helplessness, depression, passivity, their self-esteem and immune barrier are low, and therefore they are more susceptible to diseases. Moreover, due to their passivity, pessimists find it more difficult to look for social support in difficult periods, which prolongs the subjective duration of failures [3].

Optimism is conducive both to success and dealing with difficulties; it also contributes to taking prophylactic measures: control of one's health and the course of treatment, thus determining to a large extent its further prognosis. Optimists enjoy better health, age more gracefully and face inevitable ailments with greater ease [1]. They are not easily discouraged by failures, and perceive difficult situations as challenges and tasks to solve.

A specific manifestation of optimism, namely a sense of humour, is worth mentioning.[1] It takes the form of a certain distance to reality, other people and oneself. Humour helps to reduce limitations and direct risks, and additionally to eliminate or significantly alleviate anxiety, thus allowing better control over strong emotions [5, 3]. Hospitalised patients who have the ability to laugh maintain closer relationships with friends, are better perceived by the environment, and get more social support [6, 3]. A sense of humour supports the increase in the immune function [7, 1].

People who are satisfied also demonstrate a high sense of personal control (internal control, inner-direction, and self-efficacy). They are more responsible and can cope with difficulties more easily. People without the feeling of control lose the sense of morality, and more often become ill. They believe that their life is mostly influenced by unpredictable, accidental circumstances.

Adults, especially relatives, can instil in children from a very young age the sense of resourcefulness, self-esteem, and belief in one's competence, or, on the contrary: insecurity and lack of trust in one's abilities. This later determines the way people perceive situations, especially difficult ones, as stressful/neutral or as tasks.

The sense of personal control helps people to believe that they can manage the course of events. The feeling of self-efficacy comprises a perception of one's abilities as sufficient to deal with a situation and to cope with the challenge.

Self-efficacy is a frequently studied psychological resource [8-11]. It affects motivation, persistence and power of action. Belief in one's efficacy conditions the undertaking of effective actions to change an adverse situation, or to prevent its consequences [3]. The results of numerous empirical studies clearly indicate that self-efficacy, contrary to a sense of helplessness, plays an important role in taking pro-health measures and in effective dealing with disease [12-14].

The sense of personal control is defined as a generalised belief in the ability to control reality or as an evaluation of our ability to control a given situation. The first approach is based on the concept of the location of the sense of control [15], which is perceived as a permanent personality trait.

In summing up the results of his numerous studies, Rotter [15, 16] stated that the location of the source of control doubtlessly affects human behaviour and determines their different reactions to similar situations. People can be classified as those with internal control, convinced that they can control their behaviour and the way external stimuli affect them, and those who locate control externally, i.e. those who are convinced that their behaviours and

[1] A sense of humour has been appreciated by the representatives of different trends in psychology: from Freud, who perceived it as a defence mechanism, to the representatives of humanistic psychology (Allport, Maslow, and May), who regarded it as a mature sign of distance not only to the world around us, but also to oneself.

their enhancements depend on factors beyond our scope (fate, accident, other people, and destiny).

The sense of responsibility for oneself and one's life, associated with internal control, means these people are aware of their control over external influences and their own behaviour, and thus they feel that they have a choice. People with inner-direction are likely to treat most life situations as tasks to solve. They learn from their experiences and are more resistant to difficulties [17, 18].

The second approach is a concrete, secondary dimension of personal control in individual life situations. The previously accepted belief that people with a sense of internal control can better cope with difficulties, are more compliant with the therapeutic process and are able to use their psychological resources more efficiently, which translates into more effective dealing with disease, has been questioned lately. The transactional theory of stress proves that people convinced of their own control may in certain conditions increase tension and negative emotions instead of reducing them [8, 3]. Individuals with inner-direction, when experiencing failure, may be more worried, as they tend to attribute their causes to themselves [6, 3]. Therefore, this sense of internal control may be a stressor. Eventually, it is the individual who attributes meaning to situations, determines their importance in a given situational context and in the long-time perspective, as well as evaluates and locates the source of gains and losses.

Research questions

1. To what extent does dispositional optimism and a sense of self-efficacy form important dimensions of support in chronically ill people?
2. Are optimism and a sense of self-efficacy important indicators of different assessments of life quality in chronically ill patients?

Material and methods

The study involved two groups: healthy people and chronically ill patients. The first group comprised 80 people who felt healthy, did not take any medicines continuously, were not in therapy due to any conditions, were not invalids and did not require rehabilitation or care. The group of chronically ill patients comprised 182 individuals diagnosed as: patients with ischaemic disease, following a first myocardial infarction (N = 41), patients treated chronically due to primary arterial hypertension (N = 35), patients in therapy due to a malignant neoplasm (N = 36), diabetics (N = 33) and patients with bronchial asthma (N = 37). All the subjects were under constant medical care due to the consequences of their conditions.

The healthy subjects were slightly younger (M = 48.02, SD = 6.86) than the chronically ill patients (M = 53.03, SD = 7.97). The percentage of males and females in both groups was similar: 41 females and 39 males in the group of healthy subjects, and 95 females and 87 males in the group of chronically ill patients.

The duration of the disease varied between one year and several years (M = 10.37; SD = 8.08). Sixty-two patients were ill for 1-5 years, 52 patients were ill for 6-10 years, and 68 patients were ill for over 11 years.

The study was conducted in the years 2011-2015, individually, in the patient's home or at a hospital ward (mostly the departments of the Military Institute of Medicine in Warsaw).

Many subjects declared a need for contact outside the study; therefore, meetings were often divided into two or three sessions. The time required to fill in the questionnaires was usually less than an hour.

For the study, we used Life Orientation Test-Revised (LOT-R) and Generalized Self-Efficacy Scale (GSES). The LOT-R test, comprising 10 questions, is used to measure dispositional optimism, which expresses a generalised expectation of positive events. It is intended for adults, both ill and healthy, and was developed by Scheier, Carver and Bridges [19]. A subject assesses individual statements on a scale of 1 to 5. The score is between 0 and 24 points. The higher the score, the greater the intensity of optimism. The test meets the requirements for this type of tool regarding reliability (internal compliance measured by Cronbach's alpha is 0.78) and accuracy [20].

The presented study revealed high correlations between the LOT-R test results and the satisfaction with life (r = 0.45), general satisfaction (0.36), and satisfaction with oneself (0.36).

The authors of the Polish version of the GSES score are Schwarzer, Jerusalem and Juczyński [20]. The method is based on Bandura's concept of expectations and self-efficacy (1977), and is used to measure the level of expected efficacy associated with the sense of controlling one's actions. The scale comprises 10 statements, and is designed to test adults. The sense of self-efficacy allows one to predict motivation and behaviours in various areas of an individual's functioning, as well as behaviours related to one's health [20]. The general score is between 10 and 40 points. The higher the score, the greater the sense of self-efficacy. The criteria for the reliability of GSES, determined on the basis of study results are satisfactory (Cronbach's alpha was 0.85, and the constancy coefficient was 0.78) [21].

Table 1. Life Orientation Test-Revised (LOT-R) and Generalized Self-Efficacy Scale (GSES) - summary of results in examined groups
Tabela 1. Test optymizmu (LOT-R) i Skala Własnej Skuteczności (GSES) - zestawienie wyników badanych grup

Study groups	Dispositional optimism		Self-efficacy	
	M	SD	M	SD
Healthy individuals	14.71	4.10	29.49	4.05
Ischaemic disease	13.22	4.49	30.44	4.21
Arterial hypertension	13.70	3.43	28.97	5.23
Neoplastic disease	14.32	3.46	28.39	4.96
Diabetes	14.42	3.63	29.97	5.10
Asthma	13.12	3.16	27.37	5.27

M – mean, SD – standard deviation

Table 2. Analysis of variance in results of healthy and ill patients with different qualities of life
Tabela 2. Analiza wariancji wyników osób zdrowych i chorych o różnym nasileniu jakości życia

Psychological variables	Healthy individuals (N = 80)		Ill patients (N = 182)	
	F	P	F	P
Dispositional optimism	15.88	0.000	16.34	0.000
Self-efficacy	6.34	0.003	30.97	0.000

N – number of cases, F – F-Snedecor test, analysis of variance, p – probability value

The study also used the results obtained in the same group of subjects on the Satisfaction with Life Scale (SWLS), the most common method of testing satisfaction with one's life, developed by Diener, Emmons, Larson and Griffin [22] and updated by Juczyński [20], as well as the Satisfaction Questionnaire (Fragebogen zur Lebenszufriedenheit, FLZ) developed by Fahrenberg, Myrtek, Schumacher and Brahler [23]. The latter is used to assess ten important aspects of satisfaction with life: health, work and profession, financial situation, free time, contacts with one's children, satisfaction with oneself, contacts with other people (friends, relatives, and colleagues), accommodation, marriage/romantic relationship and sexuality.

Table 3. Correlation between satisfaction/satisfaction with life and the results of the examined variables
Tabela 3. Korelacje satysfakcji i zadowolenia z życia z wynikami badanych zmiennych

Psychological variables	Life satisfaction		Satisfaction with individual areas of life	
	Healthy subjects	Ill subjects	Healthy subjects	Ill subjects
Dispositional optimism	**0.53****	**0.41****	**0.40****	**0.33****
Self-efficacy	**0.24****	**0.50****	**0.36****	**0.53****

* Confidence level of > 0.05 (Pearson's r) ** Confidence level of > 0.001

The results describing the subjects' quality of life were given in the previous issue of "Military Physician" [24].

Results and discussion

Optimism was measured using the LOT-R score, with the results falling between 0 and 24 points. The higher the score, the greater the intensity of optimism.

The variance analysis did not indicate any statistically significant differences in dispositional optimism between the results obtained in the study groups ($F = 1.38$; $p < 0.23$). The level of optimism in all the groups was average. Minor downward trends regarding optimism were observed in patients with asthma and those with ischaemic disease.

Neither the duration of the disease ($F = 0.56$; $p = 0.57$), nor the age of the patients ($F = 1.45$; $p = 0.07$) affected the level of optimism. A slight decrease in optimism was found in patients in the first years of the disease, but then it returned to the level observed in healthy individuals.

The sense of self-efficacy was determined using the Generalised Self-Efficacy Scale (GSES), and the results obtained in the studied groups are presented in Table 1.

The results of the variance analysis may indicate only a minor trend differentiating between the studied groups ($F = 2.00$; $p < 0.1$).

The sense of self-efficacy was most pronounced in patients after myocardial infarction. It was even slightly higher than in the group of healthy individuals. The lowest sense of self-efficacy was observed in patients with asthma. There were no significant differences between healthy and ill individuals regarding self-efficacy ($F = 0.59$, $p = 0.56$).

Neither duration of the disease ($F = 0.27$; $p = 0.77$), nor patients' age ($F = 1.37$; $p = 0.11$)

significantly affected the sense of self-efficacy.

Conclusions

- The results obtained by healthy individuals in the Satisfaction with Life Scale correlate most significantly with the level of dispositional optimism.
- The sense of self-efficacy also strongly correlated with satisfaction. This is an important factor describing the level of control over one's actions, predicting their effects, and the sense of control over life situations, especially difficult ones.
- Self-efficacy clearly increases along with a better assessment of the quality of life. The sense of self-efficacy is the strongest predictor of the quality of life in chronically ill patients.
- Optimism, as the sense of self-efficacy, is a factor that strongly differentiates between the subjects divided according to their evaluation of the quality of life.

Literature

1. Seligman MP. Prawdziwe szczęście. [Real happiness] Media Rodzina, Poznań 2005
2. Dember WN, Brooks J. A new instrument for measuring optimism and pessimism. Bull Psychonomic Soc, 1989; 4: 365-366
3. Poprawa R. Zasoby osobiste w radzeniu sobie ze stresem. [Personal resources and dealing with stress] In: Dolińska-Zygmunt G (ed). Podstawy psychologii zdrowia. [Basic psychology of health] Wydawnictwo Uniwersytetu Wrocławskiego, Wroclaw 2001: 103-136
4. Seligman MP. Learned optimism. Random House, New York 1991
5. MayR. Miłość i wola. [Love and will] Pax, Warsaw 1978
6. Lefcourt HM, Martin RA. Humor and life stress: Antidote to adversity. Springer-Verlag, New York 1986
7. Sheridan ChL, RadmacherSA. Psychologia zdrowia. [Psychology of health] IPZ, Warsaw 1998
8. Lazarus RS, Folkman S. Stress, appraisal, and coping. Springer, New York 1984
9. Antonowsky A. Rozwikłanie tajemnicy zdrowia. Jak radzić sobie ze stresem i nie zachorować. [Discovering the secret of health. How to deal with stress and avoid illness] IPN Foundation, Warsaw 1995
10. Bishop GD. Psychologia zdrowia. [Psychology of health] Astrum, Wrocław 2000
11. Hobfoll S. Social and psychological resources and adaptation. Rev General Psych, 2002; 6: 307-324
12. Juczyński Z. Poczucie własnej skuteczności jako wyznacznik zachowań zdrowotnych. [Sense of self-efficacy as an indicator of health-related behaviour] Promocja Zdrowia. Nauki Społeczne i Medycyna, Warsaw 1998; 5 (14): 54-63
13. Schwarzer R, Taubert S. Radzenie sobie ze stresem: wymiary i procesy. [Coping with stress: dimensions and processes] Promocja Zdrowia, Nauki Społeczne i Medycyna, 1999; 17: 72-92
14. Dolińska-Zygmunt G. Podmiotowe uwarunkowania zachowań promujących zdrowie. [Subjective conditions of health-promoting behaviours] Wydawnictwo Instytutu Psychologii PAN, Warsaw 2001
15. Rotter J. Generalized expectancies for internal versus external control of reinforcement. Psychol Monographs. 1966; 80 (1): 1-28
16. Rotter JB, Chance JE, Phares EJ. Applications of a social learning theory of personality. Holt, Rinehart & Winston, New York 1972
17. Drwal R. Poczucie kontroli jako wymiar osobowości - podstawy teoretyczne, techniki badawcze i wyniki badań. Materiały do nauczania psychologii. [Sense of control as a personality dimension – theoretical basis, study techniques and study results. Materials for teaching psychology] Warsaw 1978
18. Gliszczyńska X. Motywacja do pracy. [Motivation for work] Książka i Wiedza, Warsaw 1981
19. Scheier MF, Carver CS, Bridges MW. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a re-evaluation of the Life Orientation Test. J Pers Soc Psychol, 1994; 67: 1063-1078
20. Juczyński Z. Narzędzia pomiaru w promocji i psychologii zdrowia. [Measuring tools in health promotion and psychology] PTP. Warsaw 2001
21. Schwarzer R. Poczucie własnej skuteczności w podejmowaniu i kontynuacji zachowań zdrowotnych. [Self-efficacy in undertaking and continuation of health-related actions] In: Heszen-Niejodek I, Sęk H, (eds.) Psychologia zdrowia. [Psychology of health] PWN, Warsaw 1998
22. Diener E, Emmons RA, Larsen RJ, Griffin S. The Satisfaction With Life Scale. J Person Assess, 1985; 49: 71-75
23. Fahrenberg J, Myrtek M, Schumacher J, Brahler E. Fragebogen zur Lebenszufriedenheit (FLZ). Handanweisung Hogrefe, Göttingen 2000
24. Skrzyński W, Rzepecki P, Lazar-Sito D, Jędrzejczak E. Jakość życia u osób przewlekle chorych. [Quality of life in chronically ill persons] Mil. Phys., 2017; 96 (2): 144-148

Analysis of interest in travel medicine in Poland illustrated with the example of the www.medycynatropikalna.pl website

Analiza zainteresowań medycyną podróży w Polsce na przykładzie portalu www.medycynatropikalna.pl

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Abstract. Poland has seen continuous growth in the number of international travellers, especially those travelling for recreational purposes. As a consequence, more and more travellers need comprehensive information on disease prevention measures and health risks prevalent in a given destination area. The study discusses current trends regarding interest in the field of tropical medicine evaluated on the basis of the number of visits to a website run by the Department of Epidemiology and Tropical Medicine of the Military Institute of Medicine (www.medycynatropikalna.pl). A retrospective study was based on a statistical analysis of the number of visits to the www.medycynatropikalna.pl website between 2014 and 2016, and in individual months of 2016, using StatSoft Inc. (2014) STATISTICA version 12.0. Statistical analysis has shown a significant increase in the number of visits to the www.medycynatropikalna.pl website, from 389,321 in 2014 to 618,830 in 2016. In 2016, the website was most frequently visited between October and December (i.e. the holiday season in tropical countries), which gives evidence of a growing interest in travel to tropical destinations. This systematic increase in the number of visits to www.medycynatropikalna.pl demonstrates a growing interest in travel medicine and greater awareness related to prophylaxis among travellers.
Key words: international travels, travel medicine, website

Streszczenie. W Polsce obserwuje się systematyczne zwiększenie liczby podróży zagranicznych, głównie o charakterze turystyczno-wypoczynkowym. W związku z powyższym z roku na rok zwiększa się zainteresowanie działaniami profilaktycznymi i zagrożeniami zdrowotnymi w miejscach planowanych destynacji. W pracy przedstawiono aktualne trendy dotyczące zainteresowania medycyną podróży na podstawie odwiedzin portalu internetowego www.medycynatropikalna.pl, prowadzonego przez Zakład Epidemiologii i Medycyny Tropikalnej Wojskowego Instytutu Medycznego. Materiał i metody. Analizę retrospektywną oparto na statystyce wizyt użytkowników strony www.medycynatropikalna.pl w latach 2014-2016 oraz w poszczególnych miesiącach 2016 roku, zużyciem pakietu StatSoft Inc. (2014) STATISTICA version 12.0. Wyniki. Analiza statystyczna wykazała znaczące zwiększenie liczby wizyt na www.medycynatropikalna - z 389 321 w 2014 roku do 618 830 w 2016 roku. Najwyższe wskaźniki wizyt w 2016 roku obserwowano w czwartym kwartale (październik-grudzień), co wskazuje na zwiększenie zainteresowania podróżami do krajów tropikalnych, w których w tym czasie przypada sezon wakacyjny. Wnioski. Systematyczny wzrost liczby odwiedzin na www.medycynatropikalna.pl świadczy o zwiększeniu zainteresowania medycyną podróży oraz świadomości podróżujących w zakresie podejmowania działań profilaktycznych.
Słowa kluczowe: podróże międzynarodowe, medycyna podróży, strona internetowa

Delivered: 25/01/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4):

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Introduction

Interest in travel is increasing all around the world, including in Poland. According to World Tourism Organization data, in 2015 the number of international trips was approximately 1.184 billion. Despite the unstable global geopolitical situation, the upward trend is expected to prevail; it has been estimated that in 2050 the number of trips will exceed 1.6 billion per year [1]. In Poland, according to the estimates of the Ministry of Sports and Tourism, over 10 million trips abroad take place (among citizens aged 15 years and over). On average, Poles spend 10 days abroad during their journeys. The most frequently visited countries

include Germany (2.1 million), Great Britain (0.8 million) and Italy (0.8 million). 56% of journeys are recreational, 32% involve visiting relatives and friends, 7.5% are business trips, and 4.5% are of another nature [2, 3]. The most common recreational foreign destinations for Poles are Croatia, Italy, Turkey, Spain and Greece, but with each passing year the number of visits to Asia, Africa and Central America continues to rise. Increasingly often Poles organise their international trips independently, without the assistance of travel agencies. The most common means of travel to foreign destinations are aircraft. With every decade, the world is becoming more of a global village, and intercontinental travel is becoming increasingly more popular and affordable. All kinds of people travel: adults and young children, the elderly, pregnant women, the disabled and people with chronic diseases. The risk of falling ill during such trips depends on numerous factors, such as the endemicity of the given region, the general health of the traveller (proper function of the immune system and the thermoregulation system, and the presence of chronic diseases), as well as the protective measures taken within general health-related prophylaxis [4]. The risk increases in tropical and subtropical areas especially, where travellers are exposed to pathogens carried by insects, as well as food-borne, air-borne and sexually transmitted microorganisms, as well as zoonotic diseases. In the regions where sanitary standards are low, the most common health-related problem is diarrhoea, observed in 25-90% of people during the first 2 weeks of their stay in new environmental conditions. Another health problem is malaria, where the incidence depends on the location (the greatest morbidity is observed in Sub-Saharan Africa), and on the use or rejection of antimalarial chemoprophylaxis. Travellers also suffer from contagious, vaccine-preventable diseases, which is usually due to the low vaccination level. One such condition is hepatitis A [5]. Sexually transmitted diseases pose another risk, particularly among those people maintaining casual sexual relationships. It is estimated that 5% of Europeans have sex with individuals from the local population, including prostitutes. Half of them do not use any protection (condoms), despite the fact that venereal diseases are common among sex workers in African, Asian and Central or South American countries, from the cosmopolitan ones (AIDS, syphilis, or gonorrhoea) to tropical diseases (chancroid, donovanosis, lymphogranuloma venerum) [6, 7].

The risk of becoming ill concerns all people: tourists, individuals visiting family or friends, travelling workers or students who stay in areas characterised by difficult climatic and substandard sanitary conditions. Travel medicine is among the newest of medical specialisations. Its principal purpose is to introduce prophylactic and therapeutic measures that will prevent the incidence and further development of diseases contracted while travelling in various parts of the world. As the number of travellers continues to grow, it is becoming necessary to disseminate knowledge about the risks in the areas of popular destinations, as well as to introduce health prophylaxis to prevent health problems [5, 8].

Aim of the study

This study presents current trends regarding the interest shown in travel medicine in Poland, based on the number of visitors to the www.medycynatropikalna.pl website, administered by the Department of Epidemiology and Tropical Medicine of the Military Institute of Medicine.

Material and methods

The retrospective analysis was based on the statistics regarding the number of visits to the www.medycynatropikalna.pl website in the years 2014-2016, and in individual months of 2016. All the calculations were performed using the StatSoft Inc. (2014) STATISTICA (data analysis software system), version 12.0., www. statsoft.com (SN JGNP3087539302AR-E) and Excel spreadsheets.

Results

The statistical analysis revealed a significant increase in the number of visitors to the www.medycynatropikalna.pl website interested in tropical medicine, from 389,321 in 2014 to 618,830 in 2016 (Fig. 1). In the years 2014-2016, the number of visits to the website increased in a statistically significant manner (Chi^2= 6.00; p = 0.1992).

In 2016, the highest number of visitors was observed in the fourth quarter (October-December), which indicates an increased interest in trips to tropical countries, where this period is the holiday season (Fig. 2). The distribution of the number of visits by month was statistically significantly significant (Chi^2= 132.00; p = 0.2329).

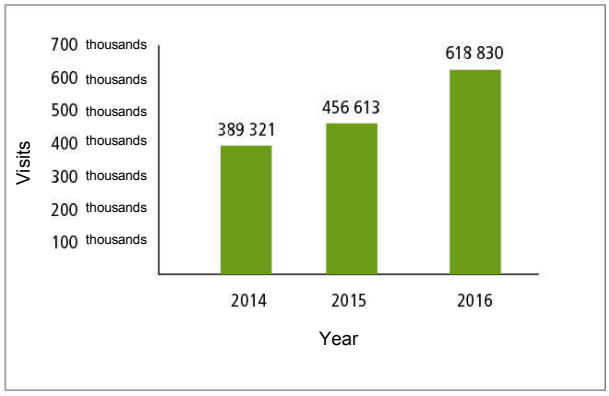

Figure 1. Number of visits to the www.medycynatropikalna.pl website between 2014 and 2016
Rycina 1. Liczba wizyt na portalu internetowym www.medycynatropikalna.pl w latach 2014-2016

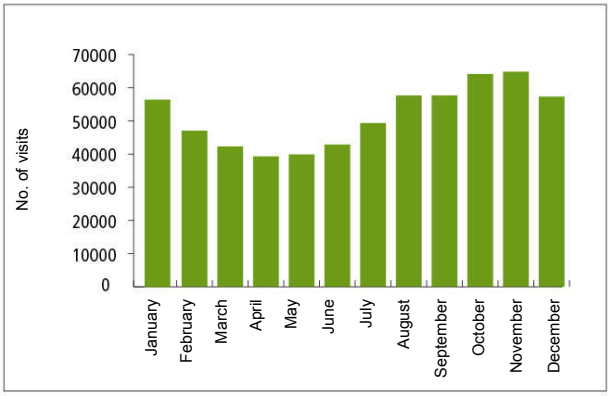

Figure 2. Number of visits to the www.medycynatropikalna.pl website in individual months of 2016 (n=618,830)
Rycina 2. Liczba wizyt na portalu internetowym www.medycynatropikalna.pl w poszczególnych miesiącach 2016 roku (n=618,830)

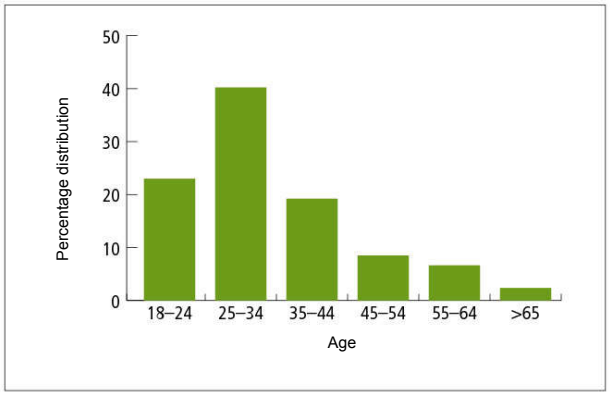

Figure 3. Percentage distribution of visitors to the www.medycynatropikalna.pl website by age
Rycina 3. Rozkład procentowy odwiedzających portal www.medycynatropikalna.pl według wieku

The visitors to the www.medycynatropikalna.pl website were mostly men (67.3% *vs* 32.7% of women) and people aged 25-34 years old (Fig. 3).

In the years 2014-2016 and in individual months of 2016, the most frequently visited were the webpages about the necessary prophylactic measures (vaccinations, antimalarial chemoprophylaxis) and health-related risks in Southeastern and Southern Asia (Thailand, India, Vietnam, and Sri Lanka), Eastern Africa (Tanzania/Zanzibar, and Kenya) and the Caribbean (Dominican Republic) (Tab. 1 – 2).

Apart from the country webpages, in the years 2014-2016 and in individual months of 2016, the most frequently visited ones were the pages presenting information about transmissible diseases (yellow fever, malaria), food-borne diseases (typhoid fever, poliomyelitis, and amoebiasis), zoonotic diseases (rabies), and sexually transmitted diseases (HIV/AIDS) (Tab. 3 – 4).

In 2016, one of the diseases that raised the most interest in the world was Zika, when an epidemic was observed in South America, especially in Brazil [9]. However, the number of visits to the www.medycynatropikalna.pl website in search for information about Brazil (in the list of countries) and Zika (in the list of diseases) was small compared to other sites, probably due to a significantly lower number of Poles visiting South America compared to those travelling to Asia or Africa. In 2016, 390 visits to the webpage about Brazil were registered, and only 187 visits to the webpage about Zika (the queries were primarily about the transmission of the virus outside South America, in the Canary Islands and Cape Verde isles).

In the list of countries, the most frequently visited was the webpage about Thailand, both in the years 2014-2016, and in the individual months of 2016. The webpage about yellow fever was the most frequently visited one in the list of diseases in the years 2014-2016, and in the first 8 months of 2016 (I-IV, VII, IX, XI—XII). In 2016, 7,000 visits to the webpage about Thailand were recorded, and 4,267 visits to the one about yellow fever (Tab. 3 – 4).

The correlation analysis demonstrates that towards the end of 2016, a statistically significant increase in the number of visits to the "Tanzania/Zanzibar", "India" and "Malaria" webpages was observed (Tab. 5).

The mean number of visits per month for the most popular webpages was: Thailand at 583.3 (range: 271.0-1013.0), yellow fever at 355.6 (range: 242.0-587.0), Tanzania/Zanzibar at 326.5 (range: 63.0-894.0), and HIV/AIDS at 124.8 (range: 34.0-306.0). The Thailand webpage was visited significantly more often than: Dominican Republic ($p = 0.0020$), India ($p = 0.0007$), Rabies ($p = 0.0226$), Malaria ($p = 0.0013$), Poliomyelitis ($p = 0.0004$) and HIV/AIDS ($p = 0.0001$). The Kenya webpage was visited significantly more often than HIV/AIDS ($p = 0.0455$). The Yellow fever webpage was visited significantly more often than Poliomyelitis ($p = 0.0215$) and HIV/AIDS ($p = 0.0043$). The details are presented in Table 6.

Table 1. Most commonly visited country pages on www.medycynatropikalna.pl between 2014 and 2016 (n=number of visits)
Tabela 1. Najczęściej odwiedzane witryny krajów na www.medycynatropikalna.pl w latach 2014-2016 (n=liczba wizyt)

www.medycynatropikalna.pl	2014	2015	2016	total
Thailand vaccinations/diseases	1,183	2,213	7,000	10,396
Tanzania/Zanzibar vaccinations/diseases	485	1,675	3,918	6,078
Kenya vaccinations/diseases	446	587	3,829	4,862
Dominican Republic vaccinations/diseases	95	518	1,756	2,369
India vaccinations/diseases	580	768	1,627	2,975
Vietnam vaccinations/diseases	169	451	1,462	2,082
Sri Lanka vaccinations/diseases	302	515	1,176	1,993
Total	3,260	6,727	20,768	30,755

Table 3. Most commonly visited disease pages on www.medycynatropikalna.pl between 2014 and 2016 (n=number of visits)
Tabela 3. Najczęściej odwiedzane witryny chorób na www.medycynatropikalna.pl w latach 2014-2016 (n=liczba wizyt)

www.medycynatropikalna.pl	2014	2015	2016	Total
Yellow fever	719	1,899	4,267	6,885
Typhoid fever	544	959	2,842	4,345
Rabies	278	917	2,129	3,324
Malaria	120	139	1,995	2,254
Poliomyelitis	114	550	1,559	2,223
HIV/AIDS	744	1,550	1,498	3,792
Amoebiasis	149	533	1,167	1,849
Total	2,668	6,547	15,457	24,672

Table 2. Most commonly visited country pages on www.medycynatropikalna.pl in individual months of 2016 (n=number of visits)
Tabela 2. Najczęściej odwiedzane witryny krajów na www.medycynatropikalna.pl w poszczególnych miesiącach 2016 roku (n=liczba wizyt)

www.medycynatropikalna.pl	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
Thailand vaccinations/diseases	708	654	529	271	398	387	452	589	626	470	1,013	903	7,000
Tanzania/Zanzibar vaccinations/diseases	223	282	218	63	81	126	341	305	248	281	894	856	3,918
Kenya vaccinations/diseases	511	295	151	182	224	113	385	406	364	486	375	337	3,829
Dominican Republic vaccinations/diseases	158	190	119	137	156	92	250	234	199	75	50	96	1,756
India vaccinations/diseases	89	40	93	141	160	33	159	113	199	190	149	261	1,627
Vietnam vaccinations/diseases	187	82	36	77	39	143	74	56	216	238	189	125	1,462
Sri Lanka vaccinations/diseases	82	138	53	134	36	45	135	81	81	150	102	139	1,176
Total	1,958	1,681	1,199	1,005	1,094	939	1,796	1,784	1,933	1,890	2,772	2,717	20,768

Table 4. Most commonly visited disease pages on www.medycynatropikalna.pl in individual months of 2016 (n=number of visits)
Tabela 4. Najczęściej odwiedzane witryny chorób na www.medycynatropikalna.pl w poszczególnych miesiącach 2016 roku (n=liczba wizyt)

www.medycynatropikalna.pl	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
Yellow fever	542	258	260	315	242	437	257	253	354	338	587	424	4267
Typhoid fever	184	163	158	188	311	711	254	153	81	177	295	167	2,842
Rabies	75	74	234	148	237	186	94	307	130	259	282	103	2,129
Malaria	26	24	112	57	48	113	112	223	283	367	374	256	1,995
Poliomyelitis	78	189	179	145	115	166	89	89	66	184	142	117	1,559
HIV/AIDS	306	52	90	72	166	236	140	34	108	140	40	114	1,498
Amoebiasis	179	49	62	130	116	86	34	121	88	72	127	103	1,167
Total	1,390	809	1,095	1,055	1,235	1,935	980	1,180	1,110	1,537	1,847	1,284	15,457

Table 5. Correlation analysis of the most frequently visited pages on www.medycynatropikalna.pl in individual months of 2016 (R - correlation coefficient)
Tabela 5. Analiza korelacji najczęściej odwiedzanych witryn na www.medycynatropikalna.pl w poszczególnych miesiącach w 2016 roku (R - współczynnik korelacji)

www.medycynatropikalna.pl	R	*P-value*
Thailand vaccinations/diseases	0.28	0.3786
Tanzania/Zanzibar vaccinations/diseases	0.62	0.0332
Kenya vaccinations/diseases	0.24	0.4433
Dominican Republic vaccinations/diseases	0.34	0.2861
India vaccinations/diseases	0.72	0.0082
Vietnam vaccinations/diseases	0.42	0.1745
Sri Lanka vaccinations/diseases	0.32	0.3126
Yellow fever	0.24	0.4433
Typhoid fever	0.04	0.8970
Rabies	0.44	0.1517
Malaria	0.90	0.0001
Poliomyelitis	0.14	0.6721
HIV/AIDS	0.21	0.5193
Amoebiasis	0.01	0.9828

Health-related problems for travellers visiting hot climate countries

Studies conducted by travel medicine specialists in Western Europe demonstrated that among 100 thousand travellers from well-developed countries going for 1 month to developing countries with a hot climate and substandard sanitary conditions, 50 thousand will develop a health-related problem, usually of minor intensity, 8 thousand people will seek medical assistance in the place of their stay, 1,100 people will be unfit for work immediately after they return from the journey, 300 people will be hospitalised while abroad or following their return, some people will be evacuated by medical services to the country, and 1 person will die due to a disease or bodily injury [10].

Table 6. Profile of the most frequently visited pages on www.medycynatropikalna.pl in individual months of 2016
Tabela 6. Charakterystyka najczęściej odwiedzanych witryn na www.medycynatropikalna.pl w poszczególnych miesiącach w 2016 roku

Thailand vaccinations/diseases	
Mean (SD)	583.3(215.9)
Range	271.0-1013.0
Median	559.0
95% CI	[446.2; 720.5]
Tanzania/Zanzibar vaccinations/diseases	
Mean (SD)	326.5(270.6)
Range	63.0-894.0
Median	264.5
95% CI	[154.5; 498.5]
Kenya vaccinations/diseases	
Mean (SD)	319.1(128.3)
Range	113.0-511.0
Median	350.5
95% CI	[237.5; 400.6]
Dominican Republic vaccinations/diseases	
Mean (SD)	146.3(63.3)
Range	50.0-250.0
Median	146.5
95% CI	[106.1; 186.5]
India vaccinations/diseases	
Mean (SD)	135.6(66.2)
Range	33.0-261.0
Median	145.0
95% CI	[93.5; 177.7]
Yellow fever	
Mean (SD)	355.6(118.1)
Range	242.0-587.0
Median	326.5
95% CI	[280.6; 430.6]
Typhoid fever	
Mean (SD)	236.8(162.5)
Range	81.0-711.0
Median	180.5
95% CI	[133.6; 340.1]
Rabies	
Mean (SD)	177.4(84.2)
Range	74.0-307.0
Median	167.0
95% CI	[123.9; 230.9]

Table 6. Profile of the most frequently visited pages on www.medycynatropikalna.pl in individual months of 2016
Tabela 6. Charakterystyka najczęściej odwiedzanych witryn na www.medycynatropikalna.pl w poszczególnych miesiącach w 2016 roku

Malaria	
Mean (SD)	166.3(129.0)
Range	24.0-374.0
Median	112.5
95% CI	[84.3; 248.2]
Poliomyelitis	
Mean (SD)	129.9(43.7)
Range	66.0-189.0
Median	129.5
95% CI	[102.1; 157.7]
HIV/AIDS	
Mean (SD)	124.8(81.2)
Range	34.0-306.0
Median	111.0
95% CI	[73.3; 176.4]

The most common health-related problems experienced by travellers include chronic gastrointestinal disorders, skin diseases, respiratory inflammations and fevers of unknown aetiology. The analyses conducted by the GeoSentinel Surveillance Network indicate an increasing prevalence of certain diseases according to the region of the world. Diseases associated with diarrhoea are observed most frequently in travellers to Southern and Southeastern Asia, dermatological problems are most often found in those travelling to Central and South America, and malaria dominates among those visiting Sub-Saharan Africa [11].

People staying in regions with difficult environmental conditions primarily suffer from acute diarrhoea, mostly caused by bacteria (enterotoxic *Escherichia coli),* less often by viruses or parasites, usually in the form of 'traveller's diarrhoea' and lasting a few days. In the group of people seeking medical help after returning from a trip the most frequent disorders involve chronic diarrhoea (persisting for more than 2 weeks), usually of parasitic origin, in which the most common pathogens are protozoa *(Giardia intestinalis, Cryptosporidium parvum, and Entamoeba histolytica)* [12, 13].

The most frequent dermatoses found in travellers are reactions to insect bites, allergic rashes, superficial skin injuries (skin abrasions, animal bites, sunburn, injuries cause by sea animals, e.g. jellyfish burns), pyodermas (pyogenic folliculitis, boils, and abscesses) and fungal infections. The most frequently diagnosed tropical dermatoses include cutaneous larva migrans, leishmaniasis, myases and skin rashes in the course of viral infections (denga, chikungunya) [14-16]. Respiratory infections in travellers (airborne and inhalatory infections) are observed usually during group trips, in hotels, planes and passenger ships. The most common include upper respiratory disorders (colds, pharyngitis, palatine tonsilitis, paranasal sinusitis) with the clinical picture similar to that of diseases unrelated with travel, found in people in the moderate climate zones. In the case of lower respiratory tract disorders, e.g. pneumonia, the clinical symptoms are much more pronounced (fever, chest pain, cough, and dyspnoea), and usually require hospitalisation. The most common aetiological factors in respiratory inflammations are cosmopolitan viral pathogens (flu and paraflu viruses, rhino-, adeno- and coronaviruses) and bacterial pathogens *(Streptococcus pneumoniae, Mycoplasma pneumoniae, Haemophilus influenzae, Chlamydophila pneumoniae, and Legionella pneumophila).* Microbes specific to the tropical climate are rarely found [17, 18]. Fever of unknown origin is a symptom of various diseases, usually parasitic or infectious. One in three cases of fever in travellers is malaria; therefore diagnostics should be primarily oriented to this condition. Other diseases characteristic of hot climate zones, associated with persistent fever, include denga, hepatitis A, typhoid fever, diarrhoea of bacterial origin, acute schistosomiasis and rickettsioses. Fever can develop also in travellers suffering from non-tropical diseases, e.g. pneumonia or pyelonephritis. They can also be associated with skin diseases or injuries (rash with secondary bacterial infection, or conditions following a burn) [19, 20].

Most diseases occur within a few weeks after the return from the trip. However, there are diseases whose incubation period is six or more weeks, thus the importance of proper medical history collection by the consulting physician. Fever which develops over 3 weeks after the return from a trip exclude, with a high degree of certainty, viral haemorrhagic fevers, denga and rickettsioses. Late symptoms may suggest cutaneous, mucocutaneous or visceral leishmaniasis, chronic forms of Chagas disease, chronic brucellosis, malaria or schistosomiasis. Proper diagnosis and effective treatment depend to a large extent on the patient, who should inform the physician about any situation that could lead to infection, such as discontinuation of antimalarial chemoprophylaxis (it should be used for 7 - 28 days following the return from the endemic region), consumption of food from local markets, casual sexual relations, received injections/infusions, animal bites, insect bites or bodily injuries [5]. Omission of this information during the medical interview may delay the proper treatment; therefore increasing the awareness and knowledge of travellers is very important.

Conclusions

A regular increase in the number of visitors to the www.medycynatropikalna.pl website in recent years indicates an increased interest in travel medicine, and higher awareness of travellers regarding prophylactic measures. The highest number of visits to the www.medycynatropikalna.pl website in the autumn and winter, and the most popular destinations in Asia, Africa and Central America suggest that Poles are interested in travelling to hot countries.

Literature

1. World Tourism Organization. International tourist arrivals up 4% reach a record 1.2 billion in 2015. www.media.unwto.org/press-release/2016-01-18/ international-tourist-arrivals-4-reach-record-12-billion-2015 (accessed on: 16/02/2016)
2. Ministerstwo Sportu i Turystyki RP. Podróże Polaków w 2013 roku. Podstawowe wyniki badań [Polish Ministry of Sports and Tourism. Poles travelling in 2013. Basic study results, www.msport.gov.pl/statystyka-turystyka/ podroze-polakow-w-2013-roku-podstawowe-wyniki-badan (accessed on: 17/02/2016)
3. Ministerstwo Sportu i Turystyki RP. Turystyka w Polsce w 2014. [Polish Ministry of Sports and Tourism. Tourism in Poland in 2014.] www. msport. gov.pl/statystyka-turystyka/ulotka-turystyka-w-polsce-w-2014 (accessed on: 17/02/2016)
4. Korzeniewski K. Medycyna podróży - o czym każdy lekarz wiedzieć powinien. [Travel medicine – facts every doctor should know] Fam Med Prim Care Rev, 2012; 14 (3): 437-441
5. Korzeniewski K. Medycyna podróży. Kompendium. [Travel medicine. A compendium] Wydawnictwo Lekarskie PZWL, Warsaw 2016
6. Korzeniewski K, Juszczak D. Travel-related sexually transmitted infections. Int Marit Health, 2015; 66 (4): 238-246
7. Matteelli A, Schlagenhauf P, Carvalho AC, et al. Travel-associated sexually transmitted infections: an observational cross-sectional study of the GeoSentinel surveillance database. Lancet Infect Dis, 2013; 13 (3): 205-213
8. Leggat PA. Risk assessment in travel medicine. Travel Med Infect Dis, 2006; 4:127-134
9. Korzeniewski K, Juszczak D, Zwolińska E. Zika-another threat on the epidemiological map of the world. Int Marit Health, 2016; 67 (1): 31-37
10. Spira A. Preparing the traveller. Lancet, 2003; 361: 1368-1381
11. Freedman DO, Weld LH, Kozarsky PE, et al. Spectrum of disease and relation to place of exposure among ill returned travellers. NEJM, 2006; 354 (2): 119-130
12. Steffen R, deBernardis C, Banos A. Travel epidemiology-a global perspective. Int J Antimicrob Agents, 2003; 21:89-95
13. dela Cabada Bauche J, Dupont HL. New developments in traveler's diarrhea. Gastroenterol Hepatol, 2011; 7: 88-95
14. Korzeniewski K, Juszczak D, Jerzemowski J. Skin lesions in returning travellers. Int Marit Health, 2015; 66 (3): 173-180
15. Hochedez P, Caumes E. Common skin infections in travellers. J Travel Med, 2008; 15 (4): 252-262
16. Hochedez P, Canestri A, Lesco M, et al. Skin and soft tissue infections in returning travellers. Am J Trop Med Hyg, 2009; 80 (3): 431-434
17. Korzeniewski K, Nitsch-Osuch A, Lass A, Guzek A. Respiratory Infections in Travelers Returning from the Tropics. Adv Exp Med Biol, 2015; 10: 75-82
18. HabibNA, BehrensRH. Respiratory infections in the traveler. CurrOpinPulm Med, 2000; 6: 246-249
19. Korzeniewski K, Gawel B, Krankowska D, Wasilczuk K. Fever of unknown origin in returning travellers. Int Marit Health, 2015; 66 (2): 77-83
20. Wilson ME, Weld LH, Boggild A, et al. Fever in returned travellers: results from the GeoSentinel Surveillance Network. Clin Infect Dis, 2007; 44 (12): 1560-1568

Evaluation of risk factors affecting wound healing after an appendectomy – own experience

Ocena czynników ryzyka wpływających na gojenie się ran po appendektomii – doświadczenia własne

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Abstract. Acute appendicitis is a common disease requiring a surgical procedure. The aim of our study was to determine the factors associated with a patient (modifiable and non-modifiable) that significantly affect the process of wound healing after an appendectomy. The conclusions drawn from the study were: wound healing after cholecystectomy was adversely affected by modifiable factors, like duration of the disease symptoms, diabetes, overweight and obesity, and smoking.
Keywords: appendectomy, wound healing, complications

Streszczenie. Ostre zapalenie wyrostka robaczkowego jest bardzo częstą chorobą wymagająca leczenia chirurgicznego. Celem naszej pracy było ustalenie czynników związanych z pacjentem (modyfikowalnych i niemodyfikowalnych), które w znaczący sposób wpływają na proces gojenia się rany pooperacyjnej po appendektomii. Na podstawie naszej pracy wyciągnęliśmy wnioski, że na proces gojenia się rany po appendektomii negatywny wpływ mają czynniki modyfikowalne, takie jak długość trwania objawów chorobowych, cukrzyca, nadwaga i otyłość, a także palenie tytoniu.
Słowa kluczowe: appendektomia, gojenie rany, powikłania

Delivered: 05/04/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 347-350

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Introduction

Acute appendicitis is a common condition that requires surgical treatment. The estimated incidence in the general population is 7-10%, and differs between age groups and sexes. The dominant groups are males, children and young adults. Before the antibiotic era, the disease was associated with high mortality (up to 95%), and only a limited number of patients who developed an appendiceal phlegmon had any chance of survival. Presently, the mortality associated with acute appendicitis oscillates between 0.1 - 1%, depending on the centre and the age group.

The first appendectomy procedure was performed in 1875 in Canada, and in Poland in 1884 (by Jan Mikulicz-Radecki). Laparoscopic surgery began to flourish in the 1990s, and includes appendectomy. Nowadays, classical and laparoscopic procedures are equally common [1, 2].

The majority of surgical patients recover quickly, but some experience post-operative complications (both early and late). The most frequent ones include: purulent post-operative wounds and prolonged wound healing (up to 11%). In most cases this is associated with evacuation of the infected material through the surgical wound, but other factors are also involved. Healing of the post-operative wound is affected by numerous factors: local, general systemic and external. They may have positive effects on the regeneration processes, but also slow them down, or completely prevent proper healing. Apart from non-modifiable factors (age, sex, comorbidities, previous chemotherapy and radiotherapy), the organism is also affected by modifiable factors (smoking, glycaemic stabilisation, and body weight) [3-5].

Aim of the study

The aim of our study was to identify modifiable and non-modifiable factors associated with a patient that significantly affect the wound healing process after a classical appendectomy.

Material and methods

The study material was provided by patients in the Department of Thoracic, General and Oncological Surgery in the year 2016 due to acute appendicitis. After hospitalisation, the patients were qualified for further healthcare in the hospital's General Surgery Clinic (for 30 days following the surgery). All patients received perioperative infection prophylaxis in the form of a single dose of 1.0 g intravenous cefazolin before the operation.

The study group consisted of patients who participated in a follow-up visit (post-hospitalisation) at our surgical clinic, i.e. 125 patients (69 females and 56 males).

The available medical records from the hospital (regarding the hospitalisation period) and from the General Surgery Clinic were retrospectively analysed.

Results

The study group was divided according to age and sex. The presence of diabetes, BMI, tobacco smoking and the duration of symptoms were also analysed.

The statistical analysis was performed using Statistica 6, while the Man-Whitney U-test and Pearson's test were used for calculations.

Among the 125 subjects who participated in a follow-up visit at the General Surgery clinic, 21 patients (16.8%) experienced disturbed wound healing in the form of purulent or periwound oozing.

Group characteristics according to sex and age

The study group comprised 69 females (55%) and 56 males (45%). Difficulties with wound healing were found in 12 females (17%) and 9 males (16%).

The mean age of the patients was 39 years (39.5 years in the female group, and 38.5 years in the male group). Difficulties with wound healing were observed in 2 patients (9%) in the group aged over 65 years old, in 5 patients (24%) in the group aged 51-65 years old, in 5 patients (24%) in the group aged 36-50 years old, and in 9 patients (43%) in the group aged 20-35 years old. The statistical analysis did not reveal any significance in the correlation between age and the occurrence of a purulent post-surgical wound (42.67 ± 13.34 *vs* 38.50 ± 14.40; p = 0.123). No statistical significance was demonstrated between sex and the occurrence of a purulent post-operative wound (p = 0844). Correlations between difficult wound healing and age are presented in Figure 1.

Group characteristics according to the duration of symptoms

In the study group 22 patients experienced disease symptoms within 24 hours, 64 patients experienced the symptoms within 25-48 hours, 29 subjects within 49-72 hours, and 10 patients after more than 72 hours. A purulent post-surgical wound was found in 1 person from the 24 hour range, in 3 patients from the 25-48 hour range, in 13 subjects from the 49-72 hour range, and in 4 patients who experienced the symptoms after more than 72 hours. A statistically significantly longer duration of symptoms was demonstrated in the group of patients with purulent wounds (57.76 ± 18.24 *vs* 41.21 ± 1855; p < 0.001). Correlations between difficult wound healing and the duration of the disease symptoms are presented in Figure 2.

Group characteristics according to the presence of diabetes

In the study group 13 patients (10%) suffered from diabetes, and among the patients with disturbed wound healing 6 had diabetes (28%).

A statistically significant correlations were observed between the occurrence of a purulent wound and the presence of diabetes (46.15% *vs* 13.39%; p = 0.003).

Group characteristics according to BMI

In the study group 61 patients had normal weight (BMI 18.5 – 24.99), 55 were overweight (BMI 25.0 – 29.99), and 9 were obese (1st degree) (BMI 30.0 – 34.99). Difficult wound healing occurred in 6 patients with normal body weight, in 12 overweight patients and in 3 patient with 1st degree obesity.

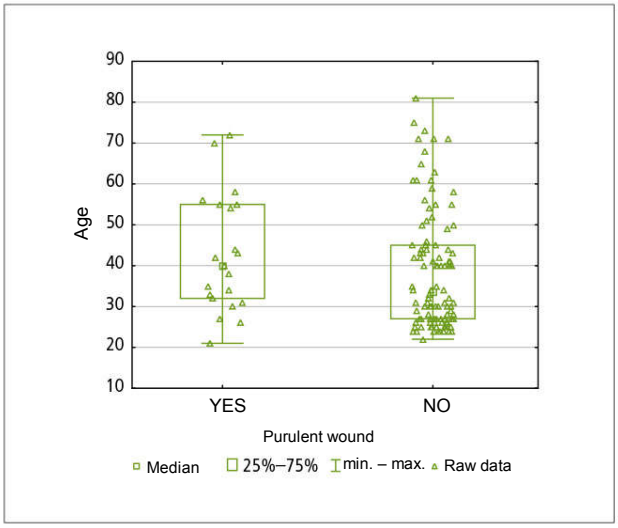

Figure 1. Prevalence of difficult healing by age
Rycina 1. Występowanie utrudnionego gojenia w zależności od wieku

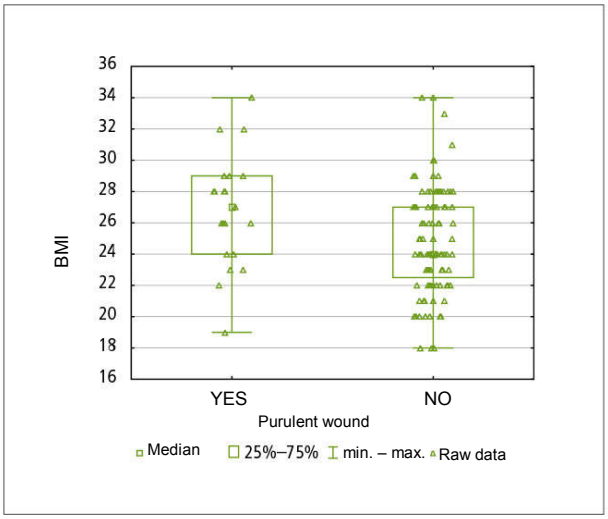

Figure 2. Prevalence of difficult healing by duration of disease symptoms
Rycina 2. Występowanie utrudnionego gojenia w zależności od długości trwania objawów chorobowych

A statistically significantly higher BMI was demonstrated in the group of patients with purulent wounds (26.81 ± 3.59 *vs* 24.86 ± 3.31; p < 0.020). Correlations between the BMI of the patients and difficult wound healing are presented in Figure 3.

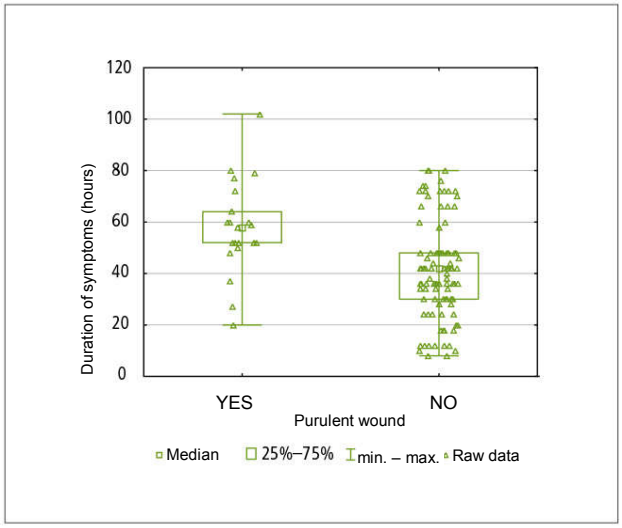

Figure 3. Prevalence of difficult healing by BMI
Rycina 3. Występowanie utrudnionego gojenia w zależności od BMI

Group characteristics considering tobacco smoking

In the study group 59 subjects (47%) were habitual smokers, 23 (18%) used to smoke in the past (more than 6 months since quitting smoking), and 43 (35%) never smoked. In the group of patients with disturbed wound healing 16 patients smoked tobacco, and in the group of subjects who never smoked or had not been smoking for at least 6 months only 5 patients experienced wound healing difficulties.

Purulent wounds were observed statistically significantly more often in patients who smoked (27.12% *vs* 7.58%; p = 0.004.)

Discussion

Wound healing is directly related to regenerative processes aimed at restoring the continuity of the damaged tissue, and the recovery of the complete functioning of the organism. The factors affecting the regeneration processes are modifiable or non-modifiable. They may have both positive and negative effects, contributing to accelerated or prolonged wound healing [1, 6]. In the diagnostics and treatment of acute appendicitis the duration of the disease symptoms is important. The longer the time, the more pronounced are the symptoms and the inflammatory process in the abdominal cavity. This translates directly into the occurrence of complications (diffuse peritonitis, perforation), and thus the course of the peri- and post-operative period. Both in children and in elderly patients, the symptoms associated with acute abdominal diseases may be atypical. In such cases both the diagnostics and implementation of appropriate therapy may be delayed, resulting in an increased inflammatory process and a higher risk of post-operative complications [5, 7, 8]. In our study, as in the one by Papandria [2], a clear correlation

could be found between the duration of the disease symptoms and difficulties with wound healing.

One of the modifiable factors prolonging the post-operative wound healing and increasing the risk of wound infection is unstable diabetes, especially the insulin-dependent type. It is important to maintain the preferred glycaemic values of 100-140 mg/dl in the peri-operative period and during the time of wound healing. In the course of diabetes, microangiopathic and macroangiopathic lesions develop, which leads to decreased tissue flow. Hyperglycaemia reduces the immune reaction to bacteria, mycotic and viral infections. During appendectomy, the risk of soft tissue infection in the operated area is increased, especially when dealing with purulent, gangrenous appendicitis, or if the appendix is perforated. In hyperglycaemic patients the number and function of leukocytes and interleukin 6 are reduced, which is directly related to the severity of the inflammation [2, 3].

Our study confirms this relationship: in the studied group the post-operative healing difficulties in the form of a purulent wound were observed statistically significantly more often in patients suffering from diabetes ($p = 0.003$).

The correlation between obesity and the increased symptoms of diabetes is recognised. Excessive fat tissue leads to insulin resistance, thus reducing the sensitivity of tissues to insulin. Patients with visceral obesity are at particular risk of difficult post-operative wound healing and bacterial superinfection. This is directly related to poor vascularisation of the fat tissue and reduced tissue flow in patients with diabetes [7, 9].

Our material also demonstrates a statistical correlation between the occurrence of overweight or obesity and difficult wound healing. Difficult wound healing following an appendectomy occurred in 10% of patients with normal weight, in 22% of overweight patients, and in 33% of patients with 1st degree obesity. Anaya confirms this correlation in his study [6].

Another modifiable factor affecting the post-operative wound healing is tobacco smoking. In the literature there are reports of a relationship between smoking tobacco and the impaired phagocytic activity of granulocytes and monocytes. Additionally, the tissue oxygenation is limited, and coagulation increases. Collagen production in patients who smoke is reduced, which also affects post-operative wound healing [10-12]

This correlation is clearly visible in our material: in the group of patients with disturbed healing, 16 patients smoked tobacco, i.e. 76% of the group, whereas in the group of patients who never smoked or had not smoked for at least 6 months only 5 subjects (24%) experienced this complication.

Conclusions

The process of wound healing following an appendectomy is adversely affected by non-modifiable factors, such as the duration of disease symptoms, and by modifiable ones, such as unstable diabetes, obesity and the smoking of tobacco.

Literature

1. Simpson J, Samaravntera A, Sara R, Lobo D. Acute appendicitis -a benign disease? Ann R Coll Surg Engl, 2008; 90 (4): 313-316
2. Papandria D, Goldstein S, Rhee D, et al. Risk of perforation increases with delay in recognition and surgery for acute appendicitis. J Surg Res, 2013; 184 (2): 723-729
3. Malone D, Genuit T, Tracy J, et al. Surgical site infections: reanalysis of risk factors. J Surg Res, 2002; 103: 89-95
4. Warner D. Postoperative smoking cessation: How long enough? Anesthesiology, 2005; 102: 883-884
5. Sheu B, Chiu T, Chen J, et al. Risk factors associated with perforated appendicitis in elderly patients presenting with signs and symptoms of acute appendicitis. ANZ J Surg, 2007; 77 (8): 662-666
6. Anaya D, Dellinger E. The obese surgical patient: a susceptible host for infection. Surg Infect, 2006; 7: 473-480
7. Marjolijn E, Timmerman W, Groen H, et al. The influence of underweight and obesity on the diagnosis and treatment of appendicitis in children. J Colorectal Dis, 2016; 31: 1467-1473
8. McGowan D, Howlader M, Patel R, et al. Management and outcome of appendicitis among octogenarians in an English hospital over a five year period. IntJ Surg, 2011; 9 (8): 669-671
9. Bamgbade 0, Rutter T, Nafiu 0, Dorje P. Postoperative complications in obese and nonobese patients. World J Surg, 2007; 31: 556-560
10. Dudzińska K, Mayzer-Zawadzka E. Wpływ palenia tytoniu na okres pooperacyjny. [Effects of tobacco smoking on the post-operative period] Anest Inten Terap, 2008; 40: 108-113
11. Pirogowicz I, Gwiazda E, Hoffman K, et al. Palenie papierosów a zaburzenia odporności. [Tobacco smoking and impaired immune function] Przegl Lek, 2007; 64: 886-888
12. Molier A, Villebro N, Pedersen T, et al. Effect of preoperative smoking intervention on postoperative complications: randomized clinical trial. Lancet, 2002; 359: 114-117

QRS amplitude measurement for standard electrocardiograms as a predictor of impaired left ventricular ejection fraction

Wartość oceny amplitudy zespołu QRS standardowego elektrokardiogramu jako predyktora upośledzonej frakcji wyrzutowej lewej komory serca

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Abstract. Early diagnosis of impaired left ventricle systolic function significantly improves the prognostic results for this group of patients. The electrocardiogram (ECG) remains the simplest and most common test to direct therapeutic decisions in cardiology patients. The aim of this analysis is to assess the relationship between reduced left ventricular ejection fraction (LVEF) and parameters of lead aVR in a standard ECG. The authors evaluated 157 consecutive patients with normal LVEF (≥50%) and reduced LVEF (<50%) who underwent a standard 12-lead ECG to assess the amplitude of the lead aVR. There was a significant correlation between the LVEF and the amplitude of lead aVR (QRS $_{„R}$). In the analysis of the ROC curve for a 5.5 mm cut-off, the sensitivity of this parameter to identify the reduced LVEF was 50.9%, and specificity was 93%. Amplitude in the lead aVR calculated from a standard ECG correlates with LVEF calculated by echocardiography.
Keywords: left ventricular ejection fraction, electrocardiogram, heart failure

Streszczenie. Wczesne rozpoznanie upośledzonej funkcji skurczowej lewej komory serca znacząco poprawia wyniki rokownicze tej grupy pacjentów. Elektrokardiogram (EKG) pozostaje najprostszym i najbardziej powszechnym badaniem pozwalającym ukierunkować decyzje terapeutyczne u pacjentów kardiologicznych. Celem prezentowanej analizy jest ocena powiązania zmniejszonej frakcji wyrzutowej lewej komory *[left ventricule ejection fraction* - LVEF) z parametrami odprowadzenia aVR standardowego EKG. Metody. Ocenie poddano kolejnych 157 pacjentów z prawidłową LVEF (>50%) i zmniejszoną LVEF (<50%), u których w standardowym 12-odprowadzeniowym EKG oceniano amplitudę odprowadzenia aVR. Wyniki. Stwierdzono znamienną korelację pomiędzy LVEF a amplitudą odprowadzenia aVR (QRS_{avR}). Na podstawie analizy krzywej ROC dla punktu odcięcia 5,5 mm czułość tego parametru w identyfikacji zmniejszonej LVEF wyniosła 50,9%, a specyficzność 93%. Wnioski. Amplituda odprowadzenia aVR obliczana na podstawie standardowego EKG koreluje z frakcją wyrzutową lewej komory serca obliczaną w badaniu echokardiograficznym.
Słowa kluczowe: frakcja wyrzutowa lewej komory, elektrokardiogram, niewydolność serca

Delivered: 22/12/2016
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 351-355

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Introduction

Heart failure (HF) is a population problem affecting approximately 26 million people around the world. The estimated direct cost associated with HF is 1-2% of the total healthcare expenses, which also makes the disease an economic problem [1]. In patients with left ventricular systolic dysfunction (LVSD), adaptation changes take place in the cardiomyocytes, resulting in abnormal remodelling of the ventricle, irreversible in later stages of the disease. Actively seeking the LVSD, especially at the asymptomatic stage, is the right course of action. Echocardiography is the method of choice in the assessment of left ventricular ejection fraction (LVEF), due to its precision, safety and cost. However, in clinical practice the simplest and most common test is the standard 12-lead ECG. In some of the literature studies available the authors comment that the aVR lead of a standard ECG can be used to assess HF [3, 4, 6, 8], and LVEF may be calculated mathematically, based on the electrocardiographic parameters [12]. Such reports motivated us to conduct the present study.

The aVR lead is an enhanced limb lead, in which the positive electrode is placed on the right arm. It registers

the electrical activity from the right ventricular outflow area and part of the septal wall, as well as providing a non-specific perspective on the left ventricle. Recently, researchers proved the usefulness of this lead in the prognosis of the left coronary artery trunk stenosis, three-vessel coronary artery lesions, risk of a shock or sudden cardiac death and Brugada syndrome. Analysis of the aVR lead is also used in dextrocardia, in the differential diagnosis of tachycardia or in the location of additional tracts. The aVR lead should be analysed together with other ECG leads; however, the above observations may suggest the usefulness of this lead as an isolated source of information.

Aim of the study

The aim of the study was to compare the systolic function of the left ventricle based on the echocardiographic measurement of the left ventricular ejection fraction (LVEF) with the assessment of the amplitude of the QRS complexes in a standard 12-lead ECG, in order to determine the test's usefulness in predicting left ventricular systolic defect.

Material and methods

Study group

The assessment involved 157 consecutive patients hospitalised in the Department of Internal Diseases and Cardiology of the Military Institute of Medicine in the years 2012-2013. They received an echocardiographic examination with LVEF assessment and a standard 12-lead electrocardiographic examination. The study protocol was approved by the Bioethical Committee of the Military Institute of Medicine in Warsaw (approval no 62/WIM/2012).

A total of 157 patients received an echocardiographic examination including LVEF assessment, and a standard 12-lead ECG test. The patients were divided into two groups. The first one comprised 57 patients diagnosed with dilated cardiomyopathy or ischaemic cardiomyopathy with impaired LVEF (<50%), and the second, control group comprised 100 patients with preserved LVEF (≥50%). The following inclusion criteria were applied: age >18 years old, and sinus rhythm in the ECG record. The exclusion criteria were: cardiac rhythm other than a sinus rhythm, bundle branch blocks in ECG records, and a condition following a cardiac stimulator implantation (including ICD and CRT).

Electrocardiographic examination

A standard resting 12-lead ECG was performed by the same, trained personnel using a BTL-08LT (BTL) with a sensitivity of 1 mm/mV, and a paper speed of 25 mm/s. All the limb and precordial leads were analysed, with a particular focus on the aVR lead. Amplitude of QRS complexes was assessed (as a sum of absolute value of the maximum positive and negative deflection of the QRS waves), and their maximal and mean values were determined. The measurements were conducted using a magnifying glass with an accuracy up to 0.5 mm.

Echocardiography

The echocardiographic examination with LVEF assessment was performed using Vivid S6 and Vivid i devices (GE Medical Systems), following a standard protocol. LVEF was calculated with the use of the modified Simpson's method of discs, using apical projections as the standard.

Statistical analysis

The statistical analysis of the results was performed with the use of Statistica 10.0 for Windows (StatSoft Inc.). The collected results were expressed as mean ± standard deviations for quantitative variables, and numbers and percentages for qualitative variables. Spearman's rank regression analysis was used in the statistical analysis of the quantitative data with distributions other than normal, and the Mann-Whitney U-test was applied. The assumed statistical significance level was $p < 0.05$.

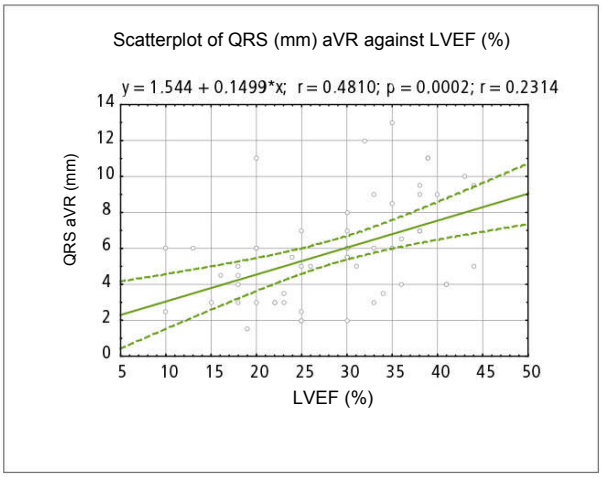

Figure 1. Correlations between left ventricular ejection fraction (LVEF) and amplitude in lead aVR (QRS_{aVR})
Rycina 1. Korelacje pomiędzy frakcją wyrzutową lewej komory (LVEF) a amplitudą odprowadzenia aVR (QRS_{aVR})

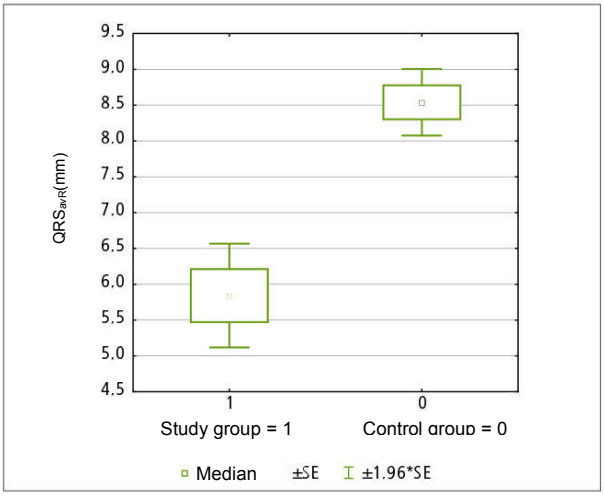

Figure 2. Box-and-whisker plot of aVR lead amplitude (QRS_{aVR}) by groups
Rycina 2. Wykres ramka-wąsy dla amplitudy odprowadzenia aVR (QRS_{aVR}) w grupach

Results

The results of 157 patients were analysed. The clinical group characteristics are presented in Table 1. In the group of patients with reduced LVEF, 75% were patients diagnosed with dilated cardiomyopathy, and 25% with ischaemic cardiomyopathy (post-infarction).

Table 1. Basic clinical characteristics of study group
Tabela 1. Podstawowa charakterystyka kliniczna grupy badanej

Parameter	Group one (n = 57)	Group two (n = 100)	P
Age (years), mean ± SD	58.4 ± 11.2	55.2 ± 18.3	si
Females/males	8/49	48/52	**<0.0001**
Left ventricular ejection fraction LVEF **(%)**	28.7 ± 8.9	60.8 ± 4.9	**<0.00001**
Coronary artery disease	25 (43.9%)	23 (23%)	**0.01**
Arterial hypertension	30 (52.6%)	50 (50%)	si
Myocardial infarction	14 (24.5%)	11 (11%)	**0.04**
BMI (kg/m^2)	29.3 ± 5.2	26.4 ± 4.3	**0.0005**

In both groups there were no significant differences regarding age. The number of males was higher in the first group than in the second group. A comparative analysis of electrocardiographic parameters was conducted in both groups (Tab. 2).

In the study group a statistically significant correlation was found between LVEF and aVR amplitude (QRSavR) (r: 0.503, p = 0.000065), mean amplitude of classical limb leads - I, II, III ($mQRSA_{3L}$) (r: 0.304, p = 0.021137), and a mean amplitude of all limb leads - I, II, III ($mQRSA_{6L}$) (r: 0.2873, p = 003021), with the strongest correlation, among all the studied parameters, observed for the aVR lead amplitude (QRS_{avR}). In the precordial leads no statistically significant correlations with LVEF were found (p > 0.05). Based on the ROC analysis for the aVR lead amplitude (QRS_{aVR}) the following results of AUC adjustment were obtained: AUC 0.775 ± 0.042, 95% CI: 0.694-0.857, p < 0.0001. For the 5.5 mm cut-off, the sensitivity of the parameter was 50.9%, and its specificity was 93% (PPV 80.6%, NPV 76.9%) (Fig. 3). Similar results were obtained for the relationship between the aVR amplitude and the mean amplitude of all 12 leads ($aVR/mQRSA_{12L}$), for which the adjustment values were AUC 0.77 ± 0.042, 95% CI: 0.689-0.857, p < 0.0001. For the 0.594 mm cut-off, the sensitivity of the parameter was 59.6%, and its specificity was 87% (PPV 72.3%, NPV 79.1%). In the comparative analysis the two parameters did not differ statistically significantly (p = 0.88) as predictors of impaired left ventricular ejection fraction.

Table 2. Comparison of selected ECG parameters by group (explanation of abbreviations in text)
Tabela 2. Porównanie wybranych parametrów EKG w grupach (objaśnienia skrótów w tekście)

Parameter	LVEF <50% n = 57 Mean ± SD	LVEF <50% n = 100 Mean ± SD	P*
QRS|(mm)	7.47 ± 4.11	8.80 ± 3.56	0.017
QRS||(mm)	6.58 ± 2.71	9.39 ± 3.89	0.000002
QRS|||(mm)	7.43 ± 4.47	8 ± 6.52	0.925
QRS_{aVR}(mm)	5.84 ± 2.79	8.54 ± 2.36	<0.000001
QRS_{aVL}(mm)	6.78 ± 3.96	6.63 ± 3.65	0.859
QRS_{aVF}(mm)	6.7 ± 7.34	7.0 ± 4.26	0.167
QRS_{V1} (mm)	9.91 ± 4.34	10.41 ± 4.09	0.592
QRS_{V2}(mm)	13.21 ± 7.24	16.89 ± 6.27	0.0001
QRS_{V3}(mm)	17.43 ± 7.94	15.99 ± 6.5	0.586
QRS_{V4}(mm)	16.8 ± 7.75	17.28 ± 6.27	0.284
QRS_{V5}(mm)	15.45 ± 7.68	16.79 ± 5.78	0.113
QRS_{V6}(mm)	14 ± 7.92	13.3 ± 4.56	0.988
$mQRSA_{3L}$(mm)	7.16 ± 3.00	8.74 ± 3.16	0.004
$mQRSA_{6L}$(mm)	40.82 ± 17.74	48.40 ± 16.20	0.008
*Mann-Whitney	U-Test		

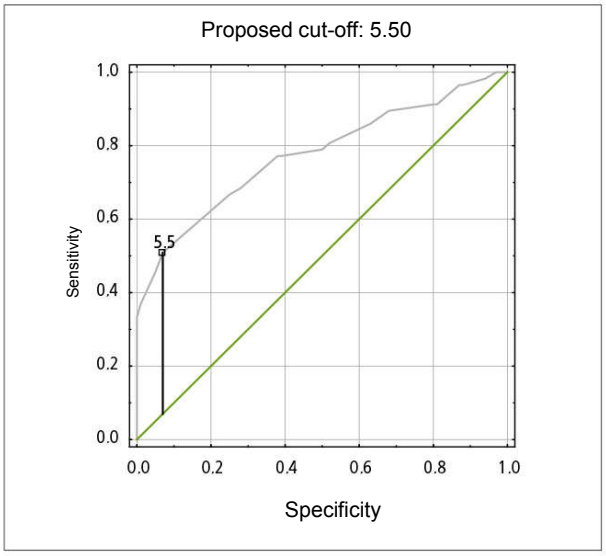

Figure 3. ROC curve of aVR lead amplitude (QRS_{aVR})
Rycina 3. Wykres krzywej ROC dla amplitudy odprowadzenia aVR (QRS_{aVR})

Discussion

A low voltage for QRS complexes is rarely observed in healthy individuals, and it may be associated with significant pathologies of the cardiac muscle (postinfarction heart failure, carditis, dilated cardiomyopathy or, less frequently, amyloidosis), and with extracardiac abnormalities (fluid in the pericardial sac, constrictive pericarditis, pleural fluid, pulmonary emphysema, hypothyroidism or obesity). In 1982, Goldberger described an electrocardiographic triad in which a high QRS voltage in the precordial leads, a relatively low voltage of limb leads, and a small progression of the R wave (V_1-V_4) were associated with HF and impaired left ventricular function. It was also observed that, although Goldberger's triad is a specific indicator of dilation cardiomyopathy, it does not reflect the degree of left ventricular dysfunction. Similar results were presented in a study by Chinitz et al. [13], assessing the 12-lead ECG of patients with low voltage QRS in the limb leads and normal voltage in the precordial leads. Based on clinical data and imaging tests, common causes of the low QRS voltage, found in 51 out of 100 patients, were identified. In the group of patients without identified causes, 63% had an enlarged left ventricle with a mean LVEF of 33%. It was concluded that in the absence of classical reasons for low amplitudes of the QRS complexes, a low voltage in the limb leads in an ECG with a normal amplitude of precordial leads may indicate a severe dilated cardiomyopathy.

In a study by Madias J. [7] a serial change in the amplitude of the QRS complexes was assessed in a patient with heart failure in the period of exacerbations and circulatory stabilisation. It was observed that the analysis of the amplitude of ECG limb leads correlated with the changes in the patient's body weight, and that it was useful in assessment of HF patients with peripheral oedemas. However, no such correlation was found for the precordial leads, which supports the claim that they are not helpful in serial assessment, due to limited reproducibility, as emphasised in the literature [14]. Moreover, certain publications indicated that the usefulness of the analysis of limb leads was comparable to that of determination of natriuretic peptides in patients with heart failure [8]. The study by Durmus E. et al. [9] even indicated that increased voltage of QRS complexes in the limb leads, especially in the aVR lead, demonstrated higher sensitivity than NT-proBNP in predicting clinical improvement in decompensated heart failure.

Modern ECG devices measure only leads I and II, and on this basis the remaining 4 limb leads are calculated (III, aVR, aVL, aVF) [2]. This suggests that, referring to the correlation between the leads aVR=-(I+II)/2 [2], the aVR lead may be used as an index for 6 limb leads, and that the index could help to register changes in all the leads, based on the measurements of only leads I and II [3-6]. The above observation was confirmed in other

studies by Madias J. [3, 6], where the significant role of the aVR lead amplitude was emphasised as an illustration of the sum of limb leads in the context of evaluation of HF patients.

It should also be emphasised that correlations were found between the changes in aVR lead voltage and changes in body weight in patients with heart failure [10].

The presented study confirmed the usefulness of the assessment of aVR lead amplitude in a standard ECG in the evaluation of left ventricular systolic dysfunction. Simultaneously, the analysis of the amplitude precordial leads was proven ineffective in the assessment of LVSD, as suggested in the above studies. Interestingly, extending the aVR amplitude measurement to include its relation to the mean amplitude of all the ECG leads does not increase suitable sensitivity in LVSD assessment. In the obtained results, both parameters demonstrated moderately high specificity and relatively low sensitivity, which does not limit their usefulness, as their sensitivity does not differ significantly from that of other electrocardiographic parameters commonly used in clinical practice. For instance, widely used criteria for the assessment of left ventricular hypertrophy (LVH) demonstrate a median specificity of 89-99%, and median sensitivity of 10.5-21% [11]. A statistically significant difference in BMI in both groups of patients is noteworthy. However, according to the Polish Cardiac Society recommendations regarding "the use of electrocardiographic diagnostics", none of the common criteria based on the amplitude of electrographic leads includes the BMI. The presented parameter, based on the analysis of aVR lead amplitude may be used in the diagnostics, therapy and monitoring of patients with heart failure with LVSD. It may also be an important element of screening tests, which is of much importance for the public health.

Conclusions

- The aVR lead amplitude, calculated on the basis of a standard ECG, correlates with left ventricular ejection fraction derived in an echocardiographic examination.
- Extending the aVR lead amplitude measurement to include the relationship to the mean amplitude of a standard 12-lead ECG does not increase the sensitivity of the left ventricular systolic function assessment.
- The evaluation of the left ventricular systolic function based on the analysis of the aVR lead amplitude may be used in clinical practice.

Literature

1. Ambrosy A, Fonarow G, Butler J, et al. The global health and economic burden of hospitalizations for heart failure. J Am Coll Cardiol, 2014; 63: 1123-1133
2. Kligfield P. How many leads are in the 12-lead electrocardiogram, and what does that mean for the diagnosis of acute ST-elevation myocardial infarction? J Electrocardiol, 2007; 40 (6): 472-474
3. Madias JE. aVR, an index of all ECG limb leads, with clinical utility for monitoring of patients with edematous states, including heart failure. Pacing Clin Electrophysiol, 2009; 32 (12): 1567-1576
4. Madias JE. Comparison of lead aVR "net QRS area" and "peak-to-peak amplitude" as indices of all limb electrocardiogram leads: Implications for the diagnosis, management, and follow-up in patients with heart failure. Med Eng Phys, 2012; 34 (8): 1037-1040
5. Madias JE, Gregg RE. Comparison of electrocardiogram aVR QRS metrics, as indices of the sums of leads I and II, and all 6 limb leads. Med Eng Phys, 2013; 35 (8): 1150-1154
6. Madias JE. Lead aVR "net QRS area" as an index of all 6 limb leads: implications for the diagnosis and follow-up of patients with edematous states, including heart failure. J Electrocardiol, 2011; 44: 748-754
7. Madias JE. Superiority of the limb leads over the precordial leads on the 12-lead ECG in monitoring fluctuating fluid overload in a patient with congestive heart failure. J Electrocardiol, 2007; 40 (5): 395-399
8. Kataoka H, Madias JE. The value of standard 12-lead electrocardiography for monitoring body fluid status in established heart failure patients. J Am Coll Cardiol, 2011; 57 (14s1): E42-E42
9. Durmus E, Hunuk B, Erdogan 0. Increase in QRS amplitudes is better than N-terminal pro-B-type natriuretic peptide to predict clinical improvement in decompensated heart failure. J Electrocardiol, 2014; 47 (3): 300-305
10. Kataoka H, Madias JE. Changes in the amplitude of electrocardiogram QRS complex during follow-up of heart failure patients. J Electrocardiol, 2011; 44(3):394.e1-9
11. Pewsner D, Jiini P, Egger M, et al. Accuracy of electrocardiography in diagnosis of left ventricular hypertrophy in arterial hypertension: systematic review. BMJ, 2007; 335:711-719
12. Krake P. Left ventricular ejection fraction can be derived from simple ECG measurements. JAAC, 2005; 45 (Supp.): 118A
13. Chinitz JS, Cooper JM, Verdino RJ. Electrocardiogram voltage discordance: interpretation of low QRS voltage only in the limb leads. J Electrocardiol, 2008; 41 (4): 281-286
14. Kania M, RixH, Fereniec M, etal. The effect of precordial lead displacement on ECG morphology. Med Biol Eng Comput, 2014; 52: 109-119

Diagnostic value of minihysteroscopy in the diagnosis of endometrial polyps

Wartość diagnostyczna minihisteroskopii w rozpoznaniu polipów endometrialnych

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Abstract. Endometrial polyps are the most common pathology of the uterine cavity. They are more frequent in postmenopausal women. The polyps may be asymptomatic or cause irregular spotting and uterine bleeding. Reproductive organ ultrasonography is a non-invasive diagnostic procedure to make a preliminary diagnosis of endometrial polyps. Diagnostic and treatment procedures in polyps include hysteroscopy (preferred) and D&C procedures. The study analyses the medical history of patients of the Gynaecology and Oncological Gynaecology Clinic, Military Institute of Medicine in Warsaw, who underwent a minihysteroscopy procedure due to suspected uterine cavity pathology in the years 2013-2016. Analysis of the results of the hysteroscopic visualization and histopathological examination of tissue extracted during the procedure showed high sensitivity of hysteroscopy in detecting endometrial polyps. In the group of postmenopausal females, the detection rate was about 97.3% and for premenopausal females about 91.2%. Hysteroscopy specificity was quite low in both groups, at about 51%. In conclusion, a hysteroscopy should be a gold standard in the diagnosis of endometrial polyps, both in premenopausal and postmenopausal women.
Key words: minihysteroscopy, endometrial polyp, diagnosis, histopathology, sensitivity

Streszczenie. Polipy endometrialne są najczęściej występującą patologią jamy macicy. Częściej występują u kobiet po menopauzie. Polipy mogą być bezobjawowe lub powodować nieprawidłowe plamienia i krwawienia z macicy. Nieinwazyjnym badaniem diagnostycznym pozwalającym ustalić rozpoznanie wstępne polipa endometrialnego jest USG narządu rodnego. Do diagnostyczno-leczniczych zabiegów wykonywanych w przypadku podejrzenia polipów należy histeroskopia (preferowana) lub, w przypadku braku odpowiedniego sprzętu, wytyżeczkowanie jamy macicy (abrazja). W niniejszej pracy przeanalizowano dokumentację medyczną pacjentek Kliniki Ginekologii i Ginekologii Onkologicznej Wojskowego Instytutu Medycznego w Warszawie, u których w latach 2013-2016 przeprowadzono zabieg histeroskopii z powodu podejrzenia patologii jamy macicy. Na podstawie analizy wyników badania histeroskopowego i badania histopatologicznego materiału pobranego z jamy macicy w czasie histeroskopii wykazano dużą czułość histeroskopii w wykrywaniu polipów endometrialnych. W grupie pacjentek przed menopauzą czułość wynosiła około 91,2%, natomiast w grupie pacjentek po menopauzie około 97,3%. Swoistość histeroskopii była dość mała i wynosiła około 51%. Z przeprowadzonej analizy wynika, że histeroskopia powinna być metodą z wyboru w diagnostyce polipów endometrialnych zarówno w grupie kobiet przed, jak i po menopauzie.
Słowa kluczowe: minihisteroskopia, polip endometrialny, diagnoza, histopatologia, czułość

Delivered: 19/04/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 356-361

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Introduction

Endometrial polyps are the most common pathologies of the uterine cavity, found in approximately 7.8-34.9% of women [1]. They are defined as semi-spherical (less often pedunculated) lesions about 0.5-3 cm in diameter, covered with columnar epithelium. Some may present a normal endometrial structure, but more frequently they contain cystic-enlarged glands. The polyp can be pedunculated or attached with a large base to the uterine wall (a flat polyp with a wide pedicle). In histopathological examinations, a polyp is a local hypertrophy of the endometrial glands and stroma around a vascular core. In some cases it may contain smooth muscle cells [2]. Endometrial polyps are more frequently found in postmenopausal women, as well as women who are obese, diabetic or hypertensive. Polyps are believed to constitute approximately 79% of the benign pathologies of the uterine cavity [3]. Approximately 1.5-2% of polyps are malignant, as

confirmed by histopathological examination.

About 50% of endometrial polyps are associated with clinical symptoms such as postmenopausal bleeding, breakthrough spotting or prolonged menstrual bleeding. The rest remain asymptomatic, and are found only by accident during an ultrasound examination.

A transvaginal ultrasound is a standard imaging test used in the diagnostics of the reproductive organ. Often the ultrasound alone allows the diagnosis to be established. Depending on the image quality, and the experience of the physician performing the test, indications for further, usually invasive, diagnostics can be confirmed or excluded. In some cases, the type of pathology is determined with a high probability, which enables the appropriate surgical procedure to be chosen. Due to the oncological risk, endometrial polyps need to be examined histopathologically. Currently, the method of choice in the treatment of endometrial polyps is hysteroscopy.

Miniaturisation of the equipment, which reduces trauma to the uterus, enables a hysteroscopy to be performed without anaesthesia. Moreover, following the see-and-treat principle, it allows the conducting of a diagnostic and a therapeutic procedure simultaneously, i.e. to present and remove the pathological lesions in the cervical canal and in the uterine cavity. In the Department of Gynaecology and Oncological Gynaecology of the Military Institute of Medicine, patients with a suspected pathology of the uterine cavity are typically first qualified for minihysteroscopic procedures. Classical curretage is performed only if contraindications for hysteroscopy occur.

Aim of the study

The aim of this study is to assess the contingency between the diagnosis established on the basis of a hysteroscopic visualisation of the uterine cavity, and histopathological diagnosis based on the tissue collected during the procedure from patients with an endometrial polyp. Based on the analysis of medical records of 1,031 patients, the authors assessed the sensitivity and specificity, as well as the predictive value of minihysteroscopy as a diagnostic tool in the diagnosis of polyps of the uterine cavity.

Material and methods

This was a retrospective study involving the analysis of medical records of patients from the Department of Gynaecology and Oncological Gynaecology of the Military Institute of Medicine in Warsaw, who received a minihysteroscopic procedure in the years 2013-2016. The study received a positive opinion of the Bioethical Committee of the Military Institute of Medicine in Warsaw, no. 4/WIM/2016 from 20/01/2016.

The study involved 1,031 women who were referred to a hysteroscopy due to suspected pathologies in the uterine cavity, observed in an ultrasound examination. Each patient underwent a minihysteroscopic procedure, which involved collection of material for histopathological examination.

Excluded from the study were women with a diagnosis or suspicion of pregnancy, cervical cancer or active inflammatory disease of the minor pelvis, as well as those with ongoing profuse bleeding from the reproductive tract. Hysteroscopy in women of childbearing potential was performed in the first phase of the cycle (by the 12th day of the cycle), while in postmenopausal women the day of the procedure was irrelevant.

The procedures were performed using rigid hysteroscopes by Karl Storz Endoscope, Germany, with an oval sheath, and the largest external diameter of 4 mm or 5 mm. The layered structure of the hysteroscopes enabled a continuous flow of the fluid dilating the uterine cavity. The hysteroscopes used in the study also had a working channel of 5 Fr (French) in diameter, which enabled the introduction of tools. Wide-angle, multi-lens optics (telescopes) of 2 mm and 2.9 mm in diameter were used in the optical system of the device, with a frontal image deflection angle of 30°. The medium dilating the uterine cavity during the hysteroscopy (0.9% solution of NaCl) was supplied via a catheter under approximately 50-60 mmHg pressure. The pressure was controlled by a hysteroscopic Hysteromat pump by Karl Storz Endoscope, Germany. The outflow catheter was also connected to the hysteroscope. The device was connected to an Imagel camera by Karl Storz Endoscope, and to a source of xenon light with regulated power. The image from the camera was presented on a monitor of SDI quality.

The procedures were performed in surgically aseptic conditions, without the necessity of disinfection of the vulva and vagina, or sterile coverage of the surgical field. During the procedure, the patient was in the lithotomy position.

The surgery was conducted according to the methodology described by Professor S. Bettocchi. Procedures were performed via vaginoscopy, without the use bullet forceps or specula. After filling the vagina with saline, and presentation of the posterior vaginal vault and the external orifice of the cervical canal, the hysteroscope was directed towards the external orifice of the cervical canal. Next, the endoscope was introduced through the cervical canal into the uterine cavity. When the area was adequately visualised, the abnormalities in the uterine cavity were assessed. Following the definition of a polyp of the uterine cavity (endometrial polyp), in the visual inspection a polyp-shaped lesion, protruding from the internal

uterine wall towards the cavity [3], was considered a polyp. The described lesions in each case were removed with the use of hysteroscopic tools (scissors, grasper), or with a twizzle bipolar electrode by Gynecare, connected to the Versapoint generator by the same manufacturer. The collected material was preserved in 4% formalin solution, then transported to the histopathology laboratory, where it underwent a standard assessment by a pathomorphologist. The Head of the Histopathology Laboratory of the Military Institute of Medicine in Warsaw consented to using the histopathological test results for the purpose of this study.

The statistical analysis was conducted with the use of the R statistical package, version 3.1.2 (R Core Team [2014]. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. www.R-project.org/).

In the descriptive statistics for categorical variables, the number of observations and the percentage of occurrences were considered. The categorical variables were compared using the Chi^2 test or the Fisher exact test, depending on the size of individual categories. The continuous variables were first analysed with the use of the Shapiro-Wilk test, and subsequently, depending on the result, for those variables with a normal distribution the mean and standard deviation were determined, whereas for those variables with an abnormal distribution the median and the 25% and 75% (Q1 and Q3) values were provided.

The assessment of contingency between the diagnosis of an endometrial polyp based on hysteroscopy and histopathological examination was conducted using the analysis of a contingency table for paired methods (hysteroscopy vs. histopathology). Additionally, the following predictive values were determined: sensitivity and specificity, as well as positive and negative predictive values relative to the method considered superior in a given pair of methods (histopathological examination for hysteroscopy).

The significance level was 0.05 for all the analyses.

Results

The mean age of the women included in the study was 45.1 years (SD -12.6; IQR 3.0, 55.0). The majority of them, n = 698 (76.7%), were women of reproductive age. The remaining group comprised women of postmenopausal age. Among the women in the study group, 236 (22.9%) were nulliparous, and 795 (77.1%) were multiparous. The number of deliveries in multiparous women was analysed. 274 women (26.6%) had 1 delivery, 380 women (36.8%) had 2 deliveries, and 141 women (13.7%) had at least 3 deliveries.

The statistical analysis demonstrating an endometrial polyp in the hysteroscopic examination was found in 70.8% (n = 730) of the 1,031 analysed women. The majority of them (65.9%) were premenopausal. The presence of an endometrial polyp confirmed by a histopathological examination was observed in 49% (n = 505) of the 1,031 patients in the analysed group. As above, most of the women (62.5%) were premenopausal.

The obtained results demonstrated that in 472 women (45.8%) the endometrial polyp diagnosis was established both in the hysteroscopic and histopathological examination. In 25.0% the diagnosis was established by hysteroscopy, but was not confirmed by histopathological examination, and in 3.2% polyps were found in the histopathological tests, although not in the hysteroscopic procedure. 26.0% of the patients were not diagnosed with polyps with either of the methods. Table 1 presents a comparison of the endometrial polyp diagnosis for hysteroscopy with the diagnosis based on a histopathological examination, for the entire study group. Table 2 shows a comparison of the polyp diagnosis in the group of patients before menopause, and Table 3 presents the results for postmenopausal patients.

Table 1. Diagnosis of an endometrial polyp by hysteroscopy (HSK) versus histopathology (HP) - all study groups
Tabela 1. Rozpoznanie polipa w histeroskopii (HSK) i w histopatologii (HP) - cała grupa

HSKi/sHP		
	HP: yes	HP: no
HSK: yes	472 (45.8%)	258 (25.0%)
HSK: no	33 (3.2%)	268 (26.0%)
n		1031
McNemar test	chi^2:172.4	*p-value:* <0.001
Sensitivity		93.5%
Specificity		51.0%
PPV		64.7%
NPV		89.0%

Table 2. Diagnosis of an endometrial polyp by hysteroscopy (HSK) versus histopathology (HP) - premenopausal group
Tabela 2. Rozpoznanie polipa w histeroskopii (HSK) i w histopatologii (HP) - grupa kobiet przed menopauzą

HSKi/sHP		
	HP: yes	HP: no
HSK: yes	280 (40.1%)	192 (27.5%)
HSK: no	27 (3.9%)	199 (28.5%)
n		698
McNemar test	chi^2:122.8	*p-value:* <0.001
Sensitivity		91.2%
Specificity		50.9%
PPV		59.3%
NPV		88.1%

Table 3. Diagnosis of an endometrial polyp by hysteroscopy (HSK) versus histopathology (HP) - postmenopausal group
Tabela 3. Rozpoznanie polipa w histeroskopii (HSK) i w histopatologii (HP) - grupa kobiet po menopauzie

HSKi/sHP		
	HP: yes	HP: no
HSK: yes	179 (56.5%)	65 (20.5%)
HSK: no	5 (1.6%)	68 (21.5%)
n		317
McNemar test	chi^2: 49.7	*p-value:* <0.001
Sensitivity		97.3%
Specificity		51.1%
PPV		73.4%
NPV		93.2%

An analysis of the results based on the McNemar test revealed a statistically significant correlation between the hysteroscopic and histopathological diagnosis (McNemar test x2: 172.4; *p-value:* <0.001). Based on the obtained results, the sensitivity and specificity of hysteroscopy in detecting endometrial polyps was demonstrated to be 93.5% and 51.0%, respectively. A higher sensitivity was observed in the group of postmenopausal women than in the group of patients before menopause (97.3% vs 91.2%), with a relatively low specificity in both groups. The remaining prognostic indicators for the entire study group were as follows: positive predictive value (PPV) 64.7%, and negative predictive value (NPV) 89.0%. Higher PPV and NPV values were observed in menopausal women (PPV of 73.4% vs 59.3% and NPV of 93.2% vs 88.1%, respectively).

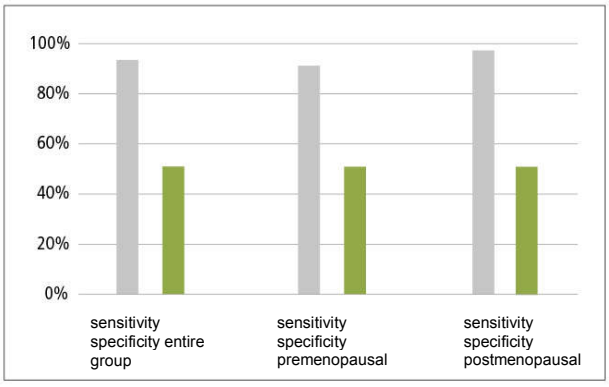

Figure 1. Specificity and sensitivity of hysteroscopy in the diagnosis of endometrial polyps
Rycina 1. Obraz graficzny czułości oraz swoistości histeroskopii w wykrywaniu polipa endometrialnego

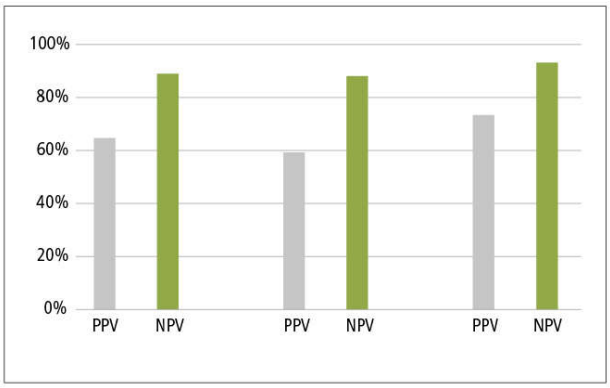

Figure 2. Positive predictive value (PPV) and negative predictive value (NPV) of hysteroscopy in the diagnosis of endometrial polyps
Rycina 2. Obraz graficzny wartości predykcyjnej dodatniej (PPV) oraz ujemnej (NPV) histeroskopii w wykrywaniu polipa endometrialnego

Figure 1 presents graphically the sensitivity and specificity of hysteroscopy in the detection of endometrial polyps. Figure 2 shows the positive predictive value (PPV) and negative predictive value (NPV) of hysteroscopy in the diagnosis of endometrial polyps according to the menopausal status of patients.

In the studied group of women with endometrial polyps, in six patients (1.2%) the histopathological examination revealed a cancerous polyp; in four of these cases (0.5%) the hysteroscopic image of the polyp was abnormal. Six patients (1.2%) were diagnosed with atypical endometrial hyperplasia in the histopathological examination of the polyp, and in five of these patients (0.7%) the hysteroscopic image of the polyp was abnormal.

Discussion

The diagnosis of an endometrial polyp in a standard ultrasound examination is often associated with uncertainty regarding further diagnostic and therapeutic management. Sometimes the asymptomatic character of the lesion and its small size suggest a conservative treatment option. According to the literature data, endometrial polyps are more frequently found in women of menopausal age (74% of cases) [4]. In patients from this age group, whose polyps are symptomatic, particular caution should be exercised. Reslova et al., who analysed a group of 245 patients following hysteroscopic polypectomy, demonstrated that in postmenopausal women in 56% of cases the polyps were asymptomatic, whereas in the group of menstruating women the rate was approximately 18%. The remaining polyps may cause postmenopausal bleedings, breakthrough bleedings and prolonged or abnormal menstrual bleedings [5]. In our study, contrary to the literature data, the majority of women with endometrial polyps were of premenopausal age.

The study demonstrated a high sensitivity of hysteroscopy in the detection of endometrial polyps, confirmed by histopathological examination, especially in postmenopausal women (97.3%). The literature data also present a similarly high sensitivity of the hysteroscopic procedure regarding the diagnosis of endometrial polyps. Studies by Garuti et al. suggest that the sensitivity of hysteroscopy is 95.3% [6]. Gkrozou et al. in their metaanalysis also determined the method's sensitivity at 97.0% [7]. Loiacono et al. [8] suggest the highest sensitivity of hysteroscopy (100%) in the diagnostics of endometrial polyps. Clearly, the demonstrated high sensitivity of hysteroscopy indicates the apt qualification of patients for the hysteroscopic procedure, based on the ultrasound image.

The specificity of hysteroscopy in the detection of endometrial polyps demonstrated in this study (51%) indicates a large number of false-positive cases, unconfirmed in the histopathological examination. Considering the other indicators assessed in the study, a high negative predictive value of 89% signifies the absence of polyps in the histopathological examination. On the other hand, the diagnosis of polyps based on hysteroscopy (PPV – positive predictive value) is confirmed by the final histopathological diagnosis in only 65% of cases. Both the positive and the negative predictive value is higher in the group of postmenopausal women (PV of 73.4% vs 59.3%, NVP of 93.2% vs 88.1%, respectively). The results obtained in our study and by other authors indicate the high effectiveness of hysteroscopy in the diagnostics of endometrial polyps.

It is very important to maintain oncological alertness, especially in the larger polyps found in postmenopausal women. According to estimations, approximately 2% of the lesions diagnosed as endometrial polyps based on a hysteroscopy are found to be malignant in the histopathological examination. Alberto Daniele et al. demonstrated the high importance of hysteroscopy in the detection of hyperplastic lesions in polyps – at the level of 1.7% (NPV 100%; PPV 85.7%) [9]. Due to possible direct visualisation of the uterine cavity, and the targeted collection of the material for testing, the hysteroscopic procedure is considerably superior to abrasia in the diagnostics of preneoplastic conditions.

Conclusions

- Minihysteroscopy is a highly sensitive method for the detection of endometrial polyps (93.5%), with higher sensitivity observed in postmenopausal women compared to those before the menopause (97.3% vs 91.2%).
- In each case the material for histopathological examination should be collected during the procedure, to exclude preneoplastic and neoplastic lesions that may be found in the polyp (2.4%).
- Due to the increasing availability, limited invasiveness, and the ability to perform the procedure in outpatient conditions, minihysteroscopy may be considered a gold standard in the diagnostics and treatment of polyps of the uterine cavity.

Literature

1. AAGL practice report; practice guidelines for the diagnosis and management of endometrial polyps. J Minim Invasive Gynecol, 2012; 19 (1): 3-10
2. Kim KR, Peng R, Ro JY, Robboy SJ. A diagnostically useful histopathologic feature of endometrial polyp: the long axis of endometrial glands arranged parallel to surface epithelium. Am J Surg Pathol, 2004; 28 (8): 1057-1062
3. Antunes A Jr, Costa-Paiva L, Arthuso M, et al. Endometrial polyps in pre-and postmenopausal women: factors associated with malignancy. Maturitas, 2007; 57 (4): 415-421
4. Costa-Paiva L, Godoy CE Jr, Antunes A Jr, et. Al. Risk of malignancy in endometrial polyps in premenopausal and postmenopausal women

according to clinicopathologic characteristics. Menopause, 2011; 18 (12): 1278-1282
5. Reslova" T, Tosner J, Resl M, et al. Endometrial polyps. A clinical study of 245 cases. Arch Gynecol Obstet, 1999; 262 (3-4): 133-139
6. Garuti G, Sambruni I, Colonnelli M, Luerti M. Accuracy of hysteroscopy in predicting histopathology of endometrium in 1500 women. J Am Assoc Gynecol Laparoscopists, 2001; 8 (2): 207-213
7. Gkrozou F, Dimakopoulos G, Vrekoussis T, et al. Hysteroscopy in women with abnormal uterine bleeding: a meta-analysis on four major endometrial pathologies. Arch Gynecol Obstetrics, 2015; 291 (6): 1347-1354
8. Loiacono RM, Trojano G, Del Gaudio N, et al. Hysteroscopy as a valid tool for endometrial pathology in patients with postmenopausal bleeding or asymptomatic patients with a thickened endometrium: hysteroscopic and histological results. Gynecol Obstet Invest, 2015; 79 (3): 210-216
9. Daniele A, Ferrero A, Maggiorotto F, et al. Suspecting malignancy in endometrial polyps: value of hysteroscopy. Tumori, 2013; 99 (2): 204-209
10. Wortman M. "See-and-Treat" hysteroscopy in the management of endometrial polyps. Surg Technol Int, 2016; 28: 177-184
11. Centini G, Troia L, Lazzeri L, et al. Modern operative hysteroscopy. Minerva Ginecol, 2016; 68 (2): 126-132
12. Radowicka M, Legutowska E, Gajewska M, Wielgos M. Histopathological evaluation of intrauterine polyps and scrapings of the uterine cavity in women with endometrial polyp described in ultrasound. Neuro Endocrinol Lett, 2016; 37 (7): 518-522

Analysis of choroidal thickness changes in exudative age-related macular degeneration patients treated with aflibercept – a preliminary report

Analiza zmian grubości naczyniówki u chorych na wysiękową postać zwyrodnienia plamki związanego z wiekiem leczonych afliberceptem – doniesienie wstępne

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Abstract. The aim of this study is to investigate subfoveal choroidal thickness changes in patients with treatment-naive exudative age-related macular degeneration in the initial phase of aflibercept treatment. The prospective study included 39 eyes of 39 patients with treatment-naive exudative AMD, aged 78.1 ±9 years. Loading doses of three intravitreal aflibercept injections at 4 week intervals were performed. Measurements were performed at the baseline and 7 weeks after the last injection. The following parameters were taken into account in the statistical analysis: (1) age-related macular degeneration type; (2) visual acuity changes; (3) disease activity after three loading aflibercept injections. The mean subfoveal choroidal thickness significantly reduced from 197.9 ±113.8μm to 183.74 ±110.0μm ($p < 0.05$). Subfoveal choroidal thickness reduction from 217.58 ±111.8 μm to 199.88 ±111.3 ($p < 0.05$) was observed in the group with visual improvement and stabilization. Subfoveal choroidal thickness reduction from 196.95 ±122.9 μm to 178.50 ±112.8 μm ($p < 0.05$) was observed in the group without disease activity. Subfoveal choroidal thickness was reduced in patients with exudative age-related macular degeneration treated with aflibercept. Subfoveal choroidal thickness reduction is associated with visual improvement or stabilization and reduction of the disease activity.
Key words: choroidal thickness, CT, aflibercept, antiVEGF, age-related macular degeneration

Streszczenie. Cel. Analiza poddotkowej grubości naczyniówki u chorych z nowo rozpoznaną wysiękową postacią zwyrodnienia plamki związanego z wiekiem w początkowej fazie terapii afliberceptem. Materiał i metody. W badaniu prospektywnym przebadano 39 oczu 39 chorych z wysiękową postacią zwyrodnienia plamki związanego z wiekiem, w wieku 78,10 ±9 lat. Chorzy otrzymali 3 nasycające dawki afliberceptu w postaci iniekcji do komory ciała szklistego w odstępach 4-tygodniowych. Badania przeprowadzano przed włączeniem leczenia i 7 tygodni po podaniu ostatniej dawki leku. Analiza statystyczna uwzględniła: (1) typy zwyrodnienia plamki związanego z wiekiem, (2) zmiany ostrości wzroku, (3) aktywność choroby po 3 nasycających iniekcjach afliberceptu. Wyniki. Średnia poddołkowa grubość naczyniówki zmniejszyła się istotnie z 197,9 ±113,8 pm do 183,74 ±110,0 μm ($p < 0,05$). W podgrupie z poprawą i stabilizacją ostrości wzroku średnia poddołkowa grubość naczyniówki uległa istotnej redukcji z 217,58 ±111,8 μm do 199,88 ±111,3 μm ($p < 0,05$). W podgrupie bez aktywności choroby stwierdzono istotną redukcję poddotkowej grubości naczyniówki z 196,95 ±122,9 μm do 178,50 ±112,8 μm ($p < 0,05$). Wnioski. Poddołkowa grubość naczyniówki ulega redukcji u chorych na postać wysiękową zwyrodnienia plamki związanego z wiekiem leczonych afliberceptem. Redukcja poddotkowej grubości naczyniówki towarzyszy poprawie lub stabilizacji ostrości wzroku oraz wygaszeniu aktywności choroby.
Słowa kluczowe: grubość naczyniówki, CT, aflibercept, antyVEGF, zwyrodnienie plamki związane z wiekiem

Delivered: 21/04/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 362-366

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Introduction

Age-related macular degeneration (AMD) is a chronic, progressive disease of the central retina, which is the most common cause of vision loss in patients over 55 years old in highly developed countries [1]. By the year 2020, the number of AMD patients in Poland is estimated to reach 2 million [2]. The exudative form of AMD is caused by a pathological choroidal neovascularisation (CNV), which leads to degradation of retinal structure, and loss of central vision. The pathogenesis of the diseases is multifactorial. One of the factors can be the disturbed function of the posterior choroid. Studies demonstrate that the thickness of the choroid changes in AMD [3, 4]. Until recently, the choroid was assessed through indocyanine green angiography, ultrasonography or on the basis of histological material. Presently, optical coherence tomography (OCT) enables the non-invasive imaging of the choroid *in vivo* [5, 6]. The consequences are being studied of intravitreal injections of preparations blocking the vascular endothelial growth factor (VEGF) and placental growth factor (PlGF), as well as the effect of the natural course of the disease on choroidal thickness (CT) in exudative AMD. Short-term observations demonstrate CT reduction in patients with exudative AMD treated with anti-VEGF. In addition, the systemic effect of intravitreal injections of anti-VEGF, and reduced CT in the other, untreated eye, have been noted [7, 8]. There are reports of a correlation between a higher baseline CT and improved visual function [9].

Aim of the study

Analysis of subfoveal choroidal thickness (SFCT) in the short-term observation of patients with exudative AMD treated with aflibercept injections.

Material and methods

The observational prospective study followed the guidelines of the Declaration of Helsinki, and was approved by the Bioethical Committee of the Military Institute of Medicine in Warsaw. Patients gave their written consents to participate in the study. Included in the study were 39 eyes of 39 patients (23 females, 16 males) newly diagnosed with exudative ADM. The mean age of the patients was 78.1 ± 9 years (51-90 years). They were treated with aflibercept as part of the treatment programme (TP) "Therapy of exudative age-related macular degeneration". The local inclusion criteria followed the qualification principles for the TP:

- presence of active CNV, covering over 50% of the AMD changes, confirmed by OCT and fluorescein angiography (FA),
- size of the lesion smaller than 12 surfaces of the optic nerve head,
- absence of a dominant geographic atrophy or dominant extravasation.

The exclusion criteria were as follows:

- hypersensitivity to aflibercept or any of the excipients,
- active infection of the eye or its area,
- drug-related adverse reactions preventing its use,
- rhegmatogenous retinal detachment or 3rd or 4th degree macular hole,
- corneal disorders preventing OCT,
- cataract preventing OCT.

The general exclusion criteria included:

- stroke of the central nervous system or myocardial infarction in the previous 6 months,
- unstable arterial hypertension,
- coronary heart disease,
- epilepsy.

All patients included in the study received a qualification ophthalmological examination, involving an assessment of the best-corrected visual acuity (BCVA), intraocular pressure (IOP) using Goldman's tonometry, biomicroscopy of the anterior and posterior sections using a slit lamp, OCT and FA. Next, three loading intravitreal injections of 2 mg of aflibercept were administered at monthly intervals. A follow-up examination involving an assessment of BCVA, IOP, biomicroscopy of the anterior and posterior section and OCT was performed 7 weeks following the third aflibercept injection.

CRT and SFCT measurements were performed with the use of an OCT device (DRI-OCT Triton; Topcon; Tokyo, Japan) with 1050 nm wavelength and at 100 000 A-scans per second. Radial scans covering the macula were performed (6 x 16 mm). All the measurements were performed manually, with one researcher using the calliper. Central retinal thickness (CRT) was defined as the distance between the internal membrane and the external edge of the hyperreflective retinal pigment epithelium (RPE) in the fovea (Fig. 1 A). SFCT was defined as the distance between the hyperreflective line corresponding to Bruch's membrane below the RPE up to the chorio-scleral junction in the foveal centre (Fig. 1B). The measurements were performed between 09:00 and 13:00, to reduce the effect of daily CT variations on the results [10, 11].

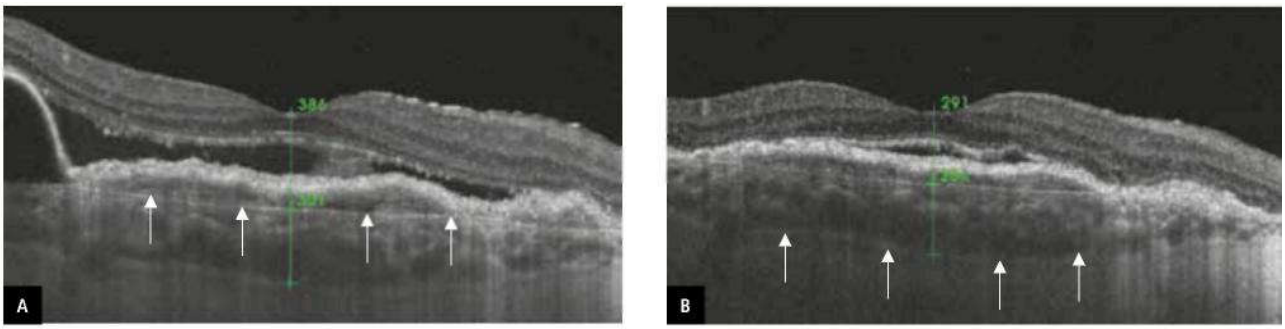

Figure 1 A: Central retinal thickness and subfoveal choroidal thickness measurement at baseline. Retinal pigment epithelium (arrows). **B:** Central retinal thickness and subfoveal choroidal thickness measurement 7 weeks after the 3rd intravitreal aflibercept injection. Chorio-scleral junction (arrows)
Rycina 1. A. Pomiar centralnej grubości siatkówki i poddołkowej grubości naczyniówki przed włączeniem leczenia. Nabłonek barwnikowy siatkówki (strzałki). **B.** Pomiar centralnej grubości siatkówki i poddołkowej grubości naczyniówki 7 tygodni po 3. iniekcji doszklistkowej afliberceptu. Granica naczyniówkowo-twardówkowa (strzałki)

The statistical analysis involved:

- types of AMD: mixed (chorioretinal), occult and classic,
- changes in BCVA: subgroup with BCVA improvement of more than 1 line or BCVA stabilisation within 1 line, and subgroup with BCVA deterioration by more than 1 line according to Snellen chart relative to the baseline [12],
- assessment of the disease activity based on the indicators of the disease activity in OCT, following the administration of 3 loading doses of aflibercept – the subgroup without active disease (total absence of subretinal fluid or intraretinal oedema) and the subgroup with active disease (presence of fluid).

The results were analysed in the STATISTICA 12.0 software. The Student's t-test was used. To compare more than two groups with a normal distribution, the ANOVA analysis of variance was used, and the differences were examined with the NIR test. All results with p <0.05 were considered statistically significant.

Results

The mean age of the patients was 78.10 ± 9.4 years, and the mean observation time was 19 weeks. The demographic data of the group are presented in Table 1. The mean baseline BCVA tested using Snellen charts was 0.39 ± 0.2, and the mean spheroequivalent was 0.90 ± 2.2 D (from -6.0 to +3.25 D). The mean IOP was 15.90 ± 2.9 mm Hg. Mixed (chorioretinal) AMD was found in 12 patients (31%), the occult form was observed in 20 patients (51%), and 7 patients (18%) suffered from the classic form of the disease. The ANOVA analysis did not reveal significant differences according to the type of AMD (BCVA: F = 3.24, p = 0.05, CRT: F = 2.10, p = 0.14, SFCT: F = 2.28, p = 0.12).

In the studied group the mean BCVA improved from 0.39 ± 0.22 to 0.47 ± 0.29 (p = 0.006). The improvement of the mean BCVA was observed in the subgroups with a classic form (from 0.36 ± 0.24 to 0.53 ± 0.34, p = 0.012) and with an occult form (from 0.46 ± 0.22 to 0.57 ± 0.28, p = 0.005). In the subgroup with mixed AMD, no change in the mean BCVA was observed (from 0.29 ± 0.16 to 0.27 ± 0.21, p = 0.753).

Table 1. Study group characteristics
Tabela 1. Charakterystyka grupy badanej

		Type of age-related macular degeneration		
		Mixed	**Occult**	**Classic**
Number of patients	39	12	20	7
Sex (female/male)	23/16	9/3	12/8	2/5
Age	78.10 ± 9.4	83.50 ± 5.00	76.35 ± 9.0	73.71 ± 11.6
Baseline BCVA (Snellen)	0.39 ± 0.2	0.29 ± 0.2	0.46 ± 0.2	0.36 ± 0.2
Baseline CRT (μm)	349.2 ± 161.4	403.67 ± 149.7	283.40 ± 110.9	443.86 ± 232.6
Baseline SFCT (μm)	197.9 ± 113.8	138.75 ± 67.8	204.9 ± 108.9	279.14 ± 145.78

BCVA – best-corrected visual acuity, CRT – central retinal thickness, SFCT – subfoveal choroidal thickness

In the studied group, the mean CRT decreased from 349.2 ± 161.4 μm to 242.6 ± 86.7 μm ($p < 0.001$). CRT was reduced in the mixed AMD subgroup from 403.67 ± 149.7 μm to 246.67 ± 100.1 μm ($p = 0.003$) and classic AMD from 443.86 ± 232.6 μm to 265.86 ±124.5 μm ($p = 0.01$), but not in the occult AMD, from 283.4 ± 110.9 μm to 232 ± 63.4 μm ($p = 0.194$).

In the entire group, the mean SFCT decreased from 197.9 ± 113.8 μm to 183.7 ± 110 μm ($p < 0.005$).

Reduction of the mean SFCT was observed in the subgroups with a classic form (from 279.1 ± 145.7 μm to 238.7 ± 122.1 μm, $p = 0.007$) and with a mixed form (from 138.75 ± 67.8 μm to 125.8 ± 69.2 μm, $p = 0.04$). In the subgroup with occult AMD, no change in SFCT was observed (from 204.90 ± 108.9 μm to 199.25 ± 115.1 μm, $p = 0.5$).

Improvement or stabilisation regarding BCVA was observed in 33 patients (85%). The mean BCVA in this group improved from 0.37 ± 0.2 to 0.51 ± 0.23 ($p = 0.018$). Deterioration in BCVA was found in 6 patients (15%). In this subgroup, the mean BCVA increased from 0.48 ± 0.2 to 0.26 ± 0.1 ($p = 0.001$). In the subgroup where BCVA improved and stabilised, the mean SFCT decreased from 217.58 ± 111.8 μm to 199.88 ± 111.3 μm ($p < 0.05$). In the subgroup with deteriorated BCVA, the mean value increased insignificantly from 89.5 ± 0.2 μm to 95 ± 0.1 μm ($p < 0.340$).

In the subgroup without active disease, SFCT decreased from 197.0 ± 122.9 μm to 178.50 ± 112.8 μm ($p < 0.008$). In the subgroup with signs of disease activity, an insignificant reduction of SFCT from 199.1 ± 104.7 μm to 190.5 ± 109.4 μm ($p < 0.47$) was observed.

Discussion

CT depends on various factors, e.g. age, length of the eye, refraction defect, corneal thickness and diastolic pressure [13]. Daily changes may also be significant, which can amount to even a few dozen micrometres [14]. CT is the highest under the foveola, and decreases along with the distance from it, reaching the lowest value in the nasal macula. Assessment of the choroid in many studies is based on a measurement in one location – typically in the foveola. Some studies introduce additional measurement points, usually 1.5-3 mm nasally and temporally from the foveola [15].

Our study results demonstrate that SFCT is reduced in previously untreated patients with exudative AMD after the administration of 3 loading intravitreal injections of aflibercept. The results correspond to previous publications [8, 16].

In the entire group the SFCT decreased by 7%. The outcome was similar to previous publications, where a reduction in CT of a few to several percent was reported. In observation of an analogous group of patients (previously untreated patients with exudative AMD), Mazaraki et al. found a statistically significant reduction in SFCT from 226.4 μm to 208 μm at 4 weeks after the administration of the last (third) loading dose of aflibercept. Even larger reductions were observed by Koizumi et al. In a year-long observation of patients with exudative AMD, previously untreated with anti-VEGF preparations, a SFCT decrease by 13.3% was reported. Although it was demonstrated that CT reduces with age, decreasing by 1.56 μm per year on average [17], the reduction in the above studies was considerably greater.

CT reduction in AMD is also observed during treatment with other anti-VEGF products [18], as well as following a photodynamic therapy with verteporfin, or intravitreal injections of glucocorticoids [19].

The relationship between CT and improved BCVA in the treatment of AMD with intravitreal injections of anti-VEGF is extensively researched. In our study, we found a significant reduction in SFCT in the group with improved and stabilised BCVA, but not in the group with deteriorated BCVA. In a retrospective observational study of patients with occult AMD who received ranibizumab injections, Hernandez-Martinez et al. demonstrated that higher SFCT correlated with better final BCVA [9]. Koizumi et al. did not find a relationship between CT and changes in the visual function, neither in a three-month, nor in a year-long observation of patients treated with aflibercept due to exudative AMD. However, in the same study they revealed a relation between CT reduction and improved BCVA in the group of patients with polypoidal choroidal vasculopathy (PCV), a rare form of CNV [16]. A positive correlation between BCVA and CT in PCV was found also by Sakurada et al., who assessed the effect of the combined therapy with intravitreal aflibercept or ranibizumab injections and subsequent photodynamic therapy on CT [20]. The correlations demonstrated in the studies on patients with PCV may be due to the pathomechanism of the disease, which is based primarily on choroidal dysfunction. CT was found to be greater than PCV than in those patients with exudative AMD.

Similar differences are present in the assessment of the relationship between CT and disease activity. In our study we found a significant reduction in SFCT in the group without an active disease (by 18.5 μm - 9.4%, $p < 0.05$), but not in the group with an active disease (8.6 μm - 4.3%, the result is statistically insignificant). The data is congruent with the results of a 12-month observation by Koizumi et al., but contrasting with the results presented by Kang et al., who assessed the response to treatment with ranibizumab in a 6-month observation. The response was defined as a reduction by at least 100 μm of the subretinal fluid, or its complete retraction. Higher baseline SFCT was found in the group responding to the treatment [21].

The discrepancies in the reported data may be due to pharmacokinetic differences between the medicines used. Aflibercept is composed of fragments of extracelluar human VEGF-1 and VEGF-2 receptor domains, combined with the Fe fragment of human IgG1. They demonstrate stronger affinity to binding growth factors (VEGF-A and PlGF) than their natural receptors [22]. Therefore, its effect not only on CNV but also on the choroid is stronger than that of ranibizumab. It appears

that CT reduction, by limiting the blood supply to CNV, results both in reduced disease activity, and in improved visual acuity in patients with exudative AMD. However, as the choroid plays an important nutritional role for the retina, its excessive thinning may result in retinal dysfunctions.

The relationship between CT and disease activity and visual acuity requires observation. Further treatment and observation is conducted in the present group.

Conclusions

SFCT is reduced in AMD patients treated with aflibercept. In the initial phase of therapy, the reduction occurs in patients without impaired vision or disease activity.

Study limitations

The studied parameters did not include the axial length (AL), central corneal thickness (CCT) or diastolic pressure, which affect the choroidal thickness.

All the measurements were performed by one researcher. In the literature no significant differences are found between measurements performed by trained and experienced researchers; however, the measurements performed by one person may be less reliable.

Some patients were burdened with systemic diseases, including diabetes and arterial hypertension, which could also affect the study results.

Literature

1. Congdon N, O'Colmain B, Klaver CC, et al. The Eye Diseases Prevalence Research Group. Causes and prevalence of visual impairment among adults in the United States. Arch Ophthalmol, 2004; 122: 477-485
2. Partyka O, Wysocki MJ. Epidemiology of eye diseases and infrastructure of ophthalmology in Poland. Epidemiol Rev, 2015; 69 (4)
3. Tan KA, Gupta P, Agarwal A, et al. State of science: Choroidal thickness and systemic health. Surv Ophthalmol, 2016; 61 (5): 566-581
4. Karalezli A, Corak Eroglu F, Kivancv T, Dogan R. Evaluation of choroidal thickness using spectral-domain optical coherence tomography in patients with severe obstructive sleep apnea syndrome: a comparative study. Int J Ophthalmol, 2014; 7 (6): 1030-1034
5. Ikuno Y, Kawaguchi K, Nouchif T, Yasuno Y. Choroidal thickness in healthy Japanese subjects. Invest Ophthalmol Vis Sci, 2010; 51: 2173-2176
6. Spaide RF, Koizumi H, Pozzoni MC. Enhanced depth imaging spectral-domain optical coherence tomography. Am J Ophthalmol, 2008; 146: 496-500
7. Koizumi H, Kano M, Yamamoto A, et al. Short-term changes in choroidal thickness after aflibercept therapy for neovascular age-related macular degeneration. Am J Ophthalmol, 2015; 159 (4): 627-633
8. Mazaraki K, Fassnacht-Riederle H, Blum R, et al. Change in choroidal thickness after intravitreal aflibercept in pretreated and treatment-naive eyes forneovascular age-related macular degeneration. Br J Ophthalmol, 2015; 99(10): 1341-1344
9. Hernandez-Martinez P, Dolz-Marco R, Hervss-Marm D, et al. Choroidal thickness and visual prognosis in type 1 lesion due to neovascular age-related macular degeneration. Eur J Ophthalmol, 2017; 27 (2): 196-200
10. Chan A, Duker JS, Ko TH, Fujimoto JG. Normal macular thickness measurements in healthy eyes using Stratus optical coherence tomography. Arch Ophthalmol, 2006; 124 (2): 193-198
11. Shin JW, Shin YU, Lee BR. Choroidal thickness and volume mapping by a six radial scan protocol on spectral-domain optical coherence tomography. Ophthalmology, 2012; 119 (5): 1017-1023
12. Chung WH, van Dijk EH, Mohabati D, et al. Neovascular age-related macular degeneration without drusen in the fellow eye: clinical spectrum and therapeutic outcome. Clin Ophthalmol, 2016; 21 (11): 63-70
13. Hautz W, Gołębiewska J, et al. OCT i Angio-OCT w schorzeniach tylnego odcinka gałki ocznej. [OCT and Angio-OCT in diseases of the posterior section of the eye] Medipage, Warszawa 2015: 26-29
14. Usui S, Ikuno Y, Akiba M, et al. Circadian changes in subfoveal choroidal thickness and the relationship with circulatory factors in healthy subjects. Invest Ophthalmol Vis Sci, 2012; 53 (4): 2300-2307
15. Maul EA, Friedman DS, Chang DS, et al. Choroidal thickness measured by spectral domain optical coherence tomography: factors affecting thickness in glaucoma patients. Ophthalmology, 2011; 118 (8): 1571-1579
16. Koizumi H, Kano M, Yamamoto A, et al. Subfoveal choroidal thickness during aflibercept therapy for neovascular age-related macular degeneration: twelve-month results. Ophthalmology, 2016; 123 (3): 617-624
17. Margolis R, Spaide RF. A pilot study of enhanced depth imaging optical coherence tomography of the choroid in normal eyes. Am J Ophthalmol, 2009; 147 (5): 811-815
18. Kim JH, Lee TG, Chang YS, et al. Short-term choroidal thickness changes in patients treated with either ranibizumab or aflibercept: a comparative study. Br J Ophthalmol, 2016; 100 (12): 1634-1639
19. Yumusak E, Ornek K, Dikel NH. Comparison of choroidal thickness changes following intravitreal dexamethasone, ranibizumab, and triamcinolone in eyes with retinal vein occlusion. Eur J Ophthalmol, 2016; 26 (6): 627-632
20. Sakurada Y, Sugiyama A, Tanabe N, et. al. Choroidal thickness as a prognostic factor of photodynamic therapy with aflibercept or ranibizumab for polypoidal choroidal vasculopathy. Retina, 2016; 20 (Epub ahead of print)
21. Kang HM, Kwon HJ, Yi JH, Lee CS. Subfoveal choroidal thickness as a potential predictor of visual outcome and treatment response after intravitreal ranibizumab injections for typical exudative age-related macular degeneration. Am J Ophthalmol, 2014; 157 (5): 1013-1021
22. Garcia-Layana A, Figueroa MS, Araiz J, et al. Treatment of exudative age-related macular degeneration: focus on aflibercept. Drugs Aging, 2015; 32 (10): 797-807

Analysis of bioelectrical macular function in patients with exudative age-related macular degeneration after cataract surgery

Analiza czynności bioelektrycznej siatkówki w obszarze plamki u chorych na wysiękową postać zwyrodnienia plamki związanego z wiekiem poddanych operacji zaćmy

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Abstract. The aim of the study is to analyse the electrophysiological function of the retina (its cone system) near the macula, using a multifocal electroretinogram in eyes with exudative age-related macular degeneration having undergone cataract surgery. A 12-month prospective, randomized study included 50 eyes of 49 patients (mean age 78.94 ± 5.54 years) with diagnosed inactive exudative age-related macular degeneration and cataract, previously treated with intravitreal injections of vascular endothelial growth factor inhibitors. Two groups of patients were selected: group I (n = 25 eyes) - patients who underwent phacoemulsification, and group II (n = 25 eyes) - patients who were observed. In both groups multifocal electroretinogram recordings were made, including: response density, latency and amplitude of the P1 wave. In both groups and between them, the final results of average response density, average latency and average amplitude of the P1 wave had no observable differences in subsequent time intervals. (p>0.05). Phacoemulsification does not affect the retinal bioelectrical function in patients with inactive exudative macular degeneration.
Key words: exudative age related macular degeneration, phacoemulsification, multifocal electroretinography

Streszczenie. Celem pracy jest ocena czynności elektrofizjologicznej siatkówki (jej układu czopkowego) w rejonie plamki za pomocą badania wieloogniskowej elektroretinografii w oczach z wysiękową postacią zwyrodnienia plamki związanego z wiekiem poddanych operacji zaćmy. Materiał i metody. Do 12-miesięcznego prospektywnego, randomizowanego badania zakwalifikowano 50 oczu 49 chorych (średnia wieku 78,94 ±5,54 roku) z rozpoznanym nieaktywnym wysiękowym zwyrodnieniem plamki i zaćmą, uprzednio leczonych doszklistkowymi iniekcjami preparatów blokujących czynnik wzrostu śródbłonka naczyń. Wyłoniono dwie grupy pacjentów: grupę I (n=25 oczu) - chorzy, u których wykonano fakoemulsyfikację, i grupę II (n=25 oczu) - chorzy obserwowani. W obu grupach oceniano parametry wieloogniskowej elektroretinografii: gęstość odpowiedzi, latencję i amplitudę fali P1. Wyniki. W obu grupach nie stwierdzono różnic w wartościach średnich gęstości odpowiedzi, latencji i amplitudy fali P1 w kolejnych przedziałach czasowych i pomiędzy grupami (p >0,05) Wnioski. Fakoemulsyfikacja nie powoduje zmian czynności bioelektrycznej siatkówki centralnej u chorych z nieaktywną postacią AMD.
Słowa kluczowe: wysiękowe zwyrodnienie plamki związane z wiekiem, fakoemulsyfikacja, wieloogniskowa elektroretinografia

Delivered: 14/07/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 367-374

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Introduction

Age-related macular degeneration (AMD) is a chronic, progressive disease of the macula, i.e. the central retina. AMD affects people over 50 years old. There are two types of AMD: a dry, mild form (approx. 85-90% of cases), and an exudative form (approx. 10-15% of cases), characterised by intra- or subretinal neovascularisation, rapid progression and considerably poorer prognosis. It is estimated that AMD affects approximately 1.2-1.5 million people in Poland [1]. Frequently the disease is associated with other age-related pathologies of the eye, such as opacification of the eye lens. The current method of treatment of exudative AMD involves multiple intravitreal injections of agents blocking vascular endothelial growth factor (VEGF), such as ranibizumab and bevacizumab (off-label), and, additionally, injections of aflibercept, a placental growth factor (PlGF) inhibitor. However, one should note that blocking VEGF is temporary, and the recurring activity of exudative AMD requires constant monitoring and repeated treatment. The advancement of a cataract in the affected eye is an important factor for the organ's function. Phacoemulsification involving the placement of an artificial implant into the anterior chamber is a common method of treating cataracts. In patients with concurrent macular degeneration it may improve vision, as well as facilitate diagnostics and the assessment of disease activity through a better understanding of the eye fundus.

In daily practice, usually the only functional test of the retina in AMD patients is a visual acuity examination. Other, more objective methods of evaluation of the retinal activity are being researched. One of them is multifocal electroretinogram (mfERG), which reflects the functional status of the cones and bipolar cells of the retina [2-6].

Aim of the study

The aim of the study is to analyse the electrophysiological function of the retina (its cone system) near the macula, using a multifocal electroretinogram in eyes with exudative age-related macular degeneration that underwent cataract surgery.

Material and methods

The prospective, 12-month randomised study involved 49 patients (50 eyes) aged 78.94 ± 5.54 years old, with exudative AMD, previously treated with intravitreal injections of anti-VEGF preparations (ranibizumab and/or bevacizumab). The research project was approved by the Bioethical Committee of the Military Institute of Medicine in Warsaw in 2013. The patients included in the study were informed about potential adverse reactions of the performed therapeutic and diagnostic procedures. They signed informed consent forms. The basic qualification criteria involved an age over 50 years old, absence of any active macular degeneration process, confirmed by optical coherence tomography and flurescein angiography, and a cataract of at least grade N02/NC2/C2/ P2 according to the LOCS III system [7]. Other local inclusion criteria were as follows:

- the best-corrected visual acuity of letters 34-74 on the ETDRS charts (0.1-0.63 according to Snellen),
- the size of the entire exudative lesion of no more than 12 MPSG DA (optical nerve disc areas according to Macular Photocoagulation Study Group Disc Area) [8, 9].

The local exclusion criteria included:

- irreversible foveal damage (subretinal scar or geographical atrophy),
- macular extravasation of at least 50% of the lesion,
- retinal detachment,
- previous vitreaoretinal procedure, glaucoma procedure or keratoplasty,
- previous retinal photocoagulation performed less than one month before the study,
- history of macular photocoagulation,
- unstable or advanced glaucoma,
- active infection of the eye or its protective apparatus,
- previous or active uveitis,
- significant degeneration of the peripheral retina.

The general exclusion criteria included:

- stroke of the central nervous system or myocardial infarction in the previous 6 months,
- unstable arterial hypertension and ischaemic heart disease,
- epilepsy as contraindication for mfERG.

Two study groups were formed by a process of randomisation.

Group I - 25 eyes in 25 patients aged 80.04 ± 4.47 years old, which underwent cataract removal using phacoemulsification with implantation of anterior chamber IOL. Group I included 15 female (60%) and 10 male (40%) patients. Nine right eyes (36%) and 16 left eyes (64%) were studied. In 15 eyes (60%) type I (occult form) was observed, and in 10 eyes (40%) type II (classic form) of exudative AMD was observed.

Group II - 25 eyes in 24 patients aged 77.84 ± 6.44 years old, without cataract surgery, despite the presence of a grade II cataract according to LOCS III. Group II included 13 female (54%) and 11 male (46%) patients. Eight right eyes (32%) and 17 left eyes (68%) were studied. In 16 eyes (64%) type I of exudative AMD was observed, and in nine (36%) type II was observed.

Multifocal electroretinography was performed using the EP-100 Pro device by Tomey, following the current recommendations of the International Society for Clinical Electrophysiology of Vision (ISCEV) [10]. Before the examination, mydriatics were administered to both eyes of the patient: 1% tropicamide and 10% phenylephine. During the preadaptation, the patient stayed for at least 15 minutes in a room with normal light. The multifocal ERG option was activated in the device. Next, two temporal electrodes were attached to the patient's head

and, following anaesthesia of the conjunctival sac with drops (0.5% proxymetacaine, Alcaine), two TE-100 corneal contact electrodes were attached. All electrodes were integrated with a helmet, compatible with the ERG device. A grounding electrode was mounted on the left earlobe. After the check of electrode resistance (the "impedance" option), the patient was asked to take a comfortable position at approximately 30 cm from the monitor, which was emitting a signal in the form of hexagons to stimulate the retina. Next, the fixation point in the field of vision was determined, continuously monitored and corrected as necessary before the session was repeated. Retinal stimulations lasted a couple to several minutes, in 15-30 seconds sequences. After the test, the obtained record was saved in the device's database.

The following parameters describing the bioelectric reaction of the retina were analysed: response density (V), latency (L) and P1 wave amplitude (A) from six concentric rings. The rings covered the subsequent areas of the macula: no. 1 from 0° to 3°, no. 2 from 4°, no. 3 from 5°, no. 4 from 7°, no. 5 from 9°, and no. 6 from 13°. mfERG was performed at the baseline and after 6 and 12 months of follow-up. In each group the baseline parameters (V0, L0, A0) were compared with the data from subsequent control points after 6 (V1, L1, A1) and 12 months of follow-up (VK, LK, AK). The groups were compared according to the presence of significant differences between parameters V, L and A in individual time intervals of the observation, and according to any significant differences in the time courses of the parameters.

The procedure of phacoemulsification with implantation of AcrySoft IQ SN60WF (Alcon) anterior chamber IOL were performed each time by the same experienced surgeon, using the Infinity® Vision System (Alcon) system. If the degeneration reactivated (presence of subretinal fluid, intraretinal oedema, progression of the size of detachment of the pigment epithelium), intravitreal anti-VEGF preparations were administered, authorised by FDA and EMEA for the treatment of exudative AMD: ranibizumab (0.5 mg / 0.05 ml) or aflibercept (2 mg / 0.05 ml). The treatment was conducted at monthly intervals, until the neovascular activity was suppressed, and visual acuity stabilised.

Results

The clinical material was compared by determination of the levels of statistical difference for the variations in group I and group II. Based on the comparison of the sex variable, the groups did not differ significantly (Chi^2= 0.32, p = 0.57). No significant differences were found for the following variables: right or left eye (Chi^2= 0.89, p = 0.76), type of exudative AMD – occult or classic form (Chi^2= 0.85, p = 0.77), or age (t-Student, t = 1.40, p = 0.17).

The parameters from the baseline electrophysiological test were analysed. The groups did not differ statistically with respect to these parameters. The distribution of the observed parameters in time within the groups is presented in Tables 1, 3 and 5 for group I, and Tables 2, 4 and 6 for group II.

Density of P1 wave response

In both groups the mean density of P1 wave response from all the rings in the subsequent control time points was compared (Tab. 1 – 2). The Anova analysis for repeated V measurements, conducted with the F-test revealed that the mean values of baseline parameters did not differ significantly from those from the subsequent control points after 6 and 12 months (F = 1.03 – ring I; F = 1.59 – ring II; F = 0.96 – ring III; F = 1.52 – ring IV; F = 0.78 – ring V; and F = 1.87 – ring VI). The significance levels for the compared parameter were as follows: ring I (V1) – p = 0.36, ring II (V2) – p = 0.21, ring III (V3) – p = 0.39, ring IV (V4) – p = 0.22, ring V (V5) – p = 0.46, and ring VI (V6) – p = 0.16.

P1 wave latency

In both groups mean density of retinal P1 wave latency from the rings at the subsequent control time points was compared (Tab. 3 – 4). The Anova analysis for repeated L measurements, conducted with the Fisher F-test revealed that the mean values of baseline parameters did not differ significantly from those from the subsequent control points (F = 1.66 – ring I; F = 2.25 – ring II; F = 0.86 – ring III; F = 0.88 – ring IV; F = 0.88 – ring V; and F = 0.32 – ring VI).

Table 1. Distribution of mean values of P1 wave response density (nV/deg.2) for six concentric rings at different time points in group I. Comparison with initial values
Tabela 1. Rozkład średnich wartości parametru gęstości odpowiedzi fali P1 (nV/st.2) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w grupie I. Porównanie względem wartości początkowych

		Comparison with point 0		Comparison with point 0	
Ring no.	**Point 0 X±SD**	**6 month X±SD**	P	**12 month X±SD**	**P**
VI	247.8 ± 165.71	302.44 ± 216.53	0.21	269 ± 199.66	0.21
V2	103.4 ± 53.58	92.56 ± 56.58	0.66	103.88 ± 82.92	0.66
V3	77.96 ± 55.97	74.38 ± 47.48	0.15	83.6 ± 66.85	0.15
V4	30.8 ± 13.7	37.42 ± 14.4	0.47	36.16 ± 24.55	0.47
V5	22.64 ± 12.1	25.3 ± 12.17	0.61	24.2 ± 12.02	0.61
V6	14.96 ± 7.1	17.16 ± 11.98	0.69	15.32 ± 6.42	0.69

Test Anova/Bonferroni; x – mean value, SD – standard deviation

Table 2. Distribution of mean values of P1 wave response density (nV/deg.2) for six concentric rings at different time points in group II.
Comparison with initial values
Tabela 2. Rozkład średnich wartości parametru gęstości odpowiedzi fali P1 (nV/st.2) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w grupie II. Porównanie względem wartości początkowych

		Comparison with point 0		Comparison with point 0	
Ring no.	**Point 0 X±SD**	**6 month X±SD**	**P**	**12 month X±SD**	**P**
VI	238.84 ± 199.7	229.84 ± 169.92	0.4	189 ± 151.23	0.4
V2	117.36 ± 114	117.16 ± 102.72	0.51	92.88 ± 82.62	0.51
V3	70.24 ± 47.15	66.56 ± 36.48	0.85	55.96 ± 26.1	0.85
V4	32.76 ± 21.38	31.96 ± 17.13	0.51	30.4 ± 15.74	0.51
V5	23.16 ± 12.1	22.08 ± 9.89	0.87	22.4 ± 12.06	0.87
V6	16.24 ± 9.11	15 ± 7.62	0.23	13.6 ± 7.85	0.23

Test Anova/Bonferroni; x – mean value, SD – standard deviation

Table 3. Distribution of mean values of P1 wave latency (ms) for six concentric rings at different time points in group II. Comparison with initial values
Tabela 3. Rozkład średnich wartości parametru latencji fali P1 (ms) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w grupie I. Porównanie względem wartości początkowych

		Comparison with	point 0	Comparison with point 0	
Ring no.	**Point 0 X±SD**	**6 month X±SD**	**P**	**12 month X±SD**	P
L1	47.42 ± 10.61	49.22 ± 9.08	0.14	50.84 ± 11.19	0.14
L2	48 ± 10.29	47.55 ± 10.69	0.08	50.56 ± 11.1	0.08
L3	48.83 ± 10.47	50.37 ± 9.84	0.16	52.17 ± 11.48	0.16
L4	49.33 ± 9.16	49.31 ± 10.03	0.08	51.82 ± 10.65	0.08
L5	50.08 ± 10.88	49.92 ± 11.25	0.39	51.78 ± 11.25	0.39
L6	49.59 ± 10.23	50.88 ± 10.85	0.37	52.42 ± 10.23	0.37

Test Anova/Bonferroni; X – mean value, SD – standard deviation

Table 4. Distribution of mean values of P1 wave latency (ms) for six concentric rings at different time points in group II. Comparison with initial values
Tabela 4. Rozkład średnich wartości parametru latencji fali P1 (ms) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w grupie II. Porównanie względem wartości początkowych

		Comparison with point 0		Comparison with point 0	
Ring no.	**Point 0 X ± SD**	**6 month X ± SD**	**P**	**12 month X ± SD**	**P**
L1	52.96 ± 9.88	53.29 ± 8.81	0.47	52.25 ± 9.96	0.47
L2	53.1 ± 10.1	54.23 ± 9.62	0.72	52.4 ± 9.31	0.72
L3	52.99 ± 9.95	53.65 ± 9.22	0.32	53.27 ± 9.92	0.32
L4	53.94 ± 10.17	55 ± 9.02	0.38	54.54 ± 9.67	0.38
L5	52.5 ± 10.61	53.86 ± 9.88	0.77	52.51 ± 10.66	0.77
L6	52.75 ± 11.15	53.51 ± 9.8	0.25	53.77 ± 10.38	0.25

Test Anova/Bonferroni; X – mean value, SD – standard deviation

Table 5. Distribution of mean value of P1 wave amplitude (nv) for six concentric rings at different time points in Group I. Comparison with initial values
Tabela 5. Rozkład średnich wartości parametru amplitudy fali P1 (nv) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w Grupie I. Porównanie względem wartości początkowych

		Comparison with point 0		Comparison with point 0	
Ring no.	**Point 0 X ± SD**	**6 month X ± SD**	**P**	**12 month X ± SD**	**P**
A1	0.75 ± 0.5	1.23 ± 1.55	0.13	0.83 ± 0.61	0.13
A2	0.38 ± 0.2	0.34 ± 0.2	0.5	0.39 ± 0.3	0.5
A3	0.36 ± 0.27	0.36 ± 0.23	0.48	0.38 ± 0.32	0.48
A4	0.2 ± 0.11	0.24 ± 0.1	0.36	0.22 ± 0.17	0.36
A5	0.21 ± 0.11	0.2 ± 0.1	0.4	0.22 ± 0.12	0.4
A6	0.33 ± 0.58	0.21 ± 0.1	0.48	0.2 ± 0.08	0.48

Test Anova/Bonferroni; X – mean value, SD – standard deviation

Table 6. Distribution of mean value of P1 wave amplitude (nv) for six concentric rings at different time points in group II. Comparison with initial values
Tabela 6. Rozkład średnich wartości parametru amplitudy fali P1 (nv) dla sześciu koncentrycznych pierścieni w poszczególnych czasowych punktach kontrolnych w grupie II. Porównanie względem wartości początkowych

		Comparison with point 0		Comparison with point 0	
Ring no.	**Point 0 X ± SD**	**6 month X ± SD**	**P**	**12 month X ± SD**	P
A1	0.75 ± 0.59	0.73 ± 0.49	0.11	0.6 ± 0.44	0.11
A2	0.46 ± 0.43	0.44 ± 0.33	0.43	0.34 ± 0.25	0.43
A3	0.37 ± 0.24	0.34 ± 0.17	0.73	0.29 ± 0.15	0.73
A4	0.21 ± 0.15	0.2 ± 0.1	0.74	0.18 ± 0.09	0.74
A5	0.25 ± 0.14	0.23 ± 0.12	0.8	0.23 ± 0.13	0.8
A6	0.24 ± 0.14	0.21 ± 0.11	0.13	0.19 ± 0.1	0.13

Test Anova/Bonferroni; X – mean value, SD – standard deviation

The significance levels for the compared parameter were as follows: ring I (L1) – p = 0.20, ring II (L2) p = 0.11, ring III (L3) – p = 0.43, ring IV (L4) – p = 0.42, ring V (L5) – p = 0.42, and ring VI (L6) – p = 0.72.

Wave P1 amplitude

In both groups the mean amplitude of the P1 wave from all the rings in the subsequent control points was compared (Tab. 5 – 6). The Anova analysis for repeated A measurements was conducted in analogy to the above parameters. The observation of the amplitude distribution also demonstrated that neither the mean baseline values nor the mean values of the parameters from the subsequent control points differed significantly (F = 1.63 – ring I; F = 1.93 – ring II; F = 0.91 – ring III; F = 1.29 – ring IV; F = 0.56 – ring V; and F = 0.66 – ring VI). The significance levels for the compared parameter were as follows: ring I (A1) – p = 0.20, ring II (A2) p = 0.15, ring III (A3) – p = 0.41, ring IV (A4) – p = 0.28, ring V (A5) – p = 0.57, and ring VI (A6) – p = 0.52.

Discussion

By using mfERG as a diagnostic tool one can create a map of the electrophysiological activity of the anterior pole retina by simultaneous stimulation of different areas up to 50-60° from the fovea. To assess the functional status of the macula we used the following, common parameters: density of response, latency and amplitude of the P1 wave from 2 – 6 concentric rings covering the area of the central retina within 1-13°. The pathological lesions in the macula usually are manifested by a decrease in the central peak of the density of response from the 5° area, which usually correlates with the presence of subretinal fluid and reduced visual acuity [11, 12]. Additionally, in those eyes with AMD at very early stages and/or with lesions preceding AMD, lower amplitude and longer latency of the P1 wave were observed in the response of the foveolar cones [13, 14]. These data inspire the introduction of electrophysioloy into the pool of diagnostic tests used to monitor the retinal status in the course of macular degeneration.

Used as a tool to evaluate the effectiveness of the therapy of exudative AMD, mfERG may become a valuable source of information about the macular function for the attending physician. Previous studies indicate that after therapy of exudative AMD, regardless of the method, mfERG demonstrated an increased or stabilised density in the response of the cones in the area affected by the pathology. Correlation between these results and improvement in visual acuity and the anatomical status of the central retina were observed [6, 15-18].

The presence of a cataract may affect the results of mfERG test. Improved transparency of the optical centres following implantation of an artificial lens does not affect latency of the P1 wave, although it results in increased mean amplitude of P1 wave response from the central retina, from the area of 4°, as observed by Worderhoff et al. In the group of 18 eyes which underwent the mfERG test prior to and following cataract surgery, the authors observed statistically significant differences in the amplitude of the P1 wave before and after the surgery [19]. In our study, in the group of eyes undergoing the procedure, the increasing trend in the mean amplitude was particularly visible for the area covering 3° (from ring I) in the first control point. However, the differences had no statistical significance.

The problem of the effect not only of the cataract surgery, but also of the implant type, on the course of macular degeneration is also discussed. Therefore, to assess retinal function, multifocal electroretinography is being introduced. Łąk et al. analysed the course of AMD according to the implants used. A total of 20 eyes in 40 patients had Acry-Soft Natural SN 60 AT (Alcon) lens implants with a blue light filter (400 – 500 nm), and in 20 complementary eyes AcrySoft Natural SA 60 AT (Alcon) lenses without the filter were implanted. After 18 months of follow-up researchers noticed a significant deterioration in the density and amplitude of the P1 wave, but only in the eyes with the AcrySoft Natural SN 60 AT (Alcon) lens [20]. In our study, all patients received the same implant of the anterior chamber IOL, to eliminate the potential effect of the type of implant on the macular changes and on the results of the electrophysiological examination.

The stabilisation of parameters of the bioelectrical function of macular cones and bipolar cells presented in our study demonstrated that phacoemulsification with IOL implantation did not affect them significantly at the one-year follow-up.

As previously mentioned, the study subjects were earlier treated with intravitreal anti-VEGF preparations. Literature reports suggest an initial improvement and subsequent stabilisation of the electrophysiological functional parameters in some patients treated due to exudative AMD. Szmatłoch et al. made this observation. They conducted a study in a group of 31 eyes with exudative AMD treated with intravitreal bevacizumab. They assessed the density of P1 wave response and its latency. Although no statistically significant differences

were found between the results of baseline mfERG and the results after 6 and 12 months of therapy, a positive trend regarding the density of P1 wave response was observed in one of the two rings analysed [2]. Moschos et al. also assessed mfERG parameters in patients treated with bevacizumab. Their results suggest stabilisation of the parameters of bioelectrical retinal function, with a slight trend towards improvement. This study was limited by its short duration of 3 months [18]. In the groups of patients in our study no significant changes in the bioelectrical retinal parameters were observed, which demonstrates that therapy with anti-VEGF (used in the case of recurrent activity of the neovascular membrane) did not affect them significantly in the 12-month follow-up period. It should be emphasised that our patients with exudative AMD continued treatment after the initial phase of the therapy prior to inclusion in the study, thus obtaining suppression of the disease activity.

It is important that despite the fact that ERG is an objective test, its use is limited in patients with highly advanced macular lesions and reduced visual acuity (below letter 34 on the ETDRS charts, below 0.1 on the Snellen charts). Due to these factors maintaining foveal fixation, necessary for the proper mfERG test, is difficult. Therefore, fixation monitoring during recording, as well as interpretation of the results should be conducted carefully, especially in patients with considerably reduced visual acuity [21]. On the other hand, in patients who meet the conditions for proper mfERG examination, the functional status of central retina can be assessed more precisely, beside the routine visual acuity test. The results of electrophysiological examinations conducted in patients with exudative AMD may affect the therapeutic management and prognosis, when the baseline retinal damage due to the disease is considered. It requires continuation of the analyses based on observation in numerous groups of patients.

Conclusions

Based on our studies we find that phacoemulsification with IOL implantation and continuation of the treatment of exudative AMD in the case of recurrent disease activity does not affect significantly the bioelectrical retinal parameters such as density of P1 wave response, its latency and amplitude. mfERG demonstrates a potential as a diagnostic tool to support the objective monitoring of the progression of degenerative changes in the central retina.

Literature

1. Stankiewicz A, Figurska M. Zwyrodnienie plamki związane z wiekiem-przewodnik diagnostyki i terapii. [Age-related macular degeneration: a diagnostic and therapeutic guide] TerMedia Wydawnictwa Medyczne, Poznań 2010: 7
2. Szmatłoch K, Lubiński W. Analiza funkcji bioelektrycznej systemu czopkowego regionu plamki u chorych na wysiękową postać zwyrodnienie plamki związanego z wiekiem leczonych doszklistkowymi iniekcjami bewacyzuma-bu (Avastinem). [Analysis of the bioelectrical function of the cone system in the macular area in patients with exudative age-related macular degeneration treated with intravitreal injections of bevacizumab (Avastin)] Okulistyka, 2014; 4: 44-50
3. Gonzalez-Garcia E, Vilela C, Navea A, et al. Electrophysiological and clinical tests in dry age-related macular degeneration follow-up: Differences between mfERG and OCT. Documenta Ophthalmologica, 2016; 133 (1): 31-39
4. Shetty R, Pai SA, Vincent A, et al. Electrophysiological and structural assessment of the central retina following intravitreal injection of bevacizumab for treatment of macular edema. Documenta Ophthalmologica, 2008; 116 (2): 129-135
5. Lipski A, Bornfeld N. Multifocal electroretinography in patients with exudative AMD and intravitreal treatment with pegaptanib sodium. Retina, 2007; 27 (7): 864-872
6. Maturi RK, Bleau LA, Wilson DL. Electrophysiologic findings after intravitreal bevacizumab (Avastin) treatment. Retina, 2006; 26 (3): 270-274
7. Chylack L, Wolfe J, Singer D, et al. The Lens Opacities Classification System III. Arch Ophthalmol, 1993; 111 (6): 831-836
8. Chamberlin JA, Bressler NM, Bressler SB, et al. The use of fundus photographs and fluorescein angiograms in the identification and treatment of choroidal neovascularization in the Macular Photocoagulation Study. The Macular Photocoagulation Study Group. Ophthalmology, 1989; 96 (10): 1526-1534
9. Subfoveal neovascular lesions in age-related macular degeneration. Guidelines for evaluation and treatment in the macular photocoagulation study. Macular Photocoagulation Study Group. Arch Ophthalmol, 1991; 109 (9): 1242-1257
10. Hood DC, Bach M, Brigell M, et al. ISCEV Standard for clinical multifocal electroretinography (2011 edition). Doc Ophthalmol, 2012; 124: 1-13
11. Torres-Soriano ME, Cubas-Lorenzo V, Garcia-Aguirre G, et al. Multifocal Electrophysiologic findings after intravitreal bevacizumab (Avastin) treatment. Retina, 2012; 32: 972-976
12. Jurklies B, Weismann M, Hiising J, et al. Monitoring retinal function in neovascular maculopathy using multifocal electroretinography-early and long-term correlation with clinical findings. Graefes Arch Clin Exp Ophthalmol, 2002; 240 (4): 244-264
13. Li J, Tso M0, Lam TT. Reduced amplitude and delayed latency in foveal response of multifocal electroretinogram in early age related macular degeneration. Br J Ophthalmol, 2001; 85 (3): 287-290
14. Feigl B, Brown B, Lovie-Kitchin J, Swann P. Cone and rod-mediated multifocal electroretinogram in early age-related maculopathy. Eye, 2015; 19: 431-441
15. Mozolewska-Piotrowska K, Lubiński W, Goslawski W, et al. Evaluation of retinal function after photodynamic therapy of subfoveal choroidal neovas-cularisation in patients with age-related macular degeneration. Ann Acad Med Stetin, 2007; 53 (Suppl 1): 16-21
16. Moschos MM, Panayotidis D, Theodossiadis G, Moschos M. Assessment of macular function by multifocal electroretinogram in age-related macular degeneration before and after photodynamic therapy. J Fr Ophtalmol, 2004; 27 (9): 1001-1006
17. Karanjia R, Eng KT, Gale J, et al. Electrophysiological effects of intravitreal Avastin (bevacizumab) in the treatment of exudative age-related macular degeneration. Br J Ophthalmol, 2008; 92 (9): 1248-1252

18. Moschos MM, Brouzas D, Apostolopoulos M, et al. Intravitreal use of bevacizumab (Avastin) for choroidal neovascularization due to ARMD: a preliminary multifocal-ERG and OCT study. Multifocal-ERG after use of bevacizumab in ARMD. Doc Ophthalmol, 2007; 114 (1): 37-44
19. Wórdehoff U V, Palmowski AM, Heinemann-Vernaleken B, et al. Influence of cataract on the multifocal ERG recording-a pre- and postoperative comparison. Doc Ophthalmol, 2004; 108 (1): 67-75
20. Łąk D, Lubiński W, Sylwestrzak Z, et al. Ocena porównawcza przebiegu zwyrodnienia plamki związanego z wiekiem u pacjentów po operacji zaćmy metodą fakoemulsyfikacji z wszczepieniem soczewek Acrysoft SN 60 AT i Acrysoft SA 60 AT. [Comparative assessment of the course of age-related macular degeneration in patients following cataract surgery using phacoemulsification with implantation of Acrysoft SN 60 AT and Acrysoft SA 60 AT lenses] Ann Acad Med Stetin, 2007; 53 (Suppl 1): 43-48
21. Pedersen KB, SjØlie AK, Vestergaard A H, et al. Fixation stability and implication for multifocal electroretinography in patients with neovascular age-related macular degeneration after anti-VEGF treatment. Graefe's Archive Clin Experimental Ophthalmol, 2016; 254 (10): 1897-1908

Use of 18F-FDG PET/CT in the complex evaluation of patients with Takayasu's disease – a case report

Zastosowanie badania 18F-FDG PET/CT w kompleksowej ocenie pacjenta z chorobą Takayasu – opis przypadku

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Abstract. Takayasu's disease is an inflammatory disorder of large and medium vessels, first described by a Japanese ophthalmologist. The aetiology is not fully known, although it is suspected that the main driver is an autoimmune response of the organism, combined with a genetic predisposition. This disease mainly affects females <40 years and is located mostly in the aorta and its major branches. The gold standard in Takayasu's disease diagnostic imaging tests involves: angio-CT and angio-MRI. There are attempts to include 18F-FDG PET/CT into diagnostic testing. The article presents the case of a 51-year-old male diagnosed with Takayasu's disease within the superior mesenteric artery following angio-CT, and 18F-FDG PET/CT which confirmed the diagnosis and detected other inflammation sites.
Key words: Takayasu's disease, large vessel vasculitis, kidney failure, essential hypertension, PET

Streszczenie. Choroba Takayasu to opisana po raz pierwszy przez japońskiego okulistę choroba zapalna dotycząca naczyń dużego i średniego kalibru. Jej etiologia nie została do końca poznana, choć podejrzewa się, że głównym czynnikiem sprawczym jest autoimmunologiczna odpowiedź organizmu połączona z uwarunkowaniami genetycznymi. Chorują głównie kobiety poniżej 40. roku życia. Choroba umiejscawia się przeważnie w aorcie oraz jej największych odgałęzieniach. Złotym standardem diagnostycznym w chorobie Takayasu pozostają badania obrazowe: angio-CT i angio-MRI. Podejmowane są próby włączenia w tok diagnostyczny badania 18F-FDG PET/CT. W artykule przedstawiono przypadek 51-letniego mężczyzny, u którego rozpoznano chorobę Takayasu w obrębie tętnicy krezkowej górnej na podstawie badania angio-CT oraz badania 18F-FDG PET/CT, co pozwoliło na potwierdzenie rozpoznania i zobrazowania innych ognisk zapalnych.
Słowa kluczowe: choroba Takayasu, zapalenie dużych naczyń, zawał nerki, samoistne nadciśnienie tętnicze, PET

Delivered: 27/02/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 375-379

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Introduction

Takayasu's disease (Takayasu's arteritis), first described by a Japanese ophthalmologist, is a chronic, inflammatory disorder of large and medium vessels. Its aetiology is not fully understood, although it is suspected that the principal cause is an autoimmune response combined with a genetic predisposition in the HLA-Bw52 and HLA-B39 antigenes, common in the countries of the Far East and in India. This thesis is supported by increased globulin and nonspecific antibody levels in the organisms of patients with Takayasu's arteritis. The causal relationship involving a bacterial or viral infection factor has been questioned. The incidence of the disease in Europe is estimated at 1-3 million/year [1].

There have been reports of Takayasu's arteritis concurrent with seronegative spondyloarthropathies, juvenile idiopathic arthritis, systemic lupus erythematosus, Wegener's granulomatosis, sarcoidosis, Crohn's disease or colitis ulcerosa, which indicates a similar genetic background, and may confirm the autoimmune origin of the disease [2, 3].

The disease primarily affects women, on average

aged < 40 years (less often men), and is typically located in the aorta and its major branches, rarely invading other vessels. Based on the collected data, four types of the disease have been distinguished:

- type I (Shimizu-Sano) - symptoms of cerebral ischaemia due to lesions in the aortic arch,
- type II (Kimoto) - arterial hypertension due to lesions in the renal arteries or aorta,
- type III (Inada) - lesions in the aorta above and below the diaphragm – combines the features of types I and II,
- type IV - usually associated with lesions in the wall of aorta or its branches corresponding to types I-III [2, 3].

During an asymptomatic period of varied length, the immune system is activated, involving infiltration of the vascular wall and its granulation. The spreading inflammatory process involving mononulear cells (lymphocytes) is visible in the adventitia, and it affects the vasa vasorum vessels. The granulomatous lesions in the media contain Langerhans cells. In a histopathological examination the concurrence of early and late lesions is typical. Changes in the arterial walls result in sectional narrowing, or complete closure of the vascular lumen, with potential re-channelling in the case of older lesions. Post-stenotic dilations and aneurysms develop [4].

In diagnostics, apart from classic angiography, angio-CT and angio-MRI, the importance of PET/CT with 18F-fluorodeoxyglucose is increasing. The test allows inflammatory lesions to be detected in the vascular wall, and their course to be monitored. Treatment should be implemented after the assessment of disease activity. To establish the diagnosis, the following have to be confirmed:

- symptoms of vascular inflammation (vascular murmurs, limb claudication, increasing difference between the pressure values measured on both limbs),
- increased CSR,
- specific angiographic changes,
- general symptoms that cannot be attributed to other diseases [5].

The treatment of choice is corticotherapy, used until the CSR normalises, with subsequent gradual dose reduction, and even discontinuation of the medicine. In resistant cases methotrexate, mofetil mycophenolate, cyclophosphamide or leflunomide can be introduced. Surgical treatment is performed only in patients with pronounced clinical symptoms of organ ischaemia [5].

Case report

In March 2015, a 50-year-old man visited the emergency department of the Military Institute of Medicine due to a sudden, acute pain in the left lumbar area, without any other symptoms. During his stay in the emergency department the patient received a complete blood count test, general urinalysis, CRP and abdominal ultrasound. None of the studies revealed any abnormalities. Based on the results of the tests, cholelithiasis and pyelonephritis were excluded. The patient was referred for an abdominal CT, which revealed oedema of a part of the left kidney, and the presence of a thrombus in a branch of the renal artery was suspected. After consultation with a nephrologist and a surgeon, outpatient treatment with low-molecular weight heparin in a therapeutic dose was introduced.

A month later the patient returned to the emergency department of the Military Institute of Medicine due to pain in the left lower abdomen, radiating to the back. The pain occurred suddenly, without an injury or other tangible cause. Moreover, the patient developed fever. Any signs of infection were excluded, articular pains occurred. Complete blood count and smear, general urinalysis, eGFR, CSR, electrolytes, creatinine, urea, CRP, coagulation times, glucose, AST, ALT, LDH and abdominal ultrasound were ordered. Elevated creatinine concentrations from 0.9 to 1.4 mg/dl were observed, as well as reduced eGFR from > 90 to 57 ml/min, increased CSR, elevated CRP concentration, leukocytosis of 14 thousand and PLT of 493 thousand.

The ultrasound examination showed a normal image of the abdominal organs. Following a surgical assessment, an abdominal angio-CT was performed, and revealed dissection of the superior mesenteric artery and some of the ileal branches, the false lumens were coagulated, and no changes in the intestinal walls. Thrombosis of the anterior left renal artery branch was diagnosed, with infarction of the upper, frontal and lower segment. Due to acute kidney injury (AKI) the patient was admitted to the Department of Nephrology. At admission, the patient was in a moderately good general condition, cardiovascularly and respiratorily stable, logically responding to verbal stimulation, suffering, in pain. Arterial pressure of 112/60 mmHg, regular cardiac function of 70/min. Normal alveolar murmur over the lungs. The abdomen was tender, especially in the left lower quadrant, with pronounced peritoneal symptoms, peristalsis was very slow. Goldflam's sign on the left side was positive. No peripheral oedemas were observed. Additional tests revealed elevated inflammatory markers: CSR 46 mm, CRP 5.0 mg/dl, the complete blood count demonstrated a leukocytosis of 20 thousand with a neutrophil smear, PLT of 574 thousand, normal complement compounds, and general urinalysis revealed low specific weight urine. The patient received conservative treatment.

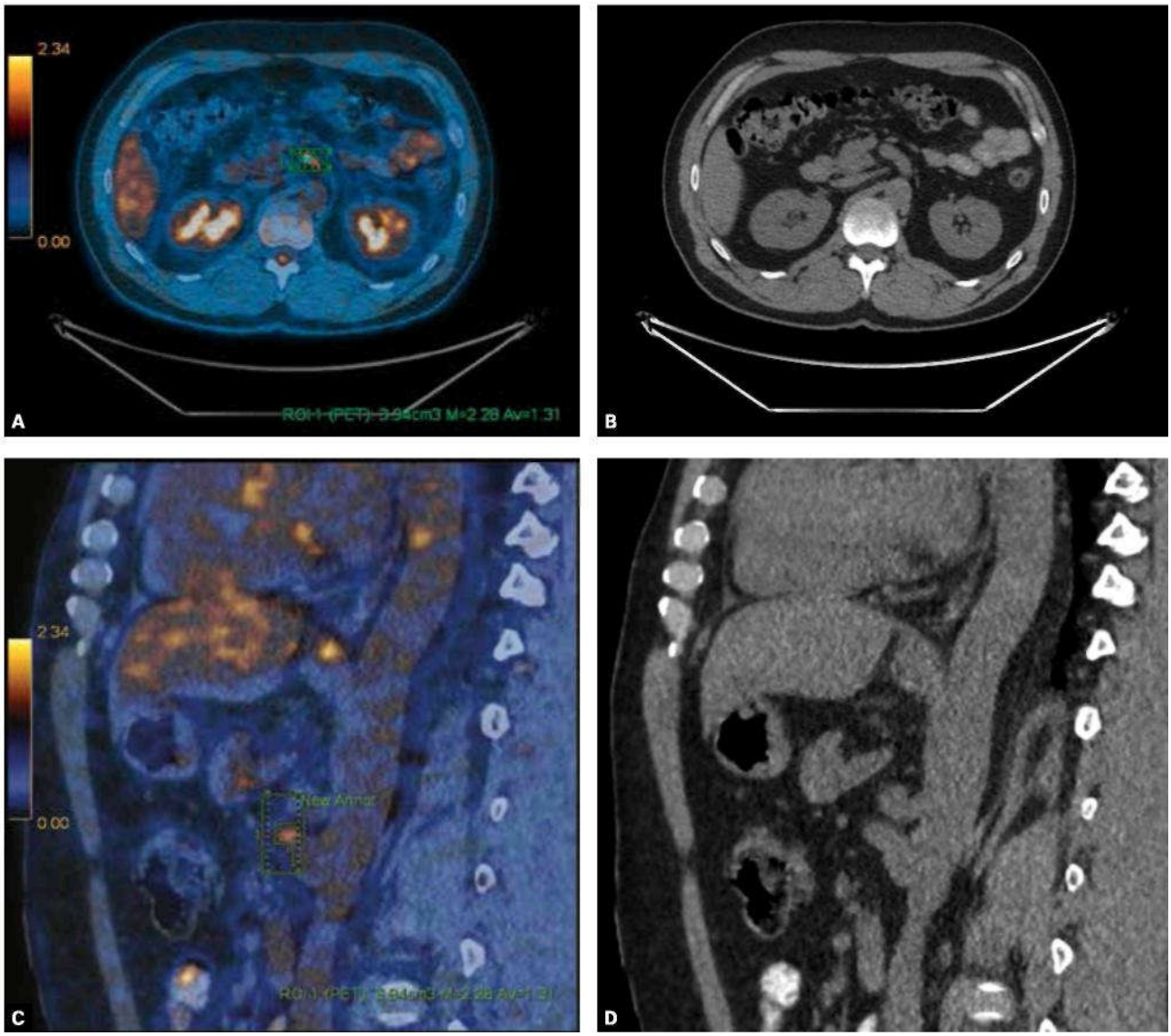

Figure 1. Study of 18F-FDG PET/CT - transverse and sagittal cross-sections show widened superior mesenteric artery to 11 mm with diffuse, moderately increased 18F-FDG metabolism, SUV_{max} 2.3

Rycina 1. Badanie 18F-FDG PET/CT-w projekcjach poprzecznej i strzałkowych widoczna poszerzona tętnica krezkowa górna do 11 mm z rozlanym, miernie wzmożonym metabolizmem 18F-FDG, SUV_{max} 2,3

Based on the interview and additional tests, inflammation of major vessels was suspected. After radiological consultation an extensive infarction area was found in the left kidney, covering the superior, anterior and inferior segments (40-50% of the parenchyma), secondary to thrombosis of the real artery, and progression of the inflammatory infiltration around the bifurcation of the superior mesenteric artery. Therapy with glucocorticosteroids was deemed necessary to maintain vital functions. Due to the risk of intestinal ischaemia and the condition following infarction of the left kidney, empirical antibiotic therapy was introduced: ceftriaxone and ciprofloxacin intravenously, and metronidazole orally. After a rheumatological consultation, Takayasu's disease was suspected. Tests for antinuclear antibodies (ANA), anti-dsDNA antibodies, C3 compound and C4 compound of the complement were ordered, and the following treatment was prescribed: methylprednisone at a dose of 1 g for 3 days, followed by prednisone at a dose of 60 mg/d for 4 weeks, gradually reduced by 5 mg every 2 weeks according to the clinical picture, as well as six infusions of 1 g of cyclophosphamide every 4 weeks.

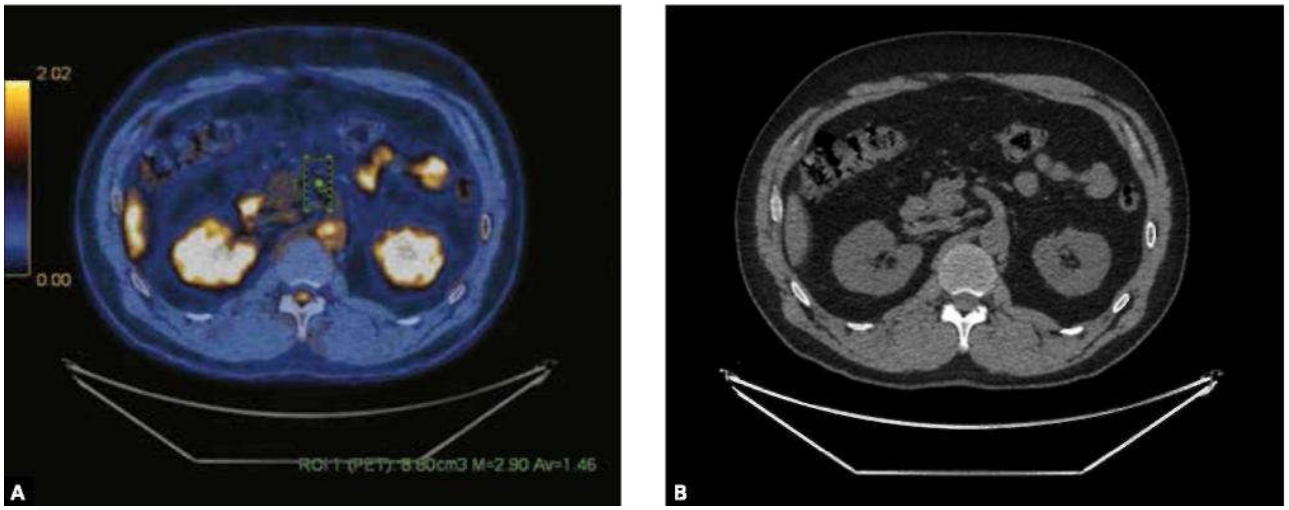

Figure 2.18F-FDG PET/CT control study, transverse cross-section shows widened superior mesenteric artery to 10 mm with persistent small focal intensification of 18F-FDG accumulation in the superior mesenteric artery, approx. 30 mm from branching off from the aorta, SUV_{max} 2.9

Rycina 2. Badanie kontrolne 18F-FDG PET/CT-w projekcji poprzecznej widoczna poszerzona tętnica krezkowa górna do 10 mm z utrzymującym się drobnym ogniskowym wzmożeniem gromadzenia 18F-FDG w tętnicy krezkowej górnej, w odległości ok. 30 mm od odejścia od aorty, SUV_{max}2,9

After the first dose of intravenous methylprednisone, the patient noticed a considerable improvement. The pain significantly subsided. The intestinal function was gradually restored, and the patient started passing normal stools. Diuresis was significant, of approximately 3,000 ml. The anticoagulatory treatment with low-molecular weight heparin in a therapeutic dose was continued, and acetylsalicylic acid was introduced. During the patient's stay, increased arterial pressure to 160/90 mmHg was observed symmetrically on both limbs. A beta-blocker was introduced, followed by a calcium channel blocker, resulting in a good hypotensive effect. Antibodies: ANA, dsDNA, ANCA, APLA - negative. Further hospitalisation of the patient was uncomplicated. He was discharged in a good general condition, with a diagnosis of inflammation of the large vessels (involving superior mesenteric artery, left renal artery), and thrombosis of the left renal artery with infarction of 40-505 of the renal parenchyma and arterial hypertension. An out-patient 18F-FDG PET/CT examination was ordered. To continue the treatment, prednisone at 60 mg/d and azathioprine at 100 mg/d were prescribed.

In May the patient was readmitted to the hospital to assess the effectiveness of the treatment. The patient's general condition at admission was good. Arterial hypertension was well-controlled. The body weight was 5 kg lower than during the previous hospitalisation. Abdominal pain was mild, usually temporary, after a large meal. Additional tests revealed normal renal function, and no elevation of the inflammatory markers. The immunosuppressive therapy was continued, the prednisone dose was reduced to 40 mg, and the dose of azathioprine remained the same. The 18F-FDG PET/CT examination (Fig. 1) after approximately 3 weeks of immunosuppressive therapy demonstrated a minimally active inflammatory process in the superior mesenteric artery. Otherwise, no signs of active inflammation in the aorta or other large arteries were found. The patient was discharged in a generally good condition.

Another follow-up visit took place in August, to perform a planned angioCT test of the aorta and renal arteries. At admission the patient's condition was good. Arterial hypertension was well-controlled. The body weight had increased by 7 kg since the previous hospitalisation. Abdominal pain was still mild, usually following large meals. Additional tests revealed normal renal function, and no elevation of the inflammatory markers. Compared to the angio-CT examination from April, a nearly complete regression of the inflammatory infiltration around the initial section of the superior mesenteric artery was found (previous diameter of the vessel was 4 mm, presently 8 mm). At the bifurcation of the superior mesenteric artery an aneurysm of 14 x 11 mm was present, approximately 3 cm long, with a dissected wall and narrow true lumen. The aneurysm sac was partially coagulated. A distal branch of the mesenteric artery diverged from the aneurysm sac. Compared to the previous examination, the left branch had restored patency (the right one still demonstrated a trace contrast passage). Partial regression of the infarction lesions in the left kidney was observed, with cirrhotic lesions in the inferior segments and persistent thrombi in the branch of the anterior renal artery. Previous immunosuppressive therapy was maintained: prednisone at 20 mg/d and azathioprine at 100 mg/d. The patient was discharged in a generally good condition.

In November he was hospitalised again, and a follow-up angio-CT was conducted. The aneurysm-enlarged (with dissected wall, partially coagulated) section of the superior mesenteric artery at the bifurcation was still

visible. Compared to the examinations from April and August, the complete regression of the inflammatory infiltration around the initial part of the superior mesenteric artery was observed.

The post-infarction changes in the left kidney, along with the thrombi in the branch of the anterior renal artery persisted. Due to clinical signs of remission, following consultation with the head of the department, the previous treatment was continued, and a follow-up hospitalisation in 3 months was planned.

In February the patient was readmitted for the assessment of disease activity. In the planned follow-up 18F-FDG PET/CT examination (Fig. 2) a minimally active inflammatory process was found in the superior mesenteric artery. Compared to the previous examination (in May) it was less extensive. Otherwise, no signs of inflammation in the aorta or other large arteries were demonstrated.

Discussion

Takayasu's disease is a rare and late diagnosed inflammatory disorder of unclear aetiology. It affects the large and medium arteries. The initial symptoms are non-specific, and include primarily weakness, fever, night sweats, loss of body weight, arthritis and various skin lesions. Late diagnosis may cause irreversible complications, e.g. vascular obstruction, loss of vision and various cardiovascular complications.

PET/CT examination with the use of 18F-FDG may be used in the diagnostics of vasculitis. Current reports emphasise its high sensitivity and specificity [6, 7]. It provides information regarding the location and advancement of the disease in the vessels. However, as in the presented case, the greatest advantage of the test is the ability to detect the disease at early stages in patients with non-specific symptoms. To sum up, the 18F-FDG PET/CT test may be used in initial and follow-up diagnostics during immunosuppressive treatment of patients with inflammatory vascular diseases such as Takayasu's disease.

Literature

1. Numano F. The story of Takayasu arteritis. Rheumatology, 2002; 41:103-106
2. Al Abrawi S, Fouillet-Desjonqueres M, David L, et al. Takayasu arteritis in children. Ped Rheumatol, 2008; 6: 17
3. Balamtekin N, Gurakan F, Ozen S, et al. Ulcerative colitis associated with Takayasu's arteritis in a child. Acta Paediatr, 2009; 98: 1368-1371
4. Kołodziejczyk B, Gazda A, Musiej-Nowakowska E, Rutkowska-SakL. Choroba Takayasu u 8-letniej dziewczynki [Takayasu's arteritis in an 8-year old girl] Department and Polyclinic of Developmental Age Rheumatology, prof. Eleonora Reicher Instytute of Rheumatology in Warsaw. Reumatologia, 2011; 49(1): 71-77
5. Szczeklik A, ed. Choroby wewnętrzne. [Internal diseases] Practical Medicine, Krakow 2016
6. Webb M, Chambers A, AL-Nahhas A, et al. The role of 18F-FDG PET in characterising disease activity in Takayasu arteritis. Eur J Nuci Med Mol Imaging, 2004;31:627-634
7. Cabrera A, Caicedo AL, Elena A, et al. 18F-FDG PET/CT in the diagnosis of Takayasu's arteritis and the assessment of response to therapy. Revista Espańola de Medicina Nuclear e Imagen Molecular (in Spanish) (English Edition), 2014; 33 (5): 302-305

20-year-old female with intestinal malrotation – a case report

Zaburzenia zwrotu jelit u 20-letniej chorej – opis przypadku

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Abstract. Malrotation is a congenital anomaly typically diagnosed during the first year of life. Adult malrotation is very rare and the non-specific symptoms may lead to a delayed diagnosis and treatment. We present a case of a 20-year old female with malrotation of the intestine. Ladd's procedure was performed.
Key words: malrotation, Ladd's procedure, computed tomography scan

Streszczenie. Zaburzony zwrot jelit jest wadą wrodzoną, najczęściej rozpoznawaną w ciągu 1. roku życia. U dorosłych występuje rzadko, a niespecyficzne objawy mogą prowadzić do opóźnienia rozpoznania oraz leczenia. Prezentujemy przypadek 20-letniej kobiety z malrotacją jelit, u której wykonano operację Ladda.
Słowa kluczowe: malrotacją, operacja Ladda, tomografia komputerowa

Delivered: 08/02/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 380-382

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Introduction

Intestinal malrotation refers to a number of anatomical variants involving abnormal positioning of different sections of the gastrointestinal tract, and incorrect mesenteric fixation. The defect is found in 0.5-1% of the population, but the clinical symptoms are observed in 1 per 6,000 births [1]. It is typically diagnosed in the first year of life. In older children and adults the clinical picture is non-specific, and the condition is often difficult to diagnose.

Case report

A 20-year-old female was admitted to the general surgery ward in an emergency procedure due to strong upper abdominal pain, vomiting and dehydration. It was the third episode of similar symptoms within 10 days. Seven days earlier, the patient was hospitalised in another hospital due to abdominal pain. Then she received imaging diagnostics, including double-phase computed tomography. The study revealed the small intestine located on the right, the large intestine on the left side, the superior mesenteric artery on the right relative to the mesenteric vein. The stomach was filled with stagnated chyme. On the border of the transverse and ascending duodenum a whirlpool sign was visible – a rotation of the duodenal mesentery and mesenteric vessels, with the right-sided position of the further part of duodenum, and a narrowing of the organ's lumen. The small intestinal and colonic loops were not dilated. The patient received conservative treatment resulting in resolution of symptoms, and she was discharged in a generally good condition.

After a few days, another episode of pain occurred, and the patient was admitted to hospital again. Her condition at admission was moderately good. The physical examination revealed a soft abdomen, the presence of upper abdominal pain, the absence of peritoneal symptoms, and normal peristalsis. The laboratory tests demonstrated: RBC 5.60, WBC 17.62 (10^3/µl), urea 25.06 (mmol/l), creatinine 509 (µmol/l), GFR 10.1 (ml/min/1.73 m), and CRP 6.6 (mg/l). The patient did not report any chronic diseases.

Figure 1. Intraoperative photograph shows twisted small bowel mesentery
Rycina 1. Obraz śródoperacyjny. Widoczny skręt krezki jelita cienkiego

Due to the high values of the renal parameters, the patient received an abdominal computed tomography examination without contrast, which revealed in the right upper abdomen a whirl corresponding to an intestinal twist in the duodenal area, with the stomach filled with excessive content. No other pathological signs were found. Based on the complete clinical picture and the previous course of the disease, the patient was diagnosed with severe intestinal obstruction due to intestinal malrotation with concurrent pre-renal renal impairment. The patient was qualified for surgical treatment.

The peritoneal cavity was opened through a midline incision. A significant distension of the stomach was found intraoperatively, whereas the small intestinal loops did not demonstrate signs of obstruction or necrosis. Further, a malrotation of the small intestinal mesentery was revealed (Fig. 1), as well as peritoneal adhesions pressing the duodenum, which caused its narrowing. The peritoneal adhesions were released, and the small intestinal mesentery was "untwisted". Additionally, an appendectomy was performed. Layered sutures were applied to close the abdomen No complications were observed in the perioperative period. In further hospitalisation the renal parameters normalised. On the fourth day the patient was discharged in a generally good condition.

Discussion

Between the fourth and twelfth weeks of foetal development the midgut rotates by 270 degrees in the counter-clockwise direction. Inhibition or disruption of this process results in a number of defects, collectively referred to as intestinal malrotation. Many anatomical variants are distinguished, depending on the developmental stage in which the disorder occurred. Incomplete intestinal rotation is the most common form. This defect is associated with the presence of bands of peritoneal connective tissue which attach the loops of the caecum and the ascending colon to the posterior abdominal wall, transversely to the duodenum, and with abnormal mesenteric fixation. The bands are referred to as Ladd's bands. Due to the compression of the duodenum, they may cause its obstruction. Abnormal mesenteric fixation involving a pathologically narrow basis may contribute to intestinal malrotation, and as a consequence, to its strangulation and a subsequent blood supply impairment and intestinal necrosis [2]. The clinical picture in adult patients is often non-specific.

The disease may take a chronic or an acute form. Chronic disease is characterised by recurring abdominal pain associated with flatulence, nausea and vomiting. The symptoms may be attributed to other diseases, such as irritable bowel syndrome, ulcer, conditions of the pancreas or even mental disorders [3, 4]. The diagnosis may be further complicated by the fact that this congenital disease in most cases is recognised in infancy, and is rarely considered in the differential diagnosis of adult patients. Frequently the accurate diagnosis is established during a laparotomy performed due to a different condition. The most dangerous complication is intestinal malrotation with subsequent blood supply impairment and intestinal necrosis. The symptoms occur suddenly, the course of the disease is rapid and it is an indication for an urgent surgical intervention.

Abdominal X-ray examination does not provide the diagnosis, as the test's sensitivity and specificity in detection of abnormal intestinal rotation are limited. The symptoms demonstrated during the test, such as characteristic lucencies in the right jejunum, or absence of faecal masses in the right lower quadrant of the large intestine may indirectly suggest intestinal malrotation and justify more extensive imaging diagnostics. The ultrasound examination may reveal distension of the duodenal loop, small intestinal loops or caecal displacement. In the case of intestinal malrotation associated with intestinal twist, small intestinal loops are twisted around the trunk of the superior mesenteric artery [3]. It is also important to assess the relationship between the superior mesenteric artery (SMA) and the superior mesenteric vein (SMV). Anatomically, the superior mesenteric vein is situated anteriorly and to the right of the superior mesenteric artery. In intestinal malrotation,

the SMV is situated superiorly and to the left of the SMA. However, inversion of the mesenteric vessels is observed in approximately 60% of the patients with intestinal malrotation. It may also be found in patients without malrotation [5]. A CT scan may reveal abnormal, right-sided position of the small intestine, left-sided position of the caecum, and moreover, in patients with intestinal malrotation then aplasia of the pancreatic uncinate process is observed [6]. Positioning of the mesenteric vessels is also assessed in the CT study. As the mesenteric root is narrow, it is sometimes twisted around the axis formed by the SMA. Clinical manifestations include symptoms of severe gastrointestinal obstruction, and the condition is demonstrated in imaging studies in a whirlpool form [3, 7].

The standard surgical treatment is Ladd's procedure, described for the first time by William Ladd in 1936. It involves the following stages: releasing the peritoneal bands (Ladd's bands), widening of the narrow mesenteric rot by separating its lamina, correctional placement of the intestine, and prophylactic appendectomy in order to prevent potential diagnostic problems in the future [2, 3].

Summary

Intestinal malrotation is rarely diagnosed in adult patients, and general surgeons may never encounter this condition in their clinical practice. Intestinal malrotation with volvulus and intestinal strangulation is an important indication for surgical intervention. In the presented case, the decision to introduce surgical treatment was based on the course of the disease, namely recurrent symptoms with concurrent deterioration of the renal function. The diagnostic procedures, especially CT scans, enabled a pre-operative diagnosis. Potential development of volvulus justifies surgical treatment in patients diagnosed with malrotation, regardless of the clinical picture. Therefore, this type of therapy should always be considered in intestinal malrotation.

Literature

1. Torres A, Ziegler M. Malrotation of the intestine. World J Surg, 1993; 17: 326
2. Buglaj M, Patkowski D, Czernik J, Hilger T. Zaburzenia zwrotu jelit – spektrum kliniczne. [Intestinal malrotation – a clinical spectrum] Pol Przegl Chir, 2007; 79 (4): 513-533
3. Emanuwa O, Ayantunde A, Davies T. Midgut malrotation first presenting as acute bowel obstruction in adulthood: a case report and literature review. World J Emerg Surg, 2011; 6: 22
4. Nakajima Y, Sakata H, Yamaguchi T, et al. Successful treatment of a 14-year-old patient with intestinal malrotation with intestinal malrotation with laparoscopic Ladd procedure: case report and literature review. World J Emerg Surg, 2013; 8(1): 19
5. Applegate K.E, Anderson J.M, Klatte E.C, Intestinal Malrotation in Children: A Problem-solving Approach to the Upper Gastrointestinal Series. Radiographics, 2006; 26 (5): 1485-1500
6. Zissin R, RathausV, OscadchyA, et al. Intestinal malrotation as an incidental finding on CT in adults. Abdom Imaging, 1999; 24 (6): 550-555
7. Pickhardt PJ, Bhalla S. Intestinal malrotation in adolescents and adults: spectrum of clinical and imaging features. AJR, 2002; 179: 1429-1435

Gout – "the disease of kings"

Dna moczanowa – „choroba królów"

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Abstract. Gout is a disease caused by the accumulation of excess monosodium urate crystals in the joint fluid, tissues and organs. This process is a result of long-standing hyperuricemia, defined as an abnormally high level of uric acid in the serum of more than 6 or 7 mg/dl. Gout is one of the most common forms of inflammatory arthritis. It affects about 1 to 2% of adults of the Western population. If untreated, it results in disability and poorer quality of life. Confirming the presence of typical monosodium urate crystals in the joint fluid or tophus under polarized light microscopy has been the gold standard for the diagnosis of gout. In patients with normal kidney function, allopurinol is still recommended for first-line urate-lowering therapy (ULT). In case of intolerance or the presence of contraindications to allopurinol, a newer xanthine oxidase inhibitor (febuxostat) is recommended. In contrast to allopurinol it does not require a reduction of dose in patients with moderate kidney failure. The article presents a 64-year-old man hospitalised in the Department of Internal Diseases and Rheumatology due to recurrent pain and swelling of peripheral joints.
Key words: gout, tophus, hyperuricemia

Streszczenie. Dna moczanowa jest zespołem objawów klinicznych będących konsekwencją odkładania się kryształów moczanu sodu w płynie stawowym, tkankach i narządach. Proces ten jest wynikiem długotrwałej hiperurykemii, którą definiuje się jako zwiększone stężenie kwasu moczowego w surowicy >6 lub 7 mg/dl. Dna moczanowa jest jedną z najczęstszych chorób zapalnych stawów, występującą u 1-2% osób w krajach zachodnich. Nieleczona prowadzi do niepełnosprawności i gorszej jakości życia chorego. Złotym standardem w diagnostyce dny moczanowej jest badanie z użyciem mikroskopu spolaryzowanego, potwierdzające obecność charakterystycznych kryształów kwasu moczowego np. w płynie stawowym lub w aspiracie ze złogu z guzka dnawego. U pacjentów z prawidłową funkcją nerek lekiem pierwszego rzutu zmniejszającym stężenie kwasu moczowego w surowicy pozostaje allopurynol. W przypadku jego nietolerancji lub przeciwwskazań do jego stosowania rekomendowany jest nowszy inhibitor oksydazy ksantynowej, febuksostat. Lek ten w przeciwieństwie do allopurynolu nie wymaga redukcji dawki w umiarkowanej niewydolności nerek. W artykule przedstawiono przypadek 64-letniego mężczyzny hospitalizowanego w Klinice Chorób Wewnętrznych i Reumatologii z powodu nawracającego bólu i obrzęku stawów obwodowych.
Słowa kluczowe: dna moczanowa, guzek dnawy, hiperurykemia

Delivered: 13/03/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 383-388

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Introduction

Gout is known from ancient times, and was referred to as "the disease of kings" because its occurrence was associated with the luxurious kind of lifestyle that only the aristocracy could afford. Contrary to less affluent social strata, the diet of the aristocracy was based on large quantities of red meat, fatty foods and alcohol. Gout affected Alexander the Great, Sigismund III Vasa and Stanisław August Poniatowski. In recent years, the incidence of gout is clearly on the increase [1, 2]. It is associated with longer life expectancy, dietary changes, and a higher prevalence of chronic diseases, i.e. chronic renal disease, type 2 diabetes, arterial hypertension and other cardiovascular diseases. Important risk factors include: obesity, alcohol abuse, increased consumption of meat, seafood, meals and drinks rich in fructose, and medications, mostly diuretics, especially thiazide diuretics, cyclosporin or acetylsalicylic acid in small doses [3-6]. A typical gout flare starts suddenly, without any warning signs. The affected joint is red, swollen, warm and very painful. The symptoms are most pronounced on the first day of the flare. The most often involved joints include: metatarsophalangeal (MTP) joint in about 75% of patients, other joints of the foot including the ankle in about 50% of patients, knee joints in about 30% of patients, and the phalangeal joints of the hand in about 25% of patients [7]. The first untreated episode of gout resolves spontaneously within 2 weeks. Gout therapy consists of the treatment of the acute flare, management in the intercritical period, aimed at preventing further flairs, and treatment of chronic (tophaceous) gout. Non-pharmacological and pharmacological methods are used. Non-pharmacological management involves primarily patient education regarding dietary modifications, lifestyle changes, including increased physical activity, and

therapy of the comorbidities. Pharmacological treatment consists in using anti-inflammatory drugs and medicines reducing the serum concentration of uric acid. The aim of the therapy is to reduce the serum uric acid levels to 6 mg/dl (360 µmol/l) [8].

Case report

In 2014, a 64-year-old man with arterial hypertension, type 2 diabetes, chronic renal disease and ischaemic heart disease was admitted to the Department of Internal Diseases and Rheumatology of the Military Institute of Medicine (medical record no. 2014-66358). The patient was admitted due to recurrent pain and oedema of the peripheral joints. Based on the medical interview, the first symptoms occurred in 1998, in the form of sudden pain and oedema of the right ankle and the metatarsophalangeal joint of toe I of the right foot, with skin redness and increased heat. The symptoms disappeared spontaneously after approximately 2 weeks. The patient experienced similar attacks 3-4 times per year, with the following joints affected: metatarsophalangeal joint of toe I in both feet, right ankle, knee joint and small joints of the hands. The patient observed that the flares usually occurred after big meals involving the consumption of spirits, or after intense physical activity (the patient participated in numerous marathons). For several years non-steroidal anti-inflammatory drugs (NSAIDs) were used, resulting in a temporary clinical improvement.

In 2009, due to fever up to 38°C and recurring joint symptoms, the patient was hospitalised in a rheumatology department in Poland. Laboratory tests from that time revealed significantly elevated inflammatory markers (CSR of 60 mm/h, CRP 10 mg/dl), leukocytosis (WBC 15x10^9/l), increased serum uric acid concentration (12 mg/dl), elevated serum creatinine (1.6 mg/dl) and reduced eGFR (46 ml/min/1.73 m^2). A culture of the synovial fluid from the right knee joint and the right ankle excluded septic arthritis. Colchicine was introduced, resulting in a gradual resolution of the articular symptoms. Based on the complete clinical picture the patient was diagnosed with polyarticular gout and chronic kidney disease, probably due to long-term use of NSAIDs.

Figure 1. Massive tophus of right elbow
Rycina 1. Masywny guzek dnawy prawego stawu łokciowego

On admission to the Department of Internal Diseases and Rheumatology, Military Institute of Medicine, the patient was in a generally good conditions, without fever. He received long-term treatment with 80 mg/d of furosemide, 400 mg/d of milurit, 60 mg/d of gliclazide, 2.5 mg/d of bisoprolol, and, during a gout flare, with colichicine in a maximum dose of 2 mg/d. The physical examination revealed overweight (BMI 26.1 kg/m^2), tenderness and oedemas of individual metatarsophalangeal (MCP) and proximal interphalangeal (PIP) joints of both hands, tenderness and oedema of the right knee joint, massive tophus in the right cubital bursa area (Fig. 1), as well as numerous tophi in the region of the small joints of the hands and feet (Fig. 2).

Figure 2. A. Gouty tophi of left hand. B. Massive tophus of second metacarpophalangeal joint of the right hand
Rycina 2. A. Guzki dnawe ręki lewej. B. Masywny guzek dnawy II stawu śródręczno-paliczkowego ręki prawej

Figure 3. Gouty bone lesions in hands and feet affecting especially the metatarsophalangeal joints, wrist joints, some metacarpophalangeal joints and the in-terphalangeal joints of the hands. The periarticular soft tissue swelling with calcification -tophi, numerous geodes and bone erosions; and lytic bone lesions
Rycina 3. Zmiany o charakterze dny w kościach rąk i stóp z zajęciem stawów śródstopno-paliczkowych, nadgarstków, niektórych stawów śródręczno-paliczkowych i międzypaliczkowych rąk. Pogrubienie tkanek miękkich okołostawowych ze zwapnieniami - guzki dnawe; liczne geody i nadżerki kostne; zanik kostny

In addition, during hospitalisation the arterial pressure was significantly elevated (to 180/110 mm Hg). Laboratory tests demonstrated increased CSR (83 mm/h), elevated concentrations of CPR (8.6 mg/dl), serum uric acid (10 mg/dl), urea (74 mg/dl), creatinine (2.2 mg/dl), triglycerides (300 mg/dl) with normal total cholesterol and LDL and HDL fractions, as well as reduced eGFR (32 ml/min/1.73 m^2). An ultrasound examination of the joints of the hands and feet revealed signs of active articular inflammation, numerous erosions in the joint heads, and hyperechogenic deposits with acoustic shadows. An x-ray examination of the hands and feet demonstrated gout lesions in the bones of hands and feet, with the involvement of the metatarsophalangeal joints, wrists, some of the metacarpophalangeal and interphalangeal joints of the hands, with numerous geodes and osseous erosions, massive deposits in the soft periarticular areas, tophi, and radiographic signs of bone atrophy. The most pronounced were the lesions in the metacarpophalangeal joint of the second finger, and the proximal interphalangeal joint of the third finger of the right hand (Fig. 3). Courtesy of the Department of internal Diseases and Nephrology of the Military Institute of Medicine, a phase-contrast microscopic test was performed, which confirmed the presence of sodium urate crystals in the synovial fluid from the right knee joint, and

in the deposit from the tophus in the right cubital bursa. The patient was diagnosed with arthritis in the course of gout. Therapy with 10 mg/d of prednisone was introduced, and a gradual dose reduction was recommended, as well as the long-term use of colchicine at a dose of 0.5 mg/d. Due to abnormal renal function parameters and the increased serum concentration of uric acid, allopurinol was substituted by febuxostat at an initial dose of 80 mg/d, the hypotensive therapy was modified: the furosemide dose was reduced to 40 mg/d, 5 mg/d of amlodipine was introduced and 5 mg/d of lisinopril. Due to hypertriglyceridemia, fenofibrate was used. A diet low in purines, simple sugars, and excluding spirits was recommended. The patient was referred to the Department of Orthopaedics for surgical removal of a massive tophus in the right bursa. During the follow-up visits at 6-month intervals, a reduction in the serum uric acid concentration to 6.5 mg/dl was observed, as well as a lower number of tophi, and less frequent flares, down to one per year. As the target serum uric acid concentration was not reached (<5 mg/dl), the dose of febuxostat was titrated to 120 mg/d.

Discussion

The diagnostic and therapeutic criteria in gout have been modified many times [9, 10]. In 2016, the European League Against Rheumatism (EULAR) published updated guidelines regarding the diagnosis and treatment of gout. The gold standard in the diagnostics is confirmation of the presence of monosodium urate crystals in the synovial fluid (collected from the affected joint), in the content of the synovial bursa or in deposits forming tophi, with the use of polarised light microscopy [11]. This allows the diagnosis of gout to be established with a high degree of certainty.

When such a test cannot be performed, the ACR/EULAR classification criteria from 2015 should be used, including clinical, laboratory and imaging criteria [12]. Classification is based on a score, determined according to the presence or absence of symptoms, and on the results of laboratory tests in different categories (Tab. 1). The maximum score is 23 points, which is the number our patient obtained. Gout can be diagnosed at > 8 points.

In the treatment of gout the following stages are distinguished: flare management, therapy in the intercritical period, and treatment of chronic (tophaceous) gout. The medicines of choice used in an acute attack include colchicine (up to 2 mg/d) and/or non-steroidal anti-inflammatory drugs (NSAIDs) at maximum recommended therapeutic doses. Acetylsalicylic acid in small doses is not recommended, as it increases the serum uric acid concentration. If the above medicines are contraindicated and/or ineffective, glucocorticosteroids (GCs) are recommended, orally (30-35 mg/d in relation to prednisolone), or in intraarticular or intramuscular injections. In patients with frequent and severe gout flares with contraindications for colchicine, NSAIDs and GCs, IL-1 inhibitor, i.e. anakinra, should be considered [13]. In the intercritical period, and during chronic gout, the management aims to prevent future flares. Therapies reducing the serum uric acid concentration are introduced if the flares are frequent (> 2/year), tophi are present, chronic arthritis is observed and renal cholelithiasis is concurrent. In such cases, due to its effectiveness, low cost and safety, the first-line medicine is allopurinol at an initial dose of 100 mg/d, titrated by 100 mg every 2-4 weeks (maximum dose is 600 mg/d). The aim of the treatment is to reduce the serum uric acid concentration to 6 mg/dl (360 µmol/l), and in gout with a severe course, as in the presented case (i.e. with tophi, chronic arthropathy and frequent recurrences) to < 5 mg/dl (300 µmol/l). This concentration of the serum uric acid should be maintained for at least a few years [8].

Some studies suggest that uric acid demonstrates a protective effect in neurodegenerative diseases, such as Alzheimer's disease or Parkinson's disease [14, 15], so its concentration in the serum should not be lower than 3 mg/dl for long periods.

If allopurinol does not provide the expected improvement, is not tolerated by the patient or is contraindicated, e.g. in renal impairment, observed also in our patient, febuxostat at a dose of 80 mg or 120 mg is an alternative.

It is a non-purine, selective xanthine oxidase inhibitor. Compared to allopurinol, eliminated from the organism mainly through the kidneys, approximately 50% of febuxostat is excreted with the urine, so it can be used in renal insufficiency [16-18].

Benzobromarone (50-100 mg/d) and probenecid (500-1,000 mg/d) are other medicines reducing the serum uric acid concentration whose mechanism of action consists in increasing the excretion of uric acid in the urine. However, they are not easily available in Poland, and there are certain limitations to their use, i.e. age >60 years old or renal cholelithiasis. In frequently recurring flares, colchicine may be used long-term at a dose of 0.5-1 mg/d, and in the case of contraindications for colchicine, NSAIDs or GCs in small doses can be introduced.

In patients suffering from gout, the treatment of comorbidities is important.

Table 1. Gout classification criteria ACR/EULAR 2015
Tabela 1. Kryteria klasyfikacyjne dny moczanowej ACR/EULAR 2015 [20]

Criterion introducing	**At least one episode of pain, oedema, increased heat in the peripheral joint**	**If yes ↓**
Diagnosis of gout	Uric acid crystals found in synovial fluid, aspirate from the bursa, tophus	If yes, finish (diagnosis established). If no, see below ↓
Criteria considered if the above is not fulfilled	**Categories**	**Score**
Characteristics of articular invasion during the occurrence of symptoms/attack	Joint(s) or bursa other than the ankle joint, metatarsus, MTP 1 (or their involvement in a polyarticular process)	**0**
	Ankle joint, metatarsus (as an oligoarticular process, without MTP1 inflammation)	**1**
	MTP 1 (monoarticular or oligoarticular process)	**2**
Characteristics of the attack	No specific picture	**0**
1. redness of the involved joint 2. pain upon touch or pressure for the involved joint 3. significantly impaired walking, inability to move the involved joint	One characteristic	**1**
	Two characteristics	**2**
	Three characteristics	**3**
Typical time course of gout flares, i.e. occurrence of >2 attacks, irrespective of the anti-inflammatory treatment used: 1. time of maximum pain <24 h 2. resolution of symptoms within ≤14 days 3. complete resolution (to the baseline level) between the attacks	Without a typical attack	**0**
	One typical attack	**1**
	Recurrent typical attacks	**2**
Confirmed tophi	Absent	**0**
	Present	**4**
Concentration of serum uric acid	4 mg%(<240 µmol/l)	**-4**
	4-6 mg% (240-360 µmol/l)	**0**
	6 to <8 mg% (360 to <480 µmol/l)	**2**
	8 to <10 mg% (480 to <600 µmol/l)	**3**
	≥10mg% (≥600 µmol/l)	**4**
Examination of the synovial fluid	Not performed	**-2**
	No uric acid crystals were found	
Deposits of uric acid confirmed in the symptomatic joint a. In the ultrasound examination (double contour) and/or b. In DECT examination	Not found or tests not performed	**0**
	Uric acid deposits found	**4**
Gout-associated destruction of the joints confirmed in an imaging X-ray test of hands and/or feet – at least one erosion	Not found or tests not performed	**0**
	Lesions present	**4**

The criteria for gout diagnosis are met if the sum of points is >8. Maximum score is 23 points.

If possible, loop or thiazide diuretics should be substituted with thiazide-like (e.g. indapamide) or potassium-sparing diuretics (e.g. amiloride, triamterene). Medicines used in the treatment of arterial pressure, e.g. losartan or calcium channel blockers also demonstrate strong uricosuric properties [19], as well as fenofibrate used in hyperlipidemia.

Summary

Gout is a chronic articular disease that, if untreated, may lead to irreversible changes in the peripheral joints, resulting in chronic pain and disability. In the present case, the patient's clinical condition improved significantly after introducing a small dose of colchicine for permanent use, and substituting allopurinol with febuxostat, due to advanced renal impairment. Following the dietary recommendations and modification of the previous treatment resulted in a significant reduction in the serum uric acid concentration, a decreased number of days with gout attacks, and the disappearance of tophi.

Acknowledgements

The microscopic examination was performed courtesy of Magdalena Wiśniewska MD at the Department of Internal Diseases and Nephrology, Military Institute of Medicine

Literature

1. Roddy E, Doherty M. Epidemiology of gout. Arthritis Res Ther, 2010; 12: 223
2. Kuo CF, Grainge MJ, Zhang W, et al. Global epidemiology of gout: prevalence, incidence and risk factors. Nat Rev Rheumatol, 2015; 11: 649-662
3. Choi HK, Atkinson K, Karlson EW, Curhan G. Obesity, weight change, hypertension, diuretic use, and risk of gout in men: the Health Professionals Follow-up Study. Arch Intern Med, 2005; 165: 742-748
4. Choi HK, Atkinson K, Karlson EW, et al. Alcohol intake and risk of incident gout in men: a prospective study. Lancet, 2004; 363: 1277-1281
5. Choi HK, Atkinson K, Karlson EW, et al. Purine-rich foods, dairy and protein intake, and the risk of gout in men. N EnglJ Med, 2004; 350: 1093-1103
6. Krishnan E. Chronic kidney disease and the risk of incident gout among middle-aged men: a seven-year prospective observational study. Arthritis Rheum, 2013; 65:3271-3278
7. Majdan M. Zapalenie stawów wywołane przez kryształy. [Arthritis caused by crystals] In: Puszczewicz M, ed. Wielka interna - reumatologia. [Internal medicine – rheumatology] Medical Tribune Polska, Warsaw 2011:317-328
8. Richette P, Doherty M, Pascual E, et al. 2016 updated EULAR evidence-based recommendations for the management of gout. Ann Rheum Dis, 2017; 76: 29-42
9. Zimmermann-Górska I. Postępowanie diagnostyczno-terapeutyczne w chorobach wywoływanych przez kryształy. [Diagnostic and therapeutic management in diseases caused by crystals] Reumatologia, 2012; 50: 177-180
10. Sivera F, Andres M, Carmona L, et al. Multinational evidence-based recommendations for the diagnosis and management of gout: integrating systematic literature review and expert opinion of a broad panel of rheumatologists in the 3e initiative. Ann Rheum Dis, 2014; 73: 328-335
11. Pascual E, Sivera F, Andres M. Synovial fluid analysis for crystals. Curr Opin Rheumatol, 2011; 23: 161-169
12. Tuhina N, Jansen TL, Dalbeth N, et al. Gout classification criteria: an American College of rheumatology/European League Against Rheumatism collaborative initiative. Ann Rheum Dis, 2015; 74: 1789-1798
13. Ottaviani S, Moltó A, Ea HK, et al. Efficacy of anakinra in gouty arthritis: a retrospective study of 40 cases. Arthritis Res Ther, 2013; 15: R123
14. Weisskopf MG, O'Reilly E, Chen H, et al. Plasma urate and risk of Parkinson's disease. Am J Epidemiol, 2007; 166: 561-567
15. Kim TS, Pae CU, Yoon SJ, et al. Decreased plasma antioxidants in patients with Alzheimer's disease. Int J Geriatr Psychiatry, 2006; 21: 344-348
16. Grabowski BA, Khosravan R, Vernillet L, Mulford DJ. Metabolism and excretion of [14C] febuxostat, a novel nonpurine selective inhibitor of xanthine oxidase, in healthy male subjects. J Clin Pharmacol, 2011; 51: 189-201
17. Becker MA, Schumacher HR, Espinoza LR, et al. The urate-lowering efficacy and safety of febuxostat in the treatment of the hyperuricemia of gout: the CONFIRMS trial. Arthritis Res Ther, 2010; 12: R63
18. Hira D, Chisaki Y, Noda S, et al. Population pharmacokinetics and therapeutic efficacy of febuxostat in patients with severe renal impairment. Pharmacology, 2015; 96: 90-98
19. Choi HK, Soriano LC, Zhang Y, et al. Antihypertensive drugs and risk of incident gout among patients with hypertension: population based case-control study. BMJ, 2012; 344: d8190
20. Maślińska M. Dna moczanowa i choroba wywołana przez kryształy dwuwodnego pirofosforanu wapnia. [Gout and disease caused by crystals of calcium pyrophosphate dihydrate] Reumatologia, 2016; 1: 105-109

PMC in Afghanistan - medical actions within the 5th and 6th rotations, based on experience of military service in FOB Warrior

Polski Kontyngent Wojskowy w Afganistanie - działania medyczne w ramach V i VI zmiany, doświadczenia własne służby w FOB Warrior

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Abstract. Arab countries are characterized by a specific geopolitical situation and numerous conflicts that have both external and internal determinants. The Polish military joined the forces intended to stabilize the situation in Afghanistan in March 2002 at the invitation of the American authorities, as part of Operation Enduring Freedom (OEF). Within the following rotations of the Polish Army in Afghanistan, a varying number of soldiers participated in the mission (from approximately 200 to over 2000). Since the beginning of the mission in Afghanistan, Polish soldiers were supported by medical personnel, on duty 24 hours a day. The tasks of the medical services were primarily: prevention of injuries and illnesses, and their therapy, providing drugs and medical supplies, coordination of medical evacuation at all levels, and training. The medical activities concerned both the Polish military and the Afghan population - both civilians and official forces (policemen, soldiers). At FOB Warrior, approximately 10-20 people were assisted daily. Among the dominant war injuries were: post-explosion, shrapnel and gunshot. Medical forces were involved in all activities of the Polish Military Contingent, providing continuous on-duty support and medical assistance to 361 Polish soldiers.
Key words: FOB Warrior, Medical Support Group, International Security Assistance Force, Operation Enduring Freedom, Polish Military Contingent

Streszczenie. Kraje arabskie charakteryzują się specyficzną sytuacją geopolityczną i licznymi konfliktami, które mają uwarunkowania zarówno zewnętrzne, jak i wewnętrzne. Wojsko Polskie dołączyło do sił stabilizujących sytuację w Afganistanie w marcu 2002 roku na zaproszenie władz amerykańskich, dołączając do operacji Enduring Freedom (OEF). W ramach kolejnych zmian Wojska Polskiego w Afganistanie uczestniczyła zmienna liczba żołnierzy (od około 200 do ponad 2000). Od początku trwania misji w Afganistanie polscy żołnierze wspierani byli w systemie dyżurowym 24 h/d zapleczem medycznym. Do zadań służb medycznych należały przede wszystkim: prewencja urazów i chorób oraz ich terapia, zaopatrywanie w leki i materiały medyczne, koordynacja ewakuacji medycznej na wszystkich jej poziomach oraz prowadzenie szkoleń. Działania dotyczyły Wojska Polskiego i ludności afgańskiej - zarówno cywili, jak i służb (policja, wojsko). W FOB Warrior udzielano pomocy średnio 10-20 osobom dziennie. Wśród urazów wojennych występowały głównie obrażenia wybuchowe, odłamkowe i postrzałowe. We wszystkie działania PKW nieodmiennie zaangażowane były siły medyczne, które służyły ciągłym wsparciem w systemie dyżurowym, udzielając pomocy medycznej 361 polskim żołnierzom.
Słowa kluczowe: FOB Warrior, Grupa Zabezpieczania Medycznego (GZM), Międzynarodowa Siła Wsparcia Bezpieczeństwa ISAF, operacja Enduring Freedom, Polski Kontyngent Wojskowy

Delivered: 18/05/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 389-396

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Introduction

Arab countries have for many years seen lingering unstable socio-political situations, which to a significant extent are a result of actions taken by the leaders of countries aimed at the formation of so-called state-centres. The formation of state-centres consists of the forcible imposition, on culturally and historically similar countries, of an order that is promoted by one of the states. Such events occur across the world, but their particular concentration can, however, be recognised in the area of the Arab (i.e. Iraq, Lebanon, and Afghanistan) as well as African countries (i.e. Chad) [1].

Conflicts in the area of Afghanistan have continued since the beginning of the existence of this state, i.e. from 1747. This is influenced both by external and internal (ethnic) factors. The territory of Afghanistan is inhabited by 11 major tribal groups (the largest being the Pashtuns, and among them the most numerous representatives, the Durrani) and many others with significantly lower populations, fighting for influence and territory. In addition, the conflicts in this region are negatively influenced by external situations of a geopolitical nature – in the 18th and 19th centuries both Russia and Britain fought for Afghan territory. The Afghans managed to gain full independence from Britain after the end of World War I, in 1919.

After World War II, Afghanistan initiated military cooperation with the Soviet Union, and in the later period also with the USA [2]. In 1998, after the attack of al-Qaeda cells on American diplomatic posts in Kenya and Tanzania, as well as on the USS Cole in Yemen, the UN authorities demanded that Afghan authorities cease providing support to terrorist organisations. The critical moment was, however, the 11 September 2001 terrorist attacks within the territory of the USA. These became the direct impulse for the initiation of actions aimed at stabilisation of the situation in Afghanistan [3].

Table 1. Command and composition of rotations of the Polish Army in Afghanistan [7]
Tabela 1. Dowództwo i skład poszczególnych zmian Wojska Polskiego w Afganistanie [7]

Rotation	Rotation commander	Composition
I	Maj. Gen. Marek Tomaszycki	Soldiers of: 18th Airborne Battalion from Bielsko-Biała, 17th Mechanised Brigade from Międzyrzecz, 10th Armoured Cavalry Brigade from Świętoszów, 25th Air Cavalry Brigade, 1st Special Forces Regiment from Lubliniec, 1st Pomeranian Logistic Brigade, Central Civil-military Co-operation Group from Kielce, Central Psychological Operations Group and the Military Gendarmerie
II	Brig. Gen. Jerzy Biziewski	Soldiers of: 17th Mechanised Brigade from Międzyrzecz, 6th Airborne Brigade from Kraków, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 2nd Sapper Brigade from Brzeg, 1st Logistic Brigade from Bydgoszcz, 1st Special Forces Regiment from Lubliniec, 9th Reconnaissance Regiment from Lidzbark Warmiński, 5th Engineer Regiment from Szczecin, 49th Combat Helicopter Regiment from Pruszcz Gdański, 56th Combat Helicopter Regiment from Inowrocław, Central Psychological Operations Group from Bydgoszcz, Central Civil-military Co-operation Group from Kielce and the Military Gendarmerie
III	Brig. Gen. Grzegorz Buszka	Soldiers of: 12th Mechanised Brigade from Szczecin, 6th Airborne Brigade from Gliwice, 1st Logistic Brigade from Bydgoszcz, 2nd Sapper Brigade from Kazuń, 2nd Reconnaissance Regiment from Hrubieszów, Central Psychological Operations Group from Bydgoszcz, Military Gendarmerie and the Central Civil-military Co-operation Group from Kielce
IV	Col. Rajmund Tomasz Andrzejczak	Soldiers of: 12th Mechanised Division from Szczecin, 16th Pomeranian Mechanised Division from Elbląg, 2nd Mechanised Corps from Kraków, 6th Airborne Brigade from Gliwice, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 56th Combat Helicopter Regiment from Inowrocław, 1st Sapper Brigade from Kazuń, Central Psychological Operations Group from Bydgoszcz, Central Civil-military Co-operation Group from Kielce and the Military Gendarmerie
V	Col. Rajmund Tomasz Andrzejczak	Soldiers of: 6th Airborne Brigade from Kraków, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 1st Logistic Brigade from Bydgoszcz, 2nd Masovian Sapper Brigade from Kazuń, 2nd Combat Helicopter Regiment from Pruszcz Gdański, 5th Engineer Regiment from Szczecin, 1st Masurian Artillery Brigade from Węgorzewo, Central Psychological Operations Group in Bydgoszcz, Central Civil-military Co-operation Group (CIMIC) in Kielce, Military Gendarmerie
VI	Brig. Gen. Janusz Bronowicz	Soldiers of: 21st Podhale Rifles Brigade from Rzeszów, 2nd Sapper Brigade from Kazuń, 56th Combat Helicopter Regiment from Inowrocław, 49th Combat Helicopter Regiment from Pruszcz Gdański, 2nd Reconnaissance Regiment from Hrubieszów, 9th Reconnaissance Regiment from Lidzbark Warmiński, 23rd Artillery Brigade from Bolesławiec, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, Central Psychological Operations Group from Bydgoszcz, Central Civil-military Co-operation Group (CIMIC) from Kielce, Military Gendarmerie

Table 1. Command and composition of rotations of the Polish Army in Afghanistan [7]
Tabela 1. Dowództwo i skład poszczególnych zmian Wojska Polskiego w Afganistanie [7]

VII	Brig. Gen. Andrzej Przekwas	Soldiers of: 1st Armoured Brigade from Wesoła, 3rd Mechanised Brigade from Lublin, 1st Masurian Artillery Brigade from Węgorzewo, 2nd Sapper Brigade from Kazuń, 5th Engineer Regiment from Szczecin, 56th Combat Helicopter Regiment from Inowrocław, 49th Combat Helicopter Regiment from Pruszcz Gdański, 2nd Reconnaissance Regiment from Hrubieszów, 15th Mechanised Brigade from Giżycko, 20th Mechanised Brigade from Bartoszyce, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 15th Air Defence Regiment from Gołdap, 1st Pomeranian Logistic Brigade, 2nd Communication Regiment from Inowrocław, 3rd Road-Bridge Regiment from Chełmno, 10th Logistic Brigade from Opole, Central Psychological Operations Group from Bydgoszcz, Central Civil-military Co-operation Group (CIMIC) from Kielce, Military Gendarmerie
VIII	Brig. Gen. Andrzej Reudowicz	The core of the 8th rotation of the ISAF PMC in Afghanistan were soldiers of the 10th Armoured Cavalry Brigade (IOBKPanc) from Świętoszów with soldiers of other units of IIDKPanc, with soldiers from Świętoszów forming approximately 60% of the personnel of the 8th rotation of the PMC in Afghanistan; apart from the soldiers from the IOBKPanc the 8th rotation was formed, among others, by the soldiers of: 11th Armoured Cavalry Division "Black Division" from Żagań and its subordinate units; other units: 56th Combat Helicopter Regiment from Inowrocław, 49th Combat Helicopter Regiment from Pruszcz Gdański, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, Central Civil-military Co-operation Group (CIMIC) from Kielce, Central Psychological Operations Group from Bydgoszcz, 10th Logistic Brigade from Opole, 9th Reconnaissance Regiment from Lidzbark Warmiński, Military Gendarmerie
IX	Brig. Gen. Sławomir Wojciechowski	Soldiers of: 17th Mechanised Brigade from Międzyrzecz, 1st Sapper Brigade from Brzeg, 2nd Sapper Brigade from Kazuń, 34th Armoured Cavalry Brigade from Żagań, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 10th Logistic Brigade from Opole, 11th Artillery Regiment, 9th Reconnaissance Regiment, 49th Combat Helicopter Regiment from Pruszcz Gdański, 2nd Electronic Warfare Centre, Central Civil-military Co-operation Group from Kielce, Central Psychological Operations Group from Bydgoszcz, Military Gendarmerie
X	Brig. Gen. Piotr Błazeusz	Soldiers of: 2nd Mechanised Corps, 16th Mechanised Division, 12th Mechanised Division, Zawisza Czarny 15th Mechanised Brigade in Giżycko, Duke Józef Poniatowski 25th Air Cavalry Brigade, 9th Armoured Cavalry Brigade, 6th Airborne Brigade, Hetman Wincenty Gosiewski 20th Mechanised Brigade in Bartoszyce, 21st Podhale Rifle Brigade, 23rd Artillery Brigade, Col. Piotr Wysocki 10th Logistic Brigade in Opole, 11th Artillery Regiment, 2nd Sapper Regiment, 9th Reconnaissance Regiment, 56th Combat Helicopter Regiment from Inowrocław, Elbląg Region 16th Command Battalion, 16th Supply Battalion, 2nd Electronic Warfare Centre, Centre of Preparations for Foreign Missions
XI	Brig. Gen. Bogdan Tworkowski	9th rotation of the PMC in Afghanistan numbered 2500 soldiers and the core of the PMC was the 6th Airborne Brigade from Kraków, Gliwice and Bielsko-Biała, commanded by Brigadier General Bogdan Tworkowski, the other components were soldiers, among others, from: 49th Air Base from Pruszcz Gdański, 5th Engineer Regiment from Szczecin, 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 11th Masurian Artillery Regiment from Węgorzewo, 21st Podhale Rifles Brigade from Rzeszów, 23rd Artillery Regiment from Bolesławiec, 2nd Radioelectronic Centre from Przasnysz, Central Psychological Operations Group from Bydgoszcz, 1st Logistic Brigade from Bydgoszcz, 10th Logistic Brigade from Opole, Military Gendarmerie, Special Forces
XII	Brig. Gen. Andrzej Tuz	Soldiers of: 12th Mechanised Brigade from Szczecin, 25th Air Cavalry Brigade, 1st Military Field Hospital from Bydgoszcz, 18th Reconnaissance Regiment from Białystok, 4th Chemical Regiment from Brodnica, Military Gendarmerie, Centre of Preparations for Foreign Missions in Kielce, 9th Reconnaissance Regiment from Lidzbark Warmiński, 1st Sapper Brigade from Brzeg, 2nd Sapper Brigade from Kazuń, 10th Logistic Brigade from Opole, 1st Land Forces Aviation Brigade, Central Psychological Operations Group from Bydgoszcz, 2nd Radioelectronic Centre. Special Forces Group composed of: Special Forces Command, JW GROM, JWK, JW NIL.
XIII	Brig. Gen. Marek Sokołowski	Core of the 13th rotation of the Polish Military Contingent were the soldiers of the Książę Józef Poniatowski 25th Air Cavalry Brigade from Tomaszów Mazowiecki, the contingent was co-created by the soldiers of the 21st Podhale Rifles Brigade from Rzeszów, 49th Air Base from Pruszcz Gdański, Central Psychological Operations Group from Bydgoszcz, Centre for Preparations for Foreign Missions (CIMIC) from Kielce, 11th Artillery Regiment from Węgorzew, 2nd Masovian Sapper Brigade from Kazuń, 10th Logistic Brigade from Opole, Special Forces and other units and institutions of the Polish Army
XIV	Brig. Gen. Cezary Podlasiński	Main combat element of the 14th rotation of the Polish Military Contingent was formed by the soldiers of the 10th Armoured Cavalry Brigade from Świętoszów, supported by the soldiers of the special forces, as well as soldiers from other units in Poland: 25th Air Cavalry Brigade from Tomaszów Mazowiecki, 10th Logistic Brigade from Opole, 9th Reconnaissance Regiment from Lidzbark Warmiński, Central Psychological Operations Group from Bydgoszcz, 4th Chemical Regiment from Brodnica, 1st Land Forces Aviation Brigade, 1st Military Field Hospital in Bydgoszcz and the gendarmes from Mińsk Mazowiecki
XV	Col. Adam Słodczyk	Soldiers of: 10th Logistic Brigade in Opole; apart from the soldiers from Opole the 15th rotation was formed by the soldiers from: 1st Armoured Brigade, 2nd Mechanised Corps, 5th Chemical Regiment, Special Forces, 2nd Military Field Hospital and the Military Gendarmerie

PMC in Afghanistan in the years 2002-2016

The Polish military joined the forces intending to stabilize the situation in Afghanistan in March 2002 at the invitation of the American authorities, as part of Operation Enduring Freedom (OEF).

The first group of soldiers, numbering over 300, was involved in such activities as protecting the airport in Kabul, clearing the area of mines and redeveloping the infrastructure and providing communication support [4]. Poland headed Multinational Division Central-South, covering such areas as Karbala and Najaf [5]. The main tasks of the Polish forces included: influencing the Afghan community by means of providing security, setting up control points and patrolling the supervised area, preventing terrorist activities and cooperating with local civil institutions [6]. Table 1 lists information about subsequent formations, including their composition and rotation commanders.

Within the scope of subsequent rotations of the PMC in Afghanistan, first within OEF, and then the International Security Assistance Forces (ISAF) mission, the number of participating soldiers varied (Fig. 1) [8-10].

Finally, ISAF was replaced with the Resolute Support Mission (RSM). The lower number of Polish soldiers, e.g. in 2002, to a significant extent resulted from the presence of the Polish Army in Iraq at that time and the operations conducted there. However, such allocation of Polish military forces faced criticism from the authorities of the alliance, which caused an increase in the number of soldiers of the Polish Armed Forces in Afghanistan, as well as taking over the command of the 9th ISAF with the Danish and the Germans forces within Multinational Corps Northeast [11, 12].

Position of the medical forces in the Polish Military Contingent

The PMC in Afghanistan was formed, apart from the forces conducting defence activities, by sub-units responsible for the medical support for the mission, including the National Support Element (NSE), to perform the logistic function, which included the medical section. NSE was engaged in such activities as medical evacuation and medical relief interventions, such as dentistry or psychological aid.

The main tasks of the health service in PMC Afghanistan included:

- prevention of injuries and diseases and their therapy,
- supply of drugs and medical materials,

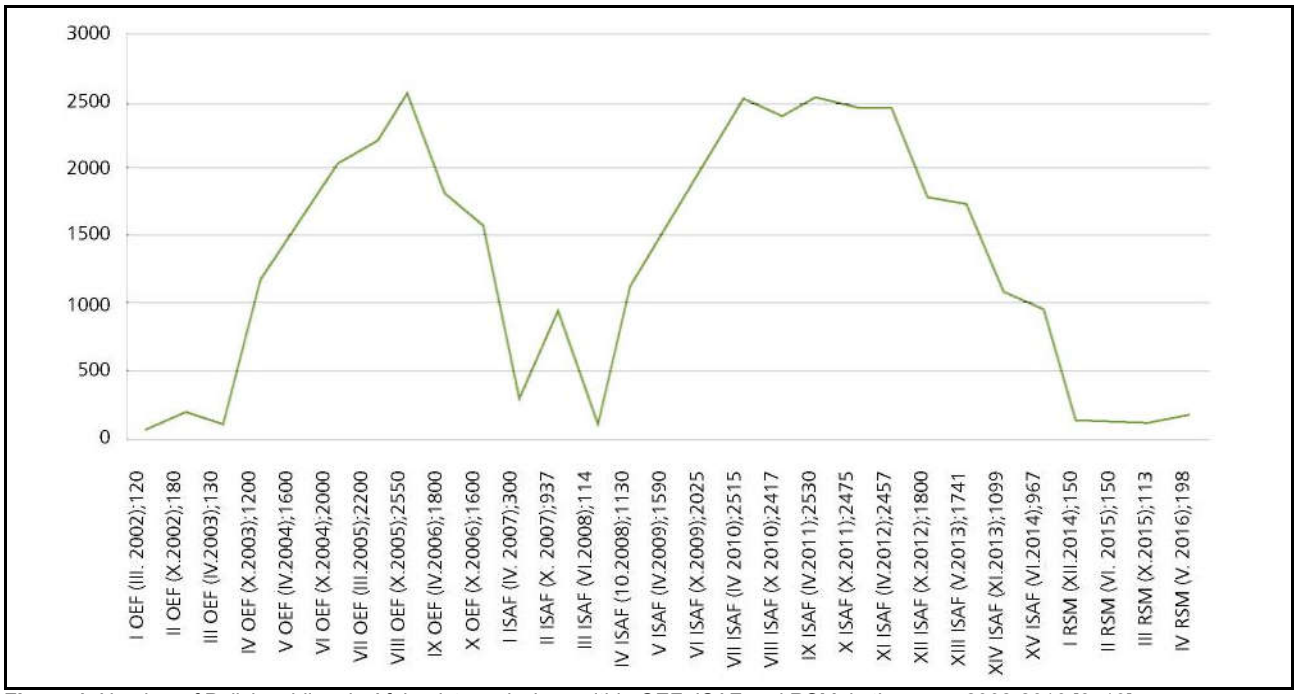


Figure 1. Number of Polish soldiers in Afghanistan missions within OEF, ISAF and RSM, in the years 2002-2016 [8, 10]
Rycina 1. Liczebność żołnierzy Wojska Polskiego na misjach w Afganistanie w ramach OEF, ISAF i RSM w latach 2002-2016 [8, 10]

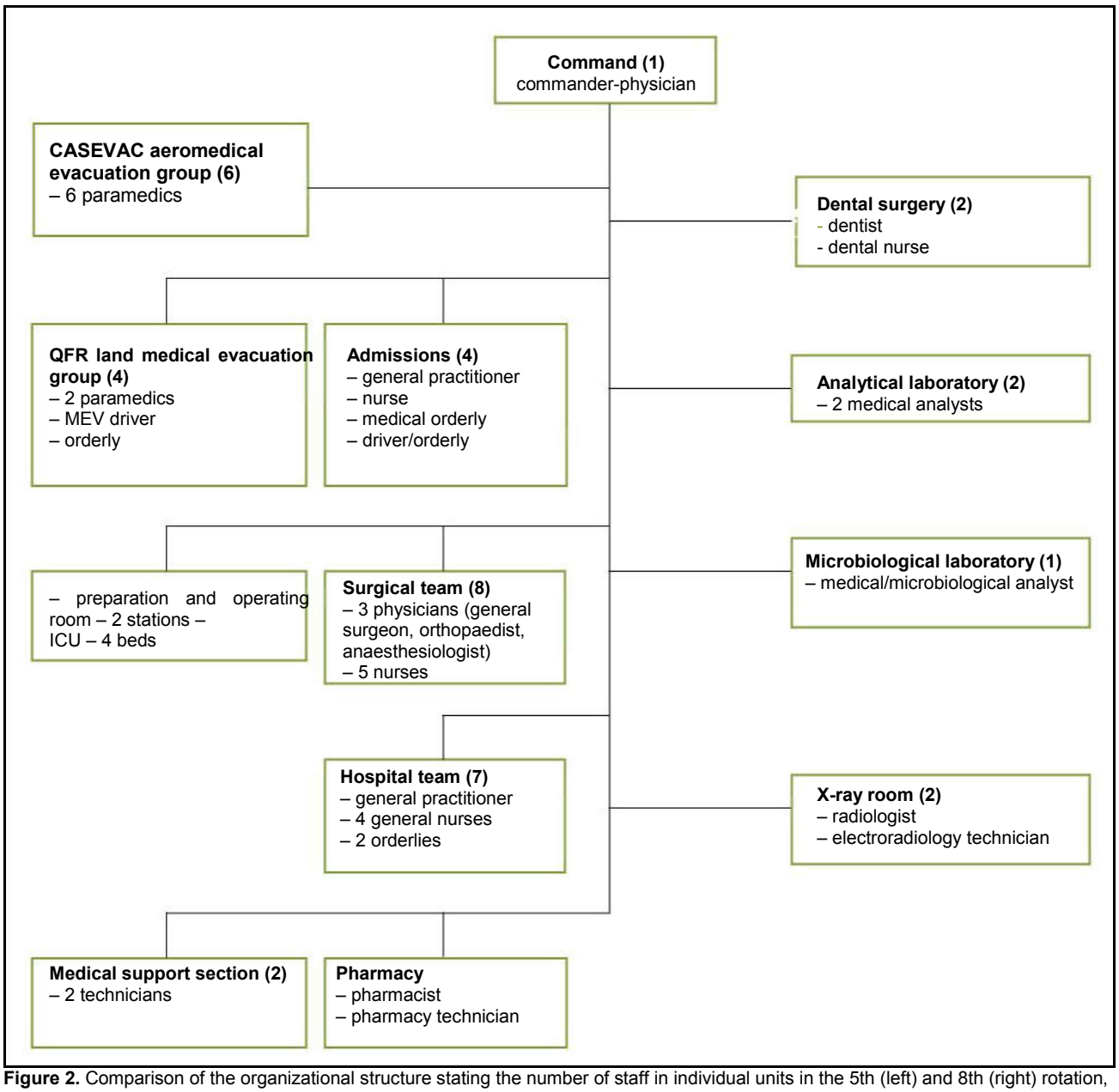
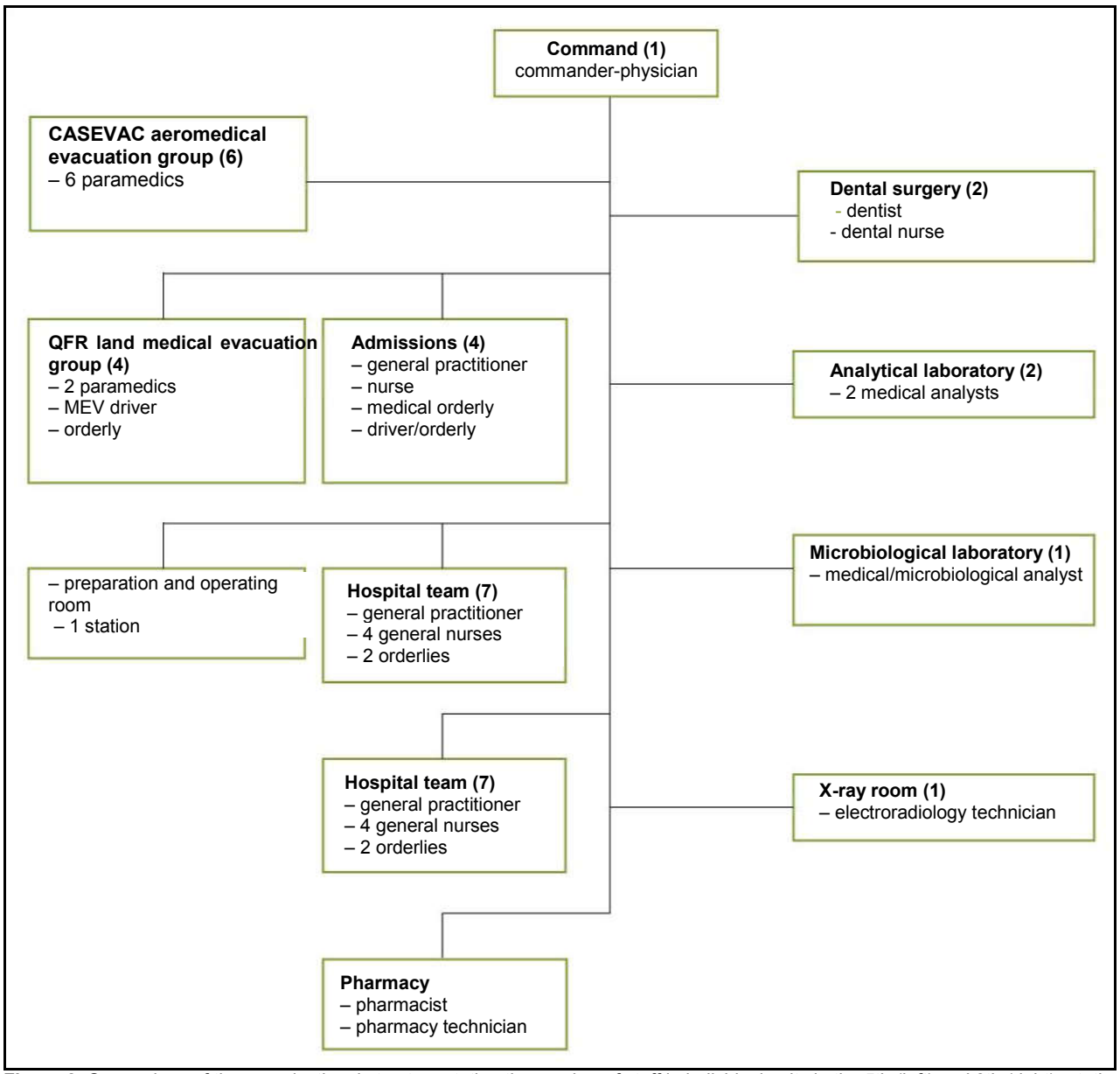


Figure 2. Comparison of the organizational structure stating the number of staff in individual units in the 5th (left) and 8th (right) rotation, based on the author's own data and ref. 13
Rycina 2. Porównanie struktury organizacyjnej wraz z liczbą personelu w poszczególnych jednostkach pomiędzy V (strona lewa) i VIII zmianą (strona prawa) - na podstawie obserwacji własnych i 13. pozycji piśmiennictwa 13

- coordination of medical evacuation at levels 1-4 (where level 1 – outpatient clinics and medical facilities, level 2 – Medical Support Group, level 3 – US Combat Support Hospital in Bagram Air Field, and level 4 – evacuation to Poland),
- training, building the skills and capacities of the medical staff,
- medical reporting on own activities [13].

Managing health care during the activity of PMC in Afghanistan was the duty of the health care chief, who concurrently served the function of medical officer of the PMC and was directly responsible to the PMC commander. A significant role in terms of medical evacuation was ascribed to level 2 – i.e. the Medical Support Group (MSG) [14].



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The main tasks of the MSG included, among other things, the reception and triage of casualties, performing surgical procedures, short-term treatment of soldiers with a prognosis of quick return to active duty, as well as preventive activities (such as the implementation of a preventive vaccination programme) or specialised training (such as MEDEVAC or MASCAL).

It should be noted that these, particularly during early rotations (e.g. the 5th, in which the author participated), underwent frequent modifications. The author himself joined the 5th rotation some time after it had begun. The composition of the rotations should therefore be treated as planned, not as factual, as it changed dynamically. This is visible, for example, when we compare the organisational structure of the MSG of the rotation in which the author participated with one of the later ones (8th rotation) (Fig. 2).

Table 2. Basic medical support in individual bases of the PMC in Afghanistan [13]
Tabela 2. Podstawowe zaplecze medyczne w poszczególnych bazach PKW w Afganistanie [13]

Base	Sub-unit name
FOB Ghazni	Medical evacuation group (2 paramedics, driver, orderly)
FOB Warrior	Medical section (level 1): outpatient clinic (2 physicians, 2 nurses) dental surgery (1 physician) MEV Rosomak medical evacuation group (2x2 paramedics, driver, orderly)
	Combat group BRAVO: MEV Rosomak medical evacuation group (4 paramedics)
FOB GIRO	Medical aid post (1 paramedic) 1 medical evacuation group from the BRAVO group (4 paramedics)
COPQARABAGH	medical aid post 1 medical evacuation group from the BRAVO group (4 paramedics)
FOB Vulcan	Mentoring group (2 physicians, 4 paramedics) 2 medical evacuation groups in MEV Rosomak (2 x 4-person team)

The main functioning principle for medical support in the course of the mission in Afghanistan was continuous availability of the medical forces. Each military base of the Alliance became responsible for providing medical care to the soldiers stationed in the given area.

This care was provided in defined stages, with the patient being transferred in accordance with the required levels of medical treatment. Only if there was a possibility of quick return to duty was medical care provided continuously at the lower levels. Teams providing medical care were grouped in particular bases subordinated to the PMC, the details of which are given in Table 2.

In addition, apart from the listed groups performing actions within the scope of medical support, medical activities were also conducted by other units. For example, the Police Operational Mentor and Liaison Team (POMLT) handled training of police officers, while the Operational Mentor and Liaison Team (OMLT) trained other military personnel [13].

FOB Warrior

FOB Warrior was composed of the following units, the main task of which was medical care for soldiers, especially in emergencies.

Table 3. Specificity of medical care at FOB WARRIOR during the 6th rotation - author's own data based on personal notes and memories
Tabela 3. Specyfika opieki medycznej w FOB WARRIOR podczas trwania VI zmiany - dane na podstawie własnych notatek i wspomnień

Feature	Discussion
Patients – number	A few – several people per day requiring care at different levels of medical treatment (a total of N ~1440 in the 6 months of service in FOB WARRIOR)
War-related injuries	
Type – due to frequency of occurrence	**Dominant injuries:** explosive, fragmentation, gunshot, traffic.
Injured – due to frequency (approx. values)	**Injured most frequently:** **20%** Polish soldiers, **5%** American soldiers, **15%** Afghan soldiers, and **60%** Afghan police
Injuries other than military action injuries	
Kind - type	**Soft tissues (80%)** - traffic injuries, bite wounds **bone tissue (20%)** - dominant, such as fractures, dislocations, sprains, traffic injuries (civilian population), making up 90% of injuries in this group
Internal medical care	**Care including outpatient medical care:** **soldiers (90%)** - 70% injuries, 30% internal medical treatment **civilian population (10%)** -100% cases covered injuries, no internal medicine treatment in this group of patients

- outpatient clinic:
– 2 physicians
– 2 nurses
- dental surgery:
– dentist (for FOB Warrior and FOB Ghazni),
- and two medical evacuation groups:
– 2 paramedics in each
– 1 MEV driver in each
– 1 orderly in each

Detailed tasks of the personnel included being on duty 24 hours a day in the base and providing security to foot, wheeled and air patrols in the area. Medical care was provided to Polish and American soldiers, as well as Afghan army, police and the civilian population. The specificity of medical care in FOB WARRIOR is presented in Table 3. It should be noted that, contrary to other bases, at FOB WARRIOR, due to the continuous attacks on the personnel related to providing medical services, submitted the statistical data on a current basis to the supervisors in the GHAZNI, without collecting

detailed data in their resources. The data presented in Table 3 is based on the personal notes and memories of the author, and therefore they may differ from the official data.

As shown in the table above, injuries related to military activities, such as those caused by explosions, fragmentation or gunshots, dominated both among the soldiers and the civilian population. These observations are in line with the data from the other FOB [15, 16].

The other tasks of the medical personnel of FOB WARRIOR included triage, assessment of vital signs, dressing injuries (e.g. aid after primary amputation, performing thorax drainage, applying artificial ventilation, reanimation, bleeding control and others), stabilisation of vital signs and preparation for evacuation to the next care level by air.

Summary

In the course of the PMC mission in Afghanistan there were several aid schemes implemented (over 190 in the project of redeveloping Ghazni itself), over 10 thousand soldiers and civilians were trained and over 130 tonnes of humanitarian aid were handed over [7]. All the activities of the PMC involved the medical forces, which provided continuous support in a duty rota system, which included providing medical assistance to 361 injured soldiers, who required medical care for a period exceeding 7 days.

Literature

1. Huntington S. Zderzenie cywilizacji [The Clash of Civilisations]. Warszawskie Wydawnictwo Literackie Muza, Warsaw 2007
2. Niedziela S. Afgański tygiel [The Afghan Crucible]. Bellona, Warsaw 2008: 106-107
3. Hudyma P. Udział wojsk polskich w misjach zagranicznych o charakterze pokojowym i stabilizacyjnym, w latach 1953-2008 [Participation of the Polish forces in foreign peace and stabilisation missions in the years 1953-2008]. Doctoral thesis. Adam Mickiewicz University in Poznań, Poznań 2011
4. Bilski A. Przybywają siły pokojowe [Here come the peacekeeping forces]. Polska Zbrojna, 2003; 26: 31-36
5. Marcinkowski C. Operacje pokojowe na początku XXI wieku [Peace operations in early 21st century]. Ministry of National Defence, Warsaw 2004 74
6. Chrzan K. Wpływ misji w Iraku i Afganistanie na zmiany w Wojsku Polskim [The influence of the mission in Iraq and Afghanistan on the changes in the Polish Army]. Rocznik Bezpieczeństwa Międzynarodowego 2011: 199-2011
7. Podsumowanie polskiego udziału w misji ISAF [Summary of the Polish participation in the ISAF mission]. www.do.wp.mil.pl/artykuly/aktualnosci/2015-01-05-podsumowanie-polskiego-udziau-w-misji-isaf/ (accessed on: 24/04/2017)
8. NATO. ISAF's mission in Afghanistan (2001-2014) (Archived), www.nato. int/cps/en/natohq/topics_69 366.htm (accessed on: 10/04/2017)
9. Jureńczyk Ł. Użycie Polskiego Kontyngentu Wojskowego w misjach pokojowych i stabilizacyjnych w poludniowo-zachodniej Azji w pierwszej dekadzie XXI wieku. Od zaangażowania do wycofania [Use of the Polish Military Contingent in peace and stabilisation missions in the South-East Asia in the first decade of the 21st century. From engagement to withdrawal]. Rocznik Bezpieczeństwa Narodowego 2010: 228-244
10. NATO. RSM Placemats Archive (2015-2017). www.nato.int/cps/en/natol-ive/107 995.htm (accessed on: 17/04/2017)
11. Górka-Winter B. Udział Polski w operacjach pokojowych i stabilizacyjnych [Participation of Poland in peace and stabilistaion operations]. Rocznik Polskiej Polityki Zagranicznej 2007
12. Korzeniewski K, Dzięgielewski P, Skórczewski K. Udział żołnierzy Wojska Polskiego w operacjach poza granicami państwa [Participation of the Polish Armed Forces soldiers in operations abroad] Mil. Phys., 2009; 87 (3): 151-159
13. Korzeniewski K, Pieniuta S, Nowak B, et al. Zadania i struktura organizacyjna służby zdrowia Polskiego Kontyngentu Wojskowego w Afganistanie [Tasks and organisational structure of medical services of the PMC in Afghanistan]. Mil. Phys., 2011; 89 (4): 364-375
14. Korzeniewski K, Bochniak A. Medical support of military operations in Iraq and Afghanistan. Int Marit Health, 2011; 62 (1): 71-76
15. Cohen S, Brown C, Kurihara C, et al. Diagnoses and factors associated with medical evacuation and return to duty among nonmilitary personnel participating in military operations in Iraq and Afghanistan. CMAJ, 2011; 183 (5): E289-E295
16. Korzeniewski K, Gregulski R. Reasons for medical evacuations of soldiers serving in International Security Assistance Force (ISAF) operation in Afghanistan. Int Marit Health, 2014; 65 (4): 210-215

Patient safety and monitoring the work of paramedics

Bezpieczeństwo pacjenta a nadzór nad wykonywaniem zawodu ratownika medycznego

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Abstract. The healthcare system in Poland gives paramedics considerable professional independence and a wide scope of authority to perform healthcare services independently. There is, however, no effective supervision of their substantive performance by professional self-government, voivodeship consultants or other entities. The only area of the paramedics' medical activity which undergoes substantive supervision is their use of physical coercion. The lack of substantive supervision over medical rescue services should be recognized as adverse both for patients prior to their admission to a hospital and for paramedics due to the lack of factual support in their work and lack of professional training based on an analysis of adverse events. It is essential to take legislative action to provide a basis for introducing methods of substantive supervision into the work of paramedics. The study analyses the legal regulations in respect of the possibilities of providing substantive supervision over the work of paramedics, and a comparison of supervision over the performance of other medical jobs, in particular physicians, nurses and physical therapists.
Key words: patient safety, paramedic

Streszczenie. W polskim systemie ochrony zdrowia ratownicy medyczni otrzymali dużą samodzielność zawodową oraz szeroki zakres uprawnień do samodzielnego wykonywania świadczeń zdrowotnych. Brak jest jednak skutecznego nadzoru nad merytorycznym wykonywaniem ich zawodu, samorządu zawodowego, konsultantów wojewódzkich lub innych podmiotów. Jedynym obszarem samodzielnej aktywności zawodowej, który podlega nadzorowi merytorycznemu, jest stosowanie przez paramedyków środków przymusu bezpośredniego. Brak nadzoru merytorycznego nad wykonywaniem medycznych czynności ratunkowych uznać należy za niekorzystny zarówno dla bezpieczeństwa pacjentów w obszarze przedszpitalnym, jak i dla osób wykonujących zawód ratownika medycznego, pozbawionych merytorycznego wsparcia oraz doskonalenia zawodowego opartego na analizie zaistniałych zdarzeń niepożądanych. Konieczne jest pilne podjęcie działań legislacyjnych dających podstawę do wdrożenia form nadzoru merytorycznego w pracy ratowników medycznych. W pracy przeprowadzona zostanie analiza przepisów prawa pod kątem możliwości sprawowania nadzoru merytorycznego nad wykonywaniem zawodu ratownika medycznego, a także porównawczo sprawowania nadzoru nad wykonywaniem innych zawodów medycznych, w szczególności lekarza, pielęgniarki i fizjoterapeuty.
Słowa kluczowe: bezpieczeństwo pacjenta, ratownik medyczny

Delivered: 17/08/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 397-400

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Introduction

The rights and professional roles of paramedics are systematically increasing in the Polish health care system. The legal regulations (State Emergency Medical Services Act of 8 September 2006) differentiate between the independent activities of paramedics and those performed under the supervision of a physician. At the moment, paramedics are legally entitled to perform 28 types of medical emergency procedures and administer 47 types of medication. They are also authorised to independently perform 38 medical services other than medical emergency procedures. The full scope of authority is obtained upon the completion of 3-year BSc studies. Paramedic education does not offer additional specialised courses or specialisations improving their professional qualifications, as opposed to nursing education, for example. What is more, although there are no legal obstacles, MSc courses in paramedical science rarely take place. The model of gradual improvement in qualifications and the acquisition of additional competences accompanying increasing professional experience has not been adopted in the Polish paramedic

services system, unlike in the UK for example, where the paramedic's career begins as an ambulance technician, leads through paramedic, specialised paramedic, advanced paramedic and ends with consultant paramedic [1].

Despite differences in the current system of paramedic training the legislator has not yet introduced a distinction between ambulance technicians (technik ratownictwa medycznego) – post-secondary graduates, and paramedics (paramedyk) – higher education graduates, as proposed by the Polish Resuscitation Council [2]. Only a number of medical rescue procedures and other medical services performed by paramedics require the supervision of a physician; however, the realisation of supervision activities is not specified by the provision of law.

Thus, the question arises whether, taking into consideration patient safety, the activities of paramedics performed independently require substantive verification and supervision and, if so, who should provide that supervision.

Importance of medical supervision

Substantive supervision in health care denotes planned procedures aimed at assessing and improving the structure, process and results of health care, as carried out by entities directly involved in providing such care [3].

The control, analysis and training regarding prehospital trauma care services, as elements increasing patient safety in emergency medical services, are noted in the instructions issued by WHO, for example [4].

As regards the legal context, supervision over particular professions is determined by Article 17 of the Polish Constitution, which is a basis for establishing professional associations for professions of public trust authorised to supervise the proper conduct of professions of public trust. According to the regulations on medical professions which have established a professional association, the supervision should be exercised over trainees as well as over fully qualified medical professionals.

In the Medical Profession Act, the term supervision is used both during the stage of a limited right to practice a profession and during specialised training when physicians need to be supervised in certain circumstances until they acquire the skills to handle those situations independently.

After specialised training, direct substantive supervision is continued by the physician in charge of a given ward or by an appointed senior physician. Only lengthy experience and gradually obtained authorisations to perform increasingly complex procedures shape physicians and allow them to work independently. Comparing the method of achieving professional independence by a physician and a paramedic, the latter does not remain under direct substantive supervision even in their first year of employment, and their responsibilities do not increase progressively and are not adjusted to their experience. In some Accident and Emergency (A&E) centres (e.g. in Stefan Żeromski Hospital in Kraków) paramedics entering employment (under an employment contract) receive supervision exercised by a person appointed to oversee the paramedic's actions in a new workplace. The supervision is usually entrusted to a senior nurse or paramedic. During the first year, the new employee is assessed on a three-month basis. The assessment is multidimensional and reflects the employee's knowledge of medical procedures, pharmacological treatment, manual skills exhibited in the conducted procedures, psychological aspects of the interactions with patients, the cooperation with the A&E team and more.

Another issue consists of the interview and verification of knowledge and practical skills of those applying for a job in Polish Medical Air Rescue teams (part of the State Emergency Medical Services).

The solutions regarding substantive supervision over physical therapists go even further. In accordance with the adopted regulations, the Polish Chamber of Physiotherapists may inspect physical therapists in order to assess the practice of the occupation. Physical therapists authorised by the professional association to conduct inspections may request medical information and documentation, access to the rooms used by the entity providing medical services, participation in activities connected to providing medical services and may also request clarifications in either written or oral form. Information about potential misconduct in the practice of the occupation is submitted to the disciplinary ombudsman. The Act on Physical Therapy also specifies that other medical professionals, should they witness the violation of any rules of professional conduct by a physical therapist, are obliged to express their observations to the person violating the rules and if this proves ineffective and the continuing violation of the rules indicates a possible risk to life or health, the other medical professional is obliged to immediately inform their immediate supervisor and the disciplinary ombudsman for physical therapists [5].

As the paramedics' professional group has no professional association of its own, the obligation to maintain control over the proper pursuit of the professional activities of public trust is neglected. During the Parliament's previous term, a draft act on the profession of paramedic and the professional association of paramedics was proposed, but the works have been suspended during the current term.

Another institution in charge of substantive supervision, aside from professional associations, are voivodeship and national consultants appointed for different medical specialities. The issue is governed by the Act on Healthcare Consultants of 6 November 2008. Their responsibilities include in particular: inspections over entities providing medical services with reference to education and professional training, inspections of the availability of medical services, inspections of the entities' medical equipment, analytical instruments and equipment for preparing and testing medicinal products as well as inspections of their effective use in the course of the teaching process. The most important task of a

consultant is the so-called consultant supervision, realised by issuing opinions on the proper diagnostic, treatment and nursing procedures in the scope of their compliance with the current state of the art, taking into consideration the availability of methods and resources. At present the Polish health care system employs consultants in emergency nursing and emergency medicine. The proposed appointment of consultants in the field of emergency medical services to perform substantive supervision over the largest group in the State Emergency Medical Services system, namely the paramedics, has been formulated by the Social Paramedics Committee and the Polish Council of Paramedics; however, it has not yet been addressed by the legislator.

Medical supervision in emergency medical services

The Act on State Emergency Medical Services in its current form does not provide a basis for exercising any substantive supervision over procedures performed independently by paramedics. It is worth mentioning that the legislator lacks consistency as regards substantive supervision in State Emergency Medical Services. The Act on State Emergency Medical Services does mention substantive supervision, but only in the context of emergency medical dispatchers. This duty is imposed on the emergency physician in an Emergency Communication Centre or a Disaster Recovery Centre. The emergency physician's task is also to provide medical dispatchers with substantial help (Article 29 of the State Emergency Medical Services Act). Thus, actions performed independently by a paramedic are by no means retrospectively assessed or controlled in terms of appropriateness, correctness or effectiveness. One exception is the use of the measures of direct coercion by a paramedic in charge of medical emergency procedures. The appropriateness of the used measures of direct coercion is assessed in each case within 3 days from the event by a psychiatrist appointed by the Voivodeship Marshall [6]. The available literature does not provide sufficient information about the degree of appropriateness of the measures of direct coercion used by a paramedic. A similar solution needs to be introduced in the assessment of appropriateness and quality of other medical procedures which can be performed independently by a paramedic. In taking account of patient safety, it is undoubtedly necessary to extend such supervision over the paramedics' right to withhold or terminate resuscitation in the first place. Nonetheless, the assessment should not be used to draw consequences (or impose penalties) against paramedics, but mainly to facilitate professional training and help prevent adverse events at the prehospital stage, thereby increasing patient safety.

Professional liability of a paramedic

In terms of penalties, it should be explained that the Act on Professional Liability of Skilled Employees of Healthcare of 18 July 1950, whose scope includes paramedics, remains in power in Polish law [7]. According to this obsolete Act, paramedics, similarly to other professions included in the Act, are accountable for professional misconduct to the Committee of Workplace Control working at the Praesidium of the Voivodeship National Council. The possible penalties are (apart from warning and reprimand) a ban on practising the profession in a given town or a fine up to PLN 1.50. Even though the issue has been brought up in public, such as by the Polish Medical Law Society as an example of absurdity in medical law, it has not been changed and remains dangerous legal fiction. This situation appears harmful not only from the viewpoint of patients but also from the viewpoint of paramedics. As without professional liability of paramedics there is no safety margin, with all claims against them being taken to court to meet administrative or judicial proceedings, due to the lack of alternative solutions.

National Monitoring Centre for Emergency Medical Services

One positive step is the proposal included in the draft amendment to the State Emergency Medical Services Act to establish a National Monitoring Centre for Emergency Medical Services. The responsibilities of the new institution would comprise, for example: defining standards for conduct or analysis of medical emergencies involving many victims [8].

Although most of the centre's duties are intended for medical dispatchers, it is certain that this institution, especially since there are no other statutory solutions, could be used to monitor the quality and effectiveness of medical rescue procedures and exercise substantive supervision over all medical professions within State Emergency Medical Services.

The matter of medical supervision over emergency medical services also calls for the creation of a separate register of selected medical rescue procedures which, following the example of acute coronary syndromes register or other currently existing registers, will help improve the quality of medical rescue procedures and patient safety at the prehospital stage.

Conclusions

- The State Emergency Medical Services system provides no substantive supervision over procedures performed independently by paramedics, with the exception of the assessment of appropriateness regarding the measures of direct coercion.
- Taking into account patient safety as well as safety during professional conduct of paramedics, it is vital to introduce actual substantive supervision over the independent professional conduct of paramedics.
- It appears reasonable to appoint voivodeship consultants and a national consultant for emergency

medical services who would be responsible for the supervision over paramedics' professional training and conduct.

- The target solution considering supervision over paramedics' professional conduct is to create a professional association for this professional group.
- Gradual improvement of paramedics' qualifications seems crucial due to gradually acquired professional experience and competencies undergoing systematic recertification and periodic verification.
- Finally, it is reasonable to introduce a career path for paramedics to reflect gradually acquired professional competencies.

Literature

1. Cooper S. Contemporary UK paramedical training and education. How do we train? How should we educate? Emerg Med J. 2005; 22: 375-379
2. Polish Resuscitation Council The position of 3 April 2006 www.prc.krakow.pl
3. Sheldon, 1982 cited in Tomasik T, Windak A, Król ZJ, Jacobs M. Podstawy poprawy jakości w medycynie rodzinnej [Foundations for Quality Improvement in General Medicine] Zdrowie i Zarządzanie, Kraków 2002: 11
4. Prehospital trauma care system. WHO 2005
5. The Act on Physical Therapy Practice of 25 September 2015. Journal of Laws of 2015, item 1994
6. The Act on Mental Health Care of 19 August 1994. Journal of Laws of 2016, item 546
7. The Act on Professional Responsibility of Healthcare Providers of 18 July 1950. Journal of Laws of 1950, No. 36, item 332
8. Draft amendment to the State Emergency Medical Services Act of 14 October 2016. Source: Government Legislation Centre

Ocular manifestations of acromegaly

Zmiany oczne w akromegalii

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Abstract. Acromegaly is a chronic disease caused by hypersecretion of the growth hormone, in the course of which characteristic changes in appearance, metabolic disorders and the development of systemic complications occur. Acromegaly is characterized by various ocular symptoms. The most commonly observed vision disorder is bitemporal hemianopsia, as a result of compression of the optic chiasm by a pituitary adenoma. In the course of acromegaly there are also changes in ocular structures and physiology unrelated to the tumour mass. Ocular symptoms of acromegaly include: increased central corneal thickness (CCT), increased intraocular pressure (IOP), change in the biomechanical properties of the cornea, higher central retinal thickness, mild retinal oedema, papilledema, diabetic retinopathy, enlarged extraocular muscles, exophthalmos, blepharoptosis, lacrimal gland enlargement, epiphora, pigmentary degeneration of the retina and choroidal melanoma. Patients with acromegaly should be under systematic and perceptive ophthalmological care.
Key words: acromegaly, growth hormone, IGF-1, eyes, visual field, corneal thickness, intraocular pressure, hysteresis, optic disc topography, retinal nerve fibre layer thickness

Streszczenie. Akromegalia jest chorobą przewlekłą, wywołaną nadmiernym wydzielaniem hormonu wzrostu, w przebiegu której dochodzi do charakterystycznych zmian wyglądu pacjenta, zaburzeń metabolicznych i rozwoju powikłań układowych. Charakteryzuje się występowaniem zróżnicowanych objawów okulistycznych. Najczęściej występującym zaburzeniem widzenia jest niedowidzenie połowicze dwuskroniowe, spowodowane uciskiem gruczolaka przysadki na okolicę skrzyżowania nerwu wzrokowego. W przebiegu akromegalii dochodzi także do zmiany w strukturach anatomicznych i fizjologii gałki ocznej niezwiązanych z efektem masy guza. Do objawów ocznych akromegalii należą: zwiększenie centralnej grubości rogówki (CCT), wzrost ciśnienia wewnątrzgałkowego (I0P), zmiana właściwości biomechanicznych rogówki, zwiększenie centralnej grubości siatkówki, łagodny obrzęk siatkówki, obrzęk tarczy nerwu wzrokowego, retinopatia cukrzycowa, pogrubienie mięśni okoruchowych, wytrzeszcz, opadanie powiek, powiększenie gruczołów łzowych, nadmierne łzawienie, zwyrodnienie barwnikowe siatkówki oraz czerniak naczyniówki. Pacjenci z akromegalia powinni być otoczeni systematyczną i wnikliwą opieką okulistyczną.
Słowa kluczowe: akromegalia, hormon wzrostu, IGF-1, oczy, pole widzenia, grubość rogówki, ciśnienie wewnątrzgałkowe, histereza, topografia tarczy, grubość włókien nerwowych siatkówki

Delivered: 16/01/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 401-405

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Introduction

Acromegaly is usually caused by a pituitary adenoma secreting excessive quantities of somatotropin (growth hormone, GH). Most symptoms and complications of the disease result from excessive production of GH-stimulated insulin-like growth factor-1 (IGF-1) by the liver. The consequences include craniofacial enlargement, hand and feet enlargement, excessive growth of bones, soft tissues and internal organs. Patients report headaches, bone and joint pain, excessive sweating, snoring, disturbed vision, as well as a changing sizes of shoes, gloves or rings. Arterial hypertension, diabetes and neoplastic diseases often develop in this group of patients.

Acromegaly is a rare disease. Every year approximately 3-4 new cases per million people are diagnosed, with the same frequency in men and women. The mean age at disease onset is approximately 40 years old. In Poland, approximately 2,000 people suffer from acromegaly. The time between the first symptoms and introducing effective treatment is usually four to ten years, which results in a long-term exposure of patients to the effects of growth factors. Untreated acromegaly reduces life expectancy by approximately 10 years, leading to a number of organ complications, including ophthalmological disorders.

Acromegaly is diagnosed based on the presence of clinical symptoms, established elevated IGF-1 level (for the sex and age), absence of GH inhibition following the

oral glucose tolerance test (OGTT), and the presence of pituitary adenoma in contrast-enhanced magnetic resonance imaging (MRI) [1].

Ocular symptoms of acromegaly depend on the following factors:

- growth of the somatotropic adenoma, and pressure to the adjacent structures (mass effect),
- symptoms associated with excessive GH and IGF-1 secretion and their effect on the ocular tissue.

Ocular symptoms associated with increasing tumour mass and its location

Pituitary tumours account for approximately 10-15% of all intracranial tumours. Depending on the size of the tumour, they can be classified as microadenomas (tumours of <1 cm in diameter) or macroadenomas (≥1 cm). At the diagnosis of acromegaly, 80% of somatotropic adenomas are macroadenomas [1]. Visual disorders are common in acromegaly, as the growing tumour presses on the optic chiasm. Very large tumours developing in the cavernous sinus area may damage other cranial nerves, including the motor nerves of the eyeballs.

A disturbed field of vision (FV) occurs, according to various studies, in 4.3-74% of patients with acromegaly, and depends on the type of adenoma [2-4]. To compare, before 1970 as many as 90% of patients demonstrated defects in the field of vision [5]. This rate decreased significantly after the introduction of advanced neuroimaging techniques. Defects in the field of vision are conditioned by the anatomic relationships between the growing pituitary gland and the optic chiasm. Bitemporal hemianopia is a typical symptom of a tumour pressing the chiasm. Pressure on the central part of the chiasm exerted from below by the growing adenoma results in a gradual displacement of the anterior part of the chiasm, and pressure on the fibres originating in the medial, nasal parts of retina are responsible for the perception of images located in the temporal areas of the field of vision [5]. Initially, the defects are found in the upper temporal quadrants, then they progress and involve the lower temporal quadrants as well. Field of vision disorders do not always follow a specific pattern. In some cases the defects in the field of vision may be monolateral, asymmetric, individual peripheral scotomas, in time combining into larger lesions, or – rarely – taking the form of a central scotoma. The degree and pattern of the visual field defects depend largely on the symmetry of damage to the nerve fibres from both nasal halves of the retina. In rare cases, compression of the optic nerve chiasm may manifest only as photophobia, without any detectable perimetric changes [6]. The relationship between the pituitary tumour size and damage to the visual field has been confirmed in numerous studies, including in acromegaly patients [4, 7]. Those with larger tumours demonstrate more advanced changes in the field of vision [4, 7, 8]. Kan et al. revealed a positive correlation with the vertical diameter of the somatotropic adenoma, even with a relatively small tumour volume [7]. It was demonstrated that tumour size correlates positively with GH concentration [4]. However, no relationship has been presented between IGF-1 and the size of the adenoma and changes in the field of vision [4, 7]. In some cases of acromegaly a field of vision defect typical for the tumour pressing the chiasm was found in relatively small tumours, without suprasellar expansion. In some patients small, atypical defects in the lower quadrants may occur. Observations suggest that direct pressure on the chiasm caused by the tumour may be only one of a few mechanisms engaged in visual field damage. Differences in the topography and anatomy of the chiasm, empty sella syndrome, blood supply disorders and inflammatory factors may play important roles in the pathomechanism of visual changes in the course of acromegaly [9].

Expanding temporal defects in the field of vision in both eyes may disturb sensory fusion, lead to phoria decompensation, and result in a disturbed near vision. Other ocular symptoms in patients with acromegaly include diplopia (resulting from the lateral growth of the tumour into the cavernous sinus and damage to the oculomotor nerves), and, rarely, Maddox' see-saw nystagmus.

Field of vision tests should be performed in every patient with pituitary adenoma, even in the absence of any ophthalmological symptoms. Follow-up perimetric examinations should be conducted regularly (every 1-3 months, or more often), depending on the clinical symptoms, tumour size, and type of treatment (surgery, pharmacology or radiotherapy). Static automated perimetry is a more sensitive method of detecting early field of vision defects [7]; however, Goldmann's kinetic perimetry is a valuable tool for the assessment of the peripheral field of vision in patients with reduced visual acuity [4]. Assessment of the field of vision is also the principal marker of functional changes in the visual pathway following causal treatment, and it may be useful in early detection of a recurring adenoma, or lack of response to a therapy.

In the diagnostics of ocular disorders in patients with acromegaly the following tests are necessary: ophthalmoscopic assessment of the optic nerve disc (OND), assessment of the thickness of the retinal nerve fibre layer (RNFL), with comparative analysis of the RNFL thickness between the nasal and temporal sectors in optical coherent tomography (OCT) or scanning laser polarimetry (GDx), as well as evaluation of colour vision, whose acquired impairment in the red-green axis is a typical symptom of visual neuropathy.

Bitemporal hemianopia in the course of acromegaly is usually associated with optic nerve disc pallor and reduction of RNFL thickness in the nasal sectors. In some patients with acromegaly, OND demonstrates a normal appearance (which is a good prognostic factor regarding preservation of vision). In rare cases, optic oedema of the optic nerve disc has been reported [10].

Symptoms associated with excessive GH and IGF-1 secretion and their effect on the ocular tissue

Hyperplasia of the organs and soft tissue is a typical symptom in acromegaly. Literature data regarding the effect of growth factors on the biology of ocular tissues in acromegaly patients are limited. Previous studies demonstrated in patients with acromegaly an increased CCT thickness and elevated IGF-1 concentration in the subretinal fluid and in the aqueous humor [11]. Studies on animals revealed a stimulating effect of IGF-1 on the production of corneal extracellular matrix, which resulted in increased resistance and disturbed outflow of the aqueous humor through the trabecular meshwork. Studies on rats confirmed the presence of mGH RNA and GH immunoreactive proteins in the retina, which may suggest that the growth hormone also presents a local autocrine and paracrine effect [12-14]. In *in vitro* studies, retinal pigment epithelial cells cultured in laboratory conditions demonstrated mRNA expression for type 1 and type 2 IGF receptors

Disturbed ocular hydrodynamics and increased intraocular pressure (IOP) in acromegaly were described in the mid-20th century. It was observed that in patients with open angle primary glaucoma, serum GH concentration is more often elevated. Other studies confirmed that increasing GH concentrations in the blood serum due to arginine administration is associated with higher IOP [16].

Previous studies demonstrated that CCT was higher in acromegaly patients than in the control groups of healthy individuals, and the groups of patients with a hormonally inactive form of the disease [17]. It was also observed that CCT and IOP were significantly higher in the patients with somatotropic adenoma compared to the patients with other adenomas [18]. In a prospective observation, Emrah et al. demonstrated significantly higher CCT, IOP and IGF-1 values in the tears of patients with acromegaly before the treatment, and a reduction in these parameters after the therapy [19]. Polat et al., on the contrary, did not report a statistically significant difference in mean CCT value between the group of patients with acromegaly and the control group, but confirmed a significantly higher IOP in the former [20]. These differences may be due to changes in the biomechanical properties and topography of the cornea observed in the course of neuroendocrine diseases. In one of the published studies, computed keratography and ocular response analyser (ORA), measuring the IOP and viscoelastic properties of the cornea (hysteresis) were used in patients with acromegaly. A significant difference was demonstrated in viscoelastic properties and corneal topography between the group of patients and that of healthy individuals [21]. According to researchers, the principal determinants of increased CCT in acromegaly patients are increased GH and IGF-1 concentrations, hormonal activity of the disease, and prolonged duration of its active phase. Detailed assessment of the cornea and IOP measurements are recommended in the panel of ophthalmological tests in patients with acromegaly.

Growth factors may also directly affect the retina. It was demonstrated that elevated IGF-1 concentration may result in a mild retinal oedema due to an increased permeability of small vessels. Previous studies confirm both an increased thickness of the retina in the foveal area, when measured by OCT [20], and lack of any change, when the thickness is measured using scanning laser tomography (HRT) [22]. The discrepancies between the results of these tests may result from different measuring techniques and assessment of different layers of the retina. Future studies involving vascular techniques such as angio-OCT and fluorescein and/or indocyanine green angiography may provide new data on the effect of GH on the retina and choroid in patients with acromegaly.

Diabetes is the second, after arterial hypertension, most common metabolic complication in acromegaly patients. The effect of GH in the development of diabetic retinopathy (DR) was observed for the first time by Poulsen in 1953 [23]. The author found that removal of the pituitary gland was associated with reduced severity of diabetic retinopathy [23]. Since then, the effect of GH/IGF-1 on the development of diabetes has been studied extensively. According to the published data, the incidence of DR in acromegaly is between 2.9% [24] and 30% [25, 26]. In the majority of cases, DR takes the form of pre-proliferative retinopathy (mild or moderate) without concurrent diabetic cataracts, although there are reports of individual cases of advanced proliferative diabetic retinopathy (PDR) [27]. Exposure of the retina to excessive quantities of GH stimulates the increased production of local growth factors, such as IGF-1 and VEGF (vascular endothelial growth factor), which, due to autocrine and/or paracrine activities, may contribute to the development of microvascular diabetic changes [28]. This therapy is supported by the fact that DR does not correlate with serum GH/IGF-1 concentrations [26]. Inokuchi et al. observed several times higher IGF-1 concentrations in the vitreous body and serum of a patient with acromegaly and severe proliferative diabetic retinopathy [29]. The researchers suggested that excessive production of local IGF-1, or breaking of the blood-eye barrier (responsible for diffusion of plasma IGF-1 to the vitreous body), may result in faster development of retinopathy. Other authors observed that IGF-1 accelerates VEGF expression in certain cell lines [30]. Smith et al. observed that therapy with growth hormone inhibitors may inhibit retinal ischaemia, and secondary neovascularisation in vivo induced by VEGF [31]. Severe cases of DR in acromegaly patients are associated, as in primary diabetes, with poor control of glycaemia, prolonged duration, advanced age and genetic predispositions. Patients with acromegaly should remain under close ophthalmological observation to ensure early detection of DR, which in rare cases may develop into advanced PDR.

Exophthalmos, caused by thickening of the oculomotor muscles, is a very rare symptom of acromegaly [32]. In the literature there are a few reports

of exophthalmos in patients with acromegaly and concurrent Cushing's disease of hyperthyroidism in the course of Graves' disease [33, 34]. In two cases prolonged exophthalmos and excessive lacrimation in female patients were the first symptoms of acromegaly, and a CT scan of the orbits demonstrated thickened oculomotor muscles, excessive subcutaneous tissue of the eyelids, and enlarged lacrimal glands [35]. It appears that in acromegaly patients a detailed study of the setting and mobility of eyes, and assessment of double vision and exophthalmos (exophthalometry) are justified, along with imaging tests of the orbit and an endocrinological examination in difficult cases. In the pathogenesis of the exophthalmos of unknown aetiology, one should consider the rarely observed trophic effect of GH on the orbital soft tissues in the course of acromegaly.

GH and IGF-1 are factors affecting both the growth and the increased number of cells in the organism; they may potentially stimulate uncontrolled divisions and neoplastic induction. It has been confirmed that the risk of malignant neoplasms in acromegaly patients is raised, which is associated with reduced life expectancy, and higher mortality. In the literature there are two cases of patients with acromegaly and a benign choroidal melanocytic nevus, who developed a choroidal melanoma a few years after treatment (pharmacological, surgical and radiotherapy) [36]. It is assumed that the increased dynamics of benign choroidal nevi may be due to the presence of GH and IGF-1 receptors on the melanocytes. Increased incidence of retinal pigment epithelial degeneration in acromegaly is also reported [37]. Patients qualified for radiotherapy should undergo a detailed ophthalmological assessment for the presence of choroidal nevus, and a risk assessment of a potential secondary malignancy of the lesion.

Summary

Apart from ophthalmological symptoms associated with the mass effect, acromegaly may induce many important ocular complications, frequently underestimated in daily clinical practice. In ophthalmological diagnostics, next to the basic ophthalmological examination and field of vision assessment, the following tests are recommended: examination of biomechanical properties of the cornea, ocular hydrodynamics testing, and morphological measurements of the retina. Long-term ophthalmological observation may be helpful in the early detection of recurrent adenoma or if there is no response to the applied therapy.

Literature

1. Giustina A, Chanson P, Bronstein MD, et al. A consensus on criteria for cure of acromegaly. J Clin Endocrinol Metab, 2010; 95: 3141-3148
2. Hennessey JV, Jackson IM. Clinical features and differential diagnosis of pituitary tumours with emphasis on acromegaly. Baillieres Clin Endocrinol Metab, 1995;9:271-314
3. Lee JP, Park IW, Chung YS. The volume of tumor mass and visual field defect in patients with pituitary macroadenoma. Korean J Ophthalmol, 2011; 25 (1): 37-41
4. Rivoal 0, Brezin AP, Feldman-Billard S, et a I. Goldmann perimetry in acromegaly: a survey of 307 cases from 1951 through 1996. Ophthalmology, 2000; 107:991-997
5. Anderson D, Faber P, Marcovitz S, et al. Pituitary tumors and the ophthalmologist. Ophthalmology, 1983; 90: 1265-1270
6. Kawasaki A, Purvin VA. Photophobia as the presenting visual symptom of chiasmal compression. J Neuro-ophthalmol, 2002; 22 (1): 3-8
7. Kan E, Kan EK, Atmaca A, et a I. Visual field defects in 23 acromegalic patients. Int Ophthalmol A, 2013; 33: 521-525
8. Thomas R, Shenoy K, Seshadri MS, et al. Visual field defects in non-functioning pituitary adenomas. Indian J Ophthalmol, 2002; 50 (2): 127-130
9. Rieger A, Rainov NG, Ebel H, et al. Factors predicting pituitary adenoma invasiveness in acromegalic patients. Neurosurg Rev, 1997; 20: 182-187
10. Mueller GL, McKenna TJ, Kelly G, et al. Papilledema in two patients with acromegaly and intrasellar pituitary tumors. Arch Intern Med, 1981; 141: 1491 - 1495
11. vanSetten G, Brismar K, Algvere P. Elevated intraocular levels of insulin-like growth factor I in a diabetic patient with acromegaly. Orbit, 2002; 21: 161-167
12. Rocha EM, Cunha DA, Carneiro EM, et al. Insulin, insulin receptor and insulin-like growth factor-I receptor on the human ocular surface. Adv Exp Med Biol, 2002; 506:607-610
13. Harvey S, Kakebeeke M, Murphy AE, et al.Growth hormone in the nervous system: Autocrine or paracrine roles in retinal function? Can J Physiol Pharmacol, 2003; 81:371-384
14. Harvey S, Baudet ML, Sanders EJ. Retinal growth hormone in perinatal and adult rats. J Mol Neurosci, 2006; 28: 257-264
15. Martin DM, Yee D, Feldman EL. Gene expression of insulin like growth factors and their receptors in cultured human retinal pigment epithelial cells. Brain Res Mol Brain, 1992; 12:181-186
16. Rocha EM, Cunha DA, Carneiro EM, et al. Insulin, insulin receptor and insulin-like growth factor-I receptor on the human ocular surface. Adv Exp Med Biol, 2002; 506:607-610
17. Ciresi A, Amato MC, Morreale D, et al. Cornea in acromegalic patients as a possible target of growth hormone action. J Endocrinol Invest, 2011; 34: 30-35
18. Bramsen T, Klauber A, Bjerre P. Central corneal thickness and intraocular tension in patients with acromegaly. Acta Ophthalmol (Copenh), 1980; 58: 971-974
19. Emrah K, Elif KK, AN 0. Comparing two acromegalic patients with respect to central corneal thickness, intraocular pressure, and tear insulin-like growth factor levels before and after treatment. Indian J Ophthalmol, 2015; 63 (9): 731-732
20. Polat S, Ugurlu N, Ersoy R, et al. Evaluation of central corneal and central retinal thicknesses and intraocular pressure in acromegaly patients. Pituitary, 2014; 17:327-332
21. Altinkaynak H, Duru N, Ersoy R, et al. Topographic and biomechanical evaluation of cornea in patients with acromegaly. Cornea, 2015; 34 (1): 65-70
22. Sen E, Tutuncu Y, Elgin U, et al. Comparing acromegalic patients to healthy controls with respect to intraocular pressure, central corneal thickness, and optic disc topography findings. Indian J Ophthalmol, 2014; 62 (8): 841-845
23. Poulsen JD. Diabetes and anterior pituitary deficiency. Diabetes, 1953; 2: 7-12
24. Arya KR, Pathare AV, Chadda M, et al. Diabetes in acromegaly: A study of 34 cases. J Indian Med Assoc, 1997; 95: 546-547
25. Amemiya T, Toibana M, Hashimoto M, et al. Diabetic retinopathy in acromegaly. Ophthalmologica, 1978; 176: 74-80
26. Azzoug S, Chentli F. Diabetic retinopathy in acromegaly. Indian J Endocrinol Metab, 2014; 18 (3): 407-409
27. Malhotra C. Proliferative diabetic retinopathy in acromegaly. Oman J Ophthalmol, 2010; 3 (2): 96-97
28. Sónksen PH, Russell-Jones D, Jones RH. Growth hormone and diabetes mel-litus. A review of sixty-three years of medical research and a glimpse into the future? Horm Res, 1993; 40: 68-79
29. Inokuchi N, Ikeda T, Yasuda F, et al. Severe proliferative diabetic retinopathy associated with acromegaly. Br J Ophthalmol. 1999; 83: 629-630
30. Meyer-Schwickerath R, Pfeiffer A, Blum WF, et al. Vitreous levels of insulin-like growth factors I and II and the insulin-like growth factor binding proteins 2 and 3, increase in neovascular eye disease. Studies in non-diabetic and diabetic subjects. J Clin Invest, 1993; 92: 2620-2625
31. Smith LE, Kopchick JJ, Chen W, et al. Essential role of growth

hormone in ischemia-induced retinal neovascularization. Science, 1997; 276:1706-1709
32. Zafar A, Jordan DR. Enlarged extraocular muscles as the presenting feature of acromegaly. Ophthal Plast ReconstrSurg, 2004; 20: 334-336
33. Schwarz F, der Kinderen PJ, Houtstra-Lanz M. Exophthalmos-producing activity in the serum and in the pituitary of patients with Cushing's syndrome and acromegaly. J Clin Endocrinol Metab, 1962; 22: 718-725
34. Burgos Pelśez R, Simó Canonge R, Hernśndez-Pascual C, et al. Acromegaly and Graves-Basedow disease. Report of 3 cases. Med Clin (Bare), 1994; 103:179-180
35. Mehra M, Mohsin M, Sharma P, et al. Epiphora and proptosis as a presenting complaint in acromegaly: Report of two cases with review of literature. Indian J Endocrinol Metab, 2013; 17: 149-151
36. Corcuff JB, Ogor C, Kerlan V, et al. Ocular naevus and melanoma in acromegaly. Clin Endocrinol (Oxf), 1997; 47: 119-121
37. Cosemans I, Demaerel P, Wets B, et al. Retinitis pigmentosa in association with acromegaly: a case report. Doc Ophthalmol, 1999; 98: 175-181

Obesity in children

Otyłość u dzieci

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Abstract. Excessive body weight is an increasingly common problem in highly developed societies. Obesity has reached epidemic proportions worldwide and the problem is growing among children and adolescents. Factors which lead to obesity include malnutrition and a sedentary lifestyle, as well as the influence of socio-economic, demographic, environmental, genetic and endocrine factors. Obesity in children and adolescents is a risk factor for cardiovascular, respiratory and gastrointestinal system diseases. It can also be a cause of psychiatric problems. Obesity is considered a disease which should be treated to prevent its potential harmful effects by reducing the patients' body mass.
Key words: obesity, children, body weight, body mass index (BMI), risk factors

Streszczenie. Nadmierna masa ciała to coraz powszechniejszy problem w wysoko rozwiniętych społeczeństwach. Otyłość osiąga aktualnie rozmiary ogólnoświatowej epidemii, a problem narasta także wśród dzieci i młodzieży. Do czynników ryzyka wystąpienia otyłości należy zaliczyć niewłaściwe odżywianie i siedzący tryb życia, ale także wpływy socjoekonomiczne, demograficzne i środowiskowe oraz czynniki genetyczne i endokrynologiczne. Otyłość u dzieci i młodzieży jest czynnikiem ryzyka chorób układu sercowo-naczyniowego, oddechowego i pokarmowego, może być także podłożem zaburzeń psychicznych. Uznawana jest za chorobę, której leczenie ma zapobiegać jej potencjalnym skutkom poprzez zmniejszenie masy ciała chorego. **Słowa kluczowe:** otyłość, dzieci, masa ciała, indeks masy ciała (BMI), czynniki ryzyka

Delivered: 10/02/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 406-410

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Introduction

The number of obese people in the world today is on the increase, and the problem also concerns children and adolescents. The recent data regarding overweight and obesity in this age group indicate that the phenomenon is becoming a global epidemic [1-3]. In North America, approximately one third of the paediatric population is overweight or obese [4, 5]; in Europe one in five children has excessive body weight. According to the International Obesity Task Force, each year there are approximately 400,000 new cases of overweight children and adolescents, and 85,000 new cases of obesity in this age group [6]. In Poland, in the years 2007-2009, the OLAF study "Overweight and obesity in children and adolescents in Poland" was conducted. It involved 17,573 children and adolescents aged 7-18 years old. Overweight or obesity was found in 18% of boys and 14% of girls [7].

Overweight and obesity in children may be initially assessed using the body mass index (BMI) [8]. According to the World Health Organisation (WHO), being overweight in children is defined as a BMI in the 85-97th percentile range, whereas a BMI higher or equal to the 97th percentile signifies obesity [9, 10].

Aetiology of obesity in children and adolescents

Paediatric obesity is a complex condition, determined by genetic factors, diet, physical activity and social conditions [11, 12]. Less often is obesity caused by a specific disease of known pathogenesis. The most common type is primary obesity, also known as simple obesity. It results from a prolonged positive energy balance, i.e. excessive energy supply relative to the energy expenditure.

Environmental factors associated with obesity in children

In the prenatal period, the following affect obesity in a child: low birth weight relative to the gestational age, high weight gain during pregnancy in the mother, increased glycaemia (gestational diabetes), and smoking tobacco by the mother [13].

In the perinatal period, the significant risk factors for obesity include high birth weight and delivery via a Caesarean section. It was observed that Caesarean section disturbs the normal colonisation of the neonate's gastrointestinal tract [14, 15], which may be associated with an increased risk of obesity in the future [16-18].

In infancy, the development of obesity is affected by artificial nutrition, rapid body weight increase, and short sleeping times in the child [19-21].

Risk factors for obesity associated with nutrition and lifestyle

Nutrition plays an important role in the development of obesity in children. The following factors are associated with the increased incidence of obesity: consumption of excessive amounts of calories relative to the organism's requirement in infancy, introducing solid food before 6 months of age, increased consumption of sweet drinks (juices, carbonated drinks), improper manner of eating meals (eating while watching TV, missing breakfast, infrequent eating meals with parents), and limited consumption of fruits and vegetables [12, 21-23].

Most guidelines for children and adolescents recommend 60 minutes of moderate, or even intense physical activity per day. In many studies limited physical activity was associated with a more frequent incidence of obesity. A sedentary lifestyle (especially spending too much time in front of a TV or a computer) is associated with a higher BMI [12, 24, 25].

Sociodemographic factors

Cross-sectional studies revealed that members of certain ethnic groups (e.g. Aboriginal Australian, Latino and South Asian populations) are at a higher risk of obesity. In Western countries with high income levels, children from the lower-income environments are burdened with a higher risk of overweight and obesity than those from families with a higher socioeconomic status [12].

Pathological causes of obesity

Endocrine disorders, such as Cushing's syndrome, hypothyroidism, growth hormone deficiency or pseudohypoparathyroidism are associated with increased body weight and growth retardation. Among the listed diseases, severe obesity is present only in the clinical picture of Cushing's syndrome. The causes of endocrinological obesity are rare, and are found in less than 1% of obese children and adolescents. The most common cause of overweight due to endocrinological disorders is hypothyroidism [26].

A number of genetic diseases are also associated with excessive body weight. Genetic syndromes whose symptoms include obesity at an early age are rare. In these syndromes obesity is often accompanied by growth disorders. According to the causal mechanism, genetic syndromes with obesity may be classified into three groups [12].

- Monogenic syndromes – caused by a single gene mutation. In these syndromes obesity is one of the main clinical syndromes. They include Bardet-Biedl syndrome, Cohen syndrome, and Alström syndrome [12].
- Chromosomal anomalies, e.g. Down's syndrome or Turner syndrome, where obesity is a non-specific symptom [12].
- Parental imprinting anomalies, e.g. Prader-Willi syndrome, in which obesity is a specific symptom, found in approximately 90% of patients. It develops already by 2 years of age, and increases with age. It is associated with excessive appetite, reduced sense of fullness, and incorrect nutritional behaviours, e.g. an obsessive need to gather and consume food. Obesity in this syndrome is resistant to dietary treatment, and no effective pharmacological therapy is available [12, 27].

Certain tumours of the nervous system are also related with obesity in children, e.g. craniopharyngioma, and deregulating the autonomic system due to its location in the hypothalamus, which results in rapid body weight gain [28].

Consequences of obesity

Overweight and obesity have a number of clinical consequences. The most important ones affect the cardiovascular system. There is a clear, well-documented relationship between obesity and arterial hypertension, ischaemic heart disease, atherosclerosis, and cerebral strokes, heart failure and venous thrombosis [29-31].

Other important consequences include metabolic disorders, such as type 2 diabetes, metabolic syndrome and dyslipidemia. Disorders of the lipid and carbohydrate metabolism are components of the metabolic syndrome, and increase the risk of cardiovascular diseases [29-31].

Non-alcoholic hepatic steatosis and cholecystolithiasis are among the complications increasingly found in children. Obesity also contributes to an increased incidence of gastrooesophageal reflux [29-31].

In obese girls elevated concentrations of androgens are often observed, resulting in polycystic ovaries syndrome associated with fertility disorders at the reproductive age [29-31].

It should also be emphasised that patients who are overweight or obese since childhood are burdened with a higher risk of developing, in adult life, malignant neoplasms such as breast cancer, pancreatic cancer, colorectal cancer, uterine cancer, prostate cancer and gall bladder cancer, compared to the general population [32].

Discussing clinical consequences must involve psychological problems, such as depression, social isolation, problems with acceptance by the peer group, and low self-esteem. Aggression, poor results at school and impaired concentration are among the problems associated with obesity in children and adolescents. They may all result in abnormal increased appetite, higher risk of alcohol abuse, cigarette smoking, and even suicide [29, 30].

Screening methods of assessing obesity

To assess the degree of obesity, child growth charts and body mass index (BMI) are used in clinical practice. Growth charts (e.g. body weight relative to age, height relative to age, and body weight relative to height) enable the graphic presentation of the position of a given parameter, and to compare it with values that are considered normal. BMI is derived from the formula:

BMI = actual body weight [kg]/(height [m])^2.

The value of the calculated BMI is compared with the data from the growth chart. BMI assessment with the use of growth charts enables the child's nutritional status to be analysed, and is considered a gold standard in the diagnosis of obesity.

Other anthropometric parameters can also be used to assess the degree of obesity. The most common ones include:

- measurement of the skinfold thickness, including the subcutaneous tissue, assessed over the mid-triceps, over the scapula, and in the navel area;
- Cole's index (least mean square - LMS) is used in younger children: LMS = (MR x WS/ WR x MS) x 100, where MR – child's true body weight, WS – mean height for the child's age and sex, WR – child's real height, MS – mean body weight for the child's age and sex; obesity is diagnosed when LMS >110;
- waist circumference – measured at the navel level, at an equal distance from the anterior superior iliac spines; obesity is diagnosed when the value is >95 centile;
- waist-hip ratio – a ratio of the circumference of the waist, measured between the lower costal arch and the wings of ilium, to the circumference of the hips, measured at the highest circumference of the buttocks, below the wings of ilium [33]; values of <0.8 indicate a pear-shaped body, and those >0.8 indicate abdominal obesity. If the ratio is higher than 0.85, the risk of cardiovascular diseases is increased.

Management of obesity in children

Obesity is considered a difficult to treat disease. It is a chronic disorder, characterised by periods of "partial remission" and "exacerbation". Attempts at treatment involving lifestyle modification, dietary changes and physical exercise are moderately effective, especially regarding permanent body weight reduction [34-36].

The fundamental element in therapy of obesity is modification of the lifestyle of children and their families. One of the principal changes is increasing the time spent on physical exercise, instead of the time spent in front of a TV or computer. Regular physical activity, along with a proper diet, results in a systematic body weight reduction, decreasing fat tissue, and an increased lean mass. Physical exercise should be adapted individually to the child, with the starting point being over one hour daily spent on activities such as sports, playing games, or other outdoor activities. The patient should spend less than two hours a day passively, i.e. watching TV, playing computer or video games [38].

Reduction of caloric intake is necessary in this therapy. Recommendations regarding the prevention and treatment of obesity are based on a balanced diet, in which the total fat content is 25-35% of the caloric value, saturated fats are <7% of the caloric value, *trans* fats are <1% of the caloric value, and cholesterol is <300 mg.

Support from the family is very important in the management of an obese child. Obesity of children in Polish society is rarely perceived as a problem. In addition, in the case of most obese children, their relatives also suffer from the condition. To ensure the effectiveness of the treatment, the entire family need to co-operate, as well as acknowledge and understand the problem. Therefore, it is recommended to give up frequent meals out, and eat together at home, at a table instead of in front of the TV, to engage the child in the shopping for and preparation of meals, to give up high-calorie snacks by the entire family, and to spend time together on physical activities [37].

Pharmacological treatment

In pathologically obese adolescents (>16 years old), the dietary therapy and lifestyle modification may be complemented with pharmacological treatment. Such management is considered if the diet and lifestyle modification over a 6 month period did not achieve the desired effect, i.e. a significant body weight reduction. Considering pharmacotherapy is indicated also if obesity-related complications occur (metabolic disorders, cardiovascular diseases, degenerative articular diseases, psychological problems due to obesity persisting despite a proper diet and physical activity, especially if type 2 diabetes of cardiovascular diseases are present in the family) [38].

One of medicines used in the treatment of obesity is orlistat, an enteral lipase inhibitor, preventing the disintegration and absorption of fats during the digestive process. The product is approved for use in children over 10 years of age [25]. Due to adverse reactions (abdominal pain, flatulence, diarrhoea, and sudden tenesmus) the medicine is rarely tolerated by patients.

Another medicine used in the treatment of obesity is metformin. It inhibits the hepatic production of glucose, reduces blood insulin concentration, inhibits lipogenesis, increases peripheral sensitivity to insulin, and can reduce appetite by elevating the level of glucagon-like peptide. A study evaluating the effects of metformin demonstrated a BMI reduction by 0.5 kg^2 compared to the placebo [38].

Sibutramine, a serotonin reuptake inhibitor, demonstrated a slightly higher degree of body weight reduction than the placebo, but due to adverse reactions (arterial hypertension, tachycardia, hyperactivity and sleeplessness) it is not used in children and adolescents [25].

Surgical management

The data on the surgical treatment of obesity in adolescents are very limited, but they may be considered promising. Gastric bypass (Roux-en-Y method) is presently one of the most common bariatric surgeries. According to the published reports, it allows the BMI to be reduced by one-third within the two year period following the procedure [39]. Studies have also demonstrated a post-operative improvement in the metabolic parameters and psychosocial consequences of obesity [39-41]. However, the adverse effects of the surgical procedure itself should be considered, e.g. gastric bleeding, gastric stenosis, oesophageal reflux disease, fistula formation at the site of gastric wall stapling, anastomotic leak and resulting peritonitis, and anastomotic stenosis [39].

Summary

Overweight and obesity pose increasing problems in patients at the developmental age. The world literature contains multiple data supporting the thesis that paediatric obesity leads to obesity in adulthood, and is associated with the risk of numerous diseases, including cardiovascular disorders, gastrointestinal conditions, neoplasms and psychological problems. Observation of the problem indicate that the introduction of effective educational programmes for children from a very young age and for adults is very important, as well as disease prophylaxis.

Literature

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009-2010. NCHS Data Brief, 2012; 82: 1-8
2. Wijnhoven TM, van Raaij JM, Spinelli A, et al. WHO European Childhood Obesity Surveillance Initiative 2008: weight, height and body mass index in 6-9-year-old children. Pediatr Obes, 2013; 8 (2): 79-97
3. Guran T, Bereket A. International epidemic of childhood obesity and television viewing. Minerva Pediatr, 2011; 63: 483-490
4. Ogden CL, Carroll MD, Kit BK, et al. Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA, 2014; 311: 806-814
5. Roberts KC, Shields M, de Groh M, et al. Overweight and obesity in children and adolescents: results from the 2009 to 2011 Canadian Health Measures Survey. Health Rep, 2012; 23: 37-41
6. www.iaso.org/about-iaso/iasomanagement/iotf/
7. Kutaga Z, Litwin M, Tkaczyk M, et al. Polish 2010 growth references for school-aged children and adolescents. Eur J Pediatr, 2011; 170: 599-609
8. Evaluation and management of obesity. In: Fauci AS, Braunwald E, Kasper DL, et al. (eds). Harrison's principles of internal medicine. McGraw-Hill Medical, New York 2008: 2395-2413
9. Shields M, Tremblay MS. Canadian childhood obesity estimates based on WHO, I0TF and CDC cut-points. Int J Pediatr Obes, 2010; 5: 265-273
10. Dietitians of Canada, Canadian Paediatric Society, The College of Family Physicians of Canada, and Community Health Nurses of Canada: Promoting optimal monitoring of child growth in Canada: using the new WHO growth charts. Can J Diet Pract Res, 2010; 71: e1-e3
11. Plourde G. Preventing and managing pediatric obesity. Recommendations for family physicians. Can Fam Physician, 2006; 52: 322-328
12. Han JC, Lawlor DA, and Kimm SY. Childhood obesity. Lancet, 2010; 375: 1737-1748
13. Kleiser C, Schaffrath Rosario A, Mensink GB, et al. Potential determinants of obesity among children and adolescents in Germany: results from the cross-sectional KiG-GS Study. BMC Public Health, 2009; 9: 46
14. Janczewska I, Domżalska-Popadiuk I. Znaczenie kolonizacji bakteryjnej przewodu pokarmowego noworodków donoszonych urodzonych drogą cięcia cesarskiego. [Significance of bacterial colonisation of the gastrointestinal tract in full-term neonates delivered by Cesarean section] Ann Acad Med Gedan, 2014; 44: 99-104
15. Salminen S, Gibson GR, McCartney AL, et al. Influence of mode of delivery on gut microbiota composition in seven year old children. Gut, 2004; 53: 1388-1389
16. Reinhardt C, Reigstad CS, Backhed F. Intestinal microbiota during infancy and its implications for obesity. J Pediatr Gastroenterol Nutr, 2009; 48: 249-256
17. Kalliomaki M, Collado MC, Salminen S, et al. Early differences in fecal microbiota composition in children may predict overweight. Am J Clin Nutr, 2008; 87:534-538
18. Luoto R, Kalliomaki M, Laitinen K, et al. Initial dietary and microbiological environments deviate in normal- weight compared to overweight children at 10 years of age. J Pediatr Gastroenterol Nutr, 2011; 52: 90-95
19. Baird J, Fisher D, Lucas P, etal. Being big or growing fast: systematic review of size and growth in infancy and later obesity. BJM, 2005; 331: 929
20. Yan J, Liu L, Zhu Y, et al. The association between breastfeeding and childhood obesity: a meta- analysis. BMC Public Health, 2014; 14: 1267
21. Taveras EM, Rifas-Shiman SL, Oken E, et al. Short sleep duration in infancy and risk of childhood overweight. Arch Pediatr Adolesc Med, 2008; 162: 305-311
22. Timlin MT, Pereira MA, Story M, et al. Breakfast eating and weight change in a 5-year prospective analysis of adolescents: project EAT (Eating Among Teens). Pediatrics, 2008; 121: e638-e645
23. Wansink B, van Kleef E. Dinner rituals that correlate with

child and adult BMI. Obesity, 2014; 22: E91-E95
24. Luca P, Birken C, Grewal P, et al. Complex obesity. Curr Pediatr Rev, 2012; 8:179-187
25. Bagchi D. Global perspectives on childhood obesity: current status, consequences and prevention. Academic Press, Burlington (MA) 2010
26. Miller J, Rosenbloom A, Silverstein J. Childhood obesity. J Clin Endocrinol Metab, 2004; 89:4211-4218
27. Farooqi S, 0'Rahilly S. Genetics of obesity in humans. Endocr Rev, 2006; 27: 710-718
28. Hamilton JK, Conwell LS, Syme C, et al. Hypothalamic obesity following craniopharyngioma surgery: results of a pilot trial of combined diazoxide and metformin therapy. Int J Pediatr Endocrinol, 2011; 2011: 417949
29. Han JC, Lawlor DA, Kimm SY. Childhood obesity. Lancet, 2010; 375: 1737-1748
30. Szymocha M, Bryta M, Maniecka-Bryta I. Epidemia otyłości XXI wieku. [Epidemics of obesity in 21st century] Zdrowie Publiczne, 2009; 119: 207-212
31. Head GA. Cardiovascular and metabolic consequences of obesity. Front Physiol, 2015; 6: 32
32. Wolin KY, Carson K, Colditz GA. Obesity and cancer. Oncologist, 2010; 15: 556-565
33. Majcher A, Pyrzak B, Czerwonogrodzka A, et al. Body fat percentage and anthropometric parameters in children with obesity. Med Wieku Rozwój, 2008; 12(1): 493-498
34. ter Bogt NC, Bemelmans WJ, Beltman FW, et al. Preventing weight gain: one-year results of a randomized lifestyle intervention. Am J Prev Med, 2011; 365:1969-1979
35. Wadden TA, Volger S, Sarwer DB, et al. A two-year randomized trial of obesity treatment in primary care practice. N Engl J Med, 2011; 365:1959-1968
36. Appel LJ, Clark JM, Yeh HC, et al. Comparative effectiveness of weight-loss interventions in clinical practice. N Engl J Med, 2011; 365: 1959-1968
37. Epstein L, Myers M, Raynor H, Saelens B. Treatment of pediatric obesity. Pediatrics, 1998; 101: 554-570
38. August GP, Caprio S, Fennoy I, et al. Prevention and treatment of pediatric obesity: an endocrine society clinical practice guideline based on expert opinion. J Clin Endocrinol Metab, 2008; 93: 4576-4599
39. Hsia DS, Fallon SC, Brandt ML. Adolescent bariatric surgery. Arch Pediatr Adolesc Med, 2012; 166: 757-766
40. Austin H, Smith K, Ward WL. Psychological assessment of the adolescent bariatric surgery candidate. Surg Obes Relat Dis. 2013; 9: 474-480
41. Behrens C, Tang BQ, Amson BJ. Early results of a Canadian laparoscopic sleeve gastrectomy experience. Can J Surg, 2011; 54: 138-143

Megaureters in children – advances in diagnosis and treatment

Postępy diagnostyki i leczenia moczowodów olbrzymich u dzieci

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Abstract. Ultrasound is the most popular examination methods in children with urinary tract infections, allowing early detection of defects in the urinary tract. One of the malformations which may cause urinary tract blockage is a megaureter. The majority of authors consider ureters wider than 7 mm as megaureters. Megaureters can be considered primary or secondary, depending on the cause. A suspected megaureter should be diagnosed to determine the cause and to plan the treatment to prevent infections and progressive damage of the kidney function. Ultrasound of the abdomen and the urinary tract remains a basic test. A voiding cystourethrogram is the second most frequent examination, as it allows, among other things, the diagnosis of vesico-ureteral reflux. It is also advisable to perform a renoscintigraphy, which allows the renal function to be assessed and to determine the degree of urine flow disorder. It is estimated that nearly 80% of megaureters do not require intervention, as the problem subsides spontaneously. 15-20% of children with a megaureter require surgical treatment. Surgical treatment involves a resection of the distal, tapered section and transplantation of the ureter to a new location within the bladder triangle. The common goal of all those methods is to obtain a long, submucosal part of the ureter, as protection against vesico-ureteral reflux.
Key words: megaureter, children, hydronephrosis, renal failure, treatment

Streszczenie. U dzieci z zakażeniami układu moczowego coraz częściej wykonuje się badania ultrasonograficzne w celu wczesnego wykrycia wad układu moczowego. Do wad, których konsekwencją może być zastój moczu, należą między innymi moczowody olbrzymie. Większość autorów za moczowody olbrzymie uważa moczowody szersze niż 7 mm. Moczowody olbrzymie dzieli się w zależności od przyczyny na pierwotne i wtórne. Podejrzenie moczowodu olbrzymiego zobowiązuje do ustalenia przyczyny oraz zaplanowania leczenia zapobiegającego zakażeniom i postępującemu uszkodzeniu funkcji nerek. Podstawowym badaniem pozostaje ultrasonografia jamy brzusznej i układu moczowego. Kolejnym najczęściej wykonywanym badaniem jest cystografia mikcyjna. Badanie pozwala między innymi na rozpoznanie refluksu pęcherzowo-moczowodowego. Wskazane jest także wykonanie renoscyntygrafii, która pozwala na ocenę funkcji nerek oraz określenie stopnia zaburzeń odpływu moczu. Ocenia się, że blisko 80% moczowodów olbrzymich nie wymaga interwencji, gdyż problem ustępuje samoistnie. U 15-20% dzieci z moczowodem olbrzymim konieczne jest leczenie operacyjne. Polega ono na wycięciu dystalnego, zwężonego odcinka i przeszczepieniu moczowodu olbrzymiego w nowe miejsce w obrębie trójkąta moczowego. Wspólnym celem wszystkich sposobów reimplantacji jest uzyskanie długiego podśluzówkowego odcinka moczowodu, co ma zabezpieczyć przed odpływem pęcherzowo-moczowodowym.
Słowa kluczowe: moczowód olbrzymi, dzieci, wodonercze, niewydolność nerek, leczenie

Delivered: 27/02/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 411-415

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Introduction

In the past few years, the indications for radiologic diagnostics that enable the detection of urinary tract defects (urography, voiding cystourethrography) have been modified. Presently, in children with urinary tract infections (UTI) a preliminary ultrasound examination is typically recommended for early detection of defects causing urine retention. The tests are also used in the prenatal period. Abnormalities found later than in the prenatal period are often associated with typical symptoms: urinary tract infections and haematuria. Megaureters are among the disorders that may cause urine retention resulting in UTI [1].

A megaureter (MU), or enlarged ureter, refers to a ureter dilated above the normal range for a given age group. In normal conditions, the ureteral lumen is 3-5 mm wide. Megaureters in most cases are wider than 7 mm. This definition presents the anatomic condition, without considering the cause of ureteral enlargement. In 1977, an international classification was established regarding the nomenclature for megaureters. It involved the division

into three main categories, according to the aetiology, and subsequent classification into a primary or secondary megaureter (Fig. 1.). A megaureter is a symptom, not a diagnosis. A dilated ureter may develop as a consequence of an obstruction to urinary flow or a retrograde flow of urine, but it is also frequently found in an idiopathic form, without a palpable cause (non-obstructive and non-refluxive). A ureter can be dilated unilaterally or bilaterally. Diagnostic and therapeutic management is determined in terms of the cause of the symptom, and should be conducted in a specialised centre [2]. Prenatal diagnosis of a megaureter is difficult. The disorder is more often diagnosed in postnatal diagnostics performed due to pyelocalyceal dilation in pregnancy.

Megaureters are the second most frequent cause of foetal hydronephrosis observed in prenatal ultrasound examinations. Their estimated incidence is 1 in 10,000 births. The disorder is found four times more often in male neonates than in female. In approximately 20% of children with a megaureter the dilation is bilateral [3].

Aetiopathogenesis

The term megaureter itself is, as previously mentioned, a descriptive concept. Megaureters are classified according to their cause, and as primary or secondary. The classification of megaureters is presented in Figure 1. [4, 5].

Considering the aetiology, both primary and secondary megaureters can be further classified as obstructive, refluxive, obstructive-refluxive, non-obstructive or non-refluxive (Fig. 1).

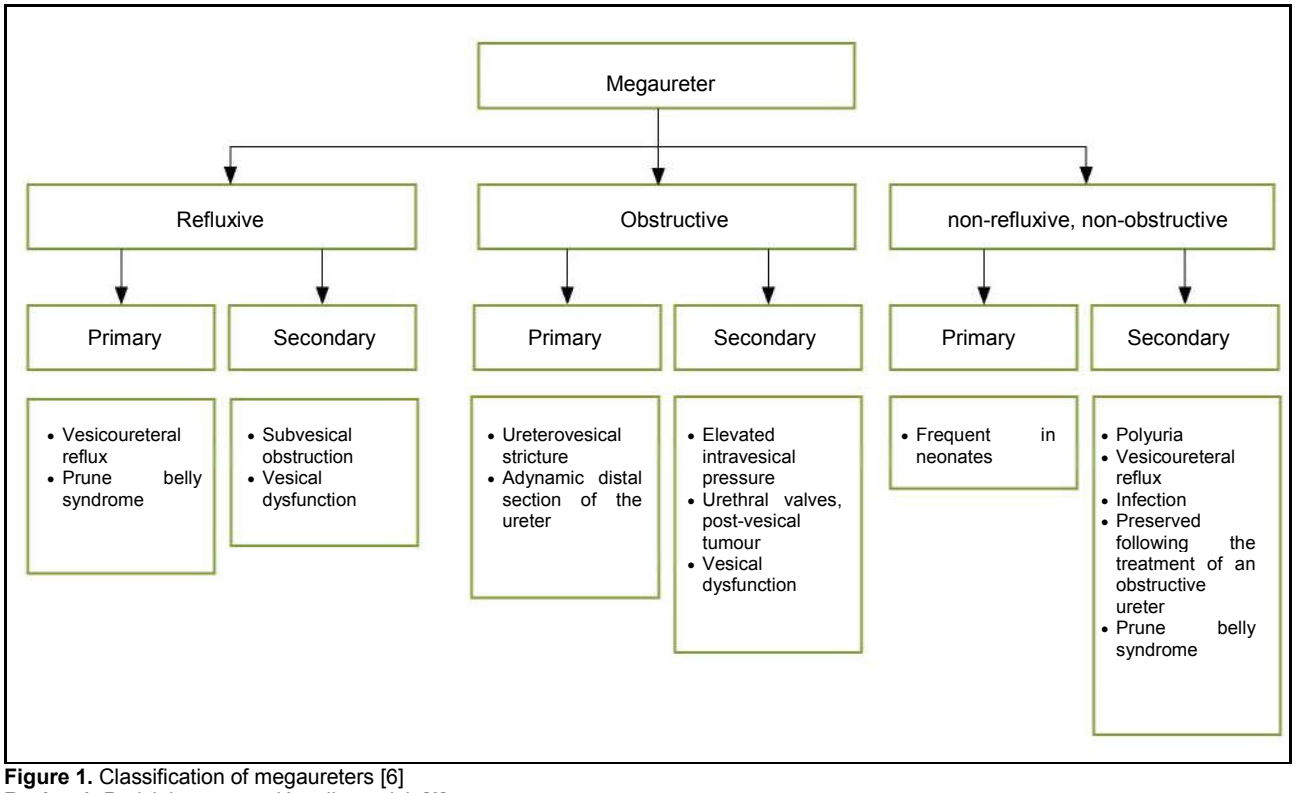

Figure 1. Classification of megaureters [6]
Rycina 1. Podział moczowodów olbrzymich [6]

Secondary, obstructive megaureters are associated with the presence of neurogenic vesicle and posterior urethral valves. Both pathologies produce increased intravesical pressure, which results in a secondary dilation of the upper urinary tract. A primary megaureter is characterised by a significant dilation of the ureter, lack of organic causes of the enlargement, absence of subvesical obstruction, presence of normal vesicoureteric junction, and normal patency of the intramural part of the ureter.

The aetiology of a megaureter is not clear. It is probably associated with an abnormal function of the intramural part of the ureter, and lack of efficient peristalsis of the supravesical ureter, due to its neuromuscular immaturity or remodelling of the ureteral wall (collagen elements substitute the contractile muscular tissue). This is overlapped by the following aspects: hyperactivity of the detrusor typical for neonates, incomplete voiding and high pressure in the urinary bladder, which contribute to a relative stasis and dilation of the upper urinary tract. Most of the presented factors are temporary, but in some cases the damage to the ureteral motor function is permanent. The line between an obstructive and non-obstructive megaureter is blurred and unclear, as reflected in the current classification of the disorder. Many deformities of the urinary tract demonstrate a spontaneous tendency to disappear along with the functional development of the ureter and the urinary bladder. It is believed that approximately 80% of megaureters unrelated to vesicoureteral reflux do not produce clinical symptoms, do not lead to progressive renal damage, and improve morphologically with time, thus surgical treatment is not required [4].

Megaureters are frequently associated with the ectopic position of their ostia. The most common locations of the ostia in such cases include bladder neck, urethra, vagina and epididymides. Ureteral ectopy is more often found in girls [4, 6, 7].

Diagnostics

If a megaureter is suspected, the cause needs to be established, and the treatment must be planned to prevent infections and progressive renal damage.

An ultrasound examination of the abdominal cavity and the urinary system is the basic test to be performed in the prenatal period. Widespread availability of ultrasonography is associated with increased detection of hydronephrosis. When the diagnosis of a megaureter is confirmed in a test performed after birth, further diagnostics of the neonate should be conducted, at a department of urology or paediatric nephrology. A urinary tract ultrasound is a simple, safe and non-invasive test that can provide important information about the size of the kidneys, as well as thickness, echogenicity and architecture of renal parenchyma. It also presents the renal pelvis and ureter, thickness of the urinary bladder wall, and shape of the urethra. In some cases it can even detect urethral obstruction [3, 6].

Diagnosis of a megaureter in a postnatal ultrasound examination performed in a child without dilated ureters in prenatal tests is also an indication for further diagnostics [7].

Another common test conducted if megaureters are suspected is voiding cystography. This study helps to diagnose vesicoureteral reflux. In the case of bilateral megaureters, it enables detection of the subvesical obstruction in all patients with hydronephrosis or a megaureter. Following confirmation or exclusion of a subvesical obstruction and retrograde vesicoureteral flow, an isotope study, renoscintigraphy, is also recommended. Renoscintigraphy helps to assess the renal function and to determine the degree of urinary flow disorder. An obstructed passage of the radiotracer is a typical image in a scintigraphic examination. According to British urologists, clinical and radiological signs that help to diagnose an obstructive megaureter include the results of dynamic renoscintigraphy, in which effective renal plasma flow (ERP) through a defective kidney is < 40%, or the value is reduced by over 5% in the follow-up studies. The obstructive nature of the disorder is also revealed if the ureter dilates progressively in subsequent ultrasound examinations [3, 8]. Urography is a less common diagnostic test. A classic urographic examination allows the assessment of the anatomy of the urinary tract. Due to the high exposure to radiation, and the common use of ultrasonography and scintigraphy, the popularity of classic urography in the routine diagnostics of megaureter is decreasing.

Computed tomography provides a detailed presentation of the renal structure and the pyelocalyceal system. However, without a contrast medium the study is less sensitive in presenting the urinary tract and bladder. It also exposes patients to higher radiation doses [9].

Treatment

As in nearly 80% of patients a ureter enlargement in the form of a megaureter resolves spontaneously, for the majority of patients initially a conservative system of

management is recommended, which consists in "watchful monitoring", and careful treatment of potential urinary tract infections. It should be noted that every patient with a megaureter treated conservatively requires long-term nephrologic and/or urologic care due to possible deterioration of the renal function in late childhood, or even in adulthood.

Approximately 15-20% of children with a megaureter need surgical treatment. Indications for operation of meaureters include increasing dilation of the ureters, impaired renal function (ERPF <40% in renoscintigraphic examination) or failure of the conservative treatment (recurring UTI, pain or deteriorating renal function in follow-up examinations).

The aim of surgical treatment of a megaureter is transplantation of the ureter, or narrowing its lumen. It is established that radical treatment of a megaureter should be performed in children over 1 year old, whose body weight is >10 kg. If surgical therapy is indicated in a patient under 1 year old, the first phase of the treatment involves the creation of a uretero-cutaneous fistula, or installation of a double J catheter in the renal pelvis, with the other end in the urinary bladder. Such management is dictated by the disproportion between the width of the megaureter and the urinary bladder capacity in young children under 1 year old. The disproportion prevents the formation of a normal anti-reflux system. In the urinary bladder of an infant, detrusor generates much higher pressure than in older children, which can lead to vesicoureteral reflux. The upper urinary tract demonstrates a limited ability to force urine into the high-pressure bladder. Incomplete voiding, typical for this age, additionally contributes to urinary tract infections. Producing a uretero-cutaneous fistula effectively improves urine flow from the renal pelvis, especially important in children with signs of chronic kidney disease. Technical modifications of the types of uretero-cutaneous fistulas are intended to transport part of the urine to the bladder, to maintain its function and ensure its normal development. This is particularly important in the case of unilateral fistulas, or in the presence of a single kidney.

Each patient with a megaureter should receive a cystoscopic examination before the final decision concerning surgical treatment. This test allows urethral defects (posterior urethral valve) to be excluded, and to assess the location of ureteral ostia, and the anatomy of the urinary bladder triangle.

Surgical treatment consists of the excision of the distal, narrowed section, and transplantation of the megaureter to a new site within the urinary triangle. The choice of surgical technique is determined by the anatomy (bladder capacity and the degree of dilation of the ureter). The most common methods include a Politano-Leadbetter, Paquin or Cohen operation. The common goal of all these reimplantation methods is to obtain a long, submucosal part of the ureter, to prevent vesicoureteral reflux.

The treatment results depend on the cause of the ureteral enlargement, age of the child and the method used. In therapies of secondary megaureters resulting from a valve bladder or neurogenic or non-neurogenic bladder dysfunction, the prognosis is uncertain. These patients require careful observation, urodynamic diagnostics, and supportive pharmacotherapy in order to reduce the tension of the sphincter and to lower the pressure in the bladder. In some cases medicines increasing the contractility of the detrusor are required [4, 6, 8].

Summary

Currently it is believed that approximately 80% of megaureters unrelated to vesicoureteral reflux do not produce clinical symptoms, do not lead to progressive renal damage, improve morphologically with time, and do not require surgical treatment.

Ultrasonographic examination of the urinary tract plays a major role in the diagnosis and monitoring of the symptoms. Every child with a positive family history or suspicious symptoms regarding the urinary tract should receive an ultrasonographic examination, and basic imaging tests of the urinary system. It allows the degree of dilation of the ureters to be determined, and to continue monitoring of the patient, to maintain conservative therapy or, if necessary, to refer the patient directly for surgical treatment.

Currently, in the majority of patients conservative treatment is introduced initially. It should be noted that each patient with a megaureter treated conservatively requires long-term nephrologic and/or urologic care due to possible deterioration of the renal function in late childhood, or even in adulthood.

Literature

1. Jung A, Zuber J, Perdzyński W. Wady układu moczowego stwarzające warunki do rozwoju i nawrotu zakażeń układu moczowego u dzieci. Zakażenia układu moczowego u dzieci. [Defects of the urinary tract contributing to development and recurrence of urinary tract infections in children. Urinary tract infections in children] Medpress, Warsaw 1999:45
2. Hodges SJ, Werle D, McLorie G, et al. Megaureter. Department of Urology, Wake Forest University School of Medicine, Winston-Salem, North Carolina. Received December 31, 2009; March 4, 2010;

Published April 13, 2010
3. Tkaczyk M, Adamczyk P, Brzewski M, et al. Postępowanie z noworodkiem i niemowlęciem z prenatalnym podejrzeniem wady wrodzonej układu moczowego. Zalecenia Polskiego Towarzystwa Nefrologii Dziecięcej 2010 [Management of neonates and infants with prenatal suspicion of congenital defect of the urinary tract. Recommendations of the Polish Society of Paediatric Nephrology 2010]
4. www.marekgorniak.pl/moczowody-olbrzymie
5. Campbell MF, Kavoussi LR, Partin A, et al. Anomalies of the upper urinary tract. Congenital urinary obstruction: pathophysiology. In: Campbell MF, Wein AJ, Voussi LR, (eds.) Campbell-Walsh urology. Vol. 1. Saunders 2007: 2975-3043
6. www.e-Urologia.pl/Moczowody olbrzymie
7. Tkaczyk M, Czarniak P, Gastoł P, et al. on behalf of the working group of the Polish Society of Paediatric Nephrology. Diagnostyka postnatalna wad układu moczowego wykrytych w okresie prenatalnym. Część 1. Wady z poszerzeniem dróg moczowych. [Postnatal diagnostics of the defects of the urinary tract detected in the prenatal period. Part 1. Defects involving ureteral dilation] Pediatr Med Rodz, 2010; 6 (2): 118-124
8. Bagłaj M, Sitnik J. Postępy w urologii dziecięcej w 2014 roku. [Advances in paediatric urology in 2014] Med Care, 2015; 6 (102): 29
9. Litwin M. Zakażenia układu moczowego u dzieci. [Urinary tract infections in children] Medical Tribune, Warsaw 2012:59-61

In the shadow of Operation Kutschera – traces of great history in the small town of Sobótka

W cieniu akcji na Kutscherę – ślad wielkiej historii w małym miasteczku Sobótka

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Abstract. Sobótka is a small town in the Lower Silesian Voivodship, at the foot of Ślęża mountain. Until 1945 it lay within Germany, and was known as Zobten. After World War II all of Lower Silesia become a part of Poland, including Sobótka. The new inhabitants were Poles from different parts of the country. The doctor who organized the Polish health service there was Wacław Żebrowski (1894-1946), a physician and officer of the Polish Army, head of the surgical ward of the 1st Regional Hospital in Warsaw, who participated in providing medical aid to soldiers of the Polish underground during the famous Operation Kutschera in 1944. He was born in Lgow, on 6 June 1894. His parents were Władysław and Maria, nee Gonturb. He began his medical studies at the Faculty of Medicine of the University of Kiev, which he continued at the University of Warsaw, with his final examinations passed at Stefan Batory University in Vilnius. In 1920 he joined the Polish Army, and during the war with Russia he served in the Military Hospital in Zamość. In the 1930s, he worked at the 1st Regional Hospital in Warsaw, where in 1936 he became the head of the surgical ward. During the German occupation Żebrowski worked as a physician at the Maltese Hospital. In February 1944, he took part in providing medical aid to soldiers of the Polish underground injured during the famous Operation Kutschera. During the Warsaw Uprising in 1944 he was a surgeon, and worked at the hospital until the end of the uprising. After World War II he settled in Sobótka, a small town near Wroclaw, where he participated in establishing Polish health services. Captain Wacław Żebrowski MD died in Sobótka on 29 November 1946.
Key words: Kutschera, military physician. Sobótka, Maltese Hospital, Wacław Żebrowski

Streszczenie. Sobótka to małe miasteczko w województwie dolnośląskim, u podnóża góry Ślęży. Do 1945 roku było częścią Niemiec jako Zobten. Po II wojnie światowej Dolny Śląsk stał się częścią Polski, w tym Sobótka (dawne Zobten). Nowymi mieszkańcami miasta zostali Polacy z różnych stron kraju. Lekarzem, który organizował tam polską służbę zdrowia, był Wacław Żebrowski (1894-1946), lekarz i oficer Wojska Polskiego, szef oddziału chirurgicznego 1. Szpitala Okręgowego w Warszawie, uczestniczył w ratowaniu żołnierzy polskiego podziemia rannych podczas słynnej akcji na Kutscherę w 1944 roku. Urodził się 6 czerwca 1894 roku w miejscowości Lgow, jego rodzicami byli Władysław i Maria z domu Gonturb. Studia medyczne rozpoczął na Wydziale Lekarskim Uniwersytetu w Kijowie, które kontynuował na Uniwersytecie Warszawskim, zaś egzaminy końcowe złożył na Uniwersytecie Stefana Batorego w Wilnie. Do Wojska Polskiego wstąpił w 1920 roku, podczas wojny z Rosją służył w Szpitalu Wojskowym w Zamościu. W latach 30. XX wieku pracował w 1. Szpitalu Okręgowym w Warszawie, gdzie w 1936 roku został szefem chirurgii. W okresie niemieckiej okupacji pracował jako lekarz w Szpitalu Maltańskim. W lutym 1944 roku brał udział w ratowaniu żołnierzy polskiego podziemia rannych podczas słynnej akcji na Kutscherę. W czasie powstania warszawskiego w 1944 roku był chirurgiem, ze swoim szpitalem przebył cały szlak bojowy. Po zakończeniu II wojny światowej znalazł się w Sobótce, miasteczku opodal Wrocławia, gdzie uczestniczył w tworzeniu polskiej służby zdrowia. Zmarł 29 listopada 1946 roku w Sobótce.
Słowa kluczowe: Kutschera, military physician. Sobótka, Szpital Maltański, Wacław Żebrowski

Delivered: 10/05/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 416-422

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Introduction

One of the most renowned and most daring operations of the Polish underground under German occupation was the execution of Franz Kutschera, a German war criminal, the SS-Brigadeführer, SS and Police Leader in German-occupied Warsaw. Although the names and noms de guerre of the direct participants of this special operation are quite celebrated, few people do justice to the Kedyw medical service and the medical staff who were essential for the wounded soldiers to survive. One of the silent heroes was Captain Wacław Żebrowski MD. His captivating story and his role in providing medical aid to soldiers of the Polish underground during the famous Operation Kutschera is certainly worth remembering.

Early life, education and military service

Wacław Żebrowski was born to Władysław and Maria, nee Gonturb, on 6 June 1894, although in some sources it is 19 or 16 June. His place of birth was the town of Lgow in the Kursk Governorate of the Russian Empire. He attended an 8-grade philological secondary school and passed his final exams in 1913. Then he moved on to study at the Faculty of Medicine at the Saint Vladimir Royal University of Kiev, but only managed to take 6 semesters before the interruption of World War I. He was drafted on 6 June 1916, and began his military service in the surgical ward of the 5th Military Hospital in Kiev. Until 15 January 1918, his tasks involved nursing wounded Russian soldiers [1]. For thousands of Poles, the October Revolution and the toppling of the tsardom meant an opportunity to be released from a foreign army. All the political shifts in Europe created a window of opportunity to regain independence. A young patriot and a student, Żebrowski sought to contact Polish organisations. Between 20 January and 1 August 1919, he worked in the Epidemic Hospital for repatriates located at the Kiev I freight station. It should be noted that it was a time of many infectious disease epidemics sweeping the area of Russia and Kresy Wschodnie (Eastern Borderlands) of the former Second Polish Republic. Typhus fever, typhoid, cholera, Spanish flu, dysentery, and tuberculosis obliterated hundreds of thousands of people. The objective of the hospitals was not merely to treat the ill, they also formed part of a sanitary cordon to protect the hinterland from the spread of infection. Working in such a place was an extremely difficult challenge, requiring enormous sacrifice.

Figure 1. Wacław Żebrowski (1894-1946), 1920s (courtesy of the Central Military Archives: AP-2835)
Rycina 1. Wacław Żebrowski (1894-1946), lata 20. XX wieku (dzięki uprzejmości Centralnego Archiwum Wojskowego: AP-2835)

There was a lack of any medicines effective enough to cure the diseases, with medical personnel also falling victim to the epidemics. Hundreds of doctors, medical students and nurses died on duty while providing help to those suffering. Those who took the risk of working with full awareness in such circumstances should be properly appreciated. For students of medicine, there was ample opportunity of working practice and of developing professional ethics in line with the Hippocratic Oath [1-3].

On 28 May 1920, at the point of escalation in military confrontations and the Bolshevik invasion of Poland, Żebrowski joined the Polish Army as a one-year volunteer. He was a doctor's assistant with the rank of officer cadet and junior doctor in the surgical ward of the Military Hospital in Zamość. His direct superior was the senior head of the ward, Lt. Prof. Romuald Węgłowski (1876-1935), an excellent operating surgeon and one of the founding fathers of vascular surgery in Poland. Under his supervision, the young apprentice was able to broaden his medical knowledge and gain the experience necessary for future work as a doctor. At the beginning of August 1920, the situation on the front was critical, with the arrival of Budyonny's Cavalry Army forcing the evacuation of the hospital in Zamość to Bydgoszcz for a few weeks. Only after the victory at the Battle of

Warsaw and the success of Operation Niemen (Battle of the Niemen River) did Poland regain control over its previously lost territories. Many medical facilities, including the Military Hospital in Zamość, could then return to their original locations. During the greatest escalation of military operations, between 300 and 1200 patients were treated in the field hospital. These numbers hint at the efforts of the entire medical personnel, which were necessary to properly nurse the sick and wounded. Officer Cadet Żebrowski worked in the Military Hospital in Zamość until 22 March 1921. His attitude was highly appreciated by his superiors. In his evaluation report of 24 January 1921, the commander of the hospital, Lt. Władysław Kafel MD (1873-1950), stated that Żebrowski was "of a remarkably just and open nature (...) was particularly meticulous, untiring and diligent as a junior doctor. He proves very useful in the surgical ward. Definitely deserves designation to the office of second-lieutenant junior doctor" [1, 4]. Upon leaving Zamość on 24 March 1921, he was appointed doctor to the 2nd squadron of the 2nd Regiment of Mounted Fusiliers, to be moved later to the 1st squadron of the 9th Regiment of Mounted Fusiliers of the Second Army.

There Żebrowski also earned the respect of his superior, hence the nomination for second-lieutenant on 24 September 1921. The motion was issued by the Sanitary Chief of the Second Army, Major Władysław Biernacki MD, who described Żebrowski as "Hard-working and thorough, motivated to fill the gaps in his knowledge. Disciplined and ethical..." On 27 December 1921 he was promoted to the rank of first officer.

This coincided with disarmament and a troop reduction, which meant fewer tasks for the military cadre. The Sanitary Department of the Ministry of Military Affairs requested all medical students of the rank of junior doctor to return to university in order to complete their education and obtain full professional qualifications. On 17 February 1922, Second-Lieutenant Junior Doctor Wacław Żebrowski was assigned to the Faculty of Medicine at the Warsaw University. The 6 terms and the preliminary Medical Exam that he passed at the Saint Vladimir Royal University in Kiev were acknowledged. During their vacation periods, military students took additional military training and were officially allocated, but their duties in terms of daily participation in class were the same as their civilian colleagues'.

Between 1 July and 31 August 1922, Żebrowski acted as junior doctor at the surgical ward of the 1st Regional Hospital in Warsaw. Then he was assigned to the 85th Infantry Regiment in Nowa Wilejka at the same rank, but simultaneously he was sent back to continue his studies at Warsaw University. During the summer of 1923 (12 July – 6 September) he took part in a specialist training course based on the 1st Sanitary Battalion, and on 17 November 1923 he was promoted to the rank of lieutenant. He used his vacation period in 1924 (12 July – 6 September) to take a sanitary course in the Military Sanitary School in Warsaw. After three years of hard work at the Faculty of Medicine of the Warsaw University, Lieutenant Junior Doctor Wacław Żebrowski completed his studies and on 12 January 1926 he returned to the 85th Infantry Regiment. In July 1926, he was temporarily appointed junior head of the surgical ward of the Hospital of the Fortified Area of Vilnius. He used his time in that picturesque region to take and pass all the necessary exams at the Faculty of Medicine of the Stephen Bathory University. On 17 October 1928, he received the Doctor of General Medicine diploma, still to be seen – beautifully adorned and signed by Prof. Kornel Michejda (1887-1960) [1].

Żebrowski left Vilnius on 9 September 1931 and was never to return. He assumed the position of the head of the surgical ward at the 8th Regional Hospital in Toruń, under Colonel Tadeusz Sokołowski MD (1887-1965), one of the best military surgeons of that time. It was a splendid opportunity to extend his knowledge and skills as a surgeon. Highly regarded by his superiors for his engagement and intellectual growth, he was promoted to the rank of captain on 1st January 1932. After two years, he was appointed junior head of the surgical ward of the 1st Józef Piłsudski Regional Hospital in Warsaw at 6 Sierpnia Street, probably because Colonel Tadeusz Sokołowski MD became the head surgeon there. In close collaboration with that first-class operating surgeon, Żebrowski was able to acquire profound knowledge and abilities, in particular in the field of trauma surgery.

In May 1936, he assumed the position of senior head of the 2nd Surgical Ward of the Regional Hospital. This crowned his career as a physician and a professional officer of the Polish Army [1, 5]. Captain Wacław Żebrowski MD also gained the respect of the commander of the hospital, Colonel Bogumił Łada MD (1889-1942), an excellent officer and medic, who served in the North-Eastern Borderlands himself for several years. On 28 October 1938, in the evaluation report regarding Żebrowski, Łada wrote that he was "of a just nature, with positive features, a gentle disposition and great ambition. Very dutiful, resolute and zealous in his care of patients..." These words reflect the truth about this military surgeon, a modest officer who never dreamed of a glittering career, but made his name as a devoted and fair co-worker and doctor.

Figure 2. Former Maltese Hospital in Warsaw, 2017 (photo Zbigniew Kopociński)
Rycina 2. Dawny Szpital Maltański w Warszawie, 2017 r. (fot. Zbigniew Kopociński)

While at the peak of his professional development, with an executive position at one of the best military hospitals in Poland of the time, World War II broke out, shattering all his plans and dreams. Żebrowski took part in the defensive war together with his entire hospital. The Third Reich and the USSR mounted an attack of such a gigantically disproportionate power to that of the Polish forces that it was unfortunately impossible to withstand. After over a month of heroic battles, Poland was divided into two zones under German and Soviet occupation, which erased the country from the map of Europe for another 6 years [1, 6].

Under German occupation

During the German occupation, Wacław Żebrowski was no longer able to work at the 1st Regional Hospital, as it was seized by the invader for its purposes. Żebrowski then moved on to cooperate with an institution with a particularly interesting history, which was the Maltese Hospital. It was the fourth facility created by the Polish Knights of Malta, after three other hospitals which had begun operating in the inter-war period, in Rychtal, Rybnik and Ołyka. The hospital was established in Warsaw upon the start of German aggression against Poland, on 7th September 1939, in the building formerly occupied by the Merchant Social Club, at 40 Senatorska Street. The commander of the crowd-funded facility was Stanisław Milewski-Lipkowski, while Roman Chłapowski took the function of his deputy. An outstanding ophthalmologist, Prof. Julian Szymański, replaced Colonel Adam Huszcza MD on 20 September as the chief doctor. During the siege of the capital, the scarce staff of the hospital tried to provide all inhabitants of Warsaw with aid [7, 8]. Between October 1939 and April 1940, after the city was captured by German forces, the Maltese Hospital had military reserve status, to later become subordinated to the Polish Red Cross in respect of organisation and budget. On 1 April 1940, the position of chief doctor was assumed by Captain Jerzy Dreyza MD, who tried his best to manage the facility and acquire good physicians, mostly military physicians.

Captain Wacław Żebrowski MD was one of these. He took the position of head of the surgery ward. In autumn 1941, the profile of the hospital was changed to a trauma hospital for civilians. At the same time, it served as a part of the sanitary service of the passive air protection service (Luftschutz Hilfdienst). As a trauma centre, the hospital proved extremely useful for the Polish underground, by helping wounded conspirators. It cooperated closely with Major Cyprian Sadowski MD, "Skiba", the Sanitary Chief of Kedyw, the Directorate for Subversion of the Home Army Headquarters. He, in turn, had regular contact with Captain Dreyza MD. By the time of the Warsaw Uprising, the Maltese Hospital had helped over 500 wounded underground soldiers. Most of them were treated by Żebrowski and his surgeons [8, 9].

Operation Kutschera

On 1 February 1944, Franz Kutschera, the SS-Brigadeführer, SS and Police Leader in German occupied Warsaw was executed in a special action by the "Pegaz" combat-sabotage unit, which was a codename of a unit later known as Battalion Parasol. The action was led by Bronisław Pietraszewicz "Lot", while the other active participants included: Elżbieta Dziębowska "Dewajtis", Zbigniew Gęsicki "Juno", Bronisław Hellwig "Bruno", Henryk Humięcki "Olbrzym", Stanisław Huskowski "Ali", Michał Issajewicz "Miś", Zygmunt Poradzki "Kruszynka", Marian Senger "Cichy", Kazimierz Sott "Sokół", Maria Stypułkowska "Kama" and Anna Szarzyńska-Rewska "Hanka". The decision to execute the German war criminal was reached in November 1943 by the Directorate of Underground Resistance and entrusted to Kedyw. Colonel Emil Fieldorf "Nil" assigned this task to a special unit named "Pegaz" under the command of Captain Adam Borys "Pług", a member of the Cichociemni ("Silent Unseen"). Major C. Sadowski "Skiba" was responsible for securing Operation Kutschera in respect of medical aid. He designated Zbigniew Dworak "Dr. Maks", a medic of the unit and a former professional officer cadet at the Medical Officer Cadet School, to actively participate in the operation. At the same time he was able to reach Captain Dreyza MD through his messenger, Stanisława Kwaskowska "Pani Stasia", and arrange for any wounded participants of the operation to be admitted to the Maltese Hospital.

On 1 February 1944, about 9:10 a.m. in front of the SS and the Police headquarters (23 Aleje Ujazdowskie), the Home Army soldiers assassinated

the infamous Warsaw executioner [7, 10, 11].

Figure 3. Warsaw, Ujazdowskie Avenue 23, site of Operation Kutschera, 2017 (photo Zbigniew Kopociński)
Rycina 3. Warszawa, Aleje Ujazdowskie 23, miejsce akcji na Kutscherę, 2017 r. (fot. Zbigniew Kopociński)

As a result of the operation, four conspirators were wounded, and two of them were gravely injured. In accordance with prior arrangements, "Dr. Maks" was waiting in Bank Square, in front of the "Melodia" restaurant. A car with the wounded on board, heavily damaged by bullets and now without windows, arrived and the unit doctor immediately realised what had happened: both "Cichy" and "Lot" had suffered gunshot wounds to the abdominal cavity, whereas "Olbrzym" had been shot in the chest and "Miś" suffered a head graze. The doctor's decision was to drive to the Maltese Hospital, where a nurse was supposed to await them in the hall. Due to unforeseen circumstances, however, they experienced a major setback, as the head surgeon and the physician who was the most experienced in treating traumas, i.e. Captain Wacław Żebrowski MD, was absent at that time, rending aid in the sanitary point for air protection. Captain Dreyza MD was also away on other business. The doctor on duty would not admit the wounded without the consent of the head surgeon, claiming there was not enough sterilised surgical material. Despite the lack of the absent head surgeon's approval, Zbigniew Dworak decided to keep the two soldiers with slighter wounds in the hospital ("Miś" and "Olbrzym"). While the patients were being transferred, Wacław Żebrowski appeared at the emergency room. The doctor of the "Pegaz" unit briefly explained the situation to him. The head surgeon catered to the wounded and ordered Captain Stanisław Gierałtowski MD to apply a dressing to the head of "Miś". After the bullet graze to the head was diagnosed and no damage to skull bone was identified, he was provided with surgical materials and sent home. "Olbrzym", who was shot in the chest, was admitted to the hospital, although no surgery was actually required. Thanks to the tender professional care of Wacław Żebrowski MD and his personnel, this brave soldier managed to recover and eventually participated in the Warsaw Uprising. The other two participants of the operation, unfortunately, suffered heavy injuries which required complex surgery performed by a team of experienced surgeons. This was not possible at that time in the Maltese Hospital [10-13]. They were both later transferred to the Transfiguration Hospital, to be operated on under the leadership of Mieczysław Świniarski MD. The occupation authorities were sure that the soldiers who participated in the operation were wounded, so they penetrated the hospitals in Warsaw in search of them. There was a possibility that "Lot" and "Cichy" could be turned in to Gestapo since they were under the supervision of the Blue Police, who learned of the transfer. Captain A. Borys decided the patients should be recaptured from the Transfiguration Hospital. Despite their critical condition, "Lot" was transferred to the Wolski Hospital and "Cichy" was transferred back to the Maltese Hospital, where Captain Żebrowski MD took care of him. In spite of the heroic efforts of the doctors, these brave soldiers could not be saved. Bronisław Pietraszewicz "Lot" died on 4 February 1944, and Marian Senger "Cichy" died two days later. His death certificate was signed by Wacław Żebrowski, the head surgeon of the Maltese Hospital. In their search for the participants of Operation Kutschera, the Gestapo arrested the doctors of the Wolski Hospital who helped "Lot". Wacław Żebrowski MD was summoned to the Gestapo Headquarters in Szucha Avenue as well. The efforts of the Polish underground, who gave large bribes to corrupt Gestapo officers, allowed the doctors to be released. Captain Borys, the leader of "Pegaz", assessed the medical coverage of the Operation as insufficient.

It was extremely difficult to organise the action underground and admit large numbers of wounded patients to the hospital in secrecy. The risk of treason was remarkably high and the life of the medical personnel was in danger. The operation was carried out nevertheless, which puts Captain Wacław Żebrowski and his co-workers in a good light. Interestingly enough, the majority of the medics who participated in the operation were professional military physicians or officer cadets of the Medical Officer Cadet School, the core of the Kedyw sanitary points. The multiple transfers of patients was unfortunately a mistake, which is why fully equipped underground sanitary points were later introduced for such purposes, where trusted doctors could visit to perform surgeries [7].

Warsaw Uprising

At the moment when the uprising broke out, at 5:00 p.m. on 1 August 1944, Wacław Żebrowski was on duty in the Maltese Hospital after Dreyza had

introduced a state of instant readiness. When the uprising battles began, there were German soldiers on the premises of the hospital. They had evacuated nearby depots at 36 Senatorska St. Wounded German soldiers were admitted to the surgical ward, where they were treated by Żebrowski and his team. On the second day of the Uprising, the hospital was captured by the insurgents and became one of the main field hospitals in the Old Town. It had 300 beds and all the necessary medicines and food. What was of particular importance was that the operating room was located in the shelter, which provided safety and enabled the doctors to perform surgeries during air-raids and while under fire. After Wola fell, it was extremely difficult for the hospitals to handle all the crowds of wounded escapees who flooded the Old Town from 4 August. The surgical team led by Żebrowski worked in the operating room around the clock. Almost all hospital beds were taken. Among the patients were approximately 20 Germans as well. Captain Dreyza MD was the commander of the hospital at that time. Beside the head surgeon, the team of doctors also included Captain Stanisław Gierałtowski, Major Szczepan Wacek, Lieutenant Władysław Arciszewski and Major Cyryl Jan Mockałło.

Between 7 and 14 August, the hospital found itself directly on the front line. A Panther tank (Panzerkampfwagen V Panther) drove into the square in front of the main entrance and attacked the building with a machine gun and its main gun. On 14 August, the infamous Dirlewanger entered the facility. SS Obersturmführer Lagana (or Lagna) gave the order to evacuate the hospital immediately. The Sanitary Chief of the Home Army Headquarters, Colonel Leon Strehl "Feliks", who was there at that time, began the evacuation together with a group of his most trusted doctors, including Żebrowski. There were not enough stretchers, so most of the patients were transported on makeshift measures, such as doors, window frames, or canvas slings. Thanks to his fluent command of German and tremendous confidence, Colonel Strehl managed to move the entire hospital through the Ogród Saski Park, to the area controlled by the insurgents. For this feat, he was later dubbed "Moses". This safe evacuation of patients was possible thanks to the entire medical staff. The head of the surgical ward, Captain Wacław Żebrowski MD, played a great role in it [9, 14].

The local hospitals in the borough of Śródmieście accommodated all the wounded. Most of the personnel of the Maltese Hospital, including Żebrowski, were relocated to the hospital at 17 Śniadeckich Street ("Przyszłość" secondary school). This facility, under the command of Major Stefan Tarnawski "Tarło", was established on 3 August, upon seizing a fully-equipped German Feldlazarett (without the patients). There were 200 hospital beds ready for use. The Maltese Hospital staff formed a considerable element of the hospital.

Figure 4. Inscription on Wacław Żebrowski's gravestone, Sobótka, 2015 (photo Zbigniew Kopociński)
Rycina 4. Inskrypcja na grobie Wacława Żebrowskiego, Sobótka, 2015 (fot. Zbigniew Kopociński)

Apart from the commander, there were four other medics in the doctor's team: Captain Wacław Żebrowski MD, Captain Stanisław Gierałtowski MD, Michał Grobelski MD and Major Władysław Kondratowicz MD.

Following the capitulation, the entire facility, together with Żebrowski, was evacuated to the factory building of the "Tudor" Accumulator Plant in Piastów as a civilian hospital subordinate to the Polish Red Cross. In March 1945, the hospital was moved to Częstochowa and continued to operate as the Malta Hospital of the Polish Red Cross, an auxiliary garrison hospital [8, 14].

After the war

The war inflicted severe physical and psychological damage on Wacław Żebrowski. The general condition of the former military physician suffered greatly in the course of his dire experience during the defensive war in 1939, the occupation with all its misfortunes, the Gestapo interrogation concerning Operation Kutschera and the aid he provided to numerous wounded conspirators, as well as the Warsaw Uprising, which cost him his son, Edward. In 1946, together with his wife, Maria Żebrowska, née Hornowska, he found himself in the Recovered Territories, and namely in the town of Sobótka (previously Zobten) in the shadow of Mount Ślęża, near Wrocław. Faithful to his vocation, he contributed to the creation of the Polish healthcare service in those dreadful post-war conditions by assuming work in a local hospital left by the Germans. His weakened organism, unfortunately, could not handle such a burden, and he died suddenly of circulatory-respiratory failure on 29 November 1946.

Three days later, he was buried in the municipal cemetery in Sobótka, in Sector 4, Row 11, Tomb 4. The inscription on his tombstone reads: "Here lies the late Dr. Wacław Żebrowski, Director of the Municipal Hospital in Sobótka. Born 6/6/1894, died 29/11/1946. Rest in peace" An officer of the Polish Army and a distinguished surgeon, defender of the motherland in the wars of 1920 and 1939, a soldier of the Home Army and a participant of the Warsaw Uprising, medical provider during Operation Kutschera and the notable evacuation of the Maltese Hospital to Śródmieście. He never sought prestige or accolades. During his service, the only medal he was presented with was the 10th Anniversary of Independence medal. Always faithful to the Hippocratic Oath, he risked his life and health for the sake of his patients many a time. His name remained almost forgotten for a long time. It was only in 2011 that the City Council of Sobótka honoured him posthumously with the title of the honorary citizen of Sobótka with the Act No. IX/73/11 of 28 June, as a symbol of respect for his noble deeds for the homeland and the society of Sobótka [1, 15].

Literature

1. Central Military Archive (CAW) in Warsaw: AP-4617, AP-2835
2. Jeśman Cz. Choroby zakaźne w Wojsku Polskim w latach 1918-1939 jako zagadnienie epidemiologiczne i profilaktyczno-lecznicze [Infectious diseases in the Polish Army in the years 1918-1939 as an epidemiological, prophylactic and medicinal issue] Habilitation thesis. Łódź 1997: 245-250
3. Felchner A. Stan zdrowia żołnierzy Wojska Polskiego w 1920 r. [Physical condition of the Polish Army soldiers in 1920] AHiFM, 1993; 56 (4): 344-347
4. Durakiewicz M. Zamojski okres działalności profesora Romualda Węgłowskiego [Professional work of Prof. Romuald Węgłoski in Zamość] www.journals.viamedica.pl/acta _angiologica/article/ viewFile/9939/8507 (access: 25.04.2017)
5. Felchner A. Pod znakiem Eskulapa i Marsa. Służba zdrowia Wojska Polskiego (od jesieni 1918 r. do mobilizacji w 1939 r.) [Under Aesculapius and Mars. The health care of the Polish Army (from the autumn 1918 until the mobilisation in 1939)] Oświęcim 2016: 246
6. Kopociński Z. 115. rocznica urodzin płk. Bogumiła Łady [The 115th anniversary of Col. Bogumił Łada] Mil. Phys., 2004; 80 (4): 286-287
7. Stachiewicz P. Parasol. Dzieje oddziału do zadań specjalnych Kierownictwa Dywersji Komendy Głównej Armii Krajowej [Parasol. The story of the special unit of the Directorate for Subversion of the Home Army Headquarters] Instytut Wydawniczy PAX, Warszawa 1984: 319-333, 336-337, 346-347, 353
8. Chaciński A. Szpital Maltański w okupowanej Warszawie [The Maltese Hospital in occupied Warsaw] Przegl Lek, 1975; 1: 143-148
9. Urbanek B. Pielęgniarki i sanitariuszki w powstaniu warszawskim w 1944 r. [Nurses in the Warsaw uprising in 1944], PWN, Warsaw, 1988:45,146
10. Sadowski C. Pamiętnik doktora „Skiby" [The Diary of Dr. "Skiba"] Wydawnictwo MON, Warszawa 1990:117-121
11. Marcinkowski T. Zbigniew Dworak- Dr Maks (1917-1963). AHiFM, 1988; 51 (2): 235-236
12. Kunicki A. Cichy front [The Silent Front] Oficyna Wydawnicza Mireki, Warszawa-Kraków 2015: 160-176
13. Dworak Z. Wspomnienia lekarza z zamachu na Kutscherę [A doctor's memories from the attempt on the life of Kutschera] Służba Zdrowia, 1958; 5: 3
14. Bayer S. Służba zdrowia Warszawy w walce z okupantem 1939-1945 [Warsaw's health service against the occupier in 1939-1945.] Wydawnictwo MON, Warszawa 1985: 115-118, 288
15. Archiwum Parafii pw. św. Jakuba w Sobótce: Księga zgonów 1946 [Death register of 1946 from the archive of the St James Parish in Sobótka]

All-year Officers' Holiday Homes of the Ministry of Military Affairs during the interwar period remaining within the borders of contemporary Poland

Całoroczne Oficerskie Domy Wypoczynkowe Ministerstwa Spraw Wojskowych okresu międzywojennego pozostające w granicach współczesnej Polski

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Summary. The Foundation of Officers' Holiday Homes was established in 1928. Besides the seasonal officers' homes the foundation also organized year-round centres of very high standards. As early as in 1929 the foundation purchased a four-storey villa called “Felicja” in Krynica. In 1932, a splendid complex was constructed in Rabka, and another, luxurious at that time, building was constructed in 1934 in Truskawiec. A year later, a modern OHH building was opened in Augustów. The last year-round use OHH was established by the foundation in 1938, in Żabie, in the building of the Hutsul Museum. These were “monumental” constructions, commemorating anniversaries of the existence of the Polish state. Some of the buildings still exist, although with changed uses. Some, like those in Truskawiec or Żabie, are nowadays located within the territories of Lithuania and Ukraine.
Keywords: foundation, tourism. Officers' Holiday Homes, tourism

Streszczenie. W roku 1928 powstała Fundacja Oficerskich Domów Wypoczynkowych (FODW). Oprócz sezonowych oficerskich domów wypoczynkowych organizowała również całoroczne ośrodki o bardzo wysokim standardzie użytkowym. Już w 1929 roku fundacja kupiła czterokondygnacyjną willę „Felicję” w Krynicy. W roku 1932 wzniosła okazały kompleks w Rabce. Kolejny luksusowy na owe czasy gmach wzniesiono w roku 1934 w Truskawcu. Rok później otwarto nowoczesny budynek ODW w Augustowie. Ostatni całoroczny ODW fundacja urządziła w 1938 roku w Żabiem w gmachu Muzeum Huculskiego. Były to „pomnikowe” realizacje, upamiętniające jubileusze istnienia państwa polskiego. Część z tych obiektów-przy zmienionych funkcjach-istnieje po dzień dzisiejszy. Niektóre z nich-takie jak ODW w Truskawcu czy w Żabiu - znajdują się dziś na terytorium Litwy i Ukrainy.
Słowa kluczowe: fundacja, profilaktyka zdrowotna. Oficerskie Domy Wypoczynkowe, turystyka

Delivered: 07/09/2017
Accepted for print: 02/10/2017
No conflicts of interest were declared.
Mil. Phys., 2017; 95 (4): 423-434

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Introduction

One of the most famous events in the health prevention sector of the interwar Polish Armed Forces was the establishment of the Officers' Holiday Homes Foundation (FODW) in Warsaw in 14 December 1928. Among the aims of the foundation were the health improvement of the army by building, establishing and maintaining recreation centres for officers and their families. Members of the organisation were obliged to pay monthly fees: generals - 5 zlotys, colonels - 3 zlotys, lieutenant colonels and majors - 2 zlotys, captains and lieutenants - 1 zloty. The following could also become members of the foundation:

- all officers in active service,
- retired officers, as long as they were members of the foundation before retiring and still paid fees as specified in the statute [1].

The statute of the organisation was officially announced within the Order of the Ministry of Military Affairs (MSWojsk) of 8 June 1929 [2]. Earlier, on 19 April 1929, the First Vice-Minister for Military Affairs sent a letter to military personnel in which they were required to appropriately “agitate”

for the sake of promoting the newly forming foundation [3]. In 1937 90% of Polish officers were members of FODW.

In the first period of the foundation's operation, small seasonal holiday resorts were launched, usually active between early June and late September. The first Officers' Holiday Home (OHH) was opened as early as in 1928 in Zaleszczyki, in a former barracks complex. A year later, a similar facility was opened on the coast in Cetniewo, in 1932 in Druskienniki and in 1937 in Jurata [4].

The management of MSWojsk very quickly decided that officers should have whole-year access to such facilities in the most attractive and curative places in the country. These events led to the creation of several "monumental" facilities, with some of them still serving their original purpose.

The aim of this article is to present the completely unknown and unresearched issues concerning the construction, establishment and, during the interwar period, maintenance by means of voluntary taxation of the OHHs. Apart from the curative and recreational aspects of the initiative, it was also a sign of patriotism and care for the reborn Polish state, which could not afford to fully fund, so necessary at the time, a health enhancing infrastructure. This paper involves facilities which remain within the current territory of the Republic of Poland. The article was written with the help of materials and source documents from the Central Military Archives (CAW) and research papers, press articles and ephemera originating from the interwar period. Among the post-war literature were several "memorial" publications.

OHH Krynica

The first all-year "central" OHH of MSWojsk, created through the initiative of the aforementioned foundation, was established in Krynica, located in the Western Beskids. It can be assumed that in many aspects Krynica during the interwar period was not inferior to Zakopane. It is therefore not surprising that, upon the establishment of the foundation, officers wanted to have their own OHH here. Because the city was located within the borders of the Kraków Corps District, the commander was obliged to present "appropriate solutions" as early as by the end of 1928 [5]. The military personnel noticed that there was an impressive building available in Krynica, called "Felicja", located on Kazimierz Pułaski Street, and belonging to Róża and Dawid Vogel. This four-storey, brickwork building, with a basement and a high loft of reinforced concrete construction was built in 1927-1928 in accordance with the design of an architect, Adolf Szyszko-Bohusz (1883-1948), famous in Poland mostly for the renovation of Wawel. The building included 72 residential rooms (6 single rooms and 3 quadruple rooms, the rest being double rooms), one large and one small dining room with kitchen facilities, a recreation room and two club rooms. The total useful area was 825 m^2 while the volume was 16,291 m^3 [5]. The building was equipped with electrical, water and sanitary installations as well as central heating. A total of 140 people could be accommodated at the same time [6]. According to Kraków's military construction experts, the villa was an excellent choice as a guest house for officers and their families [7].

In October 1929, a delegation from MSWojsk was sent to Krynica, including: Gen. Ferdynand Zarzycki (1888-1959), Gen. Stanisław Rouppert (1887-1945) and the chief of Construction Department (DB) – Eng. Henryk Wieliński. The aim of this visit was to "inspect" the proposed building and to negotiate the "price" [8]. In the report of the Central Executive Committee of the Officers' Holiday Homes Foundation (CKW FODW) for the 1929-1930 budget year it was written that they "carried out actions associated with purchasing the villa" [9]. 1 May 1930 was chosen as the date for finalising the transaction. It was therefore a priority to have everything done by 10 June 1930, the day when the first holiday season would start. Unfortunately haste made waste. The Armed Forces agreed to pay nearly 300 million złotys for the building, which many experts believed was an exorbitant price. According to the agreement, half of that price was to be paid on the day of the purchase with the remaining amount paid in three instalments as a mortgage (in USD) by April 1931. The rate of the "loan" was 12% per annum. The agreement, as negotiated, was finally signed on 1 June 1930 [10]. Five days later the building was ceremonially acquired by the military [11].

The chances of opening in the planned summer season were small, especially as the building required significant changes, because at the time it was inhabited exclusively by the owning family. In total, the adaptation cost almost 100 thousand złotys, while it was originally thought that it would only cost half as much [12].

The building was finally ready for use in the winter season, namely December 1930. The first director of the facility was Jan Moskała [13]. It is interesting to note that the facility was named after Gen. Daniel Konarzewski (1871-1935), the main initiator and founder of the OHH Foundation [6]. A commemorative plate above the main entrance to the building was installed several months later [14].

In 1931, the OHH Regional Executive Committee issued a particularly interesting booklet, where one can read, among other things, that: "The Officers' Holiday Home in Krynica is not a just sanatorium for the sick. The management of OHH tries to help everyone who seeks to improve their health here by providing them with the full curative potential of Krynica, at the most reasonable prices, so that they can maintain the best health condition

possible. Therefore, the baths available here, the waters and the medical care makes it possible for guests to not only rest during their stay, but also receive planned treatments" [15].

The leaflet also mentions that the management of OHH Krynica also provided for conveniences and the proper organisation of social activities. Dancing events could be organised daily, and a music band from a military unit in Nowy Sącz was available on demand. The club room had a ping-pong table, playing cards, a bowling table, chess, checkers, etc. Gambling was forbidden in the OHH. A library was available in a separate room [15]. In the winter the facility rented out skis and sledges for a small fee. During the summer the OHH organised tours for guests to Żegiestów, Bardyjów, Szczawnica, etc. by rented bus. In accordance with the rules, all kinds of outfits were accepted, but it was encouraged that the guests attending dinner "wear more than what was acceptable in tourism" [15]. Official dancing events at the OHH required a service dress or civilian clothes with "long trousers". Guests could choose an officer, called the senior, to manage the social activity matters. He had two juniors to help him, also chosen from among the guests [15].

ODW in Krynica was regarded as a facility of very high standard, a rarity in Poland. It was therefore not surprising that the armed forces in 1931 were proud to have such a prestigious building, envied by members of other departments and offices. Their fortune would not last long, though.

The difficulties began in the spring of 1932, just months after payment of the last instalment. The first bad omen was when a retaining wall collapsed, one intended to protect the building from landslides from the steep hill adjacent to the premises [16]. On 13 October 1932, during the 41st CKW meeting, Eng. Leopold Toruń – the new director of the Construction Department of MSWojsk – reported "cracks in the reinforced concrete ceiling above the dining room and other places in that part of the building" [17]. An order to immediately "evacuate the guests from the facility" was issued. A special commission was appointed involving three professors from Kraków in order to conduct an investigation and to issue an adequate opinion [17]. The most important sentence in the report of the commission was: "The ceilings were measured improperly and made out of poor quality material" [18]. Civil engineers, in defence of their "fellow" colleagues, suggested that the concrete used for the construction of the facility was weakened by the influence of... the curative mineral salts [18]. It was therefore decided that the facility should be closed until July 1933 and the case delivered before the courts. It was also decided to refrain from the former decision, because after legal analysis of the signed "transaction" agreement it was estimated that the chances of a successful court case were marginal. In the meantime, the Vogel family publicly announced that the money acquired from selling "Felicja" had already been spent and that they had no current savings [17].

MSWojsk could only count on themselves. During the aforementioned 41st CKW meeting it was decided that the embarrassing case should not be publicised, and its consequences minimised. For that purpose, a private guest house, the "Carlton", was rented in Krynica, with rooms for 60 guests, for a sum of 20 thousand złotys for the period between 1 November 1932 and 31 October 1933. Anyone who applied for a place in "Felicja" were to be redirected to "Carlton" for no extra charge [17]. In the autumn of 1932, at the request of the First Vice-Minister for Military Affairs, every order of the Corp Districts commanders had to include appropriate "notifications", with which they tried to explain the situation and minimise the "guilt" of MSWojsk. In order to improve the structural condition of "Felicja" as soon as possible, the chief of Construction Department of MSWojsk requested several well-known specialists to develop a design which would reinforce the compromised part of the building [19]. To ease the discontent, the management of the foundation hired a physician and a nurse for the first time [20].

In the meantime, a new retaining wall was built for 17,500 złotys, and the Engineering Research Institute in Warsaw was commissioned to create documentation for reinforcement of the cracking construction [21]. Renovation began in 1933, with the "Zieleniewski" company being contracted to prop up the construction with reinforced concrete frames placed inside the building [22]. The "reinforcement" works, which began in the spring of 1933, continued until January 1934. Of course this meant that "Carlton" would have to be rented for a further six months, until 31 March 1934. This cost an additional 8000 złotys [23]. In total, the costs of saving face amounted to about 400,000 złotys. The total additional cost of "Felicja" in the years 1930-1934 was about 600,000 złotys. Such a sum plus the cost of purchasing the Vogels' "estate" would have allowed the construction of two new such buildings. The only serious consequence of this failed investment was the dismissal of Eng. H Wieliński, director of DB MSWojsk, who was a member of the commission that purchased "Felicja"

In the following years the expenditures in Krynica were considerably smaller. Estimates for the 1934/1935 budget year amounted to 41,705 złotys [24], to 37,320 złotys for 1935/1936 [25], to 10,200 złotys for 1936/1937 [26], and to 49,300 złotys for 1937/1938 [27]. After reopening the facility in February 1934 the renovated part was referred to as "new Felicja"and the safe part of the building as "old Felicja" [28].

In 1935 the facility in Krynica received a new bus from MSWojsk, which made it possible to

expand the range of services provided by the facility [29]. In the same year a search for a suitable location for a garden and a playground for children began [30]. The playground was finally available in 1936 on a property opposite the OHH, which cost 40,730 złotys. The area was connected to a spa garden, and a special instructor made sure that the children were safe in the "garden playground" [31].

An analysis of archive documents concerning the operation of the facility in the years 1934-1938 shows that it catered for about 125 guests a month, meaning it was therefore utilised at about 80% of its capacity. The guest house was always overcrowded during the summers, while the autumns and winters had free rooms available. Starting from 1931, the guest house provided skiing courses in the winter for military staff of various ranks [32]. On 5 September 1934, the matter of the superb preparation of the OHH for winter sports was a topic of the 48th meeting of the CKW OHH foundation [33]. In general, the facility operated adequately and the guests were satisfied. From time to time some shortcomings in terms of organisation and staff occurred. One such event was recorded in 1935 within the documents of the Military Controller Corps. It was noted that the security personnel of OHH Krynica comprised almost exclusively family members of Regional Foundation Management V, in Kraków. Similar cases of nepotism were also pointed out in other districts [30].

A major "tourist attraction" of Krynica were the low prices. On 26 July 1935 one of the journalists of "Polska Zbrojna" wrote about it in a long article appropriately titled "Our oases of health and recreation. Bargain bin luxury". A single day stay in "Felicja" cost 4.15 złotys for an adult and 2 złotys for children. The author of the article noticed that: "Staying in Krynica appeals especially to women. Currently 130 out of the 160 guests are female. Those who are not are older men or children. Because of that, the single women experience boredom, while the older men are quite popular with them. Maintaining this balance troubles the unfortunate, yet the quite well liked OHH director, Lt Col. Galiński, who is constantly criticised for not providing dancers for dancing events. The poor colonel, in an attempt to alleviate the issue, tried inviting everyone from a neighbouring guest house, "Kasztelanka", which resulted in the arrival... of even more women" [34].

Years later, visits to OHH Krynica were pleasantly recalled by Irena Rowecka-Mleczarska, a daughter of Col. Stefan Grot-Rowecki (1895-1944), who participated for the first time in a new year's celebration in 1938/1939 [35].

Finally, it needs to be said that OHH Krynica could not prevent the construction of a three-storey building directly adjacent to the OHH, started in 1938 by Emilia Funarska. The argument that the new building would "obstruct the view of OHH guests" found no approval among the local authorities or the Voivodeship office.

OHH Rabka

The second stage of the year-round OHH events began upon the decision to create a similar facility in Rabka. This was taken in early 1931, in cooperation with the "Rodzina Wojskowa" association. Their voice was the decisive factor and the military staff did not hide that fact [36]. Officers' holiday homes were treated by the management of that organisation as a chance to develop forms of family relaxation, and to improve children's' health. A particularly popular argument was the fight against "chest" illnesses. Rabka was a particularly helpful place in combating tuberculosis, with climatic conditions that were particularly beneficial to children and teenagers.

The OHH management, eager to please the management of "Rodzina Wojskowa" association as soon as possible, signed an agreement with the owners of the "Limba" guest house as early as 15 February 1931, who agreed to rent it to the military between 1 April 1931 and 31 March 1932. The facility was situated on Nowy Świat Street and could accommodate about 60 people [37]. The originators intended that the facility should be a family-oriented destination, where children could not only relax with their family but also improve the state of their health. Of course, the role of "first fiddle" in terms of selection of guests belonged to "Rodzina Wojskowa". Guests were admitted for six week periods [38], and the participants of the first two holiday periods included mostly family members of "Rodzina Wojskowa" and officers of the central institutions of MSWojsk [39]. It needs to be said that renting "Limba" was treated as an interim solution. In the meantime, a more permanent solution was pursued, which resulted in the creation of an independent OHH in Rabka. The military staff, richer in experience after the "Krynica" events, did not seek guest houses built for the sole purpose of selling them, constructed using the cheapest means. They wanted areas and buildings which were suitable for repurposing for their own intentions and needs. An opportunity arose in the summer of 1931, when a building under construction in the town centre and an adjacent area were put up for auction. It was a brickwork, single-storey, relatively roomy building "shell" (with no roof). It was intended to be a single-storey sanatorium building [40]. On 23 July 1931 the military won the auction, paying 73,193 złotys for the building [41].

The purchase was reported to CKW members by Eng. Leopold Toruń – director of the Construction Department, at the 36th meeting of the management held on 2 October 1931 [14]. The

gathered members were informed that construction had already started and that three floors and a tall loft would be built. It was therefore intended not to be a single-storey but a four-storey building. The raw state of the construction was intended to be "finished" by the end of 1931. The final completion of the work was planned for July 1932. The design included 30 rooms for children and 34 rooms for adults. Bathrooms and the main sanitary conveniences were to be installed in the basement.

The first three months of construction work cost 150,000 złotys, but in order to make the facility usable, a further 350,000 złotys were required [14]. Such circumstances forced CKW members to extend the rent of "Limba" for an additional six months, which meant its use would continue until 30 June 1932 [14]. In an article in "Polska Zbrojna" from 30 April 1932 it was written that the facility in Rabka would not host any guests that year. A special press announcement addressing the opening date was then to be released [42].

Construction and painting works were finished as planned, and cost 282,303 złotys. It is interesting to note that brine was delivered to the building by a special pipeline, which cost the foundation almost 14,000 złotys. Brine baths were located in the basement of the OHH [43].

On 15 July 1932 the building was furnished and ready to host its first guests. However, the opening date was postponed until 1 September 1932 because "the newly constructed building needed to dry out" [44]. The technical documentation of the building is stored in the CAW. A draft construction design of OHH Rabka was made by Eng. Kazimierz Kulczyński from Kraków. From the descriptive part of that document one can learn that:

- "The plot on which the building is situated is rich in sunlight, covers 5000 m^2, is at 480 meters above sea level, is located between Poniatowski Avenue to the south and Słowacki Street and "Gorzki" stream to the north.
- The building is supplied with water via pipelines from a nearby spa and has its own sanitary installation. It covers an area of 530 m^2 including the ground level terrace, while the volume measures 8604 m^3.
- Terraces and balconies are located mostly on the south side of the building. The ground level terrace with an entrance to the garden covers 60 m^2, the terrace above the dining room covers 85m^2. The building has three staircases: main and side ones. There are six floors in total: basement, ground floor, first, second and third floors, a loft and a spacious attic. The basement will contain a utility zone. The ground floor has the management and a boarding facility for children with a dining room, a games room and an infirmary. The first, second and third floors and the loft contain single, double and triple rooms, a dining room and a living room for adults. The ground floor is connected with other floors by a staircase in the hall.
- All rooms have ventilation, adjustable window blinds, hot and cold water, electricity and alarm bells. The floor surface on the ground level and on the third floor is based on xylolite, while the rest uses oak floor boards" [44].

The grand opening was magnificent and involved many distinguished guests. Traditionally, there was also a guard of honour and a concert by a military orchestra. The act of commissioning OHH Rabka on 13 October 1932 on the CKW forum of the OHH Foundation was reported by Gen. S. Rouppert. His speech contained the following passage: "The home in Rabka fulfils every requirement of modern technology. Its exquisite comfort can be used as a model for such facilities" [17]. Soon after the opening, a military publication wrote: "one of the most modern and well situated holiday homes is – with some of the qualities of a children's spa – the Rabka OHH, with its guest house and boarding facilities for 80 children. There is also a dining room, a salt chamber with windows and an open terrace. Apart from the well furnished rooms and games rooms, this Rabka guest house also has excellent support and utility rooms, such as the kitchen, cold store, and others" [45]. To clarify this article it needs to be said that 12 out of the 62 guest rooms were located in the mansard part of the building. Apart from that, the building also had a larger residential hall for children, with 12 beds. Two dining rooms were available, one intended for adults and a smaller one for children. The OHH could accommodate a total of 120 people [46].

About two weeks after the facility opened for the first time, the Orders of District Corps Commanders contained appropriate notifications, which announced that the first holiday period would start on 3 October 1932. The OHH boarding facilities could accommodate children who required long-term climate therapy, and who could be provided with pedagogical and medical care. They also had access to school education [47].

On 13 October 1932, during the 41st CKW meeting the commander of Corps District (DOK) V in Kraków, who directly supervised the officers' holiday home in Rabka, was asked to negotiate the purchase of a plot adjacent to the facility. An old, single-storey building stood there, purchased a month previously for 50,000 złotys. Two tennis courts and a volleyball court were to be built on the property. The management of the facility received 8000 złotys for that purpose [17].

The year 1933 was a crucial one for OHH Rabka. A fully detailed notification about the capabilities of the facility was published in a military journal on 7 May 1933. It mentioned that only children aged 4 to 12 were admitted to the boarding facilities. A stay in the boarding facilities cost 4 złotys a day for periods lasting up to three

months, and 3 złotys a day for longer stays. The OHH guest house was intended for adults and their healthy children. In general, there were two types of curative and recreation seasons. The main season was: June, July, August, December and January, while the complementary season involved the remaining months. Prices during the main season were 20% higher. Guests were provided with single, double, and triple rooms. The boarding facilities had double and triple rooms [48].

On 23 October 1933 the "House Rules of the Officers' Holiday Home in Rabka" were implemented in the facility by the order of District Executive Committee of the Foundation of DOK V in Kraków. The first part of that document involved the guest house, the second the boarding facilities. The main duty of the guests was a "friendly attitude towards the management, compliance with the rules, in order to avoid disruption of their work and an unpleasant atmosphere" [49]. The guests were provided with: a social games room, where chess, checkers and playing cards were available, a library, a games room with a radio, a record player, and a piano, and a rental shop where one could "acquire" balls and deckchairs in summer and skis, skates and sledges in winter.

At the request of the guests, dancing events were organised, while in the summer trips to the city and other nearby areas were organised [49]. It was not easy for a member of the Foundation to book a place at an OHH. Summer and holiday periods in particular attracted large "crowds" [50].

Regardless of the adults' troubles, Rabka catered mostly for the youngest. The boarding room admitted children who required spa treatment or a stay in a mild, sub-mountainous climate because of their health condition [51]. Children were divided into two age groups, the first including pre-schoolers, the other schoolchildren. Each group was supervised by a teacher, a nurse and a hygienist. A paediatrician was always available and, periodically, a dentist.

Each child arriving at the sanatorium was subjected to a three-day quarantine in order to "inspect their health and prevent potential infection" [51]. Because the children stayed for quite a long time, there was a need to provide them with adequate means of education. As early as in April 1933, boys attended the Wieczorkowski Secondary School for boys, while girls went to the St Theresa Secondary School for girls. Studying and homework were also carried out in an organised manner [52].

In mid-1933, the gradually improving promotion and advertisement of Rabka meant it attracted many more applications than the facility could accommodate. It was therefore decided that the building should be expanded with a grand boarding facility [53]. The development of the documentation was finished in August 1933, and construction started as early as in September of the same year [54]. One month later, in "Polska Zbrojna", a notification was published that "the success of the boarding facility in Rabka resulted in the construction of a new wing where a new boarding facility will be housed" [55].

Documents stored in CAW indicate that the constructed boarding facility was meant to be a three storey building with a tall gabled roof. Its volume was intended to measure 5673 m^3, with a living space of 320 m^2. The building would be constructed by "Spójnia Budowlana" from Kraków and cost 103,000 złotys [56].

At the same time, a one-storey building was also being built, connected to the other side of the complex, designated as an isolation ward for sick children. It included two rooms, a kitchen and sanitary conveniences. The boarding facility and the isolation ward were connected to the main building. In mid-1933 a double garage was built at the rear of the facility [31].

The boarding facility opened on 1 October 1934, and could accommodate 80 children. The facility was modelled after a famous children's sanatorium in Reichenau. Dr Irena Kościuszko, an experienced physician, specialising in child diseases, was nominated as its manager. She lived in the boarding facility and had the assistance of a teacher, two hygienists and several servants. The director of the whole complex was Antoni Grabowski, a retired major [34].

Several weeks after opening, the boarding facility of OHH Rabka was named after Gen. Aleksander Narbut-Łuczyński (1890-1977), the commander of Kraków district, the same district which supervised the facility. It was a form of implementing a special resolution adopted at the 49th CKW meeting on 8 October 1934 [29]. It was a means of honouring the efforts of the general, who held the facility in Rabka in high regard. The general did everything in his might to make the promotion of the facility as successful as possible.

While speaking of OHH Rabka, it is worth noting that after the "boarding" wing was opened the value of the complex was estimated at 1,123,654 złotys [58]. The property value continued to grow in the following years due to the management's frequent investments in the facility. For instance, in the 1935/1936 budget year 41,926 was spent on property purchases and the creation of a playground for children [25]. They were the priority here... In the summer of 1935 Rabka was visited by Teresa Skwarnicka – a journalist of "Polska Zbrojna", who intended to showcase the newly opened boarding facility nicknamed "the children's health palace" [59]. When another editor of a military journal visited the facility, there were 7 fathers, 29 mothers and as many as 109 children staying at the facility. As recorded by the journalist, one could learn, for instance, that a day-long care including accommodation and service in a double room of the OHH during the main season cost 4.65

złotys for an adult and 3.20 for a child. At the time the same service, of lower quality, cost 7-12 złotys in private guest houses in Rabka [34].

The main focus of OHH Rabka was therefore... the children. "A rowdy sprout" did not make it easier for adults to rest; therefore on 11 May 1937, by the power of the resolution of the chief of MSWojsk Sanitary Department, the OHH was repurposed into a Military Sanatorium for Children [60]. The decision was taken by 1936, when an order of MSWojsk was issued. [61] The sanatorium comprised two parts: one was the internal ward, the other a bone tuberculosis ward. The facility was still named after Gen. Narbut-Łuczyński, still accommodated children aged 5-14 years [62], and remained under the management of the OHH.

OHH Augustów

The third OHH, important not only to the armed forces, was built in Augustów [63]. In the 1930s, official state authorities participated in propaganda actions in order to familiarise Polish people with the lakes and forests in Augustów. The 1st Regiment of Krechowice Uhlans, stationed by Białe Lake, was immensely helpful, particularly with their accommodation and technical support. The influence of the uhlans in Augustów was so great that people nicknamed Białe Lake "Krechowickie" while its most picturesque part, a peninsula with many old trees, was called "Oficerski" [64]. MSWojsk treated the involvement of Krechowice's soldiers in sport and tourism with great respect, mostly because water sports were regarded as military training. The relationship between the armed forces and sailors was revealed in an article published in "Polska Zbrojna" on 12 July 1934, appropriately titled "Sailing as preparation for military service".

The first Rowing Club in the Polish Armed Forces was established on 19 August 1919 in Warsaw [65]. Its marina was located on the left bank of the Vistula River, between today's Poniatowski Bridge and a railway bridge [66]. On 15 December 1931 the facility was used as a base where the new Polish Officers' Yacht Club (OYK) in Warsaw would be established [67]. Following the establishing of OYK, participation in military sailing in Warsaw grew rapidly.

In January 1931 a Naval Training Centre, a branch of the Officers' Yacht Club in Warsaw, was established in the Navy Cadets' School in Gdynia [68]. At the same time OYK developed inland sailing. The main training and tourist base was Białe Lake, where soldiers of the 1st Regiment of Krechowice Uhlans built two makeshift boathouses as early as the spring of 1928. In 1929 a sailing section and then a club were established by the "Krechowice" regiment. In 1932 the club became a part of OYK [69]. In 1933, the cooperation with that association resulted in the arrival of the first trains with kayaking tourists from high schools in Warsaw for a weekend holiday. The trainsets were equipped with special cars adapted for the transport of boats and kayaks [70]. At the same time sailing, rowing and kayaking camps organised for the soldiers and personnel of the Polish Armed Forces were becoming more popular. Augustów was not prepared for the growing numbers of guests in terms of accommodation, especially lodging. The call for building a modern military sailing facility in Augustów was becoming increasingly vocal [71].

In December of 1933 a general meeting of OYK RP was held. A club report presented during that meeting was published in a military journal. The document says that the club was already in possession of design plans for an impressive building at their unit in Augustów. The author of the design was Janusz Nagórski, a famous architect from Warsaw [72]. The "report" contained the following passage: "We have appropriate building material in stock for the construction of our headquarters in Augustów, which will commence in the spring of 1934". In another part of the report is the information that the budget estimate for 1934 included a sum of 160 thousand złotys for that purpose [72]. It was not enough for the quick execution of this investment in Augustów. Due to this issue, a commander of OYK RP, Col. Władysław Spałek, turned to the management of the OHH Foundation, seeking help with the execution of their ambitious goal [73]. The cooperation with the organisation must have been successful because the president of the Chief Officers' Council was Gen. Tadeusz Kasprzycki (1861-1937), Vice-Minister for Military Affairs (minister since 1935). It was quickly settled that the marina in Augustów would be a common goal for both associations and that its facilities would serve both water sports enthusiasts and members of the OHH Foundation [73]. The author of the design was asked to make appropriate alterations. The main idea of the "modernisation" consisted in dividing the residential area of the main building into separate parts for the sport and hotel facilities. The sport part was to be adapted for admission of organised OYK training groups, accommodated in larger rooms, while the hotel part consisted of smaller, more private rooms for officers and their families from the OHH Foundation [63].

The marina was intended to be situated on the aforementioned "Oficerski" peninsula of the Krechowieckie (Białe) Lake. There were already a boathouse and workshop there. The archive in Rembertów has the design for OHH Augustów. It shows that the large building would be built on a plot measuring 25,144 square meters [74]. Earthworks and levelling were done by engineers of the 1st Uhlan Regiment. The main construction stage started in the summer of 1934. The protocol

from the 49th CKW meeting of 8 October 1934 contained a passage stating: "The committee acknowledges the initiation of construction work for a building on a two hectare plot in Augustów, which will contain a yacht facility" [29]. The protocol from the 50th CKW meeting mentions that the foundation first spent 400,000 złotys and then increased their contribution to 600,000 złotys [30]. OYK, via the State Office for Physical Education, and the Cadet Corps, "contributed" 200,000 złotys to the project [24].

Construction works took less than a year, and the opening ceremony was held on 7 June 1935. Situated in a picturesque location, the brickwork, two-storey building with a basement and white painted walls had a total surface of 1700 m^2 and a volume of 16,800 m^3. The basement contained cellars, warehouses and a central heating boiler. On the ground level were: a reception, a spacious hall, kitchen, a small dining room and a large one in the shape of a semicircle with large windows and a view of Krechowickie Lake. The residential area contained 46 rooms, a quiet games room, viewing terraces, the manager's office, a two-room flat for the administrator and 6 rooms for servants. Generally, the OHH consisted of the "presentable" hotel part and the less impressive "sports" segment on the second floor. The first part contained 31 single, double and triple rooms. This segment included flats of the Ministry of Foreign Affairs (5 rooms), MSWojsk (3 rooms) and minister Tadeusz Kasprzycki's (3 rooms) [75]. The second part, the sports segment of the facility in Augustów, contained 15 rooms for two, four, six or eight people. The attic contained a laundry room and large laundry drying rooms. The building was provided with water and sanitary installations, electricity and its own central heating. Up to 120 people could stay at the same time [6]. Next to the building was a large marina (which doubled as a swimming area), boat house and a car garage. The first host of the marina in Augustów was Cpt. Jerzy Wacek. The daily lodging and board for the members of the Foundation and representatives of their families was 4 złotys [76]. Three weeks after opening the facility, "Polska Zbrojna" sent a journalist there in order to showcase the most modern facility of the Polish Armed Forces. On 28 July 1935 a lengthy article was published in a military journal, where one could read about, among other things, that "in terms of location, architecture and purpose it is the only such facility for sports and recreation in Poland and one of few in Europe" [34].

In terms of administration, the facility in Augustów was under the supervision of the commander of Corps District No III Grodno. The marina was still financially supported by the OHH Foundation. In accordance with their documents, in the 1936/1937 budget year 134,928 złotys were transferred for the purpose of the facility [26]. These funds allowed the installation of radio equipment, and the building of a tennis court, yacht marina and a railway station [77]. The water equipment rental store was highly popular among the guests. In 1938 Grodno district requested another 113,000 złotys [78], which was necessary in order to build a

new boat house, guardhouses, gardeners' flats, driveway and stairs by the lake. It was also intended to install lighting for the whole area and heating in the existing boathouses [78]. The first posters advertising OHH Augustów appeared in May 1936, which announced that the hotel part contained 40 flats while the "sports" part contained 80 [79].

Upon opening the facility in Augustów, MSWojsk began issuing ordinances requesting every graduate of schools for commissioned and non-commissioned officers to complete a two-week camp on qualified tourism. The newly promoted could choose from the following camps: mountain, cycling, gliding, rowing, sailing or kayaking [80]. The last three were organised mostly in Augustów. The sailing course was the most desirable, and resulted in a sailor's rank exam. The assigned candidates had access to accommodation, instructors and water equipment free of charge. They only had to pay a boarding fee of 7.5 złotys a day [81].

It was therefore not surprising that the facility was impossibly overcrowded, especially since it held, in addition to officers' camps, similar forms of training and recreation for other groups of the Polish Armed Forces. The whole operation was coordinated by the OYK RP management. Each training season lasted between 18 May and 20 October. 234 sports amateurs were trained in 1936 alone. At that time the facility in Augustów had 19 sailing yachts and two motor boats [82].

Apart from training in sailing, both rowing and kayaking courses were also organised. Most of the participants in those were younger people. Ice sailing was a novelty that was offered, with the first such training course being held at the beginning of 1935 [83]. An ice boat racing contest in Augustów was inaugurated by the OYK in mid-December of 1935 [72]. On 22 December 1935, one of the first "winter sailing" courses in Poland was started. This historic training course was concluded on 4 January 1936 [83]. The facility in Augustów can therefore be treated as a precursor of Polish ice boating.

The technical base of the marina was used not only by the participants of training courses but also civilian guests of the OHH. It was also visited by people who enjoyed nature, "lowland" skiing, mushroom picking and fishing. The facility was also visited by VIPs such as Józef Beck, Edward Rydz-Śmigły, Walery Sławek and Janusz Jędrzejewicz. It is also worth noting that in 1938, a Polish-Lithuanian conference was held there, in order to "bring together" the two countries and help them establish diplomatic relations [84]. A report from early 1938 stored in the CAW archives mentions that each year between 1 May and 31 October the facility provided services for about 1200 guests in total [85]. Therefore, the average utilisation of the rooms was about 85%.

"Bzów Villa" of the OHH Foundation in Sulejówek

At the end of this article it should be mentioned that the OHH Foundation also "emerged" in Sulejówek near Warsaw. The importance of this small town rose rapidly in the late 1920s when Jędrzej Moraczewski, a soldier of the Polish Legions and the first Prime Minister of an independent Poland, and his wife Zofia moved into the "Siedziba" manor, built in 1911. She was a friend of the second wife of the Marshal, Aleksandra Szczerbińska-Piłsudzka. The Jędrzejewski family convinced Aleksandra to buy the "Milusin" plot next to their property along with the "Otradno" cottage, in the possession of Konstanty Skorupka, a railwayman who intended to sell them. The transaction was finalised on 31 March 1921, and the purchase price was 900,000 Polish marks. A few days later the Piłsudzkis moved into "Otradno", also nicknamed "Drewniak", with their daughters Jadwiga and Wanda. At the time the Polish Armed Forces already planned to found a home for Józef Piłsudzki (1867-1935) in Warsaw or nearby. It was therefore decided that a spacious Polish manor would be built on the "Milusin" plot, which would then be the home of the Marshal and his family. An appropriate design was created by an architect, Kazimierz Skórewicz. On 13 June 1923 Gen. D. Konarzewski handed the keys of the newly finished building over to the Marshal on behalf of the Polish Soldier Committee. This happened exactly two weeks after Józef Piłsudzki resigned from the function of chief of the General Headquarters of the WP. Following those events, Piłsudzki started a new life distanced from the political quarrels in Poland. The situation changed after the May Coup in 1926, after which the Marshal moved into Belweder Palace. The manor in Sulejówek remained his private family residence.

In order to both increase the size of the Piłsudzki's "estate" and increase the level of its security the management of the OHH decided in early 1932 to buy the "Bzów" Villa opposite the manor, together with a neighbouring area measuring 3000 m^2. It was a simple, one-storey building with a gabled roof, built in 1920. It had three flats with several rooms and a total surface area of 250 m^2. The owners were Franiciszka and Józef Kamieński. The notary act of purchase was signed on 25 October 1932. The foundation paid 77,500 złotys [86]. The purchased property was a topic of the 42nd CKW meeting of the OHH Foundation on 5 November 1932 [21]. The protocol of the meeting mentions that the villa required "renovation and maintenance" [21]. The scope of that process involved minor repairs and constructing a fence. This resulted in the rise of the property price to 80,587 złotys [21]. After the renovation and adaptation works, one of the flats of "Bzów" was used as the office of the Adjutant of the Chief of State. The complex was under the direct management of the 7th Uhlan Regiment. Its soldiers provided security during state and military ceremonies organised near the villa. "Bzów" also provided accommodation for a physician and the private guests of the Piłsudzki family. After the death of the Marshal, "Bzów" became the headquarters of the "Help Foundation for Widows and Orphans of Deceased Soldiers".

Conclusion

All interwar OHH facilities were immensely important in health prevention, and they popularised active recreation within military structures. Throughout the history of the OHH their pro-health activities were always the highest priority. Lastly, all OHH facilities were built in naturally curative locations. A stay in these facilities was seen as a chance to improve one's health condition. In the years 1929-1938, notifications published in military papers about opening seasons within each recreation facility listed illnesses and conditions which could be treated. Some of the facilities, such as Rabka or Krynica, had brines delivered to them or provided special rooms for rehabilitation. Some of the facilities had special "health paths" organised in the surrounding areas. OHH facilities in all locations provided access to parks, springs and guest houses near military facilities. The MSWojsk in every town where OHH facilities were located signed appropriate agreements which made officers and members of their families eligible for a 50% discount on rehabilitation treatment.

An important focus point of OHH was recreation. Guests could fulfil their hobbies, such as fishing or collecting mushrooms. Dancing evenings or listening to music were very popular. More "dynamic" recreational activities included volleyball, basketball and soccer. Among the most popular games were tennis and ping-pong. Several facilities provided means for water sports (kayaking, rowing and sailing), and the most famous facility of this kind was OHH Augustów. Nearly every "all-year" recreational facility provided some means of performing winter sports (skiing, sledging, and skating).

Healthy activities were also provided via tourist trips, as physical activity was seen as a positive influence on every guest. OHH facilities were therefore very important in the implementation of state policy in terms of health care. Because of that, each year thousands of people had the opportunity to be guests for several weeks and have the chance of recreation away from their homes.

The fates of each OHH varied significantly after 1939. Time was quite mild to OHH in Augustów, and just four weeks after the start of World War II the facility was taken over by the Soviets. Once the Germans and the Soviets turned against each other the OHH facilities became the property of the Wehrmaht. The Germans respected the guest house in Augustów and did not cause much damage. After the war operations were concluded, Polish troops returned to the facility. In 1948 an all-year Military Holiday Home was opened here. The facility in Augustów, as before the war, catered mostly to water sports hobbyists. In the early 1990s the Armed Forces sold the buildings to private entrepreneurs. On 9 June 1999 the facility was visited by Pope John Paul II during his 7th trip to his home country. In the place where Karol Wojtyła waited for a "sightseeing" ship now stands a sculpture in the shape of a chair. In 1999 the facilities of the holiday home were included in a list of Polish Antique Properties. Even after all these years the former OHH Augustów is still a source of pride to that city. Today, it is home to the RP Pacyfik Officers' Yacht Club.

The facility in Krynica remained in the hands of Polish Armed Forces longer than OHH Augustów. The new authorities converted the old OHH into a military sanatorium. The first guests were admitted as soon as in 1945. In 1950 the facility was expanded with a newly acquired building, located in the vicinity of the interwar building. In 1988 the 20th Military Spa and Rehabilitation Hospital was established in Krynica. The main building of the hospital was the building by 4 Świdziński Street. An old OHH building on Pułaski Street also became a part of the 20th hospital. In 1990 renovation works inside the interwar OHH building were started, which took 8 years to complete, with the project frequently going over budget. Because of that it was decided that the old OHH should be transferred to Military Property Agency. They, in turn, sold it to the Cechini – Muszyna company in 1999, which was involved in selling mineral water. The new owners added significant modifications to the building, completely changing the top floor and the roof. After the change was implemented, the company moved the director's headquarters there, which was previously located in Muszyn. Some of the finished flats were designated for free sale. One of them, called the "Alicja Cechini Centrum flat" was left for company's own purposes.

The OHH buildings in Rabka were not repurposed. During the war, the Germans first used the OHH as a sanatorium for officers and then as a field hospital for wounded soldiers. On 4 July 1946, the Minister of Health established the "Committee of the Children's Sanatorium Complex in Rabka", who was given authority over the OHH complex by the military. On 11 July 1947, the Council of Ministers decided to establish the "Sanatorium Complex for Child Tuberculosis Patients in Rabka". The first facility of this complex was created in "Wiosna" Villa, the second in the buildings of the interwar OHH. In 1957, the Children's Curative-Preventive Complex was created there. In 1962, the Town Hospital of Janusz Korczak was "transferred" to that address. On 14 November 1972 the Powiat Presidium of the National Council in Nowy Targ decided to redefine the Korczak hospital as the Independent Health Care Complex on 1 January 1973. To this day, the buildings founded from officers' funds serve as the town hospital in Rabka.

The fate of the "Bzów" Villa in Sulejówek was different still. After the defeat in September 1939, Sulejówek came under German control. The Polish Armed Forces returned there in 1946. In 1952, "Bzów" became a property of the State Treasury. In 1970, the Municipal Health Centre was established in the building. The situation for the facility, as well as the complex as a whole, started to change after initiation of the socio-political transformation in 1989. In the autumn of 1990, Józef Piłsudzki's daughters – Jadwiga and Wanda – established the Education Foundation of J. Piłsudzki's Family and initiated efforts to retake the "nationalised" property. From the beginning their goal was to establish the Museum of Marshal J. Piłsudzki in Sulejówek. Firstly, the Education Foundation intended to retake the "Milusin" manor. In 2000 the facility was returned to the Piłsudzki family. In 2006, a court decision allowed the foundation to take control of the "Otradno" building. Then the sisters began efforts to acquire "Bzów" with the neighbouring area. They intended to acquire the properties for perpetual usufruct. Lastly, "Bzów" was transferred as a 30-year lease, for the purpose of incorporating it into the museum complex [87]. In this way "Bzów" became a part of the Museum Complex of Marshal J. Piłsudzki in Sulejówek, which is an institution established by the decision of the Minister of Culture on 10 November 2008.

All of the aforementioned facilities can be regarded as memorials of fascinating – and unfairly forgotten – military traditions. They are monuments of great patriotism and selfless care for the common good of every Pole.

Literature

1. Central Military Archive (CAW), Files of the Chief of Main Staff (SSG), file No. 1.303.1.13, Statute of the Officers' Holiday Homes Foundation to commemorate the ten-year anniversary of independence of the Republic of Poland, Warsaw 1929
2. Order of the Ministry of Military Affairs (MSWojsk) No. 18, 181, of 8 June 1929. Journal of MSWojsk Orders), 1929.
3. CAW SSG files of MSWojsk, file No. 1.303.1.13 Letter of the first Vice Minister for Military Affairs to District Corps commanders of 19 April 1929.
4. Zagdańska J., Seasonal officers' holiday homes in the Second Polish Republic Przegląd Historyczno-Wojskowy [Historical and Military Review], 2015; 4: 27-50
5. CAW, Files of the MSWojsk Construction Department. (DB MSWojsk), file No. 1.300.63.175, Letter of the chairman of

the Central Executive Committee of the Officers' Holiday Homes Foundation (CKW FODW) to the commander of the V Corps District of 17 December 1928.
6. Officers' Holiday Home of Gen. Konarzewski in Krynica. Polska Zbrojna, 1930; 100: 5
7. CAW SSG files of MSWojsk, file No. 1.303.1.13, Plans of the OHH Foundation for 1930.
8. CAW SSG files of MSWojsk, file No. 1.303.1.13, Report of the Executive Committee of the OHH Foundation of the V Corps District Command in Kraków of 8 January 1930.
9. CAW SSG files of MSWojsk, file No. 1.303.1.13, CKW FODW report for the years 1929-1930
10. CAW SSG files of MSWojsk, file No. 1.303.1.13, List of payments for the house purchased for the OHH Foundation in Krynica
11. CAW SSG files of MSWojsk, file No. 1.303.1.13, Invitation for OHH Krynica inauguration ceremony on 5 June 1930 signed by Gen. Jan Wróblewski, commander of V DOK in Kraków
12. CAW SSG files of MSWojsk, file No. 1.303.1.13, CKW FODW report for the years 1930-1931
13. P, Officers' Holiday Homes. Polska Zbrojna, 1930; 182: 8. CKW FODW Notification of 15 July 1930, CAW, SSG MSWojsk files, file No. 1.303.1.13
14. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 36th CKW FODW meeting of 2 October 1931.
15. Officers' Holiday Home of Gen. Daniel Konarzewski in Krynica, Manual issued by the District Executive Committee of Officers' Holiday Homes in Kraków, Kraków 1931: 17-18
16. CAW DB files of MSWojsk, file No. 1.300.63.175, Progress report on OHH Foundation construction programme in the years 1931-1932
17. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 41st CKW FODW meeting of 13 October 1932.
18. CAW DB files of MSWojsk, file No. 1.300.63.175, Preliminary opinion of the members of the commission for the purpose of determining the cause of cracks in ceilings and walls of the OHH building in Krynica.
19. Notice to the Order No. 66 of the Commander of District Corps I in Warsaw of 17 November 1932. Journal of DOK Orders, 1932.
20. CAW DB files of MSWojsk, file No. 1.300.63.175, Report of the chief of construction of DOK V in Kraków to the chief of DB MSWojsk.
21. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 42nd CKW FODW meeting of 5 November 1932.
22. CAW DB files of MSWojsk, file No. 1.300.63.175, Construction works conducted by the OHH Foundation in the years 1933-1934
23. CAW DB files of MSWojsk, file No. 1.300.63.175, Files of the chief of SG MSWojsk, file No. 1.300.1.13, Protocol from the 47th CKW FODW meeting of 14 December 1933.
24. CAW DB files of MSWojsk, file No. 1.300.63.175, Files of the DB MSWojsk, file No. 1.300.63.175. OHH Foundation budget estimate for budget year 1934-1935
25. CAW DB files of MSWojsk, file No. 1.300.63.175, OHH Foundation budget estimate for budget year 1935-1936
26. CAW DB files of MSWojsk, file No. 1.300.63.175, Files of the chief of SG MSWojsk, file No. 1.300.1.13, OHH Foundation budget estimate for budget year 1936-1937
27. CAW DB files of MSWojsk, file No. 1.300.63.175, OHH Foundation budget estimate for budget year 1937-1938
28. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 44th CKW FODW meeting of 28 April 1933.
29. Files of the chief of SG MSWojsk, file No. 1.300.1.13, Protocol from the 49th CKW FODW meeting of 8 October 1934.
30. Files of the chief of SG MSWojsk, file No. 1.300.1.13, Protocol from the 50th CKW FODW meeting of 28 February 1935.
31. Files of the chief of SG MSWojsk, file No. 1.300.1.13, Protocol from the 46th CKW FODW meeting of 14 October 1933.
32. Files of the chief of SG MSWojsk, file No. 1.300.1.13, Statistical summaries and documents of FODW in Krynica from years 1934-1938
33. Files of the chief of SG MSWojsk, file No. 1.300.1.13, Protocol from the 48th CKW FODW meeting of 5 September 1934.
34. Furda, Our oases of health and recreation. Bargain bin luxury. Polska Zbrojna, 1935; 203: 6
35. Rowecka-Mielczarska I. Father. Memories of the daughter of Gen. Stefan Grot-Rowecki, Warsaw 1985
36. Officers' Holiday Homes. Polska Zbrojna, 1931; 136: 5
37. Order of the Commander of the District Corps VIII in Toruń, No. 11, pt. 14 of 6 June 1931. Journal of Orders from DOK VIII in Toruń, 1931.
38. Notice to the Order No. 10 of the Commander of District Corps III in Grodno of 16 March 1932. Journal of Orders from DOK III in Grodno, 1932.
39. CAW DB files of MSWojsk, file No. 1.300.63.175, Note of Association "Rodzina Wojskowa" of 19 January 1931 r.
40. CAW DB files of MSWojsk, file No. 1.300.63.175, Report of the Main Construction Commission of the OHH Foundation.
41. CAW DB files of MSWojsk, file No. 1.300.63.175, Progress report on OHH Foundation construction programme in the years 1931-1932
42. Holiday season starts soon. Officers' Holiday Homes in the years 1932-1933. Polska Zbrojna, 1932; 119: 5
43. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol of the Approval Commission created on 11 March 1933.
44. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 37th CKW Foundation meeting of 11 December 1931.
45. Kulczyński K. Officers' Holiday Home in Rabka Architektura i Budownictwo, 1933: 10-12: [Architecture and Engineering] 342-343
46. Military buildings in the years 1918-1935, Warsaw 1936: 447
47. CAW SSG files of MSWojsk, file No. 1.303.1.13, Progress report on OHH Foundation construction programme in the years 1931-1932
48. Notice to the Order No. 10 of 16 March 1932 and 48, item 12 of 18 May 1932 of the Commander of District Corps III in Grodno. Journal of Orders from DOK III in Grodno, 1932.
49. Officers' Holiday Homes in the years 1933-1934. Polska Zbrojna, 1933; 126: 5
50. OHH Home Rules for the guest house and the boarding facility, approved by the District Executive Committee of the Foundation of DOK V in Kraków of 23 October 1933.
51. Order of the Commander of the District Corps IV in Łódź, No. 31, pt. 12 of 1 September 1933. Journal of Orders from DOK IV in Łódź, 1933.
52. House rules in OHH in Rabka, Kraków 1933.
53. CAW DB files of MSWojsk, file No. 1.300.63.175, CKW Announcement of the OHH Foundation.
54. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 45th CKW OHH Foundation meeting of 11 July 1933.
55. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 47th CKW meeting of 14 December 1933.
56. cpt. eng. A. Kowalski. Boarding Facilities in the Officers' Holiday Home in Rabka Polska Zbrojna, 1933; 257: 5
57. CAW DB files of MSWojsk, file No. 1.300.63.177, Reports on construction works of the OHH Foundation in the years 1934-1935
58. CAW DB files of MSWojsk, file No. 1.300.63.177, OHH Foundation Balance on 31 March 1935.
59. Skwarnicka T. In children's "health palace". Polska Zbrojna, 1935; 173: 6
60. Order of the Ministry of Military Affairs (MSWojsk) No. 4, item 49, of 10 March 1936. Journal of MSWojsk Orders, 1936.
61. Supplement to the Order of the Ministry of Military Affairs (MSWojsk) No. 1, item 9, of 4 February 1936. Journal of Secret MSWojsk Orders, 1936.
62. Order No. 12, item 227 of DOK II in Lublin of 7 April 1937, Journal of Orders of DOK II in Lublin, 1937.
63. Sailing facility in Augustów. Polska Zbrojna, 1935; 184: 10
64. Lakes of Augustów. Polska Zbrojna, 1939; 188: 6
65. How does the Officers' Yacht Club work (Interview with commander W. Spalek). Polska Zbrojna, 1938; 311: 8
66. Order No. 88, item 90 of DOK I in Warsaw of 23 April 1920, Journal of Orders of DOK I in Warsaw, 1920.
67. CAW, Files of the Cabinet of the Minister for Military Affairs, file No. 1.300.1.522, Report of the president of the

Polish Officers' Yacht Club col. W. Spatek of 25 April 1932 to the Minister for Military Affairs.
68. Maritime Facility in Gdynia. Polska Zbrojna, 1931; 14: 9
69. Officers' Yacht club in Warsaw. Polska Zbrojna, 1932; 158: 8.
70. Kayak train to Augustów Lakes. Polska Zbrojna, 1933; 141: 4
71. Polish Officers' Yacht Club season opening ceremony. Polska Zbrojna, 1933; 130: 9
72. From the Polish Officers' Yacht Club. Polska Zbrojna, 1933; 347: 9
73. CAW DB files of MSWojsk, file No. 1.300.63.175, Report of the chief of construction of DOK III in Grodno to the chief of DB MSWojsk of 5 November 1934.
74. CAW DB files of MSWojsk, file No. 1.300.63.177, Design plans of the OHH in Augustów.
75. CAW, Files of the State's Office for Physical Education and Military Training (PUWF and PW), file No. 1.300.62.151, Report on the assessment of the economy of the Officers' Yacht Club in Augustów.
76. CAW DB files of MSWojsk, file No. 1.300.63.175, Report of the chief of construction of DOK III in Grodno to the chief of DB MSWojsk of 11 January 1937.
77. CAW DB files of MSWojsk, file No. 1.300.63.175, Requests for extension of the Officers' Holiday Homes for the years 1936-1937
78. CAW DB files of MSWojsk, file No. 1.300.63.177, Plan of construction works of the OHH Foundation for the years 1938-1939.
79. CAW KF files of MSWojsk, file No. 1.391.54.2, Launching of Military Holiday Homes in the years 1936-1937
80. CAW PUWF files of MSWojsk, file No. 1.300.62.151, Guidelines on physical education of the staff for summer season of 1936.
81. Order of the Commander of District Corps I in Warsaw No. 56, item 8, of 18 September 1935. Journal of Orders of DOK I in Warsaw, 1935.
82. This year's achievements of Officers' Yacht Club. Polska Zbrojna, 1936; 294: 3
83. Sailing in an ice boat on lakes in Augustów. Polska Zbrojna, 1935; 327: 6
84. Batuta I, Batuta W. Guide to Augustów. Guidebook for tourists and vacationers, Suwałki 1993.
85. CAW DB files of MSWojsk, file No. 1.300.63.175, Order of the chief of construction of DOK III in Grodno to the chief of DB MSWojsk of 12 January 1938.
86. CAW DB files of MSWojsk, file No. 1.300.63.175, Protocol from the 43rd CKW OHH Foundation meeting of 15 February 1933.
87. Notary act, repertory A No. 2351/2007, Office in Sulejówek.

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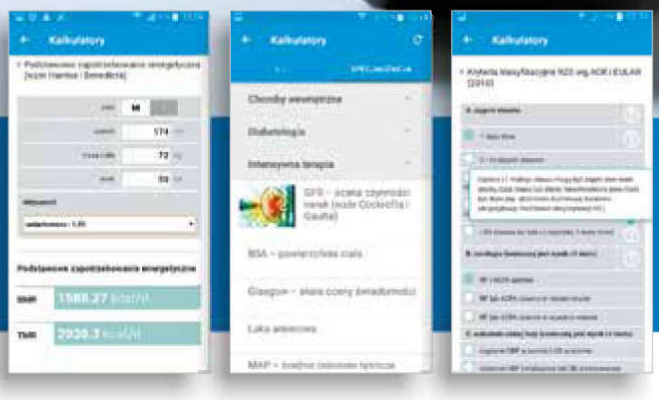

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18 education points

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13 education points

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24 education points

Details and registration
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