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) – 4

Editorial Office
Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw 44, Poland
telephone/fax: +48 261 817 380
e-mail: lekarzwojskowy@wim.mil.pl
www.lekarzwojskowy.pl

Practical Medicine Publishing House / Medycyna Praktyczna
2 Rejtana St., 30-510 Kraków, Poland
Telephone: +48 12 29 34 020, fax: +48 12 29 34 030
e-mail: listy@mp.pl

Managing Editor
Lidia Miczyńska

Proofreading
Dariusz Rywczak, Iwona Żurek

Cover Design
Krzysztof Gontarski

Typesetting
Łukasz Łukasiewicz

DTP
Katarzyna Opiela

Advertising
Piotr Lorens MD
tel. +48 663 430 191; e-mail: piotr.lorens@mp.pl

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 bibliographic 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.

GUIDELINES FOR MANUSCRIPT SUBMISSION

Background

Military Physician has been published continuously since 1920, currently as a quarterly of the Military Institute of Medicine in Warsaw, Poland.

1. Military Physician publishes original (experimental and clinical) articles, reviews, reports on military issues, deontological papers, interesting case reports, articles on the history of medicine, descriptions of rationalization results, posthumous memoirs, letters to the editor, book reviews, article (reviews) summaries from international journals particularly on the military health service, reports on meetings and scientific conferences, and announcements of events.

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

3. Military Physician is indexed in the Polish Ministry of Science and Higher Education, number of points - 4.

4. With respect to the fact that unsolicited articles submitted to our Editorial Board are royalty-free, manuscript submission with a request for publishing will be understood as the implied consent of the Author(s) not to receive any royalty and to transfer copyright to the Military Institute of Medicine.

5. A clinical article for submission should be in accordance with the requirements of the Declaration of Helsinki. The chapter "Material and methods" should contain both information on the approval of the Bioethical Committee and patients' informed consent to participate in the study. If using the results of studies conducted by other centers, such information should appear either in the text or in the acknowledgements.

6. Authors of clinical studies on medications (international name) and medical procedures should provide a description of the research funding and the influence of the sponsor on the content of the publication.

7. The Author must provide the Editorial Board with the consent of the image owner to use an image in an article.

8. Please submit your article to: Editorial Board of Military Physician, 128 Szaserów St., 04-141 Warsaw 44, Poland, or by e-mail: lekarzwojskowy@wim.mil.pl

9. All Authors who wish to publish their papers in Military Physician are asked to carefully read and strictly follow the guidelines listed below. Failure to follow the requirements of the Editorial Board makes editing more difficult, increases costs and delays publication. Manuscripts not meeting the requirements will not be published, and those considered inadequately prepared will be returned to the Authors for revision.

Manuscript

1. Manuscripts should be prepared using the MS Word text editor and sent by e-mail or by post on a 3.5" floppy disk or a CD.

2. The number of pages of the manuscript (including tables, figures and references) cannot exceed 30 pages for original articles, 30 for review articles, 20 for reports, 30 for articles on the history of medicine and 15 for rationalization articles. Reports on meetings and conferences should be concise (up to 5 pages) and discuss only significant issues.

3. An original publication may also take the form of a short temporary report.

4. Materials for printing

1) Text (with references, tables and figure captions) should be uploaded as a separate file. One page of the manuscript should contain 30 lines, about 60 characters each (must be about 1,800 characters). The text must be written in Times New Roman 12 point font and be double spaced (this also applies to references, tables, captions etc.), with 2.5 cm left margin, and no right margin, i.e. with the 'flag'. Authors are asked not to format the titles, i.e., not to center or justify them, as well as not to use the tabulator or automatic numbering (both within the text and references). A new paragraph should be started from the left margin without paragraph indentation. Please do not insert blank lines between paragraphs or enumerations. For typefaces, bold (semi-bold) and italics for foreign phrases may be used.

2) Please do not insert any graphics into the Word manuscript. Figures and tables should be referenced in the body of the text as follows: "in Figure 1", "(Table 1)". The number of tables should be reduced to a minimum. Each table should be provided with captions in Polish and English in bold in the first row. Figures (including maps) and images should be saved in a separate file. Digital images should have a resolution of 300 dpi and be saved in the TIFF format. Good quality traditional images should be delivered on photographic paper. The reverse side of each image delivered on paper should contain the author's last name, the title of the contribution, a consecutive number and a marking indicating the top of the image.

5. Papers should be prepared carefully, in accordance with Polish spelling and with special attention to communicativeness and Polish medical nomenclature. Abstracts, keywords and figure captions translated into English should be identical with the Polish version and show an appropriate language level. Manuscripts that do not meet the criteria will be returned to the authors for revision.

6. Each article should include the following:

1) On the first page: main title in Polish and English, 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.

2) Main text

Original articles should be prepared according to the following structure: introduction, aim, material and methods, results, discussion, conclusions, references; case reports: introduction, case description, discussion, summary (conclusions), and references.

Abbreviations and acronyms should be defined when first mentioned in the text and consequently used in the paper.

3) References should be presented according to the order they appear in the text. If the article has no more than four authors, please provide all their names; if there are more authors, three names maximum should be provided, followed by the words "et al.". References should be numbered using the keyboard, please do not use automatic numbering. Examples of citations:

Journal articles:

Calpin C, Macarthur C, Stephens D., et al. Effectiveness of prophylactic inhaled steroids in childhood asthma: a systemic review of the literature. J Allergy Clin Immunol, 1997; 114 (100): 452-457

Books:

Rudzki E.: Alergia na leki: z uwzględnieniem odczynów anafilaktycznych i idiosynkrazji. Lublin, Wydawnictwo Czelej, 2002: 338-340

Chapter of a book:

Wantz GE Groin hernia. In: Cameron JJ, ed. Current surgical therapy. St Louis: Mosby, 1998: 557-561

The list of references should include only those publications that were used by the Author and should be reduced 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 centers - approval of all of them, c) Declaration of Conflict of Interest, 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.

9. The Author receives 1 free copy of the issue in which his or her article has been published. For further copies, contact the Editor.

10. If the manuscript is not accepted for publication, the Editorial Board will return the submitted article to the Author.

CONTENTS

2015, vol. 93, no. 2

ORIGINAL ARTICLES

CASE REPORTS

REVIEW ARTICLES

CONTENTS

HISTORY OF MEDICINE

MISCELLANEA

LITERATURE REVIEW

SPIS TREŚCI

2015, tom 93, nr 2

PRACE ORYGINALNE

PRACE KAZUISTYCZNE

PRACE POGLĄDOWE

HISTORIA MEDYCYNY

SPIS TREŚCI

MISCELLANEA

RECENZJA KSIĄŻEK

Description of cranio-maxillofacial trauma treated at Polish Field Hospital in FOB Ghazni (Afghanistan)

Charakterystyka obrażeń czaszkowo-szczękowo-twarzowych leczonych w Polskim Szpitalu Polowym w Ghazni (Afganistan)

Paweł Peryga[1], Robert Brzozowski[2], Robert Gregulski[3]

[1] Emergency Department, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Włodzimierz Janda MD, Department of Otolaryngology and Laryngological Oncology with Clinical Cranio-maxillofacial Surgery Unit, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Col. Prof. Dariusz Jurkiewicz MD, PhD
[2] Battlefield Medicine Unit of the Military Institute of Medicine in Warsaw; head: Lt. Col. Robert Brzozowski MD, PhD
[3] Operational Command of Polish Armed Forces in Warsaw; head: Lt. Gen. Marek Tomaszycki

Abstract. The aim of this study was to examine methods of clinical and radiological assessments as well as methods for the management of casualties with severe cranio-maxillofacial injuries following head trauma on the modern battlefield. The study was based on a retrospective analysis of forty-four trauma casualties treated in the Polish Field Hospital in Ghazni, Afghanistan, between 2012 and 2014. It was reported that the main causes of combat injuries were gunshot wounds and the effects of IED explosions (75%). The causes of non-combat injuries were traffic accidents. The most common location of injuries was the facial area. X-ray series imaging was the only available method in the diagnosis of head trauma. Thirty-three casualties (75%) needed to be transferred to Level 3 medical facilities for CT scans and for further treatment. Four victims (9.1%) died of their wounds in the hospital. A significant increase in combat head and maxillofacial injuries is observed in comparison with the civilian environment. The priority in these injuries is to ensure patent airway, to control bleeding and to stabilize vital functions. High energy combat injuries of the head are very difficult to treat and their complications are caused by the direct effects of head trauma as well as wound contamination and infection.
Key words: cranio-maxillofacial injuries, head trauma, level 2 medical facility, war injuries

Streszczenie. Celem pracy była ocena kliniczno-radiologiczna oraz metody postępowania z poszkodowanymi doznającymi poważnych urazów czaszkowo-szczękowo-twarzowych w warunkach współczesnego pola walki. Oceny dokonano na podstawie retrospektywnej analizy dokumentacji medycznej 44 poszkodowanych leczonych w Polskim Szpitalu Polowym w Ghazni (Afganistan) w latach 2012–2014. Stwierdzono, że głównymi przyczynami takich obrażeń głowy były penetrujące urazy bojowe (75%): rany postrzałowe oraz powybuchowe. Przyczyną urazów niebojowych były wypadki komunikacyjne. Najczęstszą lokalizacją obrażeń była twarzoczaszka. W diagnostyce obrazowej głowy możliwe było tylko wykonanie serii klasycznych radiogramów. 33 rannych (75%) wymagało ewakuacji do szpitala poziomu 3. w celu wykonania TK oraz dalszego leczenia. Czterech poszkodowanych (9,1%) zmarło w szpitalu z powodu doznanych obrażeń. W warunkach pola walki w porównaniu ze środowiskiem cywilnym obserwuje się zwiększenie częstości występowania penetrujących obrażeń mózgoczaszki i twarzoczaszki. Priorytetem jest zapewnienie drożności dróg oddechowych, opanowanie krwotoków i stabilizacja funkcji życiowych. Wysokoenergetyczne obrażenia bojowe głowy są bardzo trudne w leczeniu, a ich powikłania spowodowane są bezpośrednimi skutkami urazów oraz zanieczyszczeniem i następową infekcją ran.
Słowa kluczowe: obrażenia wojenne, urazy głowy, obrażenia mózgowo-szczękowo-twarzowe, placówka medyczna poziomu 2.

Delivered: 08/12/2014
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 149-153

Corresponding author:
Paweł Peryga Dent., MD
Military Institute of Medicine, Department of Otolaryngology and Laryngological Oncology with the Clinical Cranio-maxillofacial Surgery Unit, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw
telephone: +48 662 799 189
e-mail: pperyga@wim.mil.pl

Introduction

Due to the location of structures critically sensitive to trauma, cranio-maxillofacial injuries are becoming an increasingly serious problem in the area of battlefield medicine (tactical medicine). An upward trend has been observed since Operation Desert Storm in Iraq in 1991, where head and neck trauma constituted over 21% of injuries [1].

Experience gained in Polish Field Hospital in FOB Ghazni (Medical Support Group of the Polish Military Contingent in Afghanistan) confirms this trend. The hospital began operating in the first half of 2010, and formed the main center of hospital treatment as well as medical evacuation in the theatre of operations for Polish soldiers and the civilian employees of the Armed Forces, representatives of Afghan security forces and civilians in the Ghazni province [14].

Aim of the study

The aim of the study was to assess the frequency, causes and effects of military cranio-maxillofacial injuries, as well as the methods of primary treatment.

Material and method

The retrospective analysis involved the medical records of forty-four casualties treated due to severe cranio-maxillofacial injuries in the Polish Field Hospital in Ghazni in the years 2012-2014 (data updated 31 March 2014). The study was based on an analysis of age, sex, circumstances of the trauma, clinical picture and associated complications.

Included were casualties with injuries that required hospitalization, while casualties who were injured and treated on an outpatient basis and who did not require hospitalization were not included in the analysis. Included in the study was a group of casualties with severe trauma due to traffic accidents. The analysis did not involve casualties suffering from neck trauma, with the exception of one casualty with a gunshot wound resulting in severe damage of the C2 cervical vertebra. The assessment took into account the organization of the Medical Support Group in the Islamic Republic of Afghanistan, which affected the casualty management procedures.

Results

On the basis of the medical records it was found that those casualties with cranio-maxillofacial injuries were primarily males (including boys) aged 5-40 years old, constituting 98% (forty-three casualties) of the study group. For 75% of the casualties the injuries were caused by combat trauma due to gunshots or explosion of improvised explosive devices (IED), whereas non-combat injuries were mainly caused by traffic accidents. The injuries were usually located in the craniofacial area. Four casualties died in hospital during the emergency procedure. 75% of the casualties were 21-40 years old. The oldest casualty was 40 years old, the youngest was 5. In twelve cases the medical records did not mention the exact age of the casualty. The mean age was 24.48 years old. Figure 1 presents the analysis of the age and sex of the casualties.

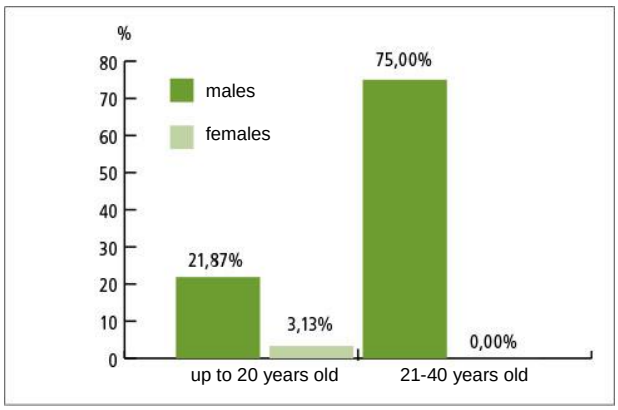


Figure 1. Analysis of the age and sex of the victims
Rycina 1. Struktura wieku i płci poszkodowanych

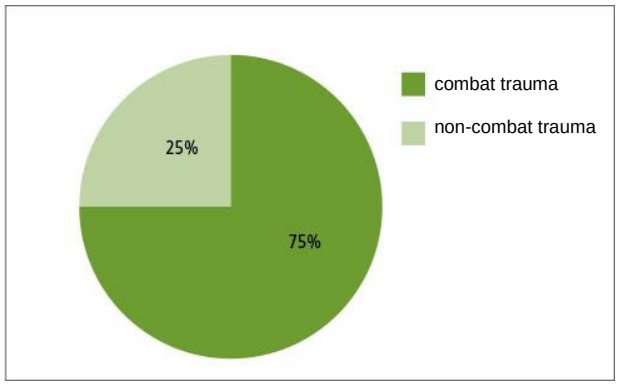


Figure 2. Percentage analysis of the causes of injuries (*combat and non-combat*)
Rycina 2. Procentowy udział urazów bojowych i niebojowych

In twenty casualties the injuries were caused by gunshots and in thirteen by fragments from IED explosions, amounting to a total of thirty-three combat trauma casualties (75%). Other causes of severe head trauma were traffic accidents (eight casualties), as well as: facial and ocular burns due to gas explosion during fire tests (one casualty) and craniocerebral and craniofacial fracture as a result of a heavy object (a car wheel) falling on the casualty's head (one casualty). Non-combat trauma affected 25% of all the casualties. Figure 2 gives the percentage of the combat and non-combat cranial injuries, while table 1 gives the circumstances in which trauma was suffered.

The medical record analysis demonstrated that in six casualties the cause of the penetrating craniocerebral injuries was a gunshot wound (GSW) to the head. The Glasgow Coma Scale (GCS) score for this group ranged from 3 to 8 points, with an average of 5.5. The results indicate severe cerebral damage. Two casualties in this group died in the Polish Field Hospital due to their injuries (in both cases GCS was 3 points). Fourteen casualties suffered craniofacial gunshot-related injuries (42% of combat trauma). The most frequent effect of gunshot injuries in this area was a multifragmentary mandibular fracture, diagnosed in eight casualties, or over half (57%) of all the craniofacial gunshot wound cases.

In thirteen casualties severe head trauma was caused by IED explosions. Isolated injuries were found in six casualties. The most common craniofacial injuries were facial and head lacerations due to fragments, often associated with bone fractures in this area, i.e. anterior walls of the maxillary sinuses and nasal bones, as well as dental injuries. The GCS score in this group was 30-15 points, with an average of 13.07. In two cases fragments penetrated into the craniocerebral area; the casualties died despite the treatment received at FOB Ghazni. These were civilians without any head protection.

All the casualties received the radiological diagnostic tests available in the Polish Field Hospital in Ghazni.

After the diagnostic and treatment procedures, thirty-three casualties were evacuated by air medical evacuation (AIR MEDEVAC) to level 3 medical facilities for further diagnostics (computed tomography, CT) and possible treatment. The following facilities of this level were available for the Polish Field Hospital in Ghazni: American N. Craig Joint Theater Hospital (CJTH) at Bagram base, Parwan province, and Kabul National Military Hospital (KNMH) in Kabul. The remaining five casualties were transferred for further treatment to a civilian Provincial Hospital in Ghazni following diagnostic procedures and initial treatment.

Table 1. Circumstances and causes of the injuries
Tabela 1. Okoliczności powstania urazów

Circumstances	Sex		Total	%
	females	males	44	100%
Combat trauma (75%)				
Head gunshot wound (GSW)	–	20	20	45.5%
IED	–	13	13	29.5%
Non-combat trauma (25%)				
Traffic accident	1	8	9	20.4%
Effects of combat gases	–	1	1	2.3%
Impact to the head	–	1	1	2.3%

In over half of the casualties, i.e. in twenty seven cases (67.4%), multifocal injuries were found. They usually involved (apart from the head) the lower limbs (ten casualties) and upper limbs (nine casualties). Isolated injuries were found in seventeen casualties (38.6%). Figure 4 presents a percentage analysis of the multifocal and isolated injuries.

Discussion

Cranio-maxillofacial injuries resulting from combat trauma have always been a serious diagnostic and therapeutic problem, and their number has risen during recent armed conflicts. The analysis of available data regarding maxillofacial injuries suffered in some of the wars conducted since 1914 to the mid-1980s did not reveal any evidence for an increasing incidence of head and neck injuries. Such an upward trend was, however, observed in Operation Desert Storm, conducted in 1991, in which head and neck injuries accounted for 21.6% of all the injuries, and 95% of which were caused by fragments [2]. In the 20th century the rates of head and neck trauma were as follows: 21% during World War II and the Korean War, and 16% during the Vietnam War. During Operation Iraqi Freedom in Iraq and Operation Enduring Freedom in Afghanistan, the rates increased to 30% and, according to some sources, even to 36% [3, 4].

The most frequent causes of combat trauma in the studied material were head gunshot wounds and injuries resulting from improvised explosive devices or land mines. Some authors suggest a more significant percentage of head injuries due to fragmentation [3, 4, 9, 10]. It should be clarified, and emphasized, that the study involved not only casualties with severe head trauma: in the case of non-combat injuries the most common cause of head trauma was traffic accident, consistent with the observations of other authors [3, 9, 12].

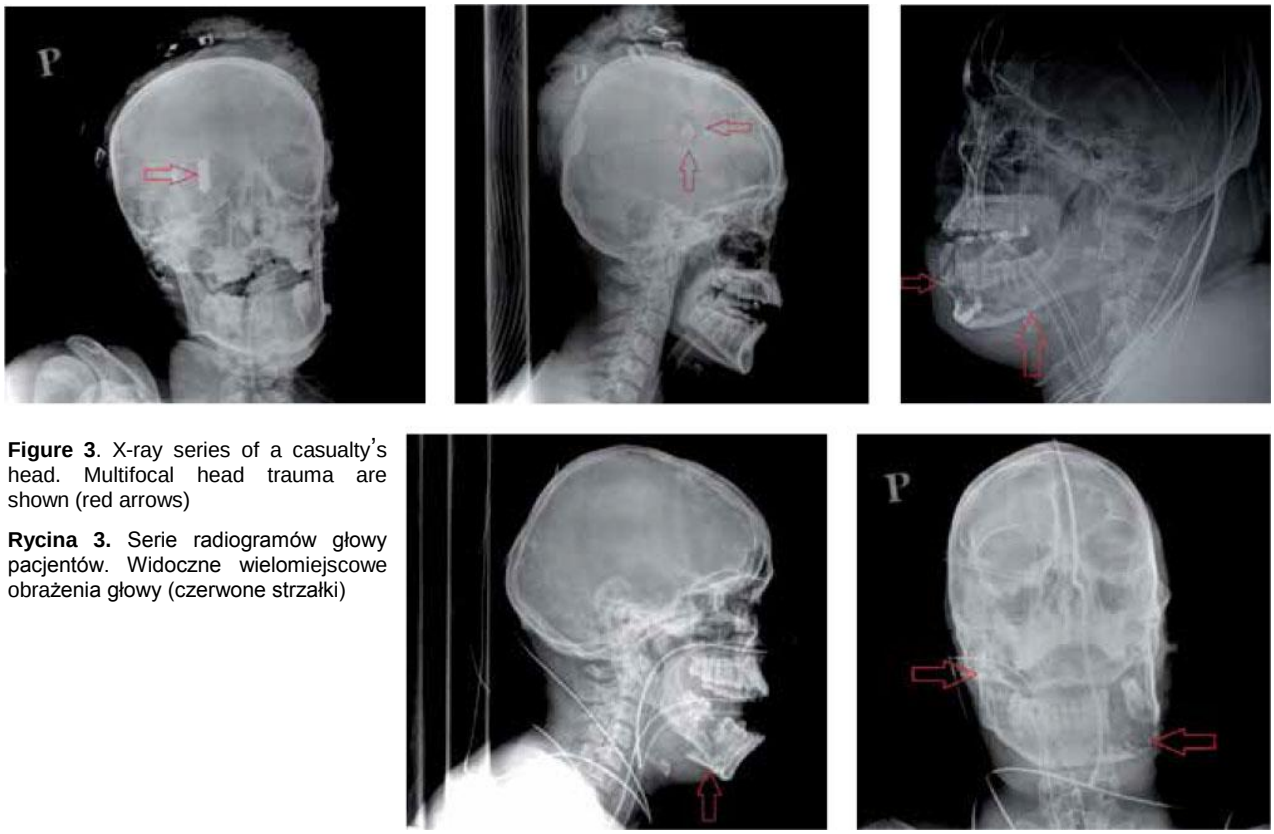


Figure 3. X-ray series of a casualty's head. Multifocal head trauma are shown (red arrows)

Rycina 3. Serie radiogramów głowy pacjentów. Widoczne wielomiejscowe obrażenia głowy (czerwone strzałki)

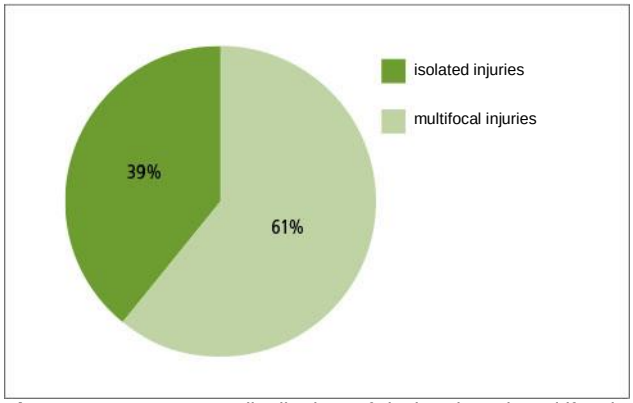


Figure 4. Percentage distribution of isolated and multifocal combat trauma
Rycina 4. Procentowy udział mnogich urazów i urazów izolowanych

Apart from the control of bleeding, providing and maintaining a patent airway is the priority in craniofacial injuries [5]. Due to extensive trauma, intubation is often impossible, or contraindicated. In prehospital conditions, to provide proper ventilation, emergency coniotomy is required with subsequent conversion to a tracheostomy. In the case of head trauma, the focus should be on maintaining intracranial pressure below 20 mmHg and cerebral flow above 70 mmHg, providing proper gas exchange and preventing hypotonia. However, cases of severe head trauma with a GCS scale score below 6 points are very difficult to treat. The analysis of medical data based on OIF/IEF conflicts indicates that mortality is 65% for GCS scores of 3-5 points, and 10% for GCS scores of 6-8 points [6].

In the case of craniofacial injuries, apart from gunshot wounds, the most difficult to treat are high-energy post-explosive injuries, characterized not only by their multiplicity, but also significant wound contamination. They prevent wound closure and require surgical cleansing before any reconstruction procedures. In mandibular fractures, apart from internal splinting and stabilization by plating, temporary fracture immobilization by external stabilization is also recommended [7, 10].

Table 2. Location of injury
Tabela 2. Lokalizacja urazów

Location	Sex		Total	%
	females	males	44	100%
Cerebrocranium		4	4	9.1%
Facial cranium		11	11	25%
Neck		1	1	2.3%
Eyeballs		1	1	2.3%
Multifocal injuries	1	26	27	61.4%

Most casualties required treatment at level 3 facilities, to which they were transported following the medical procedures related to the tasks and organizational structure of the Medical Services of the Polish Military Contingent in Afghanistan [8].

Face and neck injuries are more frequent due to the lack of direct protection, such as that provided by a tactical vest with ballistic plates to the chest and abdomen, or by a Kevlar helmet for craniocerebral protection. It should be emphasized that, despite technological advancement, the present helmets do not provide full protection for the head. Within the last twenty years a proportional increase in the number of craniofacial injuries has been observed, due to higher survival rates resulting from the relative reduction of mortal injuries to the torso [4, 13].

Due to the increased frequency of combat head trauma, especially craniofacial injuries, the role of maxillofacial surgeons, as well as head and neck surgeons, will gain importance in future armed conflicts [13].

Conclusions

- Gunshot injuries of the cerebrocranium may be rare, but they adversely affect the prognosis of survival in 33% of cases.
- In the majority of casualties (75%) the continuation of treatment at level 3 medical facilities was required.
- Using Kevlar helmets reduced the rate of craniocerebral injuries in combat trauma to the head, but the incidence of craniofacial injuries increased.
- The trend observed within the last three decades leads to the conclusion that the proportional increase in the number of craniofacial injuries in future armed conflicts will persist.

Literature

1. Dobson JE, Newell MJ, Shepherd JP. Trends in maxillofacial injuries in war-time (1914–1986). Br J Oral Maxillofac Surg, 1989; 27 (6): 441–450
2. Carey ME. Analysis of wounds incurred by U.S. Army Seventh Corps personnel treated in Corps hospitals during Operation Desert Storm, February 20 to March 10, 1991. J Trauma, 1996; 40 (3): 165–169
3. Lew TA, Walker JA, Wenke JC, et al. Characterization of cranio-maxillofacial battle injuries sustained by United States service members in the current conflicts of Iraq and Afghanistan. J Oral Maxillofac Surg, 2010; 68 (1): 3–7
4. Tong D, Beirne R. Combat body armor and injuries to the head, face and neck region: A systematic review. Military Med, 2013; 178 (4): 421–426
5. Emergency War Surgery, Third United States Revision, Department of Defense USA, 2004
6. War Surgery in Afghanistan and Iraq: a series of cases, 2003–2007, United States Army and Walter Reed Army Medical Center's Borden Institute, 2008
7. CENTCOM Joint Theater Trauma System (JTTS) Clinical Practice Guidelines (CPGs)
8. Korzeniewski K, Pieniuta S, Nowak B, et al. Zadania i struktura organizacyjna Służby Zdrowia Polskiego Kontyngentu Wojskowego w Afganistanie. [Tasks and organizational structure of Medical Services of the Polish Military Contingent in Afghanistan] Mil. Phys., 2011; 4: 364-375
9. Wade AL, Dye JL, Mohrle CR, et al. Head, face, and neck injuries during Operation Iraqi Freedom II: Results from the US Navy and Marine Corps Combat Trauma Registry. Technical Report, Naval Health Research Center 12- 01-2006
10. Breeze J, Gibbons AJ, Opie NJ, et al. Maxillofacial injuries in military personnel treated at the Royal Centre for Defence Medicine June 2001 to December 2007. Br J Oral Maxillofac Surg, 2009; 48 (8): 613–616
11. Nessen SC, Lounsbury DE, Hetz SP. War Surgery in Afghanistan and Iraq: a series of cases, 2003–2007. Borden Institute (U.S.) & Walter Reed Army Medical Center 2008
12. Hale RG, Hayes DK, Orloff G, et al. Maxillofacial and neck injury. In: Savitsky ES, ed. Combat casualty care: Lessons learned in OEF & OIF. Department of Defense USA, 2010
13. Breeze J, Gibbons AJ, Combes JG, et al. Oral and maxillofacial surgical contribution to 21 months of operating theatre activity in Kandahar Field Hospital: 1 February 2007–31 October 2008. Br J Oral Maxillofac Surg, 2010; 49 (6): 464-468
14. 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; 3: 151-159

Renal replacement therapy as part of the comprehensive treatment of excessive burns, in the data of the Military Institute of Medicine

Leczenie nerkozastępcze jako element kompleksowej terapii rozległych oparzeń w materiale Wojskowego Instytutu Medycznego

Wojciech Klimm[1], Jerzy Smoszna[1], Agnieszka Surowiecka-Pastewka[2], Wojciech Witkowski[2], Stanisław Niemczyk[1]

[1]Department of Internal Diseases, Nephrology and Dialysis, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Assoc. Prof. Stanisław Niemczyk MD, PhD, Military Institute of Medicine

[2]Clinical Department of Plastic Surgery, Reconstruction Surgery and Burn Treatment, Dialysis Therapy, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Wojciech Witkowski MD, PhD

Abstract. One of the life-threatening complications of severe burns is non-inflammatory acute renal failure (ARF) requiring urgent implementation of renal replacement therapy (RRT). The aim of the study is to present the results of RRT in patients with ARF in the course of massive burns. ARF requiring RRT occurred in twelve patients out of a total a hundred and forty-seven patients hospitalized due to burns. The subject of a retrospective analysis were ten males and two females, aged 41 to 92 years (mean: 60). RRT was implemented in the form of hemodialysis (HD) in eight (66.6%) of the patients, continuous venovenous hemodiafiltration (CVVHDF) in two (16.6%) of the patients and a combination of the above methods in two (16.6%) patients. During HD we observed a reduction in serum creatinine by an average of 2.67% and urea by 37.78% together with the stabilization of the potassium concentration and decrease in diuresis by 32.45%, on average. In CVVHDF, the average reduction of serum creatinine was 75.68%, urea was 59.40%, and kalemia stabilized. Diuresis was reestablished in 75% of the patients. In both groups the mortality was 100%. ARF requiring RRT in the course of excessive burns makes a poor prognosis for the survival of patients. RRT is an effective way to reduce the concentration of uremic toxins and to stabilize the water-electrolyte and acid-base balance. CVVHDF seems to be more effective in improving the laboratory parameters and diuresis compared with HD.
Key words: burns, continuous venovenous hemodiafiltration, hemodialysis, non-inflammatory acute renal failure, renal replacement therapy

Streszczenie. Jednym z zagrażających życiu powikłań ciężkich oparzeń jest ostra niezapalna niewydolność nerek (ARF), wymagająca pilnego wdrożenia leczenia nerkozastępczego (RRT). Celem pracy jest przedstawienie wyników RRT u pacjentów z ARF w przebiegu masywnych oparzeń. ARF wymagająca RRT wystąpiła u 12 spośród 147 chorych hospitalizowanych z powodu oparzeń. Analizie retrospektywnej poddano 10 mężczyzn i 2 kobiety w wieku 41–92 lat (średnio 60 lat). Terapię RRT wdrożono w postaci hemodializ (HD) u 8 (66,6%) pacjentów, ciągłej żylno-żylnej hemodiafiltracji (CVVHDF) u 2 (16,6%) pacjentów lub kombinacji tych metod u 2 (16,6%) pacjentów. Podczas HD osiągnięto redukcję stężenia kreatyniny w surowicy średnio o 2,67%, a mocznika o 37,78%, wraz ze stabilizacją stężenia potasu i zmniejszeniem diurezy średnio o 32,45%. W programie CVVHDF redukcja stężenia kreatyniny wyniosła średnio 75,68%, a mocznika 59,40%; ustabilizowano również kaliemię. U 75% chorych uzyskano powrót diurezy. W obu grupach śmiertelność wyniosła 100%. Wnioski. ARF wymagająca RRT w przebiegu rozległych oparzeń wiąże się ze złym rokowaniem dotyczącym przeżycia chorych. RRT jest skuteczną metodą redukcji stężenia toksyn mocznicowych oraz stabilizacji gospodarki wodno-elektrolitowej i kwasowo-zasadowej. Wydaje się, że metoda CVVHDF skuteczniej niż HD poprawia parametry laboratoryjne i diurezę.
Słowa kluczowe: hemodializa, ciągła żylno-żylna hemodiafiltracja, oparzenie, ostra niezapalna niewydolność nerek, terapia nerkozastępcza

Delivered: 16/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 154-160

Corresponding author:
Wojciech Klimm MD, Department of Internal Diseases, Nephrology and Dialysis, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw, Poland
telephone/fax: +48 261 816 811
e-mail: wklimm@wim.mil.pl

Introduction

Acute kidney injury (AKI) is one of the most dangerous complications for massive burns covering over 10% of the total body surface area (TBSA). In 30-66% of patients with AKI the condition leads to acute renal failure (ARF), impaired excretory kidney function, reduced urine quantity and retention of products of metabolic activity in the blood serum. In approximately 3-5% of AKI patients damage to the kidneys becomes life-threatening, and implementation of renal replacement therapy (RRT) is necessary. Despite developments in medicine and dialysis techniques, AKI which requiring urgent RRT procedures (AKI-RRT) is associated with a high mortality rate (over 80%) [1].

Significant discrepancies between the rates of fatal complications among patients reported in earlier studies by different authors were due to a lack of uniform criteria for AKI and ARF diagnosis. One of the current standards is the RIFLE scale (Risk, Injury, Failure, Loss, End Stage), which determines the stage of renal damage (Table 1), along with the basic distinguishing parameters include fluctuations in serum creatinine concentrations or glomerular filtration rate (GFR), as well as magnitude and duration of oliguria. Since 2005, the modified, more specific AKIN (Acute Kidney Injury Network) criteria has been used (Table 2) [2, 3].

AKI in patients with burns may take two forms: early and late. The first one occurs during the first 6 days, and results from insufficient filling of the vascular bed due to sudden fluid loss through damaged skin. Its frequency decreases after introduction of fluid resuscitation. Transfusion of large volumes of fluids, mainly crystalloids, even several liters daily during the initial stage of therapy, largely allows the avoidance of hypovolemia and early renal complications [4]. The late form is specific for the second and later weeks following the injury, and is related to developing septic complications and the nephrotoxic medications used [3]. Factors which unquestionably affect the development of AKI include: the area of burnt TBSA, and bronchial tree involvement. Earlier studies demonstrated a lack of correlation between the depth of the burn, age, sex or electric shock as the initial cause [5].

Table 1. RIFLE scale
Tabela 1. Skala RIFLE

	Serum Creatinine Concentration (SCC)/GFR	Magnitude of diuresis
Risk	SCC increased by a factor of 1.5 GFR reduced by >25%	<0.5 ml/kg b.w./h for 6 h
Injury	SCC increased by a factor of 2 GFR reduced by >50%	<0.5 ml/kg b.w./h for 12 h
Failure	SCC increased by a factor of 3 GFR reduced by >75% or SCC >4 mg/dL (with an increase by >0.5 mg/dl)	<0.3 ml/kg b.w./h for 24 h or anuria for 12 h
Loss of function	loss of kidney function for 4 weeks to 3 months	
End-stage	loss of kidney function for over 3 months	

Table 2. AKIN scale
Tabela 2. Skala AKIN

	Serum Creatinine Concentration (SCC)/GFR	Magnitude of diuresis
Stage I	SCC increased by a factor of 1.5 GFR reduced by >25% or SCC increase by >0.3 mg/dl	<0.5 ml/kg b.w./h for 6 h
Stage II	SCC increased by a factor of 2 GFR reduced by >50%	<0.5 ml/kg b.w./h for 12 h
Stage III	SCC increased by a factor of 3 GFR reduced by >75% or SCC >4 mg/dL (with an increase by >0.5 mg/dl)	<0.3 ml/kg b.w./h for 24 h or anuria for 12 h
	loss of kidney function for 4 weeks to 3 months	
	end-stage renal failure (loss of function for over 3 months)	

Aim of the study

The aim of this retrospective study was to present the outcomes of renal replacement therapy in AKI patients having massive burns, based on the material of the Military Institute of Medicine (WIM), by analyzing the therapeutic procedure starting with the pre-hospital

phase, through the conservative treatment, to the period of dialysis.

Material and method

The study covered the period from November 2011 to June 2013. The source material comprised medical records archived at the Military Institute of Medicine.

The retrospective analysis involved twelve patients (10 males and 2 females) aged 41-92 years old (mean: 60 years), hospitalized at the Clinical Department of Plastic Surgery, Reconstructive Surgery and Burn Treatment, Military Institute of Medicine, due to thermal burns, who underwent RRT in co-operation with the Department of Internal Diseases, Nephrology and Dialysis.

The study group comprised 8% of all the patients hospitalized due to burns at that time. The etiology of the thermal injuries was analyzed on the basis of reports from the Emergency Medical Services teams (EMS) and Hospital Emergency Departments (HED). Patients were differentiated according to the place of transportation immediately after the injury.

Based on the description of the physical examination performed by the physician on duty at the specialist center for burn treatments, the scope and depth of the thermal injury was analyzed, the patient's awareness at the moment of hospitalization was assessed, as well as the function of vital organs and systems, with particular attention being paid to the respiratory and cardiovascular systems.

The database was used to locate the relevant laboratory test results. The analysis of the nephrological records provided enough data to assess the function of the excretory system, as well as the method and course of nephrological treatment and renal replacement therapy.

Deterioration of renal function which met the AKI criteria before day 7 following the injury was classified as "early AKI", and after day 7 as "late AKI". A similar division was applied for AKI-RRT.

RRT was conducted in the form of hemodialysis (HD), continuous veno-venous hemodiafiltration (CVVHDF), or a combination of the two methods.

HD was performed using classic procedures, every day or every other day, based on a hydrogen carbonate buffer. The HD procedures took 2.5-3.25 hours (mean: 2.93 h). Blood flow was 150-260 ml (mean: approx. 190 ml/min). The dialysis machines used were made of highly biocompatible polysulfone membranes with a surface area of 1.3-1.7 m2, adjusted to the size and body weight of the patients. Small-molecule heparins (Fragmin at a dose of 1,250-2,500 u.m.) were used for heparinisation, except for four patients presenting clinical symptoms of hemorrhagic diathesis. Potassium concentration in the dialysis fluid concentrate ranged from 1.0 to 4.0 mmol/L, and was adjusted to suit the current kalemia.

In all the patients receiving this form of therapy a CVVHDF program was implemented as two consecutive three-day procedures with the use of Prismaflex kits and equipment. HDF dose was fixed at 35 ml/kg b.w./h of the procedure. Due to associated coagulation disorders, citrate anticoagulation was applied. The ultrafiltration rate was 50-75 mL/h.

Results

In 66.6% of cases, the burns resulted from contact with fire, in 16.6% from hot liquid, and in 16.6% from hot air. Burned body parts constituted 12-80% of TBSA (mean: 53%). The scalp was involved in 75% of the patients, neck in 67%, torso in 92%, upper limbs in 83% and lower limbs in 92%. Burns of the respiratory tract occurred in 67% of the patients.

Five (41%) patients were transported to a specialist burn treatment center directly from the scene of the event, and seven (59%) after treatment in district hospital wards. Air transport (Medical Air Rescue teams) was used for eight (66%) patients, road transport (Emergency Medical Service) for three (25%), and combined transport for one (9%).

In nine (75%) cases the patients' condition was assessed as severe, and in three (25%) as moderate. Consciousness assessment score using the Glasgow scale ranged from 3 to 15 points (mean: 9 points). Hemodynamic disorders requiring blood pressure stabilizers (pressor amines) were observed in eight (66%) patients on hospitalization.

In ten (83%) cases acute non-inflammatory renal failure (ANRF, AKI) occurred on day 1 (early AKI), in the remaining two (17%) patients on days 7 and 9 (late AKI).

The analysis of the available records demonstrates that in none of the patients was renal replacement therapy used to start AKI treatment. To maximize the patient's safety, and minimize the risk of complications associated with urgent RRT, intensive fluid therapy was applied as the first step of the treatment. Conservative AKI treatment was implemented in the form of fluid resuscitation using the Parkland formula, adopted as the optimal, first line treatment. Following recommendations, 4 ml of fluid per 1 kg of body weight for each 1% of the burnt body surface was transfused over a twenty-four hour period. A total of 50% of the fluids were administered within the first eight hours, and the remaining 50% in the following sixteen hours. The burn area was usually estimated using the Lund and Browder chart, which enables determination of the severity of the injury, considering the depth of the burns.

All the patients (100%) in the study group required RRT in days 1-22 (mean: day 9) after the injury. In four (33%) patients the AKI parameters required RRT implementation up to day 6 following the trauma (early AKI-RRT). In eight patients (66.6%) RRT was started

later (later AKI-RRT). At the moment of initiating RRT, all the patients presented characteristics of multiple organ failure, including cardiopulmonary failure.

In nine cases (75%) the direct reason for AKI-RRT was retention of the products of nitrogen metabolism, with oliguria in seven cases (58.3%), hyperkalemia in five (41.6%), and sepsis in two (16.6%). In none of the patients was hypovolemia observed at the moment of starting RRT. Acute left ventricular failure in the form of pulmonary edema due to hyperhydration was found in one patient (8.3%). Hypervolemia was iatrogenic and resulted from the excessive, uncontrolled administration of fluids while the daily diuresis was reduced.

Among the patients who received RRT from day 7, oliguria with secondary nitrogen retention, despite intensive hydration in 75% of cases, determined the implementation of RRT. None of the patients presented infectious complications.

For all of the patients who developed AKI-RRT at a later period, at the moment of RRT initiation, the excessive accumulation of uremic toxins, secondary to multiple organ failure, was observed. Developing septic shock was the reason for RRT in two (25%) cases. No iatrogenic toxic effects of medications used were reported.

In eight (66.6%) patients intermittent hemodialysis (HD) was used, in two (16.6%) continuous veno-venous hemodiafiltration (CVVHDF) was used, and in two (16.6%) a combination of the two methods.

Figures 1-7 present changes in selected parameters describing kidney function, according to the type of procedure. Under the HD program, 1 to 11 procedures were performed (mean: 4 procedures) in individual patients, with 40 procedures in total. The total time of hemodialysis was 119 hours, a mean of 11.9 h per patient.

After the first procedure: in eight patients urea concentration decreased by 19.8%, and serum creatinine by 32.2% on average. After the last procedure: creatinine concentration was reduced by 36.5% on average in 505 patients, and urea concentration decreased by 21.4% in eight patients (Figures 1-2). Simultaneously, changes in the glomerular filtration rate (GFR) were observed (Figure 3). In half of the patients diuresis increased by 132.4% on average, and in the other half a mean reduction of 74% was observed (Figure 4). Stabilization of potassium concentration: after the first procedure in ten patients, and eventually in eight patients (Figure 5).

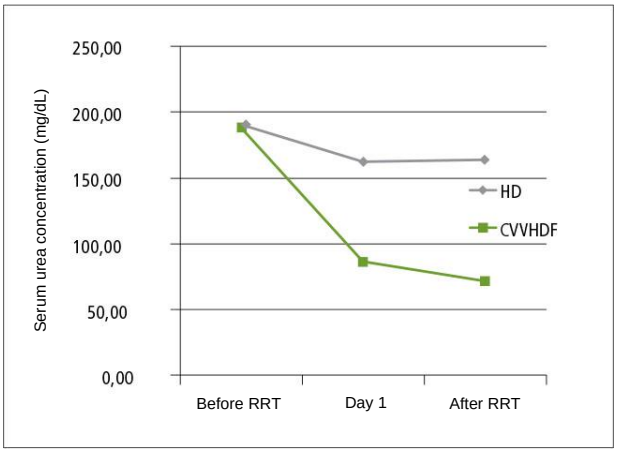


Figure 1. Influence of RRT type on serum creatinine concentration
Rycina 1. Wpływ rodzaju terapii RRT na stężenie mocznika w surowicy

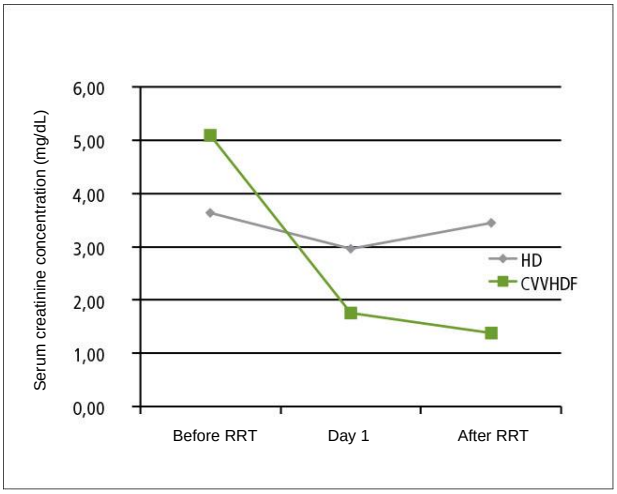


Figure 2. Influence of RRT type on serum creatinine concentration
Rycina 2. Wpływ rodzaju terapii RRT na stężenie kreatyniny w surowicy

CVVHDF in all patients resulted in a mean reduction of creatinine concentration by 75.68%, with urea concentration reduced by 59.40%; kalemia also stabilized. In 75% of patients diuresis was restored (Figure 4). The other figures present the effects of RRT type on the acid-base metabolism parameters (Figure 6-8).

Mortality in both groups was 100%. Figure 9 illustrates the duration of time intervals according to the RRT method used.

Mean time from initiation of RRT to death for all patients was 13.75 days. The shortest survival was observed in the HD group at 11.9 days. In patients who received CVVHDF the mean survival time was 2.1 days longer (17.6%) at 14 days. Combined use of both treatment methods (HD + CVVHDF) generated

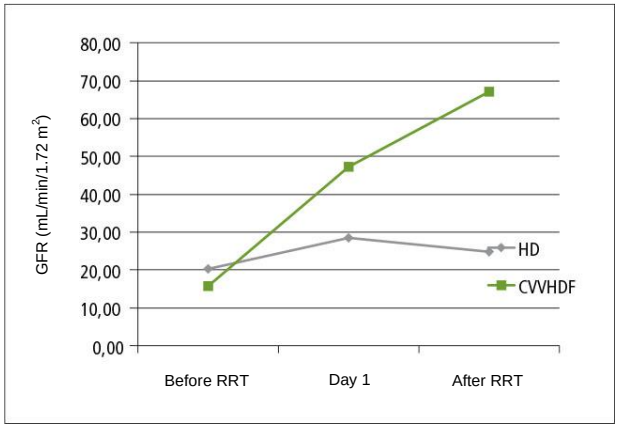


Figure 3. Influence of RRT type on GFR value
Rycina 3. Wpływ rodzaju terapii RRT na wartość GFR

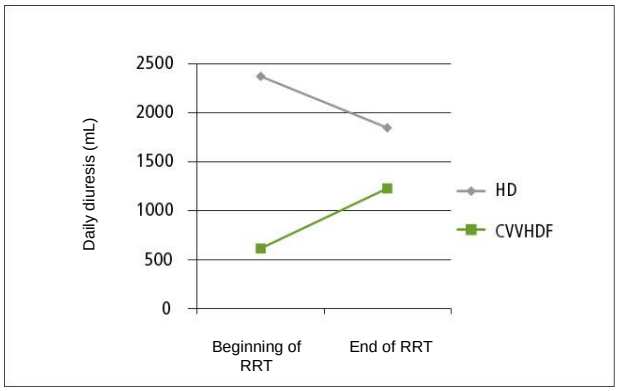


Figure 4. Influence of RRT type on daily diuresis value
Rycina 4. Wpływ rodzaju terapii RRT na diurezę dobową

an even longer time between the beginning of RRT and death, i.e. up to 21 days (9.1 [76.4%] days longer than in the HD group, and 7 [50%] days longer than in the CVVHDF group.

Discussion

AKI related to massive burns defined according to the RIFLE classification occurs in 30-60% of cases. Implementation of urgent renal replacement therapy is necessary in 5% of those patients [7-9]. At the Military Institute of Medicine, nineteen patients met the AKI criteria during the observation period; they constituted 13% of all the patients having burns of over 10% of TBSA. Twelve patients (18% of all the patients with thermal injury) required AKI-RRT.

The mortality rate in the AKI-RRT group is estimated at 40-80% [7, 8], and 100% in the study group. Such a high percentage may be due to the highest referral level of the center; the patients who were transported here were in the most severe conditions, beyond the treatment possibilities of other facilities.

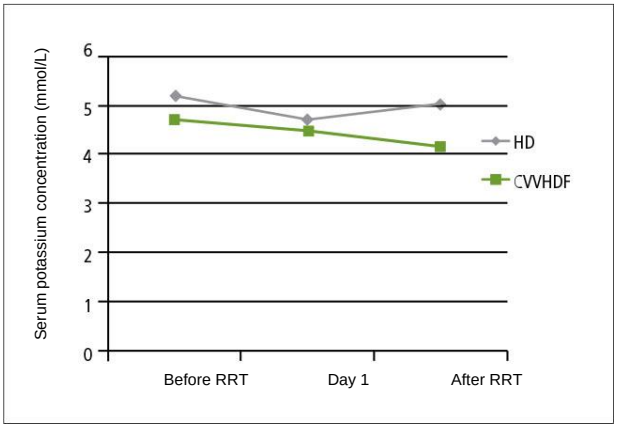


Figure 5. Influence of RRT type on serum potassium concentration
Rycina 5. Wpływ rodzaju terapii RRT na stężenie potasu w surowicy

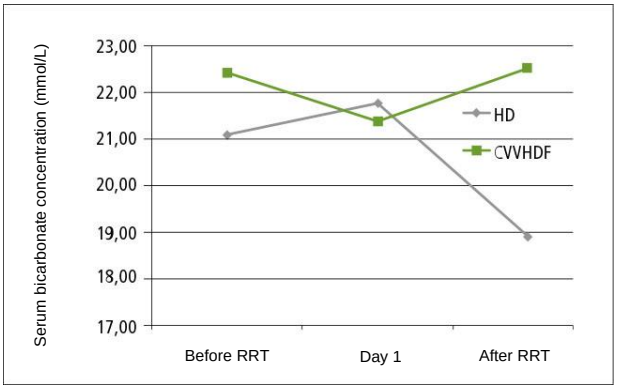


Figure 6. Influence of RRT type on serum bicarbonate concentration
Rycina 6. Wpływ rodzaju terapii RRT na stężenie dwuwęglanów w surowicy

According to the literature, the early form of AKI and AKI-RRT has mainly a pre-renal etiology, resulting from insufficient filling of the vascular bed, hypotonia and insufficiency of the heart as a suction-ejection pump, as a consequence of the violent phase of burn shock [10]. Therefore, the optimal choice of the quantity and composition of transfused fluids in a unit of time is of crucial importance. Hypovolemia, particularly if it is prolonged, results in rapid reduction of diuresis, associated with retention of the products of nitrogen metabolism. On the other hand, too aggressive filling of the vascular bed, especially without proper control of the hydroelectrolytic metabolism, entails the risk of acute cardiovascular system failure with pulmonary edema, peripheral fluid retention and hypertensive crisis [3]. In the study group hypervolemia was not observed. The correct

choice of the quantity and composition of transfused fluids, as well as objective control of the hydration level by monitoring central venous pressure, was an effective method of preventing pulmonary edema. In the study group only one patient (8.3%) was diagnosed with clinically manifested pulmonary edema due to hyperhydration as a result of uncontrolled fluid balance.

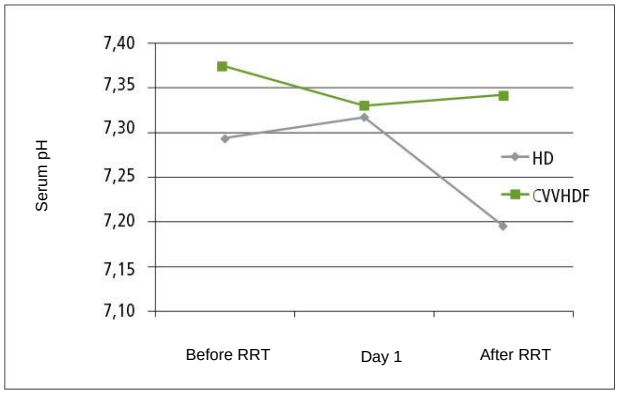


Figure 7. Influence of RRT type on serum pH value
Rycina 7. Wpływ rodzaju terapii RRT na pH surowicy

The place to which patient is transported directly from the scene of the event affects the time of development of AKI-RRT. Among the patients who required early AKI-RRT, as many as 75% were those initially treated at local hospital wards. In case of late AKI-RRT, the ratio decreased to 50%. This may indicate an increased risk of early AKI-RRT in patients who are not initially treated in a specialist burn treatment center. Careful, consistent and restrictive preservation of treatment principles in the first days following the trauma, including optimal fluid resuscitation to control hemodynamic disorders, hydroelectrolytic metabolism and acid-base metabolism, is fundamental in AKI prophylaxis [12].

The late form of AKI, which requires renal replacement therapy, usually either results from septic complications or is an iatrogenic consequence of incorrect use of nephrotoxic medications [10]. In the study group incorrect pharmacotherapy was excluded. Septic complications motivated RRT in 25% of the patients in this group. To compare, symptoms of severe infection were not found in any of the patients in the early AKI-RRT group.

Although in most patients (83.3%) AKI developed by day 6, on day 2 on average, RRT was started from day 9 on average. The main reason for delayed RRT was an attempt to introduce preservative treatment. Urgent initiation of RRT, particularly if symptoms of failure of other organs occur, is associated with a high risk for patients. Creating a temporary vascular access in emergency conditions is associated with an increased rate of hemorrhagic, embolic and septic complications, often with a fatal outcome. Therefore, in almost every case, steps are taken to avoid RRT, primarily concentrating on promoting diuresis and balancing the hydroelectrolytic metabolism and acid-base metabolism. Only when the conservative therapy fails, or massive electrolytic disorders occur, is RRT implemented.

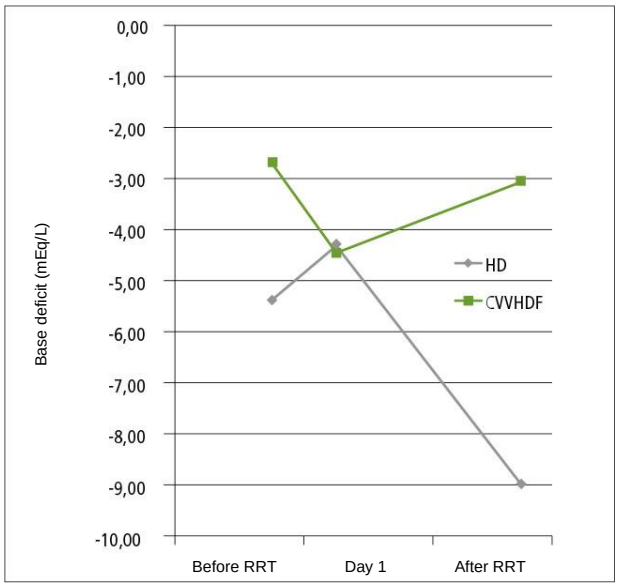


Figure 8. Influence of RRT type on serum base deficit value
Rycina 8. Wpływ rodzaju terapii RRT na niedobór zasad w surowicy

Starting RRT is associated with a fundamental decision regarding treatment method: intermittent, continuous or hybrid therapy [11]. The most frequently chosen techniques are intermittent ones, due to their widespread availability.

Performing hemodialysis (HD), hemofiltration (HF) or hemodiafiltration (HDF) using an artificial kidney in most nephrological centers is simple, safe and inexpensive. The greatest disadvantage is the burden on the circulation system during the procedure, and potential rapid and profound hemodynamic destabilization [11].

Continuous techniques, which are basically the most often used form of continuous veno-venous hemodiafiltration (CVVHDF), form a group of alternative treatment methods. The clear benefits of those long procedures, often taking many days, and especially the absence of associated cardiovascular system disorders, indicate their advantage in patients in severe conditions, who require assistance and hemodynamic stabilization [10]. Unfortunately, the high therapy costs, expensive specialist equipment and reagents required, as well as the permanent engagement of constant and numerous medical personnel, largely limit the use of this method.

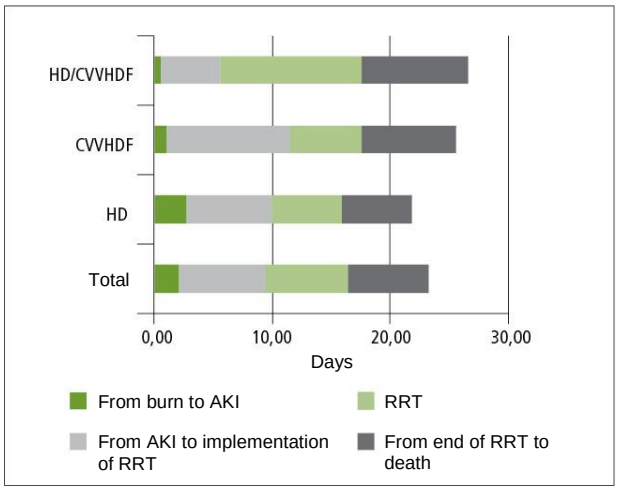


Figure 9. Influence of RRT type on medium survival time
Rycina 9. Wpływ rodzaju terapii RRT na średni czas przeżycia chorych

Recently there has been increased interest shown in hybrid techniques, such as slow low efficiency dialysis (SLED), which combines the benefits of continuous and intermittent methods while eliminating many of their disadvantages. Unfortunately, high equipment costs, despite the reduction of the procedure costs, still limits the possibility of using these methods on a large scale [11].

The available literature does not provide clear conclusions as to the absolute benefits of any one of the methods, such as in terms of extended survival time or improved quality of life. The study group received renal replacement therapy in the form of HD, CVVHDF or a combination of the two. Regardless of the technique used, all of the patients died. The analyses indicate that statistically longer survival was obtained in patients who received CVVHDF, especially in combination with HD.

Study limitations

A considerable limitation affecting the quality of the obtained results was the limited number of patients combined with the single-center nature of observation, which significantly impedes statistical analyses. Moreover, the retrospective type of the study, largely based on the analysis of medical documentation, at times incomplete, made obtaining certain important clinical information impossible.

Conclusions

Acute renal failure requiring RRT in the course of excessive burns is associated with poor prognosis for survival of the patient. The center where the patient is transported from the scene of the trauma significantly affects the time to AKI development. Renal replacement treatment is an effective method in reducing uremic toxins, and stabilizing the hydroelectrolytic metabolism. Despite the progress in new filtration techniques that avoid depression of the cardiovascular system, and the use of modern, highly biocompatible and effective dialysis devices, the mortality rate in this group of patients is high and reaches 100%. Longer survival is obtained in those patients treated with CVVHDF, compared to a classical HD procedure. CVVHDF may be used as the only method, or in combination with HD due to the increased tendency to stabilize proper diuresis.

Comments

This article is an extension of a poster awarded during the Damage Control Surgery – From Battlefield to Trauma Centre, Ossa 21-22 November 2014.

Literature

1. Brusselaers N, Monstrey S, Colpaert K, et al. Outcome of acute kidney injury in severe burns: a systematic review and meta-analysis. Intensive Care Med, 2010; 36: 915─925
2. Matuszkiewicz-Rowińska J. Ostre uszkodzenie nerek i klasyfikacja RIFLE: zalety i wady. [Acute renal damage and RIFLE classification: benefits and disadvantages] Nefrol Dial Pol, 2008; 12: 248-250
3. Ibrahim AE, Sarhane KA, Fagan SP, Goverman J. Renal dysfunction in burns: a review. Ann Burns Fire Disasters, 2013; 26 (1): 16-25
4. Leblanc M, Thibeault Y, Quérin S. Continuous hemofiltration and hemodiafiltration for acute renal failure in severely burned patients. Burns, 1997; 23 (2): 160-165
5. Holm C, Hörbrand F, von Donnersmarck GH, Mühlbauer W. Acute renal failure in severely burned patients. Burns, 1999; 25 (2): 171-178
6. Alvarado R, Chung KK, Cancio LC, Wolf SE. Burn resuscitation. Burns, 2009; 35 (1): 4-14
7. Coca SG, Bauling P, Schifftner T, et al. Contribution of acute kidney injury toward morbidity and mortality in burns: a contemporary analysis. Am J Kidney Dis, 2007; 49 (4): 517-523
8. Mustonen KM, Vuola J. Acute renal failure in intensive care burn patients (ARF in burn patients). J Burn Care Res, 2008; 29 (1): 227-237
9. Soltani A, Karsidag S, Garner W, A ten-year experience with hemodialysis in burn patients at Los Angeles County + USC Medical Center. J Burn Care Res, 2009; 30 (5): 832-835
10. Snell JA, Loh N, Mahambrey T, Shokrollahi K. Clinical review: the critical care management of the burn patient. Crit Care, 2013; 17 (5): 241
11. Matuszkiewicz -Rowińska J. Wybór techniki dializacyjnej u pacjenta z ostrym uszkodzeniem nerek. [Choice of dialysis technique in a patient with acute renal damage] Forum Nefrologiczne, 2009; 2: 80-83
12. Mosier MJ, Pham TN, Klein MB, et al. Early acute kidney injury predicts progressive renal dysfunction and higher mortality in severely burned adults. J Burn Care Res, 2010; 31 (1): 83-92

Analysis of knowledge concerning guidelines related to cardiopulmonary resuscitation among civilian and military nurses

Analiza wiedzy dotyczącej wytycznych resuscytacji krążeniowo-oddechowej wśród pielęgniarek cywilnych i wojskowych

Paulina Stępień-Matuszczyk[1,2]

Military Centre of Preventive Medicine in Gdynia; commandant: Cmdr Krzysztof Drąg MD
[2]Chair of Anesthesiology and Intensive Care at the Medical University of Łódź;
head: Prof. Wojciech Gaszyński MD, PhD

Abstract. The aim of this study was to examine the knowledge and abilities of civilian and military nurses in terms of the use of the current cardiopulmonary resuscitation (CPR) guidelines, and to draw attention to the education of medical staff of this type in the field of cardiopulmonary resuscitation. The study took the form of a questionnaire and involved fifty civilian nurses from the Dolnośląskie and Pomorskie Voivodeships and forty-two military nurses from the Dolnośląskie, Pomorskie, Mazowieckie and Kujawsko-Pomorskie Voivodeships. A substantial lack of knowledge in the field of cardiopulmonary resuscitation was observed among both civilian and military nurses. In Poland, in both civilian and military environments, too little emphasis is still placed on education concerning the guidelines related to cardiopulmonary resuscitation, where the knowledge needs to be updated constantly and verified by professionals in the field.
Key words: cardiopulmonary resuscitation, education, nurse

Streszczenie. Wstęp. Celem pracy było sprawdzenie wiedzy dotyczącej stosowania aktualnie obowiązujących wytycznych resuscytacji krążeniowo-oddechowej (RKO) wśród pielęgniarek cywilnych i wojskowych oraz zwrócenie uwagi na edukację z zakresu resuscytacji krążeniowo-oddechowej u wyżej wymienionego personelu medycznego. Materiał i metody. Badaniem w formie ankiety objęto 50 pielęgniarek cywilnych z województwa dolnośląskiego i pomorskiego oraz 42 pielęgniarki wojskowe z województwa dolnośląskiego, pomorskiego, mazowieckiego i kujawsko-pomorskiego. Wyniki. Stwierdzono istotne braki wiedzy z zakresu resuscytacji krążeniowo-oddechowej zarówno wśród pielęgniarek cywilnych, jak i wojskowych. Wnioski. W Polsce – zarówno w środowisku cywilnym, jak i wojskowym – kładzie się zbyt mały nacisk na kształcenie z zakresu wytycznych resuscytacji krążeniowo-oddechowej, których znajomość powinna być stale aktualizowana i weryfikowana.
Słowa kluczowe: pielęgniarka, resuscytacja krążeniowo-oddechowa, edukacja

Delivered: 14/01/2014
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 161-165

Corresponding author:
Lt. Paulina Stępień-Matuszczyk PhD
Military Centre of Preventive Medicine in Gdynia
4 Grudzińskiego St., 81-116 Gdynia
telephone: +48 56 624 25 87
e-mail: paulina.stepien@onet.com.pl

Introduction

The integrated system of medical emergency services in Poland has affected the development of emergency medicine and emergency nursing. Emergency medicine focuses on the treatment of patients with sudden health or life threatening risks, whereas emergency nursing concentrates on care for patients in those states. The sudden threat to health or life is associated primarily with injuries and acute illnesses [1]. Article 12 of the Act on the profession of nurse and midwife of 11 July 2011 stipulates that: "(...) nurses and midwives are obliged, within the scope of their professional qualifications, to provide assistance in each case when a delay in providing such assistance could result in a sudden health threat" [2].

Therefore, nurses should be professionally well-trained in the general sense, experienced in taking

care of patients in emergency situations, and have specialist qualifications gained during their postgraduate training. Nursing staff in Poland may be employed in hospitals, Emergency Medical Service stations, health centers, nursing homes, hospices, educational facilities, the military and in other places [1]. Therefore, the staff, regardless of the position held, should have up-to-date knowledge and training regarding the latest guidelines on cardiopulmonary resuscitation (CPR), as these form the basis for providing assistance to patients whose lives are under threat, which is one of the main tasks in this profession.

Cardiopulmonary resuscitation guidelines are the effect of scientific studies regarding a wide range of topics related to CPR. Due to the constant development in this field, the guidelines need to be regularly updated so that they still reflect progress and indicate to medical staff the best courses of action. The guidelines are updated every five years to include new therapeutic algorithms that can significantly affect treatment outcomes. The latest guidelines were introduced in 2010, and they determine the basic management algorithms for sudden life risk in children and adults, as well as underlining the principal changes in the guidelines since 2005 [3].

Basic Life Support – Automated External Defibrillation (BLS-AED) should be taught in authorized centers in the form of complementary theoretical training combined with practical exercises under the supervision of an experienced trainer (physician, nurse or paramedic). Nurses should be properly trained to perform basic resuscitation procedures according to the latest guidelines [4].

Aim of the study

The aim of the study was to verify the knowledge and indicate the importance of education regarding cardiopulmonary resuscitation among civilian and military nurses.

Material and Methods

The study took the form of direct interviews based upon a pre-prepared questionnaire. Participation in the survey was voluntary and all of the participants were guaranteed anonymity. The questionnaire consisted of fourteen questions regarding practical and theoretical knowledge of cardiopulmonary resuscitation. Fifty civilian nurses and forty-two military nurses participated in the survey. The results are presented in the table below. The participants were purposefully selected. Two groups were included in the study: the actual study group was composed of civilian nurses while the control group was composed of military nurses. The main independent variable (X) was the type of service: civilian *vs* military, and the dependent variable (Y) was knowledge.

Results

In response to question 1, regarding the knowledge of current CPR guidelines, forty-nine out of fifty civilian nurses declared that they knew the guidelines. This ratio was comparable to that of the military nurses: 41/42. A t-Student test was performed to determine if there were any differences between the civilian and military nurses in terms of the level of training in the current guidelines, and the analysis demonstrated that the level of training declared by the study participants varied between the two groups ($t_{0.05;90}$ = 5.67; p <0.05).

The level of training of civilian nurses (M_1 = 25, S_1^2 = 10.24) was statistically significantly different from that of military nurses (M_2 = 21, S_2^2 = 12.19). The results justify rejection of the null hypothesis, and allow the conclusion that the level of training for military nurses was higher than that of civilian nurses.

Similar statistical data regarding civilian and military nurses refer to the use of CPR guidelines in present work. The t-Student test demonstrated that the use of cardiopulmonary resuscitation guidelines by civilian and military nurses differed ($t_{0.05;90}$ = 5.80; p < 0.05).

The level of use of the guidelines by civilian nurses (M_1 = 25, S_1^2 = 11.56) was statistically significantly different compared to military nurses (M_2 = 21, S_2^2 = 9.33). The results allow rejection of the null hypothesis and indicate a certain advantage of civilian nurses over military nurses in that respect.

In question 4, regarding the last time CPR was performed, the analysis showed differences between the groups of civilian and military nurses ($t_{0.05;90}$ = 6.76; p < 0.05). Performance of CPR by civilian nurses was (M_1 = 25, S_1^2 = 1.62), and was statistically significantly different compared to the performance of CPR by military nurses (M_2 = 21, S_2^2 = 2.36). The results lead to the conclusion that civilian nurses performed CPR more often than military nurses.

In further questions referring to direct activities performed during CPR the statistics varied. In response to question 5, regarding the ratio of chest compressions to breaths for an adult patient, the t-Student test analysis of answers did not reveal any statistically significant difference in knowledge between the civilian group (M_1 = 25, S_1^2 = 33.66) and the military group (M_2 = 21, S_2^2 = 31.5), $t_{0.05;90}$= 1.65; p < 0.05.

As for the same question regarding resuscitation in children, the analysis of knowledge about the ratio of chest compressions to breaths during resuscitation of a child revealed that the level of awareness was different between the civilian group and the military group ($t_{0.05;90}$ = 2.07; p < 0.05).

The number of correct answers provided by civilian nurses (M_1 = 25, S_1^2 = 20.86) was statistically significantly different compared to those provided by military nurses (M_2 = 21, S_2^2 = 80.98). The results justify rejection of the null hypothesis, and allow the conclusion that the level of knowledge among military nurses was higher than that of civilian nurses.

The next question concerned familiarity with the defibrillation method, and the analysis of responses demonstrated differences between the study groups ($t_{0.05;90}$ = 2.29; p<0.05).

The level of training of civilian nurses (M_1 = 25, S_1^2 = 19.17) was statistically significantly different from that of military nurses (M_2 = 2, S_2^2 = 14.40). The results justify rejection of the null hypothesis concerning a lack of differences between civilian nurses and military nurses regarding familiarity with management procedures during defibrillation, and they indicated that the civilian nurses have better knowledge of the procedure.

The t-Student test analysis of responses to question 8, regarding the use of adrenalin in CPR, demonstrated that the level of knowledge in that respect differed between the civilian and military groups ($t_{0.05;90}$ = 1.73; p<0.05).

However, the level of knowledge of the civilian nurses (M_1 = 25, S_1^2 = 28.34) was not significantly statistically different compared to that of military nurses (M_2 = 21, S_2^2 = 31.1). The results allow rejection of the directional hypothesis, which assumes that the civilian nurses have a better understanding of the adrenalin doses required during CPR.

According to the adopted hypothesis, it should be concluded that both groups were equally familiar with adrenalin dosing during cardiopulmonary resuscitation.

Similarly, the analysis of responses to question 9, regarding knowledge of energy values used during defibrillation in children, revealed that the level of knowledge in civilian nurses (M_1 = 25, S_1^2 = 33.62) was not significantly statistically different from that of military nurses (M_2 = 21, S_2^2 = 31.5). The results justify rejection of the directional hypothesis that "the group of civilian nurses is better acquainted with the energy level used during defibrillation in children", and the conclusion that both groups are familiar with the proper energy level of defibrillation in children.

In response to question 10, regarding administration of drugs in hypothermia, only seventeen out of the forty-two study participants from the military group gave the correct answer, compared to thirty-three out of the fifty from the civilian group. The t-Student test analysis demonstrated differences in the level of knowledge in that area between the civilian and military nurses ($t_{0.05;90}$ = 3.21; p<0.05). The knowledge of the administration of drugs in hypothermia presented by civilian nurses (M_1 = 25, S_1^2 = 11.86) was statistically significantly different compared to that of military nurses (M_2 = 21, S_2^2 = 4.79). The results allow rejection of the null hypothesis: "Both groups of nurses know when to administer drugs in hypothermia". According to the adopted hypothesis, the group of civilian nurses was better acquainted with the management procedures in hypothermia.

Regarding the number of breaths before chest compressions in children during resuscitation, the analysis revealed different levels of knowledge in both study groups ($t_{0.05;90}$ = 1.53; p<0.05). The results justify rejection of the directional hypothesis, according to which the group of civilian nurses is better acquainted with the correct number of breaths performed before chest compressions in children during resuscitation.

In question 12, the level of knowledge presented by civilian nurses (M_1 = 25, S_1^2 = 25.22) was not statistically significantly different from that of military nurses (M_2 = 21, S_2^2 = 31.5). The results allow rejection of the null hypothesis: "The group of civilian nurses is better acquainted with the position in which pregnant woman should be placed during cardiopulmonary resuscitation". According to the adopted hypothesis, both civilian and military nurses knew the proper position of a pregnant woman during CPR.

The t-Student test analysis revealed that the level of knowledge regarding the correct ratio of chest compressions to the number of emergency breaths during CPR in neonates differs between the groups of civilian and military nurses ($t_{0.05;90}$ = 2.85; p<0.05). According to the adopted hypothesis, the group of civilian nurses was more familiar with the number of chest compressions and emergency breaths for a neonate during cardiopulmonary resuscitation.

As for the level of knowledge of adrenalin administration in rhythms during defibrillation, the analysis of responses demonstrated differences between the study groups ($t_{0.05;90}$ = 2.09; p < 0.05). The knowledge of administration of adrenalin in rhythms during defibrillation presented by civilian nurses (M_1 = 25, S_1^2 = 18.58) was statistically significantly different compared to that of military nurses (M_2 = 21, S_2^2 = 22.41). The results allow rejection of the null hypothesis: "Civilian and military nurses know when to administer adrenalin in rhythms requiring defibrillation". According to the adopted hypothesis, military nurses are better acquainted with when to administer adrenalin in rhythms requiring defibrillation.

Discussion

Cardiopulmonary resuscitation comprises a set of actions that require extensive knowledge, as well as complete composure during performance of the procedure. Therefore, the medical personnel need to

be well prepared to perform it. The results of the study conducted among civilian and military nurses demonstrated that not all aspects of the CPR guidelines were properly acquired by the medical personnel.

Studies carried out in different parts of the world have revealed that in emergencies the knowledge of medical personnel of CPR and first aid principles often determines the chances of survival of the casualty [5-7]. It is also worth emphasizing that every minute of delay in undertaking resuscitation decreases the chances of the patient's survival by 10-12% [8-10]. Studies evaluating familiarity with resuscitation procedures in children, conducted among primary healthcare physicians and paramedics in the Mazowieckie, Łódzkie and Zachodniopomorskie Voivodeships, demonstrated insufficient knowledge of advanced resuscitation procedures in pediatric patients [11]. This study conducted among civilian and military nurses also revealed deficits in this area, such as a lack of basic knowledge about the ratio of chest compressions to emergency breaths, both in children and in neonates. Moreover, only military nurses fully understood the correct energy level for defibrillation in children. Another important issue was the insufficient knowledge among the nurses about the number of breaths performed during CPR before chest compressions. Studies conducted among medical staff lead to the conclusion that more emphasis should be placed on updating the guidelines regarding the resuscitation of pediatric patients.

Studies carried out among the medical staff of the pediatric hospital in Poznań revealed fragmentary knowledge regarding CPR. In these studies most inaccuracies were associated with chest compressions. More nurses than physicians had a limited knowledge of resuscitation procedures. As for the knowledge related to resuscitation of children, this was two to three times better among surgical nurses than other nurses [7]. In this study conducted among military and civilian nurses, an insufficient knowledge of resuscitation cycles in adults concerning the compressions/breaths ratio was demonstrated only by civilian nurses, as all the military nurses knew the proper procedure. The problem of the lack of sufficient knowledge among the medical staff of CPR is well-documented, and has been presented in studies conducted among pediatricians [12, 13], intensive care nurses [14] and anesthesiologists [15]. Studies carried out among first-year students of the second degree part-time nursing program at the Medical University of Warsaw revealed insufficient knowledge regarding CPR, with as many as 20% of the nursing students participating in the study not knowing what BLS was, 15% not being familiar with the proper CPR algorithm, and only 44% knowing for what an automatic external defibrillator (AED) was used. The results of these studies clearly demonstrate the insufficient knowledge of the surveyed nursing students, who should already be familiar with this issue [16].

The results of this study conducted among civilian and military nurses on CPR revealed significant deficits in the knowledge of the current guidelines from 2010, regarding both management of adult and pediatric patients. Not all nurses knew the correct energy values for defibrillation or when to administer adrenalin during CPR. The t-Student test analysis showed that military nurses had slightly more extensive knowledge of CPR guidelines than civilian nurses; however, in certain areas such as the administration of drugs in hypothermia or the ratio of chest compressions to emergency breaths in neonates then the knowledge of the military staff may be considered unsatisfactory.

The European Resuscitation Council has prepared uniform teaching programs as a basis for courses in CPR in adults, children and neonates [7-9]. However, in Poland the courses are not obligatory, despite the fact that continuous education in that respect increases the level of knowledge and effectiveness of resuscitation.

Conclusions

1. In Poland, both in civilian and military environments, too little emphasis is placed on education concerning CPR guidelines.
2. Knowledge in the above area among the nursing staff should be regularly updated and verified.

Literature

1. Kózka M, Rumian B, Maślanka M. Pielęgniarstwo ratunkowe. [Emergency nursing] Warsaw, Wydaw. PZWL, 2013: 40─44
2. Ustawa z dnia 15 lipca 2011 r. o zawodach pielęgniarki i położnej. Dz. U. z 2011 r. Nr 174, poz. 1039 [Act of 15 July 2011 on the profession of nurse and midwife. Official Journal of Laws of 2011, No. 174, Item 1039]
3. Wytyczne resuscytacji krążeniowo-oddechowej 2010. [Guidelines of cardiopulmonary resuscitation 2010] Krakow, Polska Rada Resuscytacji [Polish Resuscitation Council], 2010: 83
4. Opinia Konsultanta Krajowego w dziedzinie pielęgniarstwa pediatrycznego z dnia 10.01.2011 r. w sprawie postępowania pielęgniarek środowiska nauczania i wychowania, w ramach resuscytacji krążeniowo-oddechowej [Opinion of the National Consultant for pediatric nursing of 10 January 2011 regarding actions of nurses in the educational and didactic environment related to cardiopulmonary resuscitation]
5. Bertoglio VM, Azzolin K, De Souza EN, et al. Training in cardiopulmonary resuscitation: impact on the theoretical knowledge of nurses. Rev Gaucha Enferm, 2008; 29 (3): 454─460
6. Galinsk i M, Loubardi N, Duchossoy MC, et al. In-hospital cardiac arrest resuscitation: medical and paramedical theory skill assessment in an university hospital. Ann Fr Anesth Reanim, 2003; 22 (3): 179-182
7. Grześkowiak M, Bartkowska-Śniatkowska A, Rosada-Kurasińska J, et al. A survey of basic resuscitation knowledge among medical personnel of a pediatric hospital. Anestezjol Intens Ter, 2009; 41 (3): 155-158
8. Kleinman ME, Chameides L, Schexnayder SM, et al. Part 14: Pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation, 2010; 122 (3): 876─908

9. Jedvijić J, Surbatović N, Stanković N, et al. Major changes in the European Resuscitation Council Guidelines for Cardiopulmonary Resuscitation 2010 in the field of adult basic and advanced life support. Vojnosanit Pregl, 2012; 69 (3): 265–269
10. Link MS, Atkins DL, Passman RS, et al. Part 6: Electrical therapies: automated external defibrillation, cardioversion and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, Circulation, 2010; 122 (3): 706–719
11. Szarpak Ł, Patynowska AM, Kurkowski A, et al. Znajomość zaawansowanych zabiegów resuscytacyjnych u dzieci wśród lekarzy i ratowników medycznych. [Knowledge of advanced resuscitation procedures in children among physicians and paramedics] Nowa Pediatria. Warsaw, Wydawnictwo Medyczne Borgis, 2013: 59-63
12. Buss PW, McCabe M, Evans RJ, et al. A survey of basic resuscitation knowledge among resident pediatricians. Arch Dis Child, 1993; 68: 75–78
13. Nadel FM, Lavelle JM, Fein JA, et al. Assessing pediatric senior residents' training in resuscitation: fund of knowledge, technical skills, and perception of confidence. Pediatr Emerg Care, 2000; 16: 73–76
14. Anthonypillai F. Retention of advanced cardiopulmonary resuscitation knowledge by intensive care trained nurses. Intensive Crit Care Nurs, 1992; 8: 180–184
15. Semeraro F, Signore L, Cerchiari EL. Retention of CPR performance in anesthetists. Resuscitation, 2006; 68: 101–108
16. Olejniczak D, Miciuk D, Religioni U. Ocena stanu wiedzy studentów Warszawskiego Uniwersytetu Medycznego na kierunku pielęgniarstwo, na temat udzielania pierwszej pomocy przedmedycznej. [Assessment of the level of knowledge presented by students of nursing program at the Medical University of Warsaw regarding pre-medical first aid] Pielęgniarstwo i Zdrowie Publiczne. Wrocław, Wrocław Medical University, 2013; 3: 101-110

Evaluation of bacterial flora in mucosal membrane samples in chronic rhinosinusitis

Ocena flory bakteryjnej w wycinkach z błony śluzowej w przewlekłym zapaleniu zatok przynosowych

Agnieszka Kwaśnik-Balińska[1], Justyna Osińska[2], Urszula Antos[2], Jolanta Korsak[2], Dariusz Jurkiewicz[1]

[1] Department of Otolaryngology and Laryngological Oncology with the Clinical Cranio-maxillofacial Surgery Unit, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine; head: Prof. Dariusz Jurkiewicz MD, PhD
[2]Clinical Transfusiology Unit, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine; head: Prof. Jolanta Korsak MD, PhD

Abstract. Little is known about the impact of atypical bacteria in the pathogenesis of chronic rhinosinusitis. This study examined the aerobic and atypical bacterial flora in patients with chronic rhinosinusitis (CRS) who underwent surgery. The study involved a group of thirty-four patients with CRS. The control group consisted of seventeen patients with DSN. During the functional endoscopic sinus surgery, mucosal membrane samples were taken from inside the sinus. The samples were used for detection of *M. pneumoniae* and *Ch. pneumoniae* DNA using real-time PCR. Swabs from the sinus were sent for bacteriological examination. Patients from the control group underwent nasal septoplasty, during which small samples of nasal septum mucosa were taken for detection of atypical bacteria. Swabs from the middle meatus were also taken and sent for bacteriological examination. No atypical bacteria DNA were identified in any patient using real-time PCR. The most common aerobic bacteria were: *S. aureus*, CNS, *S. epidermidis* and *K. pneumoniae*.
Key words: atypical bacteria, chronic rhinosinusitis (CRS), functional endoscopic sinus surgery (FESS)

Streszczenie. Wstęp. Mało znany jest udział bakterii atypowych w patogenezie przewlekłego stanu zapalnego zatok przynosowych (PZZP). Cel pracy. Oceniano występowanie flory bakteryjnej typowej i atypowej u pacjentów z PZZP, którzy zostali poddani leczeniu operacyjnemu. Materiał i metody. W badaniu uczestniczyło 34 pacjentów z PZZP. Grupę kontrolną stanowiło 17 pacjentów ze skrzywieniem przegrody nosa. Podczas czynnościowej endoskopowej operacji zatok przynosowych pobierano wycinki z błony śluzowej zatok przynosowych. Próbki badane były metodą *real-time* PCR na obecność DNA bakterii *M. pneumoniae* i *Ch. pneumoniae*. Wymazy pobierane z zatok przynosowych przesyłane były do badania bakteriologicznego. Pacjentom z grupy kontrolnej pobrano wycinki z błony śluzowej przegrody nosa podczas operacji przegrody nosa, które były następnie badane na obecność bakterii atypowych. Pobierano również wymazy z przewodu nosowego środkowego do badania bakteriologicznego. Wyniki. U żadnego pacjenta w badaniu *real-time* PCR nie stwierdzono obecności DNA bakterii atypowych. Najczęstszymi bakteriami tlenowymi były: *Staphylococcus aureus*, *Staphylococcus* koagulazoujemny, *Staphylococcus epidermidis* i *Klebsiella pneumoniae*.
Słowa kluczowe: bakterie atypowe, czynnościowa operacja zatok przynosowych, przewlekłe zapalenie zatok przynosowych

Delivered: 16/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys. 2015; 93 (2): 166-169

Corresponding author:
Agnieszka Kwaśnik-Balińska
Department of Otolaryngology and Otolaryngological Oncology with Clinical
Cranio-Maxillofacial Surgery Unit of the Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw, Poland
telephone: +48 261 817 469
e-mail: akwasnik-balinska@wim.mil.pl

Introduction

Chronic rhinosinusitis (CRS) is a common disease affecting 12-16% of the population and accounting for 5-10% of all respiratory infections [1]. It is an inflammatory process in the mucosal membrane of the sinuses, due to disturbed drainage and ventilation. It develops as a result of infections, allergies or

structural anomalies that obstruct the nose and ostia of the paranasal sinuses [2]. The main role in the pathogenesis of chronic rhinosinusitis is attributed to aerobic and anaerobic bacterial infections. The basic pathogens found in the mucosa in chronic rhinosinusitis are: *Streptococcus pneumoniae, Haemophilus influenzae* and *Moraxella catarrhalis* [3]. Few reports are available regarding the role of atypical bacteria in the development of chronic inflammation of the paranasal sinuses. The mechanism of CRS development is also associated with abnormalities in the ostiomeatal complex [4]. When the nasal mucosa is swollen, the ostia of the paranasal sinuses become blocked and, as a result, ventilation and mucociliary transport are disturbed.

Kern [5] explained the mechanism resulting from the blockage of the ostia of paranasal sinuses. Hypoxia leads to the disturbed functioning of the ciliary epithelium and to cilia paralysis. Simultaneously, the blood vessels dilate, edema of the mucosal membrane occurs, and the salivary gland function is disturbed, resulting in thicker secretion. The fluid retained in the sinus forms the perfect nourishment for growing bacteria. Characteristic for chronic rhinosinusitis is persistence of disease symptoms for over 12 weeks, and after that time the disease does not disappear completely. Two types of CRS are distinguished: chronic rhinosinusitis with nasal polyposis and chronic rhinosinusitis without nasal polyps. Typical for rhinosinusitis is the presence of at least two symptoms, one of which has to be related to a blockage, nasal obstruction or discharge – from the nose or running down the posterior wall of the pharynx. Additional symptoms may include: facial pain or distension and olefactory disorders [6].

Aim of the study

The aim of the study was to assess the typical and atypical bacterial flora in patients with chronic rhinosinusitis without nasal polyps, qualified for functional endoscopic sinus surgery (FESS).

Material and Methods

The study involved thirty-four patients with chronic rhinosinusitis without nasal polyps, treated in the years 2013-2014 at the Department of Otolaryngology and Laryngological Oncology with Clinical Cranio-maxillofacial Surgery Unit, Military Institute of Medicine in Warsaw. The study was approved by a Bioethical Committee; moreover, all patients provided written consent to participate in the study. The study group comprised thirty-four patients, eighteen of whom were males and sixteen females aged 19-72 years (mean age: 46.7 years). Following unsuccessful conservative treatment (antibiotic therapy and oral and intranasal steroid therapy) the patients were qualified for surgical treatment.

Prior to the procedure, all the patients received a laryngological examination with nasal endoscopy, and computed tomography of the paranasal sinuses in two projections: frontal and transverse. In all the patients in the study group, functional endoscopic surgery of the paranasal sinuses was performed under general anesthesia. During the endoscopically controlled surgery, a swab for bacteriological tests was obtained after opening the paranasal sinuses and finding inflammatory lesions. A sample of the mucosal membrane from the inflamed paranasal sinuses was made by cutting forceps to be tested for atypical bacteria. The swabs were usually obtained from the maxillary, frontal and posterior ethmoid sinuses, placed on a transport medium and within three hours delivered to the Laboratory Diagnostics Unit of the Military Institute of Medicine in Warsaw.

The material was placed on the following media: Columbia agar with 5% sheep blood, BHI agar medium to grow *Haemophilus influenzae,* MacConkey medium to grow Gram-negative bacilli, and Chapman medium to grow *Staphylococcus aureus.* The following media: Columbia agar, MacConkey agar and Chapman agar were incubated at 36-37°C for 24 hours. The BHI medium was incubated for 24 hours at 36-37°C with 5% CO_2. Assessment of bacterial growth and their identification were performed after the incubation period, using diagnostic discs and biochemical methods.

The samples from the mucosa of the paranasal sinuses were taken from the maxillary, frontal, posterior, sphenoidal sinuses and frontal recess. The mean size of the samples obtained was 10 x 10 mm. The material was immediately delivered to the Clinical Transfusiology Unit of the Military Institute of Medicine in Warsaw, where it was frozen at -80°C until testing was performed. The samples of the mucosa of the paranasal sinuses were tested by *real-time* PCR with quantitative analysis of the product in real time. The examination was performed using a SmartCycler DX3.0 thermocycler and the following kits: Duplic α $^{Real\ Time}$ Chlamydia pneumoniae Kit and Duplic α $^{Real\ Time}$ Mycoplasma pneumoniae Kit. The Duplic α $^{Real\ Time}$ Chlamydia pneumoniae Kit detects the *MOMP Chlamydia pneumoniae* gene, while the Duplic α $^{Real\ Time}$ Mycoplasma pneumoniae Kit was developed to detect gene P1 coding adhesin 1842.

The control group consisted of seventeen patients: thirteen males and four females aged 19-63 years old (mean age: 42.3 years) with nasal septum deviation, qualified for septoplasty. During the procedure under general anesthesia, a swab from the middle meatus was taken for bacteriological examination, as well as a sample from the healthy mucosa of the nasal septum in order to identify atypical bacteria.

Table 1. Results of the bacteriological examination in the study group
Tabela 1. Wyniki badań bakteriologicznych w grupie badanej

Bacteria	Number of cultures (n = 34)
Staphylococcus aureus	11 (32.4%)
Coagulase-negative Staphylococcus	7 (20.58%)
Staphylococcus epidermidis	3 (8.82%)
Klebsiella pneumoniae	3 (8.82%)
Enterobacter aerogenes	1 (2.94%)
Staphylococcus aureus, *Enterobacter aerogenes*	1 (2.94%)
Staphylococcus aureus, *Enterococcus faecalis*	1 (2.94%)
Klebsiella pneumoniae, *Proteus mirabilis*	1 (2.94%)
Klebsiella pneumoniae, *Morganella morganii*	1 (2.94%)
Klebsiella pneumoniae, coagulase-negative *Staphylococcus*	1 (2.94%)
Klebsiella pneumoniae, *Enterococcus faecalis*	1 (2.94%)
Pseudomonas aeruginosa, *Enterobacter cloacae complex*	1 (2.94%)
Klebsiella oxytoca, *Escherichia coli*, *Staphylococcus aureus*	1 (2.94%)
Haemophilus parainfluenzae, coagulase-negative *Staphylococcus* , *Streptococcus viridans*	1 (2.94%)

Tests results

All the swabs obtained from all the patients in the study group revealed bacteria. In twenty-five (73.53%) patients one bacteria type was found, and in nine (26.47%) patients mixed bacterial flora was detected. The most frequently observed bacteria were as follows: *Staphylococcus aureus* grown in eleven cultures (32.4%), coagulase-negative *Staphylococcus* in seven cultures (20.58%) and *Staphylococcus epidermidis* and *Klebsiella pneumonia* in three cultures (8.82%) (Tab. 1). The *real-time* PCR examination did not show the DNA of atypical bacteria in any of the patients. In the control group in eleven (64.7%) cultures coagulase-negative *Staphylococcus* was found, in one (5.88%) *Escherichia coli*, and in one (5.88%) *Enterococcus faecalis* (Tab. 2.). The *real-time* PCR examination did not reveal the DNA of atypical bacteria in the mucosa of the nasal septum.

Table 2. Results of the bacteriological examination in the control group
Tabela 2. Wyniki badań bakteriologicznych w grupie kontrolnej

Bacteria	Number of cultures (n = 17)
Coagulase-negative *Staphylococcus*	11 (64.7%)
Escherichia coli	1 (5.88%)
Enterococcus faecalis	1 (5.88%)
Escherichia coli, *Staphylococcus aureus*	2 (11.76%)
Staphylococcus aureus, coagulase-negative *Staphylococcus*	1 (5.88%)
Hafnia alvei, *Staphylococcus aureus*	1 (5.88%)

Discussion

The literature presents different data regarding pathogens causing chronic rhinosinusitis. In adult patients *Streptococcus pneumoniae*, *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Haemophilus influenzae* and *Moraxella catarrhalis* are usually found [7, 8]. In those patients with CRS without nasal polyps in our study, two bacteria dominated the grown cultures: *Staphylococcus aureus* (32.4%) and coagulase-negative *Staphylococcus* (20.58%). The study performed by Doyl [9] in fifty-nine patients with chronic rhinosinusitis demonstrated the presence of *Staphylococcus aureus* in 34% of cases, and coagulase-negative *Staphylococcus* in 73%. Another study involved eleven patients with CRS who underwent functional endoscopic surgery of the paranasal sinuses [10]. Swabs from the paranasal sinuses for bacteriological tests were obtained from the patients, as well as samples from the sinus mucosa for PCR examination of three atypical bacteria: *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae* and *Legionella pneumophila*. Similarly to our study, no atypical bacteria were found in any of the patients. The following bacteria dominated in the cultures: coagulase-negative *Staphylococcus* (five patients) and *Staphylococcus aureus* (two patients). Pandak et al. [11] examined sixty-two patients with chronic rhinosinusitis. During functional endoscopic sinus surgery, washings were collected from the paranasal sinuses for bacteriological and *real-time* PCR examinations. This study did not confirm either the presence of atypical bacteria in the pathogenesis of chronic inflammation of the paranasal sinuses. The most frequently grown bacteria in the cultures from the sinuses were as follows: *Staphylococcus epidermidis* (44.44%), *Staphylococcus aureus* (22.22%) and *Escherichia coli* (29.41%). Another study involving twenty-seven patients with CRS, in which PCR was used to detect *Chlamydophila pneumoniae*, did not confirm either the presence of

this bacteria in the paranasal sinuses [12]. Cultrara et al. [13] conducted a study involving twenty children with chronic rhinosinusitis, taking swabs from the nasopharynx and middle meatus, washings from paranasal sinuses, samples from the pharyngeal tonsil and from the mucosa of the ethmoid sinuses. Ninety-seven samples were obtained and tested using the HEp-2 cell culture for *Chlamydophila pneumoniae*. In only one child did the nasopharyngeal swabs and samples from the pharyngeal tonsil reveal *Chlamydophila pneumoniae*. Most study results available in the literature do not confirm the participation of atypical bacteria in the pathogenesis of chronic rhinosinusitis, which is consistent with the results of our study.

Conclusions

1. In all patients with chronic rhinosinusitis without nasal polyposis, aerobic bacteria were found.
2. The most frequently observed bacterial pathogens in CRS without nasal polyps were: *Staphylococcus aureus* (32.4%), coagulase-negative *Staphylococcus* (20.58%), *Staphylococcus epidermidis* (8.82%), *Klebsiella pneumoniae* (8.82) and *Enterobacter aerogenes* (2.94%).
3. The PCR examination did not show atypical bacteria in the DNA of any of the patients.

Literature

1. Anand VK. Epidemiology and economic impact of rhinosinusitis. Ann Otol Rhinol Laryngol, 2004; 113: 3-5
2. Śliwińska-Kowalska M, Michalska M, Szczerba I, et al. Bakteriologia infekcyjnych zaostrzeń przewlekłych zapaleń zatok przynosowych. Porównanie różnych metod pobierania materiału do badań bakteriologicznych. [Bacteriology of infectious exacerbations of chronic rhinosinusitis. Comparison of different methods of material collection for bacteriological tests] Astm Alergia Immunol, 2000; 5: 57─63
3. Jurkiewicz D, Zielnik-Jurkiewicz B, Dzierżanowska D. Zakażenia nosa i zatok przynosowych. [Infections of the nose and paranasal sinuses] In: Dzierżanowska D, Jurkiewicz D, Zielnik-Jurkiewicz B, eds. Zakażenia w otolaryngologii. [Infections in otolaryngology] Bielsko-Biała, Wyd. α-medica press, 2002: 80-108
4. Kennedy DW, Zinreich SJ. The functional endoscopic approach to inflammatory sinus disease: current prospectives and technique modifications. Am J Rhinol, 1988; 2 (3): 89-93
5. Kern EB. Sinusitis. J Allerg Clin Immunol, 1984; 73 (1): 25-31
6. Fokkens WJ, Lund VJ, Mullol J, et al. European position paper on rhinosinusitis and nasal polyps 2012. Rhinol Suppl, 2012; 23: 1-298
7. Su WY, Liu C, Hung SY, et al. Bacteriological study in chronic maxillary rhinosinusitis. Laryngoscope, 1983; 93: 931-993
8. Brook I. Bacteriology of chronic maxillary rhinosinusitis in adults. Ann Otol Rhinol Laryngol, 1989; 98: 426-428
9. Doyle P, Woodham JD. Evaluation of the microbiology of chronic ethmoid sinusitis. J Clin Microbiol, 1991; 29: 2396-2400
10. Lee RE, Kaza S, Plano GV, et al. The role of atypical bacteria in chronic rhino-sinusitis. Otolaryngol. Head Neck Surg, 2005; 113: 407-410
11. Pandak N, Pajić-Penavić I, Židovec-Lepej S, et al. Chlamydophila pneumoniae and mycoplasma pneumoniae were not identified in the sinus mucosa of patients with chronic rhinosinusitis. Eur Arch Otorhinolog, 2014; 271: 1553-1555
12. Fahrenholz J, Stratton C, Wolf B, et al. Chlamydophila pneumonia and chronic sinusitis. J Allergy Clin Immunol, 2008; 2 (suppl. 1): 217
13. Cultrara A, Goldstein NA, Ovchinsky A, et al. The role of Chlamydia pneumonia infection in children with chronic sinusitis. Arch Otolaryngol Head Neck Surg, 2003; 129: 1094-1097

Correlation assessment of early phase hematopoietic system regeneration rate and febrile state occurrence in patients after hematopoietic stem cell transplantation

Badanie korelacji szybkości wczesnej fazy regeneracji układu krwiotwórczego i występowania stanów gorączkowych u chorych po przeszczepieniu macierzystych komórek krwiotwórczych

Krzysztof Gawroński[1], Piotr Rzepecki[1], Gabriel Wcisło[2]

[1]Department of Internal Diseases and Haematology, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Prof. Piotr Rzepecki MD, PhD
[2]Department of Oncology, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Prof. Cezary Szczylik MD, PhD

Abstract. Hematopoietic stem cell transplantation (HSCT) is an established therapeutic method, especially for patients with neoplastic blood diseases. During the HSCT procedure, many patients have a febrile state of varied duration. According to clinical observations in our center, fever extended the time of hematopoietic system regeneration after transplantation. Attention should be paid to the fact that no literature sources were found to describe this problem clearly in patients after transplantation. In this study, an attempt was made to analyze the impact of fever on the hematopoietic system regeneration defined as the persistence of ANC >0.5 G/L for two subsequent days or >1.0 G/L for one day. In relation to platelet count, hematopoietic stem cell regeneration is defined as a sustained platelet count >20 G/L without the need for platelet transfusion. A high correlation was demonstrated between the total number of fever days and the number of days necessary for the patient to reach an ANC count >0.5 G/L, ANC >1.0 G/L, and between the total number of fever days and the number of the days necessary for the patient to reach a PLT count >20G/L and PLT >50G/L.
Key words: bone marrow regeneration, fever, hematopoietic cell transplantation

Streszczenie. Przeszczepienie macierzystych komórek krwiotwórczych jest uznaną metodą terapeutyczną stosowaną zwłaszcza w odniesieniu do chorych z nowotworowymi chorobami krwi. Wielu chorych w trakcie procedury transplantacyjnej ma różnie długo utrzymujące się stany gorączkowe. Według własnych obserwacji klinicznych gorączki wydłużały czas regeneracji układu krwiotwórczego w okresie potransplantacyjnym. Zwracał uwagę fakt, że nie znaleziono publikacji, które by jasno charakteryzowały ten problem w odniesieniu do chorych po przeszczepieniu. Podjęto próbę analizy wpływu gorączki na sam proces regeneracji układu krwiotwórczego, który jest wyraźnie zdefiniowany: „przyjęcie się przeszczepu to utrzymywanie się przez 2 kolejne dni liczby granulocytów podzielonych (neutrofilów) >0,5 G/L lub >1,0 G/L przez jeden dzień. Przyjęcie się układu płytkotwórczego jest definiowane jako utrzymywanie się liczby płytek krwi >20 G/L bez konieczności przetaczania masy płytkowej". Wykazano duże współczynniki korelacji pomiędzy łączną liczbą dni gorączkowych a liczbą dni potrzebnych pacjentowi do uzyskania ANC >0,5 G/L, ANC >1,0 G/L oraz łączną liczbą dni gorączkowych a liczbą dni potrzebnych pacjentowi do osiągnięcia wartości PLT >20 G/L i PLT >50 G/L.
Słowa kluczowe: przeszczepienie komórek krwiotwórczych, regeneracja szpiku, gorączki

Delivered: 20/10/2014
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 170-175

Corresponding author:
Krzysztof Gawroński MD, PhD
Department of Internal Diseases and Haematology, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw, Poland
telephone: +48,261,816,170
e-mail: kgawronski@wim.mil.pl

Introduction

At present, hematopoietic stem cell transplantations are performed not just due to hematological indications, they are also performed to treat immunodeficiency, genetically conditioned metabolic diseases and certain solid tumors. The failure of this type of therapy is caused mainly by the recurrence of neoplastic disease, infections due to immunological disorders, graft-versus-host disease or hepatic veno-occlusive disease [1-6].

Bone marrow transplantation is a procedure consisting of the administration of a preparation that contains hematopoietic (blood-producing) stem cells which can recreate a patient's hematopoietic system that has been destroyed or damaged as a result of chemotherapy and/or radiotherapy (autologous transplant), or replace the pathological hematopoiesis of the patient (e.g. in leukemia) with the hematopoietic cells of a healthy person (allogeneic transplant).

The common term "bone marrow transplant" also covers transfusion of hematopoietic stem cells isolated from peripheral blood in a process called hematopoietic cell separation, after their mobilization with the use of cytokines or cytostatics [2-4].

The transplantation procedure starts at the moment of diagnosis of the disease and preliminary qualification of the patient for an autologous or allogeneic transplant. Four phases can be distinguished:

1. **induction** – conventional chemotherapeutic doses are used to remove neoplastic cells circulating in the blood, and to reduce tumor size;
2. **mobilization/harvesting;**
3. **conditioning;**
4. **engraftment** [7-10]:

- **first period – early recovery –** estimated at <30 days after grafting; the period of neutropenia, possible damage to the mucosa and the oral cavity; it is often associated with infections resulting in fever,
- **second period – mid-recovery** – estimated at 30-100 days after grafting; in this period cellular immunity may be disturbed, acute or chronic GvHD occurs; febrile states due to GvHD or bacterial, viral or fungal infections, as well as opportunistic infections, may occur,
- **third period – late recovery –** estimated at >100 days after grafting; this period is characterized by disturbed humoral and cellular immunity, as well as the occurrence of resulting infections; chronic GvHD may develop; this period may persist for a year or more [7-10].

Fever in the course of transplantation is often clinically diagnosed, but it rarely occurs on its own.

Febrile neutropenia (FN) is a particular type of fever which can occur during the peritransplant period [11]. Neutropenia, defined as the reduction in the blood neutrophil count of below 1.5 G/L, is a risk factor of importance proven by Bodey in the 1970s. If the neutrophil count is lower than 0.5 G/L or 1.0 G/L and further reduction to < 0.5 G/L is predicted, then the risk of infection increases. Only in a third of cases can the microbiological factor behind febrile neutropenia be identified. In 25% of patients infection is diagnosed on the basis of clinical symptoms, whereas in 40% of cases it is a fever of unknown origin (FUO) [11, 12].

Graft acceptance is defined as a sustained segmented neutrophil count >0.5 G/L for two consecutive days, or >1.0 G/L for one day. Hematopoietic stem cell regeneration is defined as a sustained platelet count >20 G/L without the need of platelet transfusion [7, 10].

Once the above values are obtained and sustained, the patient may be discharged.

Aim of the study

Assessment of the rate of hematopoietic system regeneration in patients following hematopoietic stem cell transplantation with concomitant fever.

Material and Methods

The presented observations are based on sixty patients who underwent the HSCT procedure after a conditioning regimen. In all the patients the graft material consisted of cells obtained from peripheral blood using a separation method. The type of conditioning depended on the disease that was the cause of the transplantation.

The study involved thirty-three males and twenty-seven females. In total thirty-nine patients underwent autologous hematopoietic cell transplantation, and in twenty-one patients allogeneic hematopoietic cell transplantation was performed. The number of transplanted stem cells is provided in millions per kilogram of the patient's body weight.

Patient body temperature was taken twice daily (at 8:00 and 20:00) with an electronic thermometer at two sites (in the armpit and ear), and then the arithmetic mean was derived. If any of the measurements revealed a body temperature of above 38.3^{o}C, the temperature was taken every 6 hours until it reached a stable value of below 37.5^{o}C. A febrile day was defined as a day when the body temperature taken at two independent measurements was above 37.5^{o}C, or if a single measurement was at least 38.3^{o}C.

The full blood and blood serum of the patients were assessed. Complete blood count including reticulocyte values was assessed with an ADVIA2120 analyzer using full blood collected in a standard way

with a probe containing ethylenediaminetetraacetate acid (EDTA) as the anticoagulant.

Table 1. Time from administration to acceptance of transplant, depending on the type of transplant procedure [7]
Tabela 1. Czas od podania przeszczepu do jego przyjęcia się w zależności od rodzaju procedury przeszczepowej [7]

Type of transplantation	Time to acceptance of transplant
auto-BMT + G-CSF	15-25
auto-PBSCT+ G-CSF	9-12
T-cell depleted allo-BMT + G-CSF	13-20
allo-BMT + GvHD prophylaxis: CNI+MTX	22-24
allo-PBSCT ± GvHD prophylaxis with MTX	10–14
cord blood	>40

auto-BMT – transplantation of autologous hematopoietic cells from bone marrow,
auto-PBSCT – transplantation of autologous hematopoietic cells from peripheral blood,
T-cell depleted – removal of T-lymphocytes from the graft,
allo-BMT – transplantation of allogeneic hematopoietic stem cells from bone marrow,
allo-PBSCT – transplantation of allogeneic hematopoietic stem cells from peripheral blood,
G-CSF – granulocyte-colony stimulating factor (Granocyte 34, Neupogen, Neulasta, Zarzio),
CNI – calcineurin inhibiting immunosuppressants (Cyclosporin A, Tacrolimus),
MTX - methotrexate

During the patients' stay in the transplantation center, a total of eight blood tests were performed. The first one was conducted immediately before chemotherapy (conditioning regimen), the second after chemotherapy, precisely on the day of transplantation (day zero). Further tests were performed regularly at four day intervals, until day 24.

Results

As illustrated in Figure 1, the number of transplanted stem cells differed depending on the type of procedure (autologous or allogeneic hematopoietic cell transplantation) and sex of the patient. The smallest quantity of cells was transplanted to males undergoing autologous hematopoietic cell transplantation (2.7×10^6/ kg b.w. ± 0.41). On average, females had more cells transplanted (2.9×10^6/kg b.w. ± 0.35).

Higher numbers of CD34+ cells were given to patients undergoing allogeneic hematopoietic cell transplantation. Cells transplanted in males: 2.9×10^6/kg b.w. ± 0.39 *vs* in females: 3.15×10^6/kg b.w. ± 0.46.

In the study group (n = 60) the time required to obtain an absolute neutrophil count (ANC) > 0.5 G/L was 18.28 ± 6.34 days, whereas the time to obtain a platelet count (PLT) > 50 G/L was 17.62 ± 7.26 days.

In the study group (n = 60) the time required to obtain an ANC >1.0 G/L was 20.73 ± 6.94 days, whereas the time to obtain a PLT >50 G/L was 21.73 ± 7.4 days.

Correlation coefficients between the total number of febrile days and the number of days required to reach the proper values of those parameters illustrating hematopoietic system regeneration were high. This also applied to patients after autologous hematopoietic stem cell transplantation. Slightly lower coefficients were observed in patients after allogeneic hematopoietic cell transplantation.

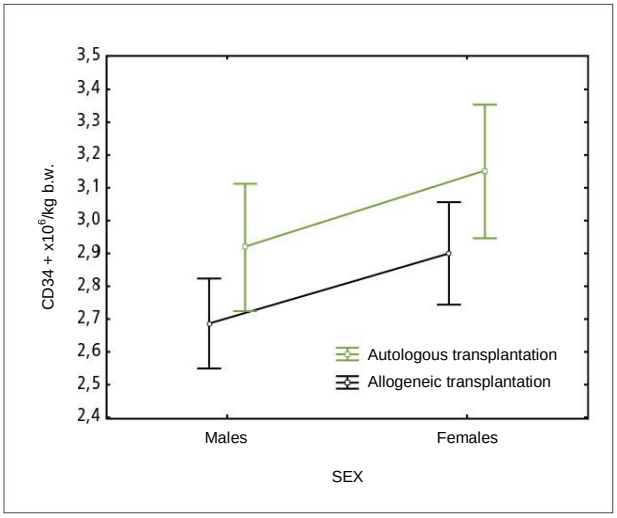


Figure 1. Value of transplanted CD34 + cells in autologous and allogeneic transplantation
Rycina 1. Liczba przeszczepianych komórek CD34+ w przypadku przeszczepów autologicznych i alogenicznych

Table 2. Mean and median number of days to reach ANC >0.5 g/L and PLT >20 g/L for all patients (n=60)
Tabela 2. Średnie i medialne liczby dni osiągnięcia ANC >0,5 G/L i PLT >20 G/L dla wszystkich pacjentów (n=60)

Variable	Mean ±SD	Median	95% CI
ANC >0.5 G/L	18.28 ± 6.34	17.0	16.65–19.92
PLT >20 G/L	17.62 ± 7.26	18.5	15.74–19.42

Table 3. Number of days to reach ANC >1.0 G/L and PLT >50 G/L for all patients (n=60)
Tabela 3. Liczba dni osiągania ANC >1,0 G/L i PLT >50 G/L dla wszystkich pacjentów (n=60)

Variable	Mean ±SD	Median	95% CI
ANC >1.0 G/L	20.73 ± 6.94	19.5	18.94–22.53
PLT >50 G/L	21.73 ± 7.40	20.5	19.82–23.65

Table 4 Correlations between the number of fever days and reaching appropriate levels of ANC, PLT, RET
Tabela 4. Korelacje liczby dni z gorączką z osiąganiem odpowiednich wartości ANC, PLT, RET

Variable	ANC >0.5 G/L	ANC >1.0 G/L	PLT >20 G/L	PLT >50 G/L	RET >20 G/L
Coefficients of correlation between the number of days and fever	0.77	0.76	0.78	0.79	0.75
Statistical significance	p <0.001	p <0.001	p <0.001	p <0.001	p <0.001

Table 5 Correlations between the number of fever days and reaching the determined levels of ANC >0.5 G/L and PLT >20 G/L, with auto and allo options
Tabela 5. Korelacje między liczbą dni gorączkowych a osiągnięciem ustalonych wartości ANC >0,5 G/L i PLT >20 G/L, gdy brano pod uwagę również opcję auto i alo

Variable	Patients after autotransplantation		Patients after allotransplantation	
	ANC >0.5 G/L	PLT >20 G/L	ANC >0.5 G/L	PLT >20 G/L
Febrile days	0.7924	0.8117	0.7112	0.7932
Coefficient p	<0.001	<0.001	<0.001	<0.001

Table 6. Correlations between the number of fever days and reaching the desired values of ANC >1000 and PLT >50 000, with auto and allo options
Tabela 6. Korelacje liczby dni gorączkowych z osiąganiem pożądanych wartości ANC >1000 i PLT >50 tys., gdy brano pod uwagę również opcję auto i alo

Variable	Patients after autotransplantation		Patients after allotransplantation	
	ANC >1.0 G/L	PLT >50 G/L	ANC >1.0 G/L	PLT >50 G/L
Febrile days	0.7893	0.8007	0.7069	0.7891
Coefficient p	<0.0001	<0.0001	<0.0001	<0.0001

Table 4 presents a very strong positive correlation between the number of febrile days and the rate of reaching the desired values (ANC >1.0 G/L, ANC >0.5 G/L and PLT >50 G/L, PLT >20 G/L and RET to the minimum value of 20 G/L).

The table clearly shows significant positive correlations regarding the number of days with fever and the time to reach ANC >0.5 G/L, ANC >1.0 G/L, PLT >20 G/L and PLT >50 G/L. The correlations are strong and statistically significant for all cases of auto- and allotransplantation.

Discussion

In many years of treating patients who received hematopoietic cell transplants, it has been observed that patients who experience fever for a long period need more time to regenerate their hematopoietic system, prolonging hospitalization. This observation was an important motivating factor behind the study that resulted in this paper. Many studies demonstrate the influence of the number of transplanted cells on the rate of hematopoietic system regeneration. In a study in America involving fifty-eight patients with acute myeloid leukemia who underwent autotransplantation during the first remission, the authors showed that increasing the number of transplanted CD34+ stem cells accelerates regeneration of the thrombopoietic system [13]. This variable was considered in our study, but no significant differences between patients were found.

The absence of such a correlation might result from a "small" difference between the numbers of cells transplanted in patients undergoing autologous or allogeneic hematopoietic cell transplantation.

A higher number of CD34+ cells were given to patients undergoing allogeneic transplantation (2.9×10^6/kg b.w. in females *vs* 3.15×10^6/ kg b.w. in males).

In the period immediately following transplantation, both ANC and PLT counts drastically decrease.

Later on, the PLT and neutrophil (NEUT) counts increase, and the transplant is considered to be accepted if the neutrophil count increases above 0.5 G/L, and PLT count above 20 G/L (without the need of platelet concentrate transfusion), in compliance with the literature data. However, in practice, PLT and ANC values considered to be "safe" are PLT >50G/L and ANC >1.0 G/L, as then the patient may be discharged.

After the procedure, the patients gradually achieve the presented criteria values. It was considered interesting to analyze how quickly (in days after the procedure) the patients reach these criteria.

Our study demonstrated that the number of days required for a patient to reach ANC >0.5 G/L is over 18, whereas the number of days needed to reach ANC >1.0 G/L is nearly 21. The number of days required to reach ANC >0.5 G/L and ANC >1.0 G/L was found to be very similar, that is at the moment when proper regeneration of the hematopoietic system begins, reflected by an ANC count increased to >0.5 G/L, when rapid improvement may be expected, as well as reaching ANC >1.0 G/L, a value safe for the patient. In one of the first studies on this subject, published in the 1990s, the authors in the Netherlands demonstrated that after transplantation of allogeneic hematopoietic cells, the median time to reach ANC>0.5 G/L was 21 days [14].

This study showed that the mean number of days required to reach PLT >20 G/L was approximately 18. Out of the sixty patients analyzed, thirty reached PLT >20 G/L not later than within 17 days, while other patients took at least 18.5 days. In 2002, researchers in Japan compared seventeen patients who received stem cells from peripheral blood with twenty-four patients who had allogeneic stem cells transplanted from bone marrow. It was demonstrated that patients reached PLT >20 G/L within 12 days following allo-PBSCT (*allogeneic peripheral blood stem cell transplantation*), and within 21 days after allo-BMT (*allogeneic bone marrow transplantation*) [15]. However, no information about febrile states was available. In another study, Jansen et al. showed extended regeneration of the thrombopoietic system, without analyzing the potential role of fever [16].

In certain studies an increased number of reticulocytes in the early phase following hematopoietic stem cell transplantation is mentioned as a good indicator of hematopoietic system regeneration. Authors in Britain reported that reticulocytes found in peripheral blood, analyzed by automatic analyzers, are more reliable than those counted manually, and therefore may be used as an indicator of early regeneration of the hematopoietic system. The same study involving twenty-five patients with lymphomas, autologous hematopoietic stem cell transplantation was applied, following high-dose chemotherapy. The percentage of the reticulocyte count was provided. Reticulocytes were divided into established subpopulations, depending on the rRNA content [17]. Jean-François Lesesve of the University Hospital of Nancy obtained similar results based on the observation of twenty-three patients with lymphomas, who underwent autologous hematopoietic cells transplantation [18]. This allows one to anticipate earlier if the patient will require transfusion of red blood cell concentrate. Our study found that an increasing reticulocyte count is statistically faster in patients after allotransplantation; more precisely, a higher reticulocyte count on day 24 was observed in patients after allogeneic transplantation. The difference in comparison with the mentioned studies is probably associated with the fact that the youngest reticulocyte fraction was not analyzed, just their total count, and that a relatively high absolute reticulocyte count of >20 G/L was considered to be appropriate.

In patients without fever, a shorter time to reach high hematological regeneration indicators (ANC, PLT, <RET) was observed, which may indicate faster regeneration of the hematopoietic system.

Our study demonstrated that from day 16 after HSCT, statistically significantly higher reticulocyte counts can be observed in non-febrile patients. However, the difference between the reticulocyte count in patients with or without fever indicates the

clearly adverse effect of fever on the regeneration of the red blood cell system. A high correlation was demonstrated between the total number of fever days, and the number of days necessary for the patient to reach an ANC count >0.5 G/L, ANC >1.0 G/L, as well as between the total number of fever days, and the number of days necessary for the patient to reach a PLT count >20G/L and PLT >50G/L. No literature discussing this problem was found.

In summing up the study, the mean number of days required to reach an ANC > 0.5 G/L was approximately 18, and the number of days required to reach an ANC > 1.0 G/L was approximately 21. The mean number of days required to reach a PLT count > 20 G/L and PLT count > 50 G/L were 18 and 20, respectively. The study presented showed that restoring the neutrophil and platelet counts in patients after allogeneic hematopoietic cell transplantation takes longer than in those after autologous hematopoietic cell transplantation. This may be due to the more complex therapeutic procedure, as well as biological processes in the hematopoietic system following allogeneic transplantation of hematopoietic cells. It may be expected that using strong immunosuppressants may directly affect hematopoiesis. Our study demonstrated a significant correlation between the occurrence of fever in the early post-transplantation period, and delayed regeneration of the hematopoietic system.

Conclusions

1. Fever in the early period following HSCT significantly delays regeneration of the hematopoietic system.
2. The effects of fever on slower regeneration of the hematopoietic system is visible regardless of the procedure used for hematopoietic stem cell transplantation.

Literature

1. Centralny Rejestr Niespokrewnionych Dawców Szpiku i Krwi Pępowinowej. [Central Register of Non-related Bone Marrow and Cord Blood Donors] www.poltransplant.org.pl
2. Dmoszyńska A, Robak T. Podstawy hematologii. [Basics of haematology] Wydawnictwo Czelej, Lublin 2003
3. Benito AI, Gonzales-Vincent M, Garcia F, et al. Allogenic peripheral blood stem cell transplantation (PBSCT) from HLA-identical sibling donors in children with hematological diseases: a single center pilot study. Bone Marrow Transplant, 2001; 28: 537-543
4. Hołowiecki J. Przeszczepianie szpiku i komórek krwiotwórczych z krwi obwodowej w nowotworach. [Transplantation of bone marrow and hematopoietic cells from peripheral blood in treatment of neoplasms] In: Krzakowski M, ed. Onkologia kliniczna. [Clinical oncology] Warsaw, Borgis Wydawnictwo Medyczne, 2006: 271-329
5. Barat B, Wu AM. Metabolic biotinylation of recombinant antibody by biotin ligase retained in the endoplasmic reticulum. Biomol Eng , 2007; 24:283–291
6. Dechancie J, Houk KN. The origins of femtomolar protein-ligand binding: Hydrogen bond cooperativity and desolvation energetics in the biotin – (strept) avidin binding site. J Am Chem Soc, 2007; 129: 5419–5429
7. Appelbaum FR, Forman SJ, Negrin RS, et al. Thomas' hematopoietic cell transplantation. Wiley-Blackwell, 2009
8. Apperley J, Carreras E, Gluckman E, et al. The 2012 revised edition of the EBMT-ESH Handbook on haemopoietic stem cell transplantation. Chugai Sanofi Aventis, 2012
9. Mehta J, Singhal S, Gee AP, et al. Bone marrow transplantation from partially HLA-mismatched family donors for acute leukemia: single-center experience of 201 patients. Bone Marrow Transplant, 2004; 33: 389–396
10. Antin JH, Raley DY. Manual of stem cell and bone marrow transplantation. Cambridge Medicine, 2009
11. Spitzer TR. Engraftment syndrome following hematopoietic stem cell transplantation. Bone Marrow Transplant, 2001; 27: 893–898
12. Santos ES, Raez LE, Eckardt P, et al. The utility of a bone marrow biopsy in diagnosing the source of fever of unknown origin in patients with AIDS. J Acquir Immune Defic Syndr, 2004; 37: 1599–1603
13. Gunn N, Damon L, Varosy P, et al. High CD34+ cell dose promotes faster platelet recovery after autologous stem cell transplantation for acute myeloid leukemia. Biol Blood Marrow Transplant, 2003; 9: 643–648
14. Löwenberg B, Verdonck L J, Dekke r AW, et al. Autologous bone marrow transplantation in acute myeloid leukemia in first remission: results of a Dutch prospective study. J Clin Oncol, 1990; 8: 287–294
15. Nagatoshi Y, Kawano Y, Watanabe T, et al. Hematopoietic and immune recovery after allogeneic peripheral blood stem cell transplantation and bone marrow transplantation in a pediatric population. Pediatr Transplant, 2002; 6: 319–326
16. Jansen J, Hanks SG, Akard LP, et al. Slow platelet recovery after PBPC transplantation from unrelated donors. Bone Marrow Transplantat, 2009; 43: 499–505
17. George P, Wyre RM, Bruty SJ, et al. Automated immature reticulocyte counts are early markers of engraftment following autologous PBSC transplantation in patients with lymphoma. J Hematother Stem Cell Res, 2000; 9: 219–223
18. Lesesve JF, Lenormand B, Lacombe F. The role of high fluorescent reticulocytes in monitoring the aplasia outcome and optimizing the timing of peripheral blood stem cell harvesting. J Hematother Stem Cell Res, 2002; 11: 987–989

A case of a patient with recurrent pericarditis

Przypadek pacjenta z nawracającym zapaleniem osierdzia

Aneta Skwarek-Dziekanowska, Katarzyna Kołodziejska, Wojciech Kula, Grzegorz Sobieszek
Internal diseases and Cardiology Clinic of the 1st Clinical Military Hospital in Lublin;
head: Prof. Władysław Witczak MD, PhD

Abstract. The pericardium is a double-layer, fibroserous sac enclosing the heart and the roots of the great vessels. It performs numerous functions, such as protecting against external infections and excessive dilation of the chambers of the heart. Pericarditis is still a diagnostic and therapeutic problem, potentially life threatening, despite the dynamic development of medicine. Constrictive pericarditis is the most serious complication in recurrent pericarditis.
Key words: acute pericarditis, echocardiography, external infections

Streszczenie. Osierdzie jest dwuwarstwowym, włóknisto-surowiczym workiem otaczającym serce i pnie dużych naczyń. Pełni liczne funkcje, w tym ochronną przed zakażeniami zewnętrznymi i nadmiernym wypełnianiem jam serca. Zapalenie osierdzia nadal stanowi istotny problem diagnostyczny i terapeutyczny, pomimo dynamicznego rozwoju medycyny zagrażający życiu pacjenta. Najpoważniejszym powikłaniem nawracającego zapalenia osierdzia jest postać zaciskająca. **Słowa kluczowe:** ostre zapalenie osierdzia, infekcje zewnętrzne, echokardiografia

Delivered: 04/02/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 176-179

Corresponding author:
Aneta Skwarek-Dziekanowska MD
Internal diseases and Cardiology Clinic of the 1st Clinical Military Hospital in Lublin
telephone: +48 81,718 32 65
e-mail: anetask@gmail.com

Introduction

The pericardium is a double-layer, fibroserous sac enclosing the heart and the roots of the great vessels. It consists of two layers: parietal pericardium and visceral pericardium, each about 2mm thick. In physiological conditions, there is up to about 50 mL of serous fluid between them. The pericardium stabilizes the position of the heart in the chest, protects it from external infections and prevents excessive filling of the heart chambers [1, 2].

In spite of the dynamic advancement of medicine, pericarditis still remains a significant diagnostic and therapeutic problem that endangers the patient's life. The diagnosis is made on the basis of a physical examination, interview and the results of numerous additional tests, especially an echocardiogram [1, 2].

Below we present a case of a patient with acute, recurrent exudative pericarditis.

Case report

A 45-year-old patient treated for three years for arterial hypertension was admitted to the internal department due to a burning chest pain persisting for two days, radiating to the interscapular area and slightly intensifying during deep breathing. The patient had had fever of up to 38°C for three days, reported headaches, muscle pains, especially in the shoulder area, nausea and increased rates of perspiration.

The examination on admission revealed an intensified vesicular murmur over the lung fields, crepitations at the basis of the left lung, tachycardia (HR 100/min), hypotension 90/60 mm HG and fever of 39°C. The physical examination revealed palpation pain in the middle epigastric region without any peritoneal signs or pathological resistance.

The laboratory test results were as follows: leucocytosis 17.3 thousand with a prevalence of neutrophiles (79.1%), ESR 18 mm/h and CRP 215.2 mg/L, but no markers for cardiac necrosis. The ECG showed sinus tachycardia 110/min and generalized lowering of the PQ segment, while the chest X-ray revealed atelectatic-inflammatory lesions in the left supradiaphragmatic field and an enlarged heart silhouette. In the echocardiography, the global heart muscle contractility was assessed as normal with ejection fraction of 60%, and the heart chambers were

of normal size. No significant valve defects were found, but there was fluid visible in the pericardial sac. The pericardium thickness behind the posterior wall of the left ventricle was 5 mm. No pathological lesions were found in the abdominal ultrasound.

Additional diagnostic tests were made: virological tests (ECHO, adenovirus, *Coxackie,* influenza, parainfluenza, hepatotropic viruses, HIV, CMV), bacteriological (throat and nose swab, urine and blood culture, antibodies against *Borrelia burgdorferi,* Quantiferon), and parasitological tests *(Toxoplasma gondii),* cancer markers (CA 15-3, CA 19-9, CEA, PSA, AFP) and rheumatological markers (ANA 3), but they did not give a clear diagnosis, leaving doubts as to the tuberculotic etiology of the pericarditis (positive Quantiferon).

The therapy administered included empirical antibiotics (cefuroxime 3 x 1.5 g), proton pump inhibitors (pantoprazole) and antipyretics, when required (paracetamol).

On the following day of hospitalization, the patient's general condition significantly worsened: weakening without loss of consciousness, blood pressure drop to 60/0 mmHg, bradycardia of about 60/min, intensified chest pain and dyspnea. An echocardiography revealed a significant increase in the amounts of fluid behind the right chamber (20 mm) and posterior wall (18 mm), as well as the systolic collapse of the free wall.

The patient underwent an urgent pericardiocentesis, aspirating 400 mL of bloody fluid, leaving the drain in for the following three days. The patient's condition significantly improved, the intensity of the chest pain decreased and the vital signs returned to normal.

The fluid evacuated from the pericardial sac was taken for general and histopathological examination, as well as bacterial culture. Biochemical tests revealed traits of exudative inflammatory fluid - partial turbidity, protein 6.4 g/dL, glucose 97 mg/Dl, LDH 397 IU/L, amylase activity 25 IU/L, leucocytosis 9800/mL with neutrophilia and the presence of single monocytes and lymphocytes. In the histopathological examination no atypical cells were found. Bacteriological tests did not result in culturing any aerobic or anaerobic bacteria, or fungi.

A nose swab culture revealed methicyllin-resistant Staphylococcus epidermidis (MRSE) sensitive to ciprofloxacin, which was introduced in the dose of 2 x 200 i.v. Apart from that, the patient was treated with colchicine 2 x 0.5 mg and ASA 3 x mg.

In the following days, the patient's condition gradually improved, the chest pains disappeared and the vital signs remained normal. Further echocardiographies revealed trace amounts of fluid and the video gastroscopy showed superficial gastritis. Laboratory tests indicated gradual normalization of the inflammatory parameters (LEU

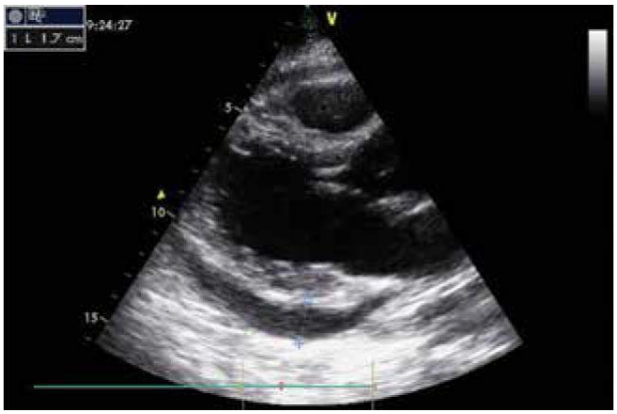


Figure 1. Liquid in the pericardium behind the back wall of the left ventricle (TTE LAX view)
Rycina 1. Płyn w worku osierdziowym za tylną ścianą lewej komory (TTE projekcja LAX)

Figure 2. Liquid pressing on the free wall of the right ventricle and the wall, collapsing it. TTE subcostal view.
Rycina 2. Ucisk płynu na wolną ścianę prawej komory z jej zapadaniem (TTE projekcja podmostkowa)

10.4 thousand, CRP 45.4 mg/L). A chest X-ray performed seven days after treatment showed persisting atelectasis and inflammatory lesions and the possible presence of trace amounts of fluid in the left cost phrenic angle. The combined antibiotics therapy was extended to twelve days. A local inflammatory response occurred in the area of the intravenous administration of drugs on the right forearm, which was linked to the increase of inflammatory parameters (CRP 95 mg/L, LEU 13.7 thousand).

After twelve days of hospitalization, the patient was discharged home in good condition with the recommendation to take medications (pantoprazole 1 x 20 mg, metoprolol 1 x 50 mg, ramipril 1 x 5 mg, ibuprofen 3 x 1 tablet, colchicine 2 x 0.5 mg), return for blood tests (ESR, CRP and CBC) in a week and visit the cardiology out-patient clinic for an examination.

Nine days later, the patient was again admitted to the hospital with the same symptoms as before (fever, chest pain, and dyspnea). The patient was cardiovascularly stable, the only anomaly in the physical examination was an intensified vesicular murmur. ECG revealed sinus tachycardia and negative T segment in leads II, III, aVF, V4-6, while a lung X-ray showed a shadow in the left cost phrenic angle and intensified bronchial pattern of the inferior field of the right lung. The chest CT image showed parabronchial parenchymal consolidations in the inferior lobe of the left lung, bronchial wall thickening with mucus present in the lumen, a 25-milimetre-thick fluid mantle in the left pleura with accompanied atelectasis, and discreet mesh-like shadows in the inferior lobe of the right lung, with single air cysts. In the pericardium 6 mm of fluid was visible. An echocardiography revealed trace amounts of fluid.

The laboratory test again showed an increase in the inflammatory parameters (ESR 62 mm/h, CRP 255.8 mg/L, LEU 21.7 thousand with neutrophilia 81.6%), but without any increased concentration of PCT.

After a rheumatology consultation, the following tests and assays were performed: c-ANCA and p-ANCA, anti-nuclear antibodies, anti-cardiolipin antibodies, IAC, complement system (C3 and C4), aCCP and RF antibodies. The results showed a significant increase of complement system components (C4 - 49.6 md/dL, C3 - 226.6 mg/dL). In relation to the increased total protein in the blood serum (8.3 g/dL), a protein electrophoresis was performed, but the result was normal. The VDRL and ASO tests also gave normal results.

The treatment administered included broad spectra antibiotics (ceftazidime 3 x 1g) and hypotensive drugs.

Because of persistent anomalies in the lungs observed in the interview, physical examination and additional tests, the patient was referred to the Pulmonological Unit of the Railway Hospital in Lublin. During the hospitalization, the patient underwent bronchoscopy which did not reveal any abnormalities in the bronchial tree. Bronchoaspirate specimens did not include any cancerous cells, while a direct culture for *Mycobacterium tuberculosis* was negative. The CTPA image excluded the presence of any thromboembolic material. The patient was discharged home in good condition without additional recommendations.

After less than a month, the patient was again hospitalized due to signs of exudative pericarditis both in the clinical image and results of an ECG and echocardiography. The repeated chest CT revealed asymmetric thickening of the pericardial sac, with a thickness of up to 20 mm, of heterogeneous density and amplification in the image. The image suggested the presence of dense exudative fluid of an inflammatory character between the pericardial layers, slight consolidation of pulmonary parenchyma with bilateral fibrosis, as well as fluid in the left pleural cavity (approx. 20 mm).

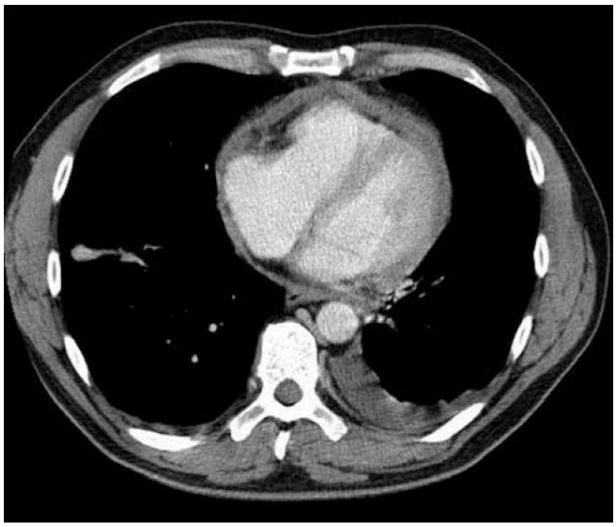


Figure 3. Chest CT scan. Description in the article.
Rycina 3. TK klatki piersiowej (opis w tekście)

It was decided to put the patient on steroids (1 mg /kg bw), colchicine, ibuprofen and again broad spectrum antibiotics (cefoperazone with sulbactam 2 x 2g). Gradually the pain diminished and the general condition of the patient improved. The patient was discharged home in good condition, with maintained steroid therapy in gradually lowered doses and colchicine administration extended to 2 weeks. The patient was recommended to visit the cardiological out-patient clinic for further examinations.

Discussion

Pericardtitis occurs in about 5% of the patients suffering from chest pain admitted to ER units [1].

The causes of pericarditis can be divided into infectious and non-infectious types; however in 30% of cases, the available tests do not allow us to determine its etiology (idiopathic pericarditis). Among the infectious cases of pericarditis, we can distinguish viral infections (Coxackie, echovirus, adenovirus, mumps, Varicella zoster, CMV, EBV, HIV), which are the most frequent, bacterial infections (Streptococcus, Staphylococcus, Haemophilus influenzae, Mycoplasma, Legionella, Gram-negative bacteria, Borrelia burgderferi), tuberculotic, parasitic, mycotic or rickettsial infections. Non-infectious causes include systemic connective tissue disorders (SLE, RA, SS), metabolic disorders (chronic renal failure, hypothyroidism, amyloidosis), early and delayed complications after myocardial infarctions, complications after cardiac surgery and invasive

cardiology procedures, chest injuries, reactions to medicines, cancer and complications in its therapy, heart failure, MODS and cardiomyopathies [1-6].

The three classical clinical symptoms are chest pain, pericardial rub and anomalies in the ECG. The diagnosis requires the presence of two of these symptoms [2]. Other possible symptoms include: dyspnea, tachypnea, intense sweating, coldness of the limbs, peripheral cyanosis, tachycardia, hypotonia and paradoxical pulse [1, 2]. The discussed patient had all the listed symptoms apart from the pericardial rub and paradoxical pulse.

The changes in the ECG that may occur include: horizontal drop of PG segment, generalized elevation of ST segment, low voltage and electrical alternans of the QRS complex. The changes evolve during the course of the disease, with the image becoming normal, T segments reversed and a return to the normal position.

The basic diagnostic test is transthoracic echocardiography. In order for the fluid to be considered a pericardial exudation, it should be present during the whole heart cycle. Also the assessment as to whether the venae cavae are enlarged is important, as it indicates higher central venous pressure. Other methods of imaging showing the presence of any fluid in the pericardial sac are CT and MRI; however their high cost and lower availability limits their application [1, 2, 9]. The etiology of pericarditis is determined with the use of tests of bodily fluids, pericardial exudate and swabs from body cavities. Virological diagnostic measures involve the identification of antibodies, PCR and in situ hybridization while bacteriological tests include cultures, Gram stain test and PCR. Tuberculotic etiology is excluded by Ziehl-Neelsen stain, culture and PCR. Autoimmune tests are also performed [1, 2, 10].

The majority of the patients, as with the described case, are hospitalized because hospital conditions offer the possibility of determining the cause, as well as monitoring the course of the disease and possible complications, such as cardiac tamponade. The therapy is divided into symptomatic and causal treatment. When the amount of fluid in the pericardial sac quickly increases and there are symptoms of a tamponade, perdicadiocentesis with decompression is required. Symptomatic treatment involves non-steroidal inflammatory drugs (ibuprofen 300-800 mg/d in doses divided every 6-8 h), or ASA (initially 800-1000 mg every 6-8 h, gradually reduced over 3-4 weeks), colchicine (0.5-1 mg/d), and systemic steroids (1 mg/kg bw/d), especially in the immune and recurrent forms of the disease [1, 2, 9]. Causal treatment depends on the determined etiology. The efficiency of colchicine in the treatment of acute pericarditis and prevention of relapses has been proved in CORP and CORE studies [8].

In 15–30% of cases appropriately treated acute idiopathic pericarditis, relapses are observed [2]. After one relapse, the probability of further relapses grows to 50% [10].

In serious forms with frequent relapses, there exists an alternative treatment - chronic steroid therapy in gradually decreased doses [1].

A grave complication of the disease is the development of constrictive pericarditis, in which the flow of blood to the right ventricle is permanently limited due to the loss of pericardial sac flexibility. The best treatment here is pericardiectomy. A delay in the surgical treatment leads to a poorer short- and long-term prognosis, as the myocardium becomes permanently damaged [10].

Conclusions

We have presented this case to show the difficulties in the diagnosis and treatment of recurrent exudative pericarditis. Despite the antibiotic and anti-inflammatory therapy, the patient had relapses of the disease. The main aim of the treatment should be the prevention of the evolution of the disease into the chronic form, as well as avoiding complications, especially constrictive pericarditis.

Literature

1. Badanie płynu osierdziowego. Choroby osierdzia. [Pericardial fluid examination. Pericardium Disorders.] In: Szczeklik A, (ed.) Choroby wewnętrzne [Internal medicine disorders]. Kraków, Medycyna Praktyczna, 2014: 128-129, 370-379
2. Rozpoznanie i postępowanie w chorobach osierdzia [Diagnosis and proceedings in pericardial disorders]. In: Braunwald E, Goldman L, (eds.) Kardiologia [Cardiology]. Wrocław, Elsevier Urban & Partner, 2007: 1719 –1742
3. Czerwińska K, Hryniewiecki T. Powikłania kardiologiczne chorób infekcyjnych [Cardiovascular complications of infectious diseases]. Nowa Klin, 2008; 15: 1154-1161
4. Chmiel A, Mizia-Stec K, Wierzbicka-Chmiel J, et al. Zaciskające zapalenie osierdzia w przebiegu reumatoidalnego zapalenia stawów [Constrictive pericarditis in the course of rheumatoidal arthritis]. Kardiol Pol, 2008; 66: 879-884
5. Górecki B, Flasiński J, Górski J. Chory z ropnym zapaleniem osierdzia powikłanym tamponadą serca, spowodowanym zakażeniem salmonella enteritidis [A patient with purulent pericarditis with cardiac tamponade caused by Salmonella enteritidis infection]. Kardiol Pol, 2008; 66: 664-668
6. Elikowski W, Małek M, Ziemnicka K, et al. Tamponada serca w przebiegu niedoczynności tarczycy. Możliwość współistnienia wirusowego zapalenia osierdzia [Cardiac tamponade in the course of hypothyroidism. Possibility of concurrent viral pericarditis]. Kardiol Pol, 2005; 62: 575-578
7. Ziółkowska L, Tężyńska I, Kawalec W, Turska-Kmieć A. Standardy postępowania diagnostycznego w wysiękowym zapaleniu osierdzia u dzieci [Standards of diagnostic procedures for exudative pericarditis in children]. Stand Med, 2008; 5: 206-208
8. Imazio M, Bobbio M, Cecchi E, et al. Colchicine in addition to conventional therapy for acute pericarditis results of the Colchicine for Acute Pericarditis (COPE) Trial. Circulation, 2005; 112: 2012-2016
9. Camm AJ, Luscher TF, et al. Choroby serca i naczyń. Podręcznik Europejskiego Towarzystwa Kardiologicznego [Cardiovascular diseases. Textbook of the European Society of Cardiology]. Vol. II. Poznań, Termedia, 2006/2007: 543-559
10. Hutchison SJ, ed. Diagnosis of pericardium disorders Wrocław, Elsevier Urban & Partner, 2010

Hyperbaric oxygen therapy – the most common side effects and threats

Terapia hiperbaryczna – najczęściej występujące powikłania i zagrożenia

Justyna Car, Radosław Tworus

[1] Department of Psychiatry and Combat Stress, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Lt. Col. Radosław Tworus MD, PhD

Abstract. Treatment with hyperbaric oxygen therapy (HBOT) is becoming more widely used in medicine. As with any therapeutic method, HBOT may also cause complications. The aim of the study was to assess the most common side effects and risk factors as well as the possibilities for preventing the complications. Apparently, the use of HBOT is safe if the proper procedures are followed, the risk factors considered and correct monitoring of the course of treatment maintained.
Key words: hyperbaric oxygen therapy, HBOT, side effects, complications, middle-ear barotrauma

Streszczenie. Leczenie z wykorzystaniem hiperbarycznej terapii tlenem znajduje coraz szersze zastosowanie w medycynie. Jak każda metoda lecznicza, także terapia z zastosowaniem tlenu hiperbarycznego może powodować powikłania. Celem pracy było omówienie najczęściej występujących działań niepożądanych, czynników ryzyka i możliwości zapobiegania powikłaniom. Wydaje się, że zastosowanie hiperbarycznej terapii tlenowej jest metodą bezpieczną, przy zachowaniu należytych procedur, uwzględnieniu czynników ryzyka i właściwym nadzorze nad przebiegiem leczenia, a stosunkowo rzadko występujące działania niepożądane mają zazwyczaj charakter przemijający.
Słowa kluczowe: hiperbaryczna terapia tlenowa, HBOT, działania niepożądane, powikłania, uraz ciśnieniowy ucha środkowego

Delivered: 02/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 180-184

Corresponding author:
Justyna Car MD
Department of Psychiatry and Combat Stress, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw
telephone: +48 261 816 450
e-mail: jcar@wim.mil.pl

Introduction

Hyperbaric oxygen therapy (HBOT) using 100% oxygen concentration at a pressure higher than atmospheric in a special chamber has been known since the 17th century, but only became commonly used at the end of the 1950s [1, 2]. The delay in the popularization of this method was related to the fear of the toxicity of oxygen as described by Lavoisier and Segouin at the end of the 18th century and the technical problems related to chamber construction and controlling the pressure [1, 3].

A therapy consists usually of 20-50 sessions, once a day, each lasting 60-90 minutes, five days a week, at a pressure of at least 1.4 ATA. Hyperbaric chambers may be stationary or mobile, and may accommodate one or more patients. There is a long list of indications for hyperbaric oxygen therapy, which is regularly updated by scientific societies, the National Health Fund (which classifies the therapy as a separate group of procedures) and medical gas producers. The current list of acute indications includes: carbon monoxide intoxication, methaemoglobinaemia, gas embolism, decompression disease, necrotic infections and injuries of the soft tissues, acute post-traumatic ischemic syndrome, thermal burns (of specific degree and extension, in children and adults), sudden loss of

hearing and loss of hearing after an acoustic trauma. The chronic indications include: radiation tissue damage, diabetic foot syndrome, hard-to-heal wounds, other damage to the skin and tissues (infection, necrosis, inflammations, abscesses, ulcers and bedsores), skin transplants endangered by necrosis and actinomycosis. The list of indications is regularly expanded and there are suggestions that HBOT may be used in the therapy of such diseases as extensive anemia, posttraumatic stress disorder and CNS injuries (strokes, brain injuries) [1, 2, 4-7].

From the beginning of HBOT use, the adverse effects of the therapy have been carefully monitored. As with any treatment method, HBOT may also cause complications, which in this case are usually of a temporary nature. With time, the greatest dangers related to this treatment method have been identified, and procedures implemented in order to minimize the adverse effects. These involve a list of risk factors and procedures in case of complications. Due to the toxicity of oxygen and repeated exposure of the patient to a pressure higher than atmospheric pressure, there are still many doubts as to the safety of the method.

Adverse effects may be caused by the biological nature of the procedure or by technical problems. The medical problems described below may be divided into pressure injuries, problems related to oxygen toxicity, sight-related complications and fears [1, 2, 8].

Types of HBOT complication

Complications related to pressure injuries

Pressure injuries stem from the impact of increased pressure on the gas-filled spaces in the human organism (middle ear, paranasal sinuses, lungs, and digestive tract), the volume of which cannot be quickly changed and therefore the pressure cannot be equalized [9].

The most common adverse effect of HBOT is middle-ear barotrauma (MEB). The estimated incidence of MEB depends on diagnostic methods of various sensitivity and the types of anomalies considered to be injuries. Usually, the complication occurs in about 2% of the patients who undergo the therapy, but in the case of Eustachian tube dysfunctions, this rate may be higher. Pressure injury of the ear most often manifests as pain or discomfort in the ear area, less often as sudden hearing impairment, tinnitus or bleeding. Sometimes it is asymptomatic and the consequences are visible only by otoscopy, in which tympanum damage is revealed [8, 10-14].

The second most frequent pressure injury is that to the paranasal sinuses, with an incidence of about 1.2% [8]. Usually this is related to a concurrent inflammation of the upper respiratory tract or paranasal sinuses [10]. Most often, the symptoms include pain in the area, discomfort, a feeling of pressure and dizziness. The mucosa of the sinus becomes congested, as a result of which it starts to leak and bleed. Depending on the type and extent of the damage, the symptoms may appear as early as during the procedure itself, although there are cases where the complication has been diagnosed several weeks after the therapy. In the long-term perspective, it may lead to chronic inflammation in the paranasal region [13, 15].

Other complications related to the exposure to increased atmospheric pressure may affect the inner ear, lungs and teeth [8]. Pressure injuries to the teeth may manifest by their damage, breaking and pain during the compression. The risk is higher in the case of teeth previously damaged, having fillings with air spaces or which are undergoing active disease processes [16].

Pressure injury to the lungs is an extremely rare complication, usually related to a pre-existing disease process. It is usually manifested in the form of pneumothorax [1, 17].

Complications resulting from oxygen toxicity

The complications resulting from oxygen toxicity usually affect the CNS and the lungs. The side effects affecting the CNS are sometimes called the Paul Bert effect, after his research in the 19th century into the metabolic changes occurring in the tissues [8, 18], and which may occur when the oxygen concentration exceeds 70%. Most often, they manifest as convulsions that do not lead to any permanent damage if the seizure does not cause any mechanical injuries. The frequency of occurrence is about 0.5% and is often preceded by trembling of the smaller muscle groups. The toxic effect of oxygen on the CNS may also result in nausea, vomiting, vertigo, anxiety, muscle cramps, fainting and very rarely in a temporary sight impairment [5, 8, 10].

On the other hand, the pulmonary complications related to oxygen toxicity, sometimes called the Lorraine Smith effect, usually take the form of a dry cough and substernal pain and occur only in single patients [8]. The changes in the pulmonary tissue stem from the increased number of oxygen free radicals (OFRs), which damage cell DNA, proteins, lipid membranes and enzymes. This leads to an inflammatory response to tissue edema, and intraalveolar bleeding. The subsequent proliferation and development of hyaline membranes causes bronchial-pulmonary dysplasia, which results in decreased vital capacity [8, 19].

Moreover, some studies have described the electrochemical corrosion of amalgam fillings during exposure to 100% oxygen [16].

Sight-related complications

Due to the high pressure in the hyperbaric chamber, the eyeballs may become temporarily deformed, which leads to axial myopia. The incidence of the complication may be even as high as 50%, but it is of temporary nature [10, 20]. A much less frequent complication involves cataracts, and this problem may become irreversible. It may appear after long-term exposure to hyperbaric oxygen (usually over 100 procedures). It is suspected that it is caused by the long-term exposure to free radicals [1, 10].

Due to the performance of Valsalva maneuver during HBOT, there have been single cases of Valsalva maculopathy (retinal hemorrhage with subsequent scarring in the macular region), but its relationship with HBOT should be considered accidental [9].

Fear

Mental complications may take various forms and appear in about 4% of patients. Some of the patients directly report fear, in others the symptoms include hyperventilation, heart palpitation or dyspnea [8]. It is estimated that claustrophobia (affecting about 2% of the population) may increase the incidence of this complication [10].

The complications described above are the most frequent medical complications of HBOT. Other adverse effects, such as abdominal pain, hypoglycemia, hallucinations, increased blood pressure, hyperthermia and nose bleeding occur much less frequently [21].

Increased risk of adverse effects

The complications described above occur more often in patients repeatedly exposed to hyperbaric oxygen; however the majority of the reported adverse effects appeared during the first three sessions. The incidence rate increases with higher chamber pressures and compression speeds. According to Boyle's law, the majority of adverse effects of increased pressure appear during compression to one atmosphere. Pressure injuries are more frequent in patients who have problems with pressure equalization e.g. unconscious or mechanically ventilated patients [11, 13]. As many as about 20% of patients declaring problems with pressure equalization may have a confirmed pressure injury of the middle ear, located by otoscopy [8]. This type of complication is described as more frequent in women, older people and patients with a pre-existing Eustachian tube dysfunction in their medical history, but these data are not confirmed in all of the available studies [11, 13, 22].

As far as the toxic effect of oxygen on the CNS is concerned, a higher probability of convulsions is reported for patients with epileptic seizures in their medical history, hyperthyroidism, hypercapnia in the course of COPD, or diabetes, as well as in patients with fever, addicted to alcohol and/or drugs and with a lowered convulsion threshold related to concurrent pharmacotherapy (e.g. administration of penicillin, disulfiram, tramadol or cephalosporins), although not all research studies confirm the above conditions as risk factors [8, 23].

The risk group for cataract includes: older people, patients with diabetes and patients on corticosteroids or after irradiation of the head and neck [10].

Prevention of complications

The number of complications may be limited by strict adherence to HBO therapy counterindications. It must never be used in patients with untreated pneumothorax or during treatment with some cytostatic drugs. Relative counterindications include: emphysema, upper respiratory tract infections, recent surgeries (of the middle ear and chest), high fever and unstable disease conditions (asthma, epilepsy, COPD, metastatic cancer). A high degree of caution is required in the case of patients with claustrophobia and with pregnant women (in which HBOT is allowed in the case of carbon monoxide poisoning) [4, 5].

Additionally, complications may be prevented with pharmacotherapy and patient training. For the prevention of middle ear injuries, the patient needs to be trained in pressure equalization by the Valsalva maneuver or Toynbee maneuver. It is helpful to maintain the patency of the ear canal with special drains inserted during tympanostomy, epinephrine and slow compression [10-12].

Pain of the paranasal sinuses may be minimized with nasal sprays, antihistamine drugs or steroid drugs, which anemise the mucosa of these areas [10, 15]. In order to prevent pressure injuries of the paranasal sinuses, an MRI of the area and a laryngological consultation are recommended.

As far as the prevention of pressure injuries to the teeth is concerned, a dental consultation before HBOT seems a justified solution [16].

One of the methods of preventing complications caused by the toxicity of oxygen on the CNS is the administration of small doses of benzodiazepine derivatives as protection against convulsive seizures. Various doses are used, for example in the case of diazepam administered orally it is usually 2.5-10 mg [8, 11]. At the same time, this type of pharmacotherapy has an anxolytic effect.

The toxic effect of oxygen can be also diminished through breaks in the administration of 100% oxygen [1].

It is important to remind the patients about the need to inform the staff about any symptoms, thus enabling quick intervention (stopping the therapy,

slower compression or supervision over the efficiency of the Valsalva maneuver) [11]. Some authors emphasize the probably greater efficiency of the maneuvers in multiperson chambers, in which the patients are sitting, in comparison to one-person chambers equipped with a bed [13].

As for the employees operating the hyperbaric chambers, the guidelines are described in the European code of good practice for hyperbaric oxygen therapy and include check-ups, exposure number limits and breaks between sessions [24].

Discussion

The wide application of HBOT demands some reflection on the safety of its use in various populations, especially in patients with concurrent diseases. Particular attention is paid to two groups of diseases that form the most common causes of death in Poland: cardiovascular diseases and neoplasms [25].

Research conducted on small groups of patients indicates the positive impact of HBOT on those with ischemic heart disease (IHD). It has been observed that HBOT leads to alleviation of coronary pain, improvement of the physical capacity and reduction of the incidence of cardiac arrhythmia.

HBOT has been reported as being beneficial for patients with an unstable form of IHD and myocardial infarction; the ECG image stabilized more quickly and the ischemic area of the myocardium became significantly smaller. There is evidence confirming the efficiency of HBOT as a supplementary therapy following cardiac surgeries consisting of artificial valve implantation or coronary vessel declogging. In this group of patients, a statistically significant drop in postsurgical deaths was observed. No significant influence of HBOT on antiaggregant therapy has been observed [26]. The application of hyperbaric therapy may also have a statistically significant influence on decreasing the heart rate and lowering systolic blood pressure [27]. There were many doubts regarding patients with an implanted cardiac stimulator, but clinical observations did not confirm that HBOT affects the functioning of these devices in the pressure range 2-7 ATA [28]. However, it must be remembered that research conducted on patients with cardiovascular burdens usually involves small groups and requires strict cardiological supervision.

Due to the toxic effect of oxygen, there were many fears as to the carcinogenic potential of hyperbaric oxygen. Due to the stimulatory effect of HBOT on angiogenesis, which is visible in patients with injuries, there were concerns that the tumor would grow as a result of this mechanism and that the therapy would accelerate the metastasis. The review of literature from recent years did not confirm the stimulatory influence of HBOT on cancer progression. However, there is evidence which may suggest the protective effect of hyperbaric therapy in the case of some neoplasms, such as breast cancer and colonorectal cancer. As hypoxia reduces the efficiency of chemotherapy, there are suggestions that HBOT could be used in some oncological patients as a supplementary treatment. In patients with head and neck cancers, HBOT may increase the efficiency of radiation therapy if appropriate treatment schemes were introduced. On the basis of the research available, it may be said that HBOT is an oncologically-safe treatment method and there are even suggestions that it may support cancer treatment, but the interpretation of these results requires some caution, as the majority of the evidence is based on research using animals [29].

Conclusions

1. On the basis of the literature review, it can be said that HBOT is a safe treatment method.
2. Complications are rare and usually temporary.
3. Appropriate caution both while referring patients for this procedure and during the procedure itself minimizes the risk of possible complications.

Literature

1. Narożny W, Siebert J. Możliwości i ograniczenia stosowania tlenu hiperbarycznego w medycynie [Advantages and limits of hyperbaric oxygen therapy in medicine]. Family Medicine Forum 2007; 4: 368-375
2. Narożny W. Hiperbaria tlenowa w patologii ucha wewnętrznego – fakty i mity [Hyperbaric oxygen therapy in middle ear pathologies - facts and myths]. Otorynolaryngologia, 2006; 5 (4): 153-161
3. Knefel G, Szymańska B, Kawecki M, et al. Medycyna hiperbaryczna – rys historyczny [Hyperbaric medicine - a historical outline]. In: Sieroń A, Cieślar G, (ed.) Zarys medycyny hiperbarycznej [Introduction to hyperbaric medicine]. Bielsko-Biała, α-medica press, 2006: 15-22
4. Buda K, Daroszewska M, Ciesielska N, et al. The guidelines of the European Society of Hyperbaric Medicine, Society of Underwater and Hyperbaric Medicine and the National Health Fund Polish Republic on hyperbaric oxygen therapy (HBOT) in 2013. J Health Sciences, 2013; 3 (9): 125-134
5. Charakterystyka produktu leczniczego – Tlen medyczny skroplony. [SmPC - Condensed medical oxygen]. AIR PRODUCTS. Published on: 21.11.2013, permit no. 21 532, ATC code: V03AN01. http://www.urpl.gov.pl/drugs/7 672 009
6. Appendix 4 of Regulation No. 88/2013/DSOZ of the Head of the Polish National Health Fund of 18 December 2013. Contract subject description. Part C - Procedure description - HYPERBARIC THERAPY
7. Kosińska L, Ilnicki P, Tworus R. Hiperbaryczna terapia tlenowa – możliwe zastosowania w wybranych zaburzeniach z pogranicza neurologii i psychiatrii [Hyperbaric oxygen therapy as a method of treatment in chosen neurological and psychiatric disorders]. Research review. Mil. Phys., 2014; 92: 462-465
8. Plafki C, Peters P, Almeling M, et al. Complications and side effects of hyperbaric oxygen therapy. Aviat Space Environ Med, 2000; 71: 119-124
9. Dziedzic T, Kostyra K, Kowalska-Jackiewicz J. Makulopatia Valsalvy u pracownika medycznego wykonującego pracę w komorze hiperbarycznej – opis przypadku. [Valsalva maculopathy in a medical staff member working in a hyperbaric chamber - case study]. Med Prakt, 2013; 64 (3): 455-459
10. Clark J. Side effects. In: Gesell LB. Hyperbaric oxygen therapy indications. Durham, Undersea and Hyperbaric Medical Society Inc, 2008: 215-220

11. Besserau J, Tabah A, Genotelle N, et al. Middle-ear barotrauma after hyper-baric oxygen therapy. UHM, 2010; 4: 203-208
12. Lima MAR, Farage L, Cury MCL, et al. Middle ear barotrauma after hyperbaric oxygen therapy – the role of insuflation maneuvers. Intern Tinnitus J, 2012; 17 (2): 180-185. DOI 10.5935/0946–5448.20 120 032
13. Fitzpatrick DT, Franck BA, Mason K T, et al. Risk factors for symptomatic otic and sinus barotrauma in a multiplace hyperbaric chamber. Undersea Hyperb Med, 1999; 26 (4): 243-247
14. Camporesi EM. Side effects of hyperbaric oxygen therapy. Abstract. Undersea Hyperb Med, 2014; 41 (3): 253-257
15. Siermontowski P, Spałek E. Uraz ciśnieniowy zatok obocznych nosa u nurkó [Pressure injury of paranasal sinuses in divers]. Polish Hyperbaric Res, 2005; 1 (10): 31-36
16. Zadik Y. Dental barotrauma. Int J Prosthodont, 2009; 22: 354-357
17. Jain KK. Oxygen toxicity. In: Jain KK, ed. Textbook of hyperbaric medicine. Göttingen, Hogrefe & Huber Publishers, 2004
18. Acott Ch. Oxygen toxicity. A brief history of oxygen in diving. SPUMS J, 1999; 3: 150-155
19. Bitterman N, Bitterman H. Oxygen toxicity. In: Mathieu D, ed. Handbook of hyperbaric medicine. Dordecht, Springer Science & Business Media, 2006: 731-766
20. 2 0. Lyne AJ. Ocular effects of hyperbaric oxygen. Trans Ophtalmol Soc, 1978; 98: 66-68
21. Sheffield PJ, Sheffield JC. Complication rates for hyperbaric oxygen therapy patients and their attendants: a 22-year analysis. In: Cramer FS, Sheffield PJ, ed. Proceedings of the Fourteenth International Congress on Hyperbaric Medicine. San Francisco, Best Publishing Company, 2003: 312-318
22. Ambiru S, Furuyama N, Aono M, et al. Analysis of risk factors associated with complications of hyperbaric oxygen therapy. J Crit Care, 20 08; 23: 295 – 300
23. Seidel R, Carroll C, Thompson D, et al. Risk factors for oxygen toxicity seizures in hyperbaric oxygen therapy: case reports from multiple institutions. Abstract. Undersea Hyperb Med, 2013; 40 (6): 515-519
24. A European code of good practice on hyperbaric oxygen therapy. European Committee for Hyperbaric Medicine, 2004
25. Wojtyniak B, Stokwiszewski J, Goryński P, Poznańska A. Długość życia i umieralność ludności Polski [Life expectancy and mortality in Poland]. In: Wojtyniak B, Goryński P, Moskalewicz B, (eds.) Sytuacja zdrowotna ludności Polski i jej uwarunkowania [Health of the inhabitants of Poland and causes of the situation]. Warszawa, Narodowy Instytut Zdrowia Publicznego - Państwowy Zakład Higieny, 2012: 38-127
26. Gmyrek J, Puszer M. Zastosowanie hiperbarycznej terapii tlenowej w kardiologii [Application of hyperbaric oxygen therapy in cardiology]. In: Sieroń A, Cieślar G, (eds.) Zarys medycyny hiperbarycznej [Introduction to hyperbaric medicine]. Bielsko-Biała, α-medica press, 2006: 166-170
27. Chateau-Degat ML, Belley R. Hyperbaric oxygen therapy decreases blood pressure in patients with chronic wounds. Undersea Hyperb Med, 2012; 5: 881-889
28. Kot J. Medical equipment for multiplace hyperbaric chambers. Part I: Devices for monitoring and cardiac support. Eur J Underwater Hyperb Med, 2005; 4: 115-120
29. Moen I, Stuhr L. Hyperbaric oxygen therapy and cancer – a review. Targ Oncol, 2012; 7: 233-242

Helplines for people with mental health issues and their families – a primitive form of telemedicine or an effective form of help?

Telefon zaufania dla osób z problemami zdrowia psychicznego i ich rodzin – prymitywna forma telemedycyny czy skuteczna forma pomocy?

Anna Nycz[1], Radosław Tworus[1], Mirosław Dziuk[2]
[1] Department of Psychiatry and Combat Stress, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Lt. Col. Radosław Tworus MD, PhD
Department of Nuclear Medicine, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine in Warsaw; head: Prof. Mirosław Dziuk MD, PhD

Abstract. A helpline for people with mental health problems, and their families, is a low cost and easy to organize form of specialized help classified as telemedicine. In comparison with modern telemedical services, like telecardiology or videorehabilitation, the helpline might appear to be a primitive solution. However, for people with mental disorders, a chance to consult a specialist by pressing a few buttons on their mobile phone could be of life-saving significance, one that could also prevent suicide. The paper presents an analysis of the objectives, tasks, capabilities and limitations of a helpline service as the oldest, yet still highly perspective form of help. Attention is drawn to the need for more research into the objectives and the effectiveness of the help provided with the use of a telephone.
Key words: helpline**,** mental health, telemedicine, telepsychiatry

Streszczenie. Telefon zaufania dla osób z problemami zdrowia psychicznego oraz ich rodzin to niskonakładowa i prosta w organizacji forma pomocy specjalistycznej zaliczana do telemedycyny. W porównaniu z nowoczesnymi usługami telemedycznymi, takimi jak telekardiologia, wideorehabilitacja itp., telefon zaufania wydaje się techniką pozornie prymitywną. Pozornie, gdyż w przypadku osób z zaburzeniami psychicznymi możliwość rozmowy ze specjalistą po naciśnięciu kilku przycisków telefonu komórkowego może mieć znaczenie ratujące życie – zapobiegające samobójstwu. W pracy dokonano analizy celów, zadań, możliwości i ograniczeń telefonu zaufania jako najstarszej, ale jednocześnie nadal wysoce perspektywicznej formy pomocy. Zwrócono uwagę na konieczność prowadzenia badań dotyczących celów oraz skuteczności pomocy świadczonej przez telefon.
Słowa kluczowe: telefon zaufania, telepsychiatria, telemedycyna, zdrowie psychiczne

Delivered: 08/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 185-189

Corresponding author:
Anna Nycz MSc
Department of Psychiatry and Combat Stress, Central Clinical Hospital of the Ministry of National Defence, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw, Poland
telephone: +48 261 816 450
e-mail: anycz@wim.mil.pl

Introduction

The advancement of technology and civilization, as well as the changing needs and increasing consciousness of the information society, allows us to predict that telemedicine will have a special role in the future. According to the definition of the American Telemedicine Association, it is a form of exchange of medical information between two parties with the use of telecommunication tools aimed at improving the patient's condition. It involves the use of various forms of telecommunication: mobile applications facilitating the decision-making process, electronic reporting and sharing of the patient's medical history,

videoconferencing, teleconsultations and other wireless technologies of bilateral communication, including the telephone and email [1]. These forms are widely used in the following branches of medicine: rehabilitation, using video in the patient's house; cardiology for sending of ECG results; radiology and surgery for sending of scan images [2-4], care for the aged for storing, sending and analyzing medical data, monitoring vital signs such as BP, HR [5-7], glucose concentration, as well as training for various groups of medical staff thanks to special mobile applications.

Telepsychiatry

Although telemedicine is, as shown above, used in many branches of medicine, there is little information available related to the use of telemedicine as an indirect form of contact with patients having mental health problems. The aim of this paper is to present the helpline as a supplementary tool in the holistic care of people in crisis. Crisis is understood as "a personal difficulty or situation which makes people unable to act and consciously control their own lives. It is a state of disintegration in which the people face the destruction of important life goals or a profound distortion of their routines and methods of managing stress factors" [8]. Helplines, which by definition are anonymous tools, are aimed at helping people who would probably never dare look for traditionally understood help, such as direct contact with a psychiatrist, clinical psychologist or therapist, in their search to find support. It is the anonymity, both of the patient/client and the consultant, that allows those people with mental health problems to break through the barrier of embarrassment and fear of stigmatization and, as a consequence, to initiate a "distance contact", which is the first active step towards seeking professional help in order to resolve the problem.

History of helplines

The idea of helplines was born in the USA, thanks to a Baptist pastor, Harry Marsh Warren, back at the beginning of the 20th century. In 1906, Rev. Marsh Warren founded an organization called the Save-a-Life League, the aim of which was to support people with suicidal thoughts via the telephone. The idea of support via the telephone soon spread to Europe (one of the pioneers was Pastor Chad Varah in London in 1953). Prof. Tadeusz Kielanowski is said to be the founder of the first helpline in Poland, known as *Gdański Telefon Zaufania "Anonimowy Przyjaciel"* ("Anonymous Friend" Helpline in Gdańsk, 1967). Thanks to him the helpline movement gained more significance and started to develop in other places in Poland. Currently, those volunteers who work in helpline services in Poland are associated by the Polish Telephone Help Association, founded in 1990 in Sopot [9]. In Poland there are many helplines designed to assist specific groups of people, such as *Niebieska Linia* (Blue Line, for victims of violence), *Ogólnopolski Telefon Zaufania dla Dzieci i Młodzieży* (Polish Helpline for Children and Youths), *Ogólnopolski Telefon Zaufania Narkotyki – Narkomania* (Polish Helpline for Drug Addictions), *Całodobowa Linia Wsparcia Centrum Poszukiwań Ludzi Zaginionych „Itaka"* (Helpline of the "Itaka" Missing People Search Centre, available 24/7), *Całodobowy Telefon Zaufania Krajowego Centrum ds. AIDS* (Helpline of the Polish AIDS centre, available 24/7), *Telefon Zaufania dla Ofiar i Sprawców Przemocy Seksualnej* (Helpline for Victims and Perpetrators of Sexual Violence), and many others.

Advantages and limitations of helplines

In spite of the passing time and the introduction of more modern and developed forms of medical help and psychoprophylactic care, such as via the Internet, helplines continue to develop rather than lose their importance. Thanks to their simple mechanism and ease of obtaining professional help, they remain a useful tool with a future, especially now when access to mobile phones is so wide. The ingenuity of the helpline lies in the ease of use of this form of help. It is available to everyone in Poland: anyone who needs help can use it. There are helplines offering help in a given region, such as a province [10], but the majority of them still help regardless of the place from which the person calls. They offer specialist and, although it may seem otherwise, multi-profile help, and work similarly to specialist out-patient clinics. If the specialist on duty diagnoses a problem, the solution of which exceeds the competences of the given helpline, he or she can direct the person to call to another helpline where there are people with professional competences in the required field (e.g. helplines for victims of violence, people fighting with addictions, for the homeless, helplines offering support for the families of missing people, telephones for patients e.g. with cancer or rare diseases, helplines for young people, etc.).

Another advantage of this form of help is its speed of distribution, provided practically at the moment the call is made. There are no limits or the queues so well-known to people who have had contact with healthcare system units on a daily basis. The speed of help distribution is often a critical factor for people in difficult life situations. Another advantage, which is often overlooked, is the relatively low material/financial cost of organizing and creating a helpline institution. The most basic and at the same time the most valuable asset are the people, who are the decisive factor defining the quality of the help. Their competences, knowledge, engagement and

above all empathy, ability to listen, time available and true will to help the person on the other end of the line may in many cases be much more useful in the saving a life or health than a visit to a doctor after a long wait in the queuing system. All the consultant needs is a room, desk, and computer or telephone, none of which are expensive. The costs are low because neither the room nor the equipment have to meet the strict and costly sanitary and epidemiological norms usually required in healthcare centers. It can be furnished with any table, while the telephone and computer with Internet access may be second-hand devices [11].

The model for the crisis intervention proceedings consists of the following six stages:

1. defining the problem,
2. ensuring the client's safety,
3. giving support,
4. analyzing the possibilities,
5. preparing plans, and
6. obtaining commitments from the client [8].

The person working in the helpline must have significant competences in the field of creating what is often referred to as 'psychological contact at a distance'. The professional initiation of contact makes it possible to pass through the first two stages in a quick and efficient manner, and then to begin the most important third stage – giving support, which is the basis for the introduction of the life changes described in the following stages of the crisis intervention.

Establishing contact with the person calling the helpline can be especially difficult for a number of reasons. Firstly, any direct contact, which in many situations naturally facilitates the creation of relations, such as holding one's hand, nodding, a warm look, facial expression or handing a tissue, is eliminated from the start. Secondly, there is no way to observe the patient, as in the case of a real face-to-face conversation. As a result, it is impossible to assess the non-verbal communication or body language, and this may hinder the accurate assessment of the mental condition [12]. The only tools available to the person working via telephone is tone of voice, modulation, patience and giving freedom of expression to the person calling. These skills, regardless of the level of the specialist knowledge, are decisive in determining whether the client will hang up after a few minutes or continue the conversation. In many branches of medicine the quality of the specialist-patient relationship does not have to have a direct impact on the consultation quality (a patient with a toothache or a broken leg can sometimes demand help in an insistent or even an aggressive way), but in the case of people in difficult life situations, who are mentally unstable, a lack of contact may have serious consequences, such as suicide [13].

Another element that needs attention in the work of the helpline is the fact that the consultant can never be sure whether the consultation will be a single conversation or will consist of several calls. Also the effects of the helpline support are difficult to assess as the fortunes of the person calling after he or she hangs up usually remain unknown.

Table 1. Statistics of conversations recorded by "Blue Line"
Tabela 1. Statystyka rozmów zarejestrowanych przez „Niebieską Linię”

Year	Total number of conversations	Number of conversations about violence
2010	3910	2644
2009	3900	2,811
2008	3210	2269
2007	1602	1059
Total	12,622	8783

In spite of all of the limitations resulting from the lack of direct relation between the specialist and the client, the helpline system is increasing in popularity, as is the trust of those in need of it. The credibility of this opinion may be confirmed, for example, by Table 1, which shows the high demand for the psychological support system of the Blue Line [14]. The data in Table 2 directly correspond to that in Table 1, and it can be concluded that this institution surely cannot respond to the needs of all victims of violence, as the scale of the phenomenon is extremely large, but it invaluably fills a gap in the system [15].

Table 2. Number of home violence victims according to "Blue Card" procedures (police statistics)
Tabela 2. Liczba ofiar przemocy domowej wg procedury „Niebieskiej Karty” (statystyki policyjne)

Year	total number of violence victims
2011	113,546
2010	134,866
2009	132,796
2008	139,747
2007	130,682

Helpline for people with mental problems – is it really necessary?

The EZOP study ("Epidemiology of psychiatric disorders and access to the mental healthcare facilities"), which included 10,000 participants, shows that one in every four people in Poland has experienced mental disorders in their lifetime, and about 40% of people aged 18-64 may need psychological help. The study result reveals that among the Polish working-age population, there may be about 2.5 million people suffering from neurotic disorders, 3.3 million people with mental issues

related to addictions and about 1 million people with mood disorders. The report also contains a range of other data about the mental health of the population in Poland. It shows that the majority of the members of society have stereotypically negative opinions about people who are mentally ill, mental disorders and mental healthcare centers, and therefore keep their distance from everything related to psychiatry. In the studied group, in the case of mental disorders, only 37% would look for the help of a psychiatrist, 24% would not use any form of medical help, and 4% would not tell anybody from their environment, even their closest family, about their mental health problems [16, 17].

The data clearly indicate that there is a large group of potential clients for a psychiatric helpline. This group includes people who have mental problems but who consider admitting to them as a sign of weakness that could result in social rejection. This, according to an EZOP study, is not a line of thinking far from the objective reality. In many cases they may be people of public trust – teachers, members of authorities, physicians, employees of the system of justice, soldiers or policemen. For them, as public people, the admission of mental dysfunctions may be particularly difficult. However, they can call a helpline and talk to a specialist, and such a telephone call may be made while walking the dog, going to work by car, or doing the shopping, in everyday circumstances, without the need to make an appointment, wait for a specific date or sit in a waiting room. In many of the normal methods of making an appointment, we can observe the "dentist waiting room effect", well known to most psychologists and psychiatrists. It means that the patients make appointments when their mental suffering exceeds their capabilities to dissimulate the problem. However, while waiting for an appointment, a number of things happen in their lives. These changes improve their mood, distract them from the problem, the mental suffering decreases while the fear of admitting weakness increases, which makes the problem seem much less significant. In such circumstances, the appointment with the specialist is cancelled. If the patient makes an appointment with a specialist after the supporting intervention of the helpline consultant, there is higher chance that the motivation to arrange the visit will be maintained, as the fear of stigmatization and embarrassment from perceiving oneself as a weak person will be reduced.

Helplines may be also useful for families with working-age people having mental problems who do not want to admit their problems or begin any type of treatment. Thanks to having contact with a helpline specialist, members of these families may learn how to behave in relation to the person with mental disorders; how to motivate a husband who is a policeman, soldier or fireman to visit a psychiatrist, psychologist or therapist, how to do it to prevent dissimulation, minimization, rationalization or intellectualization of the problem – all typical protective mechanisms employed by people with mental disorders [18, 19].

Discussion

There are few solutions in the Polish and world healthcare systems costing so little while offering such incredibly high medical and social advantages. Helplines are a great example of simple yet efficient forms of telemedical mental support for people who are in crisis or who suffer from mental disorders, as well as their families. The scarcity of research papers on the organizational forms, problems related to the concept and the organization and the assessment of the efficiency of the existing helplines for people with mental disorders and their families makes it difficult for people who want to develop this branch of telemedicine to draw conclusions from the experiences of others.

Conclusions

Helplines for people with mental problems and their families form a simple and low-cost form of specialist help.

The development of this branch of telemedicine depends on more research being undertaken into the correlations between generally understood organizational costs and the effects of telephone consultations with specialists.

Literature

1. http://www.americantelemed.org/about-telemedicine/what-is-telemedicine#.VFU-LDSG-NA, Access: 01/11/2014.
2. Król J. Od gadżetu do zastosowania klinicznego [From a gadget to a clinical application]. Kardioprofil, 2005; 3 (3): 218-219
3. Abramczyk A. Wsparcie dla gorących linii. [Support for hotlines]. Ogólnopol Przegląd Med, 2004; (8): 38
4. Komorowski AL. Aplikacje medyczne na urządzenia przenośne (część 1) [Medical applications for mobile devices (part 1)]. Nowotwory, 2012; 62 (3): 231-233
5. Bujnowska-Fedak MM, Sapilak B. Potrzeby i poglądy ludzi w podeszłym wieku w zakresie korzystania z narzędzi telemedycznych i usług zdrowotnych typu e-Health [Needs and opinions of aged people as to telemedical tools and e-Health services]. Family Med Primary Care Rev, 2012; 14 (2): 132-137
6. Kędziora-Kornatowska K, Grzanka-Tykwińska A. Osoby starsze w społeczeństwie informacyjnym [Older people in the information society]. Gerontologia Polska, 2011; 9 (2): 107-111
7. Bujnowska-Fedak MM, Reksa D, Pirogowicz I, et al. Poglądy i potrzeby w zakresie telemedycyny i usług typu e-Health w opinii Polaków i Greków [Needs and opinions of Polish and Greek people as to telemedical tools and e-Health services]. Family Med Primary Care Rev, 2008; 10 (3): 356-360
8. Lipczyński A. Psychologiczna interwencja w sytuacjach kryzysowych [Psychological intervention in crisis situations]. Warsaw, Difin, 2007: 46-57
9. http://www.swiatproblemow.pl/2011_01_2.html. Access: 01/11/2014
10. Grabowska D, Chrzanowska M, Malicki I, et al. Infolinia onkologiczna jako nowa forma pomocy pacjentom z województwa pomorskiego i ich rodzinom [The Oncological Infoline as a new form of support for patients from the Pomorskie Province and their families]. Psychoonkologia, 2013;17 (1): 32-33

11. Michalak T. Dlaczego Telefony Zaufania są potrzebne? [Why are helplines needed?] Wiadomości Psychiatryczne, 2006; 9 (4): 277-280
12. Krzystanek M. Psychiatria jutra już dziś w Polsce. Telepsychiatria w leczeniu schizofrenii. [The psychiatry of tomorrow - today in Poland. Telepsychiatry in the therapy of schizophrenia]. Psychiatria. Pismo dla praktyków, 2013; 3: 14-15
13. Młodożeniec A. Formy pomocy dla osób zagrożonych samobójstwem w Polsce. [Forms of help for people threatened with suicide in Poland]. Wiadomości Psychiatryczne, 2006; 9 (2): 123-126
14. http://www.niebieskalinia.pl/spaw/docs/zestawienie_WNL226 687 000.pdf. Access: 01/11/2014
15. http://statystyka.policja.pl/st/wybrane-statystyki/przemoc-w-rodzinie/50 863,Przemoc-w-rodzinie.html. Access: 01/11/2014
16. Moskalewicz J, Kiejna A, Wojtyniak B. Kondycja psychiczna mieszkańców Polski. Raport z badań „Epidemiologia zaburzeń psychiatrycznych i dostęp do psychiatrycznej opieki zdrowotnej – EZOP Polska" [Mental condition of the inhabitants of Poland. Report from the study – "Epidemiology of psychiatric disorders and access to the mental healthcare facilities – EZOP Poland"]. Warsaw, Institute of Psychiatry and Neurology in Warsaw, 2012: 111-247
17. http://www.ezop.edu.pl/. Access: 05/01/2015
18. Clarin JF, Fonagy P, Gabbard GO. Psychoterapia psychodynamiczna zaburzeń osobowości. Podręcznik kliniczny. [Psychodynamic psychotherapy of personality disorders. Clinical textbook]. Kraków, Wydawnictwo Uniwersytetu Jagiellońskiego, 2013: 43-57
19. Zimbardo PG, Gerring RJ. Psychologia i życie. [Psychology and life]. Warsaw, Wydawnictwo Naukowe PWN, 2012: 536-542

70th Anniversary of the 105th Borderlands Military Hospital with Outpatient Clinic in Żary. A Jubilee with a Heart

70 lat 105. Kresowego Szpitala Wojskowego z Przychodnią SP ZOZ w Żarach. Jubileusz sercem tworzony

Andrzej Kierzek MD, PhD

History Section of the Polish Otorhinolaryngology - Head and Neck Surgery Society;
head: Prof. Andrzej Kierzek MD, PhD

Abstract. The history of the 105th Borderlands Military Hospital with Outpatient Clinic in Żar, which began in 1944 in the Czemierniki-Kock-Siedlce area before the hospital eventually arrived in Żary in 1946, is presented from the beginning. Nowadays the 105th Borderlands Military Hospital with Outpatient Clinic in Żary is a multidirectional hospital with many medical specializations, an important element of the Land of Lubusz. The jubilee of the seventieth anniversary of this well-known medical institution is presented in full. The significance of the doctors Zbigniew Kopociński and Krzysztof Kopociński to the organization of this jubilee is appreciated.
Key words: history of military hospitals

Streszczenie. Na wstępie przedstawiono historię 105. Kresowego Szpitala Wojskowego z Przychodnią w Żarach, powstałego w 1944 r. w rejonie Czemierniki–Kock–Siedlce, przeniesionego w 1946 r. do Żar. Obecnie 105. Kresowy Szpital Wojskowy w Żarach z Przychodnią jest wieloprofilowym szpitalem o wielu specjalnościach lekarskich, wiodącym na Ziemi Lubuskiej. Szczegółowo zrelacjonowano uroczystość 70-lecia tej znanej placówki medycznej. Szeroko ukazano rolę doktorów Zbigniewa Kopocińskiego i Krzysztofa Kopocińskiego w organizacji tej uroczystości.
Słowa kluczowe: historia szpitali wojskowych

Delivered: 01.02.2015
Accepted for print: 10.03.2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 190-192

Corresponding author:
Prof. Andrzej Kierzek MD, PhD
5/6 Rozbrat St. 50-334 Wrocław
telephone: + 48 71 322 17 60; +48 693 52 17 60
e-mail: andrzejkierzek@wp.pl

The perception of time is a wonderful gift of adolescence, and the recovery of the memory of the interesting people we encountered then is the main function of various anniversaries. These remind us of people and events from the past, and each have their own long histories. "Let us build a history, bowing to yesterday's people and admiring today's. Let us write a will for those who come after us," wrote Jolanta Zaręba-Wronkowska. I do not know whether Zbigniew Kopociński MD, PhD and Krzysztof Kopociński MD, PhD, ophthalmologists of Żary, are aware of the works of this poet, writer, and visual artist; nevertheless, they thoroughly followed her guidelines. On 3 October 2014, under the patronage of the President of Poland, they organized a jubilee for the 105th Borderlands Military Hospital with Outpatient Clinic in Żary, and did so perfectly. *Imo pectore!* The jubilee could not have been organized in a better manner.

A careful reader may see an error in this review. He or she may wonder: how come that the hospital is a Borderlands Hospital? "In order to emphasize the bonds between soldiers and the employees of 105th Borderlands Military Hospital with Outpatient Clinic in Żary and their compatriots who were repatriated from the Eastern Borderlands of the Second Polish republic and settled in the Żary community", announced the Minister of National Defence who, by decision no. 398/2014, granted that name to the Hospital in Żary the day prior to the jubilee.

Figure 1. 105th Borderlands Military Hospital with Outpatient Clinic in Żary. Krzysztof Kopociński, Andrzej Kierzek, Zbigniew Kopociński (from the right) with women in historical nursing costumes. In the background – a two-horse sanitary wagon and armored vehicles of 11th LDKPanc (Lubusz Armoured Cavalry Division)

Rycina 1. 105. Kresowy Szpital Wojskowy z Przychodnią. Stoją od prawej: Krzysztof Kopociński, Andrzej Kierzek, Zbigniew Kopociński wraz z paniami w historycznych strojach sanitariuszek, w tle dwukonna podwoda sanitarna oraz pojazdy opancerzone 11LDKPanc.

The hospital, known earlier as the 8th Mobile Field Surgical Hospital, was founded in August 1944 in the Czemierniki-Kock-Siedlce region before setting off to follow the path of the troops of the 2nd Polish Army. In those times it was a modern and functional medical facility with a well-trained and battle-hardened staff. At the end of the war it was stationed in Ruszów, from where it moved to Iłowa Żagańska. In 1945, it changed its name to the Garrison Hospital, and in May 1946 it was relocated to the facilities of the former German psychiatric ward in Żary. Four departments were then created in this 100-bed hospital: surgical, general, dermatological and venereological, and infectious diseases. Only later, in 1951, was it given the number 105. After many years, in 2010, the hospital in Żary was merged with the hospital in Żagań.

The author has no intention of presenting a detailed history of the facility in Żary, as Zbigniew and Krzysztof Kopociński have already achieved this very well in their two anniversary books, with the participation of Prof. Czesław Jeśman of the Medical University of Lodz, on 599 pages of the work entitled "105th Military Hospital in Żary. The Pride of the Land of Lubusz", and: "The Doctors of the Military Hospital in Żary", the latter taking the form of an annex to the former work. During private talks, the Kopociński doctors, my very knowledgeable and friendly junior colleagues, admitted that they had worked on those books for over three years, devoting all their free time including the holiday months. I believe them, because such a well-written (from the methodological and historic point of view), rich in source materials, and perfect image of the history of a hospital cannot be created without thorough research.

It was many years before the political transformations happened in Poland that the Military Hospital in Żary became attached to the town and its region. Over the decades it served the citizens of the Land of Lubusz in their need for qualified medical care, oftentimes reaching far beyond its statutory activity. Such a broad scope of activity was dictated by the reputation of the facility, which itself was the result of the commitment and expertise of its employees.

Seventy years is a long period of hospital activity when performed under various political and economic conditions, a long existence that included the ups and downs of people's fates and events.

The prestigious character of this medical facility was reflected in the jubilee celebrations. On a warm and sunny October morning, the local Elevation of the Holy Cross Garrison Church, where the holy mass was held, could not contain all the dwellers of the Land of Lubusz who wished to pay tribute to the hospital. Those attending the jubilee included: His Eminence, Cardinal Henryk Gulbinowicz; His Excellency Stefan Regmunt PhD, Bishop of Zielona Góra and Gorzów; five priests; Col. Piotr Napieraj MsPharm, deputy Chief of the Military Health Service Inspectorate; Maj. Gen. Mirosław Różański PhD, representative of the Ministry of National Defence; commanders of the brigades of the 11th Jan III Sobieski Lubusz Armoured Cavalry Division; Sylweriusz Królak, Judge of the State Tribunal of the Republic of Poland; Czesław Jeśman, professor of the Medical University of Lodz; chairmen of the Patriotic Association of Borderlands and Combatant Organizations; senator Robert Dowhan, MP Bożenna

Bukiewicz, the authorities of Żary, as well as many other invited guests.

The cherished song "Boże coś Polskę", performed by the Artistic Representative Ensemble of the Polish Armed Forces from Warsaw, felt like it might crush the walls of the temple.

The memorable parts of the anniversary academy held in the State Music School, apart from the formal speeches and soldiers' song concert performed by the Artistic Representative Ensemble of the Polish Armed Forces, included speeches by Cardinal Gulbinowicz and Krzysztof Kopociński PhD. On the outskirts of the 105th Hospital, a retrospective show of field hospital operation was performed, including horse transport for the wounded. Those who became tired during the celebrations were offered pea soup from a military pot. The celebrations ended with a party for the guests and friends of the Hospital in the Garrison Club in Żagań, where several hundred of them discussed "the good old times". I was among the guests, as well as some of my former colleagues: Janusz Remiszewski, Wawrzyniec Urban, Ryszard Szałapata and others. I fondly remember my work in that friendly place during my military service in 1970-1971 as a specialist otorhinolaryngologist in the position of the deputy chief of the laryngology department. A year and a half of professional service in the 105th Military Hospital in completely new conditions and environment was not a wasted time, in hindsight.

The participants of the jubilee were accompanied by the hospital's cute mascot: Iwa Baśka, a plush donkey, in memory of a real donkey that assisted its employees for many years as a member of the transport group.

At present, the 105th Borderlands District Hospital, a multi-profile medical institution, with twelve departments and six sub-departments in Żary and seven departments and two sub-departments in the hospital in Żagań, provides access to a broad range of diagnostic and therapeutic services. The modern Emergency Department has its own platform for rescue helicopters; the cardiology department has a hemodynamic laboratory; there is also an active dermatology department, the head of which also holds the position of regional consultant; the ophthalmology sub-department provides comprehensive diagnostics and most of the available treatments in modern-day ophthalmology; the head of the modern laboratory is also the regional consultant in healthcare analytics; while the medical imaging department has its own cutting-edge specialist equipment.

As the largest hospital facility in the Land of Lubusz, it employs about 800 professionals, including more than 160 physicians. The patients are comfortable there, being cared for by devoted medical staff, with their nerves soothed by the peace and quiet of the hospital park.

On this special occasion of the jubilee, I wish all my colleagues of the "105th" all the best. May the predictions of the sceptics that the era of physicians as the intellectual elite is coming to an end never come true. I am firmly convinced that there is no thing such as old age for creative people, such as those I had the pleasure of meeting in Żary. May Providence grant us all long and happy lives. In good health. And in good luck. After all, on "Titanic" everyone was healthy, but not all were lucky.

The Lwow School of Mathematics in the service of Aesculapius – the introvisor invented by Professor H. Steinhaus

Lwowska szkoła matematyczna w służbie Eskulapa – introwizor profesora H. Steinhausa

Zbigniew Kopociński, Krzysztof Kopociński, Czesław Jeśman

Department of the History of Science and History of Military Medicine of the Medical University in Łódź;
head: Czesław Jeśman MD, PhD

Abstract. The Lwow School of Mathematics was a group of famous Polish mathematicians who worked in the interwar period in the city of Lwow. Its founders were Hugo Steinhaus and Stefan Banach, professors at the Jan Kazimierz University in Lwow. The former invented an apparatus for locating foreign bodies in the human body. He worked with, among others, military physicians from the 6th District Hospital. Unfortunately, following World War II, Lwow no longer formed part of the territory of Poland.
Key words: Steinhaus, Scharage, Bong, military hospital, Lwow

Streszczenie. Lwowska szkoła matematyczna to grupa polskich sławnych matematyków, którzy pracowali w okresie międzywojennym we Lwowie. Jej założycielami byli profesorowie Uniwersytetu Jana Kazimierza we Lwowie: Hugo Steinhaus i Stefan Banach. Pierwszy z nich wynalazł urządzenie do lokalizacji ciał obcych w ciele ludzkim. Współpracował między innymi z lekarzami wojskowymi z 6. Szpitala Okręgowego. Niestety po II wojnie światowej Lwów znajduje się poza granicami Polski.
Słowa kluczowe: Steinhaus, Scharage, Bong, szpital wojskowy, Lwów

Delivered: 02/02/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 193-197

Corresponding author:
Zbigniew Kopociński MD, PhD
105th Kresy Military Hospital with Public Out-patient Clinic,
Subdepartment of Ophthalmology
2 Domańskiego St., 68-200 Żary
telephone: +48 68,470 78 62
e-mail: zkopocinski@wp.pl

Introduction

The Lwow School of Mathematics, founded in a city proudly known as Semper Fidelis, by a group of excellent mathematicians of the Jan Kazimierz University, became famous internationally in the 20th century. The genius of the Lwow scientists has been widely admired in academic circles around the world. Professor Stefan Banach is often compared with Nicolaus Copernicus due to the importance of his discoveries, which, even for those whose mathematical knowledge is weak, should be a source of deep reflection and a reason to be proud. Mathematics is not especially popular among humanists, a group including the practitioners of the medical arts. Indeed, many physicians, graduates of biology-chemistry secondary education, are tormented with nightmares involving difficult arithmetic tasks even many years after graduating, whilst words like "integral" or "logarithm" makes them tremble with panic. Few people understand the tremendous impact that mathematics has had on the development of many branches of medicine, yet one cannot imagine many modern medical apparatuses for sophisticated diagnostics without the application of mathematical knowledge.

The activities of the representatives of the Lwow School of Mathematics give one an excellent example of the applicability of complicated mathematical formulas, propositions, estimations, etc. The school was composed of highly talented and open-minded members who were able to find practical applications for mathematical theories (for example, Stanisław Ulam was a co-creator of the American nuclear and hydrogen bomb). Medicine was a point of interest to Prof. Hugo Steinhaus, who, in the 6th District Hospital, in cooperation with physicians, developed the introvisor, an apparatus designed to locate foreign bodies inside the human body.

The first steps in locating foreign bodies

In earlier times, in the event of a cut or injury, where the physician suspected the presence of a foreign body, the only solution was surgical exploration of the injury, which implied further damage to the tissues and increased suffering of the patient, and as a consequence was not always advisable. As late as the 19th century, revolutionary inventions made it possible to confirm the presence of a foreign body within an injury. Special electrical and electro-magnetic devices began to be used in order to detect metal objects within an injury. For example, during World War I, Jödicke created an apparatus equipped with a probe that, when it came into contact with a foreign body, signaled the fact by an electrical indicator light. Holzknecht and Wachtel invented an instrument that worked on the basis of the telephone – applying a corresponding probe in the vicinity of a foreign body resulted in a sound in the telephone receiver near the surgeon's ear. Teodor Kocher managed to remove a needle caught under the skin as early as in 1884. However, all these methods failed in the case of non-metallic bodies [1].

Wilhelm Conrad Röntgen's invention of X-rays in 1895 became a gold standard in this regard, and was very quickly recognized by physicians. The first attempts at X-ray examinations in Poland were undertaken as early as in 1896 by Mikołaj Brumer, chief physician of the Hospital of the Holy Spirit in Warsaw, although these were just the beginnings of the application of this branch of diagnostics. The undisputed pioneers in this field of study included: Bronisław Sabat, head of the x-ray laboratory in the Common Hospital in Lwow (later in Warsaw), who developed roentgenkymography (movement examination using X-rays), and Karol Meyer, creator of stratigraphy, a layer-based X-ray imaging system and prototype of present-day tomography.

Originally, a single scan of an injury gave only proof of the existence of a foreign body and its projection onto the examined plane. For the purposes of spatial location, X-ray scanning began to be applied in two planes, so that the X-rays intersected at the location of the foreign body (e.g. Levy-Dorn's method, Knothe's method, and Moritz's orthodiagraph). The difficult part was that, while the location of the foreign body was marked on the skin before the patient underwent surgery, when the position of the patient's body changed, the tissues became tense as a result of anesthetics or the cutting process, the predicted location often proved to be far from accurate. There were cases where the surgeon performed X-ray scans during the operation, holding a knife in the wound to check how far from the foreign body he was cutting. This involved a huge waste of time (scanning in complete darkness in the operating theatre, the long wait required to adapt the sight, etc.) as well as the risk of exposure to extensive radiation. Instead of simple scanning, some radiologists used X-ray images for the purposes of localization (more expensive than the scan itself) on two or more films with the application of corresponding markers (e.g. the Frensdorff method). The drawback of both these methods, including the scan itself and X-ray images, was the necessity of ensuring the patient was in the identical position on the operating table as he or she had been in the X-ray laboratory, which was practically impossible [1-3]. Therefore, attempts were made to seek other methods to facilitate the transfer of the information obtained by the radiologist in a way suitable for practical application by the surgeon on the operating table.

Most of these methods were based on creating simple auxiliary devices, which would accurately locate the foreign body detected during the X-ray examination, showing the surgeon the location and direction of the cut. As early as in 1900, Jerzy Perthes used a needle as a probe and directed its tip to the foreign body under X-ray supervision, after which he wrapped the puncture point with napkins and sent the patient to the operating table. Following the needle, the surgeon was able to find the foreign body with ease, but this method was dangerous due to the possibility of damaging important vessels and organs during the probing process. Most of the remaining auxiliary devices (e.g. Neumann's method, Gocht's method, etc.) included a form of rack made of nickel-plated wire, which when properly mounted and bent by the radiologist performing the locating could then be handed over to the surgeon in order to prepare it together with the surgical instruments. While the structure of the rack facilitated setting the point under which the foreign body was located, it was not always effective since it also required precise positioning of the patient, and the structural elements themselves were often defective and complicated to use.

Prof. Hugo Steinhaus's Lwow Introvisor

Making progress in locating foreign bodies was of especial interest to military physicians, resulting from the obvious fact that during armed conflicts most wounded soldiers have shrapnel or bullets in their body, and the task of the military medical service is to provide the most effective aid. They focused on the simplicity and reliability of any potential device, as well as its applicability under difficult, field conditions.

The idea of working on a device that would detect objects hidden in the human body was proposed to Prof. H. Steinhaus by a radiologist from Lwow, Emil Meisels PhD. In 1936, he raised the question as to the possibility of predicting whether the fetal head would fit in the natural birth canal. As an excellent mathematician he decided to use the principle of

stereo vision, which occurred to him while observing his own reflection in a display case [4].

It should be noted that the first stereoscope was invented by Charles Wheatstone in 1838. This device facilitated spatial viewing by overlaying two photographs of the same point. Such photographs became very useful during World War I, together with the application of photogrammetry, a method that allows flexible maps to be created of a given area out of aerial photographs taken from two different points. In the meantime the X-ray stereo photographs were effectively used by Prof. Albert Hasselwander of Erlangen University, who invented his own stereoscopic and X-ray stereometry methods. In these, he used two X-ray images taken from two different points with a 65 mm mutual separation, based on the average distance between the pupils of the eyes.

The novel idea of Prof. H. Steinhaus consisted of the observation of a real object in real time, with the stereoscopic image of the foreign body, such as the head of a wounded soldier with the image of a bullet inside. For that purpose, he designed a device he called the introvisor. It consisted of a table with an X-ray lamp mounted upon it, which could be set in two positions (F1 and F2), whilst on the other side were mounted the target sights (S1 and S2), symmetrically to the lamp position. A stand for the X-ray screen was mounted in the middle of the table, which was replaced with semi-transparent glass in later stages of the examination. A drawing of the introvisor was presented in figure 1, together with its operating diagram: the tissue with foreign body (X) was scanned from two points (F1 and F2), which produced image Q1 and image Q2. Sights S1 and S2 were used to aim at images Q1 and Q2, concurrently moving a colored bead (Z) along a metal tube, in order to obtain two connecting lines S1–Q1 and S2–Q2, intersecting at the location of colored bead Z, a symmetrical reflection of the location of the foreign body. Afterwards, the X-ray screen was replaced with semi-transparent glass, through which the tissue with the foreign body in it could be seen together with the afterimage of bead Z within its boundaries, which reflected the location of the foreign body, X, invisible to the naked eye [5].

In March 1938, Prof. H. Steinhaus patented the working principle of the introvisor and undertook to create a prototype. This owed a lot to the work of Emil Meisels PhD. He let his private X-ray studio at 5 Kopernika St. in Lwow, where former military physician, Chai Scharage PhD (head of the department of surgery at the 8th Mobile Field Surgical Hospital during World War II, later transformed into 105th Kresy Military Hospital with Out-patient Clinic in Żary [fig. 2.]) performed his first successful operation to remove grit from a human skull model.

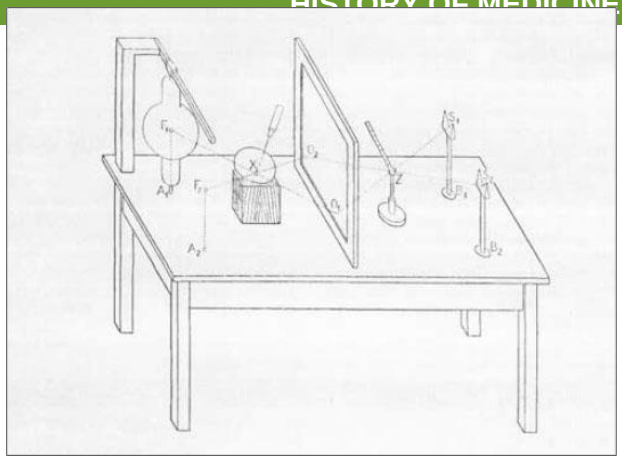


Figure 1. Introvisor – an invention by H. Steinhaus, Lwow, 1938
Rycina 1. Introwizor H. Steinhausa, Lwów, 1938 r.

The genial mathematician's invention became so well-known that other Lwow radiologists became interested in it, including: Witold Grabowicki PhD from the Department of Internal Diseases at the Jan Kazimierz University, and Maj. Alfred Bong, head of the X-ray laboratory at the 6th District Hospital and also chairman of the Lwow Branch of the Polish Radiological and Physiotherapeutic Society (PLTRiF). They invited Prof. Steinhaus to a meeting of the society, which took place on 8 May 1938 in the X-ray studio of Associate Prof. W. Grabowski at 11 Romanowskiego St. He gave a lecture entitled "On locating an object with the use of X-rays", and then, using the provisional apparatus built by Associate Prof. W Grabowski and Helena Frank-Pittowa PhD, he presented how it worked in practice. The physicians attending the meeting were very impressed, E. Meisels PhD emphasizing the ease of installing the device in an operating theatre, while Associate Prof. W. Grabowski acknowledged its simple operation [6].

The first practical apparatus was constructed at the 6th military District Hospital at 26 Łyczakowska St. (fig. 3.) by Maj. Alfred Bong PhD. This was also where the first real operation, which involved the removal of a needle fragment from a patient's (Corporal Reguła) arm took place, under local anesthesia; the operation lasting a few minutes. There were a total of four surgeries of this type at the Lwow military clinic, including two serious ones.

Figure 2. Col. Józef Szarage PhD (1887–1967)
Rycina 2. Płk dr Józef Szarage (1887–1967)

Prof. Steinhaus attempted to patent his device world-wide, improve it and sell it to interested manufacturers. In order to promote his introvisor, in the autumn of 1938 he attended the national congress of radiologists in Warsaw, where his invention attracted much interest. Maj. A. Bong PhD even received an order from Brig. Gen. Stanisław Rouppert PhD (head of the Health Department of the Ministry of Military Affairs) to make a presentation of the device in front of military experts; unfortunately, the outbreak of World War II halted further development of the introvisor. Prof. H. Steinhaus managed to avoid the massacre of Lwow professors in 1941, although, as a Jew, he had to remain in hiding together with his family, which had a negative impact on the progress of his academic work [4].

Epilogue

After World War II, Lwow became separated from the territory of Poland, and the Lwow School of Mathematics ceased to exist. Prof. Steinhaus, like many citizens of Semper Fidelis, was expatriated to Wroclaw, where he established the Department of Mathematics and Physics, which bore fruit in educating a new generation of excellent mathematicians (including Prof. Bolesław Kopociński, who also came from the Eastern Borderlands, and who claims to be a continuer and successor to the great Lwow professors). Throughout the first post-war years, thanks to Prof. Witold Grabowski, who became head of the Radiology Department of the Medicine Faculty at Wroclaw University, Prof. H. Steinhaus resumed his work on the introvisor. On 23 July 1948, during the famous Recovered Territories Exhibition, he made a presentation of the practical application of locating a bullet in a patient's head. Unfortunately, the time lost during the war could not be made up; the device was not patented globally and was never marketed [4].

It should be noted that the method created by this scholar from Lwow was highly original, and at the same time very simple. The above description accurately characterizes the representatives of the mathematical school, whose interests often exceeded the narrow field of mathematics. It should be noted that two colleagues of Prof. H. Steinhaus were military physicians, who fully understood the importance of his invention to both physicians and patients. Their knowledge and open-mindedness was reflected in the fact that three direct participants of the experiments later became professors at renowned medical universities (Bong A, Grabowski W and Meisels E).

Figure 3. The building of the 6th District Hospital, Lwow, 2006
Rycina 3. Budynek 6. Szpitala Okręgowego, Lwów, 2006 r.

The famous Lwow School of Mathematics contributed to the development of mathematics and other fields of study worldwide, the names of Polish scholars (Stefan Banach, Hugo Steinhaus, Stanisław Ulam and others) are well-known and recognized at prestigious universities and academies. We can proudly emphasize that the co-workers of Prof. H. Steinhaus included military physicians, such as the future head of the Surgical Department of the 8th Mobile Field Surgical Hospital, later transformed into the 105th Kresy Military Hospital with Out-patient Clinic in Żary, Maj. Chaim Scharage, PhD (in 1946 he changed his name to Józef Szarage) [7].

The history of Prof. H. Steinhaus's invention makes us reflect upon innumerable losses incurred by Poland as a result of World War II. We will never know what would have happened to the introvisor, if not for the occupation. How many new discoveries could have been made by the Lwow mathematicians in their

"Scottish Book" if war had not broken out, and if Lwow had remained a Polish city? How many great inventions were buried with the deaths of the many Polish scholars in the Wuleckie Hills or in Sachsenhausen?

Contemporary physicians using modern medical equipment should appreciate their colleagues from the science departments (physics, mathematics or chemistry), whose hard work bears fruit in modern diagnostic equipment. The model of cooperation between the representatives of medical fields and sciences, as created by Lwow scholars, will most probably contribute more than once in the future to creating something useful and interesting, and maybe something extraordinary, although older Lwowians believe such things were possible only in magical Lwow. Who knows?

Literature

1. Deka Z. Metody lokalizacji ciał obcych [Methods of foreign body localization]. Mil. Phys., 1939; 5: 572─603
2. Brzeziński T, Brzeziński W, Drygas A, Śródka A. Historia medycyny [History of Medicine]. Warsaw, Wyd. Lekarskie PZWL, 2004: 301-304
3. Seyda B. Dzieje medycyny w zarysie [History of medicine in outline], part 2. Warsaw, Wyd. PZWL, 1965: 409
4. Steinhaus H. Wspomnienia i zapiski [Memoirs and notes] London, Wyd. Aneks, 1992: 142─143, 156─159, 382─383
5. Steinhaus H. O lokalizacji ciał niewidzialnych [On localization of invisible bodies]. In: Księga Pamiątkowa 70-lecia Państwowego Gimnazjum imienia Króla Stanisława Leszczyńskiego [Commemorative Book of 70 years of the King Stanisław Leszczyński Middle School]. Jasło, 1938: 69-72
6. Steinhaus H. O lokalizacji przedmiotu przy pomocy promieni X [On localization of an object with the use of X-rays]. Pol Przegl Radiol, 1938; vol. XIII, no. 1-2: 207-209
7. The Institute of National Remembrance: BU 01 937 318; BU 1 977 443

Lt. Col. Professor Antoni Tomasz Aleksander Jurasz MD, PhD (1882–1961): surgeon, scientist, community worker and patriot – part III

Podpułkownik, profesor medycyny Antoni Tomasz Aleksander Jurasz (1882–1961) – chirurg, naukowiec, społecznik i patriota (część III)

Henryk Dyczek
Department of Polonia Academy in Częstochowa; head: Prof. Jerzy Supady MD, PhD

Abstract. Lt. Col. Antoni Tomasz Aleksander Jurasz (1882–1961) was both a professor of medicine and an extraordinary person – a surgeon, scientist and community worker. Born as a German citizen, he gave all his skills to Poland, the homeland of his father, Antoni Stanisław Jurasz, once Poland regained its independence in 1918. He continued his work for Poland despite the outbreak of World War II. The purpose of this series of five articles is to present the cause and effect analysis of the development of Professor Jurasz, his work and the achievements of his life.
Key words: Antoni Tomasz Aleksander Jurasz

Streszczenie. Ppłk prof. med. Antoni Tomasz Aleksander Jurasz (1882–1961) był nietuzinkowym człowiekiem: chirurgiem, naukowcem i społecznikiem. Urodził się jako obywatel niemiecki, ale wszystkie swoje umiejętności ofiarował Polsce, ojczyźnie swojego ojca, Antoniego Stanisława Jurasza, po odzyskaniu przez nią niepodległości w 1918 roku. Realizacji tego celu nie przerwał wybuch II wojny światowej. Celem niniejszego – pięcioczęściowego – opracowania, jest przedstawienie przyczynowo-skutkowej analizy rozwoju bohatera, jego twórczości i dorobku całego życia.
Słowa kluczowe: Antoni Tomasz Aleksander Jurasz

Delivered: 12/02/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 198-203

Corresponding author:
Henryk Dyczek MD, PhD
6 Tulipanowa St., 87-134 Przysiek
e-mail: henryk@dyczek.pl

Introduction

The aim of this series of articles dedicated to Lieutenant Colonel Antoni Tomasz Aleksander Jurasz, MD (1882-1961) is not only to present his contribution to Polish and international surgery, Polish society and Poland after it regained independence in 1918, but also to analyze the mechanisms through which his parents and teachers formed his character, as well as the circumstances that allowed him to generate such impressive and multi-faceted achievements during his long and rich life.

Professor A.T.A. Jurasz was the creator of the Poznań school of surgery (also known as "Jurasz's school of surgery"), the Polish School of Medicine at the University of Edinburgh, *Chirurgia Clinica Polonica*, a buoyant Academic Sports Association in Poznań, and an active branch of the Polish Red Cross in the Greater Poland region. With the Second World War still not over, Jurasz was already organizing the necessary equipment for Polish hospitals, with the restoration of the Polish health care system in view. Unfortunately, it was not appreciated by the later Polish communist government, and, forced to emigrate, he died in New York.

The first part of this work is dedicated to his family and his school environment, the second part discusses his professional life before the outbreak of the Second World War, the third tells of the events of 1939 and the creation of the Polish School of Medicine at the University of Edinburgh, the fourth is devoted to his post-war life and the fifth sums up his life and scientific accomplishments.

Part III. 1939 and the establishment of the Polish School of Medicine at the University of Edinburgh

The rank Prof. Antoni Tomasz Jurasz held in the German Army was recognized by the Polish Army; therefore on 8 February 1924, together with his seniority of 1 June 1919, he was enlisted in the reserve as a captain doctor and appointed to the Reserve Staff of the 7th District Hospital in Poznań [1]. The mobilization of the medical company of the Polish Army began on 24 August 1939. The 7th District Hospital belonged to the Poznań Army and on 4 September 1939 it was transported via railroad to the Kutno–Łęczyca–Piątek triangle [2]. Cpt. Prof. Antoni Tomasz Jurasz commanded medical company no. 701 [3], and also held the position of consultant and head surgeon of the Poznań Army [4]. Due to the severe losses suffered by the Poznań Army in the Battle of the Bzura, especially in the area of Kutno and Łowicz [5], the medical company led by Cpt. Prof. Antoni Tomasz Jurasz received an order to break through to Modlin. This involved crossing the Bzura River, which was impossible according to the intelligence officer, W. Stanisławski [3]. Therefore, Cpt. Prof. Antoni Tomasz Jurasz led the medical unit in the direction of Iłowa-Brzozowa [3]. In the meantime, constant bombing of the field hospital impeded the Bzura crossing, and eventually the units of the Poznań Army ceased to function as a whole, and whoever survived and was able to travel made their way to Kampinos [6].

The survivors included Cpt. Prof. Antoni Tomasz Jurasz, and he reached Modlin, which was under the command of Gen. Wiktor Thommée [7], who, on 19 September 1939, promoted Jurasz to Major [8] and placed Modlin Fortress Hospital under his charge [2]. He was partnered by: Maj. Henryk Lenko MD and Maj. Pietraszkiewicz MD [8]. He held the position of hospital commander until the surrender of the fortress, after which he supervised transportation of the wounded to the Ujazdów Hospital [9]. His commitment in aiding the needy was recognized and he was awarded the Cross of Valor [10]. The commitment of Jurasz is confirmed by registered nurse Leokadia Majer nee Zienkiewicz: "The figure of Prof. Jurasz, as a military physician in the hospital, became to me a symbol that allowed me to survive the occupation and should be an example to all Polish doctors" [11] and Rev. Col. Jan Słonimski, chaplain of Modlin Fortress: "An unforgettable comrade-in-arms and friend – the best Catholic I've ever known [12].

After the surrender of Modlin, Maj. Prof. Jurasz escaped from the German prison in which he was being held and reached Kraków [13]. Once there he avoided arrest together with the professors of the Jagiellonian University, invited by the Germans to a so-called "academic gathering" [14]. From Kraków he went to Budapest [13], where he waited for his wife, accompanied from Poznań by a student of the Poznań Academic Sports Association, Zenon Kocaya. The same student, upon permission of his commander, Gen. Kopański, who was in charge of the Carpathian Rifle Brigade in North Africa, came in 1942 to study at the Polish School of Medicine in Edinburgh, the founder and dean of which was Lt. Col. Prof. Antoni Tomasz Jurasz [15]. From Budapest, Jurasz headed to France, and in Paris he chaired the French Red Cross until the French capital was taken by the Germans [13]. In 1940, he arrived in the United Kingdom [16].

Polish School of Medicine at the University of Edinburgh

Thanks to the goodwill of the UK government, many soldiers who had fought during the invasion of Poland were allowed to stay in refugee camps in the United Kingdom in 1940. These included academic workers of Polish universities and students, the latter whose education had been interrupted by the war. There were about 50 trained physicians in Scotland at that time, whilst the Polish Army in the refugee camp included over 300 physicians [15]. This was recognized by Lt. Col. Prof. Francis Albert Eley Crew [17], who held the position of the Head of Biological Research under the UK Medical Research Council, who visited the camps housing Polish soldiers as part of his duties [18]. As a professor of medicine, he proposed establishment of a Polish School of Medicine (PWL) at the University of Edinburgh in order to allow the medical students to complete their interrupted studies and to allow academic workers to continue their professional development. This proposal was accepted by the authorities of the University of Edinburgh, approved by the British Minister of Health, Malcolm McDonald [19], and was much appreciated by Gen. Sikorski, Commander-in-Chief of the Polish Armed Forces in the UK.

Eventually, by resolution of the Council of Ministers of the Polish Government-in-exile of 22 October 1940, the Minister of Interior, Prof. Stanisław Kot, delegated Lt. Col. Prof. Antoni Tomasz Jurasz to represent the Polish government in talks with the British authorities over the establishment of the PWL. The PWL Organization Committee comprised: Prof. Kot, Lt. Col. Prof. A.T. Jurasz (committee representative), Prof. Fegler, Prof. Koskowski, Prof. Rogalski and Lt. Col. Gergovich PhD [20]. Three days later, Lt. Col. Prof. Jurasz commenced organizational talks with the authorities of the University of Edinburgh: Rector Sir Thomas Holland, vice-chancellor Sydney Smith and the Dean of the Medical Faculty, Prof. F.A.E. Crew. The University committed itself to appointing British professors to PWL departments that were lacking in staff.

Z. Lewicki suggests that the idea of establishing PWL came from Gen. Władysław Sikorski along with Professors Oscar Halecki and Stanisław Runge [9], while W. Tomaszewki adds that Prof. Tadeusz Sokołowski, later Head of the Surgical Department of the Medical Academy in Szczecin, was supposed to hint at the idea of establishing PWL to Lt. Col. Crew [15].

Only five days after the meeting between Lt. Col. Prof. Jurasz and the authorities of the University of Edinburgh, i.e. on 1 October 1940, it was decided that Polish professors, lecturers and other specialists in natural sciences would join the respective faculties of the university so that they could learn how they should function within the university and its academic activities. The academic staff of the PWL included: Prof. T. Rogalski – Anatomy, M. Kostowiecki PhD – Histology, B. Czempik PhD – Physics, Prof. G. F. Marrian, E. Mystkowski PhD, T. Mann PhD – Chemistry, B. Śliżyński PhD – Biology, Prof. J. Fegler – Physiology, Prof. T.J. Drennan and W. Stocki PhD – Pathology, Prof. T.J. Mackie – Bacteriology, Prof. W. Koskowski and J. Dekarski PhD – Pharmacology, Prof. S.A. Smith – Forensics, Prof. L.S.P. Davidson, A. Fidler PhD and W. Tomaszewski PhD – Internal Medicine, Prof. A. Jurasz, T. Sokołowski PhD and R. Rejthar PhD – Surgery, Prof. R.W. Johnstone and C. Uhma PhD – Obstetrics and Gynecology, Prof. C. McNeil and Z. Małkiewicz PhD – Pediatrics, Prof. J. Rostowski – Neurology and Psychiatry, A. Elektorowicz PhD and J. Kochanowski PhD – Radiology, Prof. L. Lakner – Stomatology, Dr J. Ruszkowski – Ophthalmology, J. Iwaszkiewicz PhD – Otolaryngology, H. Reiss PhD – Dermatology and Venereal Diseases. In accordance with the Polish Act on Universities of 1933, the PWL staff was subject to the Polish Minister of Interior and later to the Polish Minister of Education in London [21]. The agreement between the Polish Government-in-exile in London and the University of Edinburgh was intended to be effective only for the duration of the war [22]. Both the Scottish and Polish professors received their nomination from the Polish government in London. The Scottish professors took up duties with PWL free of charge, since they believed it was their contribution to the war effort [23]. The activity of Lt. Col. Jurasz, who had created the PWL statutes as early as by 20 November, seems enormously huge and efficient.

On 22 January 1941, after signing of the relevant agreement between the university authorities and the Polish government, PWL was established as an independent institution within the framework of the University of Edinburgh [20]. The PWL Faculty Board included: Lt. Col. Prof. Jurasz as the dean, Prof. Fegler PhD, Prof. Koskowski PhD, Prof. Lakner PhD, Prof. Rogalski PhD, Prof. Rostowski PhD, Elektorowicz PhD (delegate of associate professors), Prof. Nowakowski (joined at the end of the academic year, after release from Soviet imprisonment under the Sikorski–Mayski agreement, signed in July 1941 by and between the Polish Government-in-exile and the USSR [15]), Prof. W.G. Clark, Lt. Col. Prof. F.A.E. Crew, Prof. L.S.P. Davidson, Prof. A.M. Drennan, Prof. R.W. Johnstone, Prof. Ch. McNeil, Prof. T.J. Mackie, Prof. G.F. Marrian and Prof. S. Smith. The appointment of Lt. Col. Prof. A.T. Jurasz as the Dean of PWL was dictated by his personal traits and fluent command of English combined with his knowledge of British culture (he had an English mother and completed medical training in the German Hospital in London). He held this position, together with the rights of a rector due to the independent character of PWL until 1945.

The opening of PWL took place on 22 March 1941 in the lecture hall of the University of Edinburgh, and was performed by the President of the Republic of Poland-in-Exile, Władysław Raczkiewicz [20]. After the speeches held by the President and representatives of the university authorities, the dean of newly-established PWL, Lt. Col. Prof. A.T. Jurasz spoke; the key elements of his speech are cited after W. Tomaszewski [15]: "(…) The key motive, both mine and yours, was the strong belief that in this meaningless war we must mobilize our moral and spiritual forces, and put them at the front line of this battle that is being fought for the preservation and protection of the human community, cooperation and freedom (…). The foundation of the Polish School of Medicine in Edinburgh is both a symbol of these new ideas, in the name of which we fight for humanity to recover what we call freedom, dignity and law, as well as the symbol of the eternal spirit of human community, which, although exiled from all European countries, remains steadfast and powerful in this last bastion on this island (...) The Polish medical community will faithfully keep in memory the proofs of kindness and friendship expressed by their Scottish peers in this difficult time for science."

The contribution of Lt. Col. Prof. Jurasz from the decision to establish PWL to its opening was titanic. He prepared the administrative and educational resources for the faculty and ensured that all headed papers, stamps, student IDs, medical diplomas and PhD diplomas were consistent with the standard for 1939 [15]. On 24 March, the inauguration of the PWL academic year took place, preceded by a holy mass in St. Mary's Cathedral in Edinburgh, hosted by: the President of the Republic of Poland in Exile, employees of PWL and the students. This time, the Dean of PWL, Lt. Col. Prof. Jurasz, thanked everybody for their contribution to establishing the faculty, and he also encouraged the students to work hard and added that they should feel distinguished, as their friends and families all live under the terror of the German occupation [15]. Some subjects, due to a lack

of Polish lecturers, were taught in English, which prompted Assoc. Prof. W. Tomaszewski to author "Angielskie słownictwo lekarskie" [English Medical Terminology] [24]. The same Assoc. Prof. was the author of PWL's emblem, in consultation with the authorities of the University of Edinburgh and the Lord Lyon King-of-Arms as the heraldic authority [25].

In the opinion of the chief secretary of the Royal Society of Medicine in London, G.R. Edward, both PWL, and its clinical resources, met the strict criteria of academic evaluation [26]. When World War II was near its end, the situation of PWL began to complicate, as the agreement on establishing PWL between the University of Edinburgh and the Polish Government-in-exile provided for its existence only in the war period [20]. Therefore, after the acknowledgement of the Lublin Committee as the new Polish government by the UK government, the situation of the PWL became difficult. The Polish emblem with the white eagle had to be removed from all headed papers and PWL stamps in order to avoid diplomatic complications [15]. Owing to the intervention in the British Ministry of the Interior of Prof. Sidney Smith, Dean of the Medical Faculty of the University of Edinburgh, the British government allowed PWL students to continue their studies [15].

Since the main sponsor of PWL, the Government of the Republic of Poland in Exile, ceased to be acknowledged by the British government, PWL began to be sponsored by the Interim Treasury Committee for Polish Affairs, and then from March 1947 by the Committee for the Education of Poles in Great Britain [21].

Between 1941 and 1949, it took in 300 students, 227 of whom received medical diplomas, and 18 doctoral degrees. The PWL staff published approx. 100 academic works [25]. PWL diplomas were recognized in Poland after 1945 [15]. Graduates who, after the end of World War II, decided to stay in the United Kingdom of Great Britain and Northern Ireland, could apply to be a registered medical practitioner pursuant to the Medical Practitioners and Pharmacists Act of 1947 [25].

The activity of PWL had an educational and clinical character, as well as a social and academic one. Lt. Col. Prof. Jurasz believed that the health condition of the Polish nation after the war would be tragic. Therefore, not later than in 1941, the Health Commission under the Ministry of Labour and Social Welfare of the Polish Government in Exile was established; its purpose was to prepare a plan for countermeasures to the negative health condition of Polish citizens. Minister Stańczyk was appointed the representative of the commission, and Lt. Col. Prof. Jurasz became its chairman. The commission included 34 individuals, mainly PWL academic workers. The members of the commission worked free of charge, but after World War II the conclusions of the commission were not utilized [15].

The end of World War II meant the end of PWL's activity, as, according to the agreement of 1940/41 between the Polish Government and the University of Edinburgh, the faculty was supposed to operate only during the war. However, demobilized Polish soldiers were given an opportunity to take up studies at British and Irish universities, and their education was supported by British government scholarships [15].

In 1945 PWL ceased recruitment. In this time, over a dozen people appeared in Edinburgh, people who had either studied medicine at the underground university in Warsaw, or been released from German labor camps, their imprisonment having interrupted their studies at Polish universities in 1939. Prof. Jurasz, motivated by the circumstances (it should be noted that this initiative was his own) created, in December 1945, with the consent of the University of Edinburgh, private medical courses at the Paderewski Hospital, known as the Medical School of the Polish Paderewski Hospital in Edinburgh. A total of 37 people began their studies at the School, with 17 graduating [22]. The course completion certificates were recognized both by British and Polish authorities [15].

In spring of 1945, Prof. Antoni Tomasz Jurasz resigned from the position of PWL dean, because he planned to move the PWL Polish Paderewski Hospital to Poland and organize a medical academy there [15]. He also had to supervise the storage of the medical equipment owned by the Paderewski Fund, which was the key sponsor of the Paderewski Hospital [28]. The position of Dean of PWL was taken by Prof. Rogalski [29].

At the end of 1945, Prof. S. Pieńkowski appeared at PWL on behalf of the Ministry of Health of the Government of the People's Republic of Poland; he encouraged the academic staff to return to Poland. He promised a place for PWL at the Akademia Lekarska in Gdańsk, and the position of rector of that academy for Prof. Jurasz. However, the proposition was rejected by both the PWL Senate and by the Professor himself [30]. After several visits to Poland, and not-the-best cooperation with the PWL, and due to the position of the Paderewski Fund Management Board (the fund refused to transfer the hospital to Poland), Prof. Jurasz resigned from the position of Head of the Paderewski Hospital and moved to the United States in 1947 [27].

In 1948, he received information from the Dean of the Medical Faculty of the University of Edinburgh, Prof. Sidney Smith, stating: "The time of your School of Medicine is coming to an end. I believe the exams at the end of this semester will be the last. I had hoped that the School would be a prelude to a significant and sustainable relationship between Polish academic medicine and Edinburgh;

unfortunately, the political obstacles turned out to be too great for us and so we have to forget the dreams of our times" [29]. The last medical diplomas at PWL were awarded in 1949, and in November that year, the Dean, Prof. Rostkowski ceased the activities of the School, by unveiling a memorial plaque on 19 November 1949 in the Quadrangle at Teviot Place in memory of the foundation and activity of PWL in 1941–1949. He addressed the authorities of the University of Edinburgh in thankful words: "Speaking today on behalf of the 228 students who graduated from the Polish School of Medicine and on behalf of my Polish colleagues, I wish to express our deepest gratitude to the University Court, the Senatus Academicus, to the Faculty of Medicine and to its Dean Sir Sydney Smith for the help, assistance and support which they have given the School during the eight years of existence, to the City of Edinburgh and to the entire Scottish nation for the hospitality extended to the School, its staff and the students" [21].

Ignacy Paderewski Hospital

The implementation of PWL's curriculum required the existence of a hospital for clinical and educational purposes; therefore on 17 October 1941, in the presence of the Minister of the Polish Government in Exile, Stanisław Mikołajczyk, the Ignacy Paderewski Hospital was commissioned for use. Talks regarding the foundation of a hospital for the purposes of PWL were held between Lt. Col. Prof. Jurasz, the authorities of the University of Edinburgh and the city authorities of Edinburgh as early as in 1940 [15]. The hospital was located in the Western General Hospital and Children's Home [25] and in the Lambert Hospital, possessing 120 beds. The main sponsor of the PWL research hospital was the Paderewski Testimonial Fund, Inc. – American Memorial to Ignacy Jan Paderewski, represented in London by the Anglo-American Committee for War Refugees in Great Britain [26].

The hospital maintenance costs and nursing staff payroll were covered by Scottish authorities, while the costs of treatment and accommodation of Polish military patients were covered by the Polish Armed Forces and the Polish Ministry of Social Welfare in London [15]. A wish of Lt. Col. Prof. Jurasz was that PWL academic personnel provide free medical service in the PWL research hospital [21]. The number of Polish outpatients in 1943 was 34,129, whilst the number of inpatients was 1539. The Paderewski Hospital was particularly crowded with wounded soldiers and war prisoners from German labor camps in 1944-1945 [15]. The hospital closed in the summer of 1947, after unsuccessful attempts to move it to Poland [15].

PWL also used other hospitals in Edinburgh: the Royal Hospital for Sick Children, the City Hospital and the Eastern Hospital [25].

After the end of World War II, the situation of the Paderewski Hospital as a PWL research hospital began to look precarious. While PWL was subject to the University of Edinburgh, the Paderewski Hospital was owned by the Paderewski Testimonial Fund with its registered office in New York. That fund was politically dependent on the President's War Relief Control Board and the U.S. Department of State, and these institutions decided the fund's line of action. It was a wish of Prof. Antoni Tomasz Jurasz to move the entire Paderewski Hospital to Poland. Unfortunately, the authorities of the People's Republic of Poland, although interested in the hospital equipment, were not willing to cooperate in the process of handing over and preparing space for that equipment. The hospital was decommissioned in 1947, its patients and personnel being transferred to the Scottish Ballochmyle Hospital in Mauchline near Glasgow [31]. The planned move of the hospital to Poland was never accomplished, and the Paderewski Testimonial Fund decided that the hospital should provide services to those Polish citizens who chose to remain in the United Kingdom [32].

Literature

1. Rocznik Oficerski Rezerw 1934. Warsaw, ROPWiM, 2003: 304
2. Andrzejewski Z. Poznańskie szpitalnictwo wojskowe w latach 1945–2000 [Military hospital service in Poznań in the years 1945-2000]. Doctoral thesis. Poznań, Adam Mickiewicz University, 2011: 134
3. Makowski E. (ed). Wrześniowe dni klęski dni chwały [The September days of defeat, days of glory]. Poznań 1989: 262, 270, 273
4. Dudkiewicz Z., Żołyński K. Wkład ortopedów wojskowych w rozwój Ortopedii Polskiej [The contribution of military orthopedists in the development of Polish orthopedics], "Ortopedia, Traumatologia, Rehabilitacja" 2008. 80th Anniversary of the Polish Society of Orthopaedics and Traumatology, p. 1
5. Stankiewicz R. (ed). Z dziejów szpitala wojskowego w Poznaniu [On the history of the military hospital in Poznan]. Poznań 1995: 10
6. Bauer P, Polak B. Armia Poznań w wojnie obronnej [Poznań Army in the defensive war] 1939. Poznań 1983: 406
7. Thommée W. Ze wspomnień dowódcy obrony Modlina [From the memoirs of Modlin defenders]. Wojskowy Przegląd Historyczny, 1959; 3: 172–207
8. Głowacki L. Obrona Warszawy i Modlina [The defence of Warsaw and Modlin]. Warsaw, 1969: 358. There is a mistake here, as L. Głowacki writes Reserve Cpt. Prof. Jakub Jurasz PhD.
9. Lewicki Z. Walka z zakażeniem w chirurgii polskiej od 1867 do 1946 [Fighting infections in Polish surgery]. Doctoral thesis. Poznań, Poznan University of Medical Sciences, 2009: 94, 100
10. Śródka A. Uczeni polscy XIX–XX stulecia. [Polish scientists of 19th and 20th century]. Warsaw, 1995; vol. 2: 124
11. Majer L. Wspomnienia wojenne [War memoirs]. Family archives
12. Słonimski J. Wspomnienia [Memoirs]. Family archives
13. Meissner R. Pamiętnik prof. Antoniego Tomasza Jurasza – dokument epoki [The diary of Prof. Antoni Tomasz Jurasz – a document of the era]. Fakty AM, 2003; 3–4: 12
14. Drews R. Wkład lekarzy i farmaceutów wielkopolskich do rozwoju nauk medycznych [Contribution of Greater Poland doctors and pharmacists in the development of medical sciences]. Yearbooks of the Medical Academy in Poznań, Warsaw–Poznań, 1975; Suppl. 2: 10
15. Tomaszewski W. Na szkockiej ziemi [On Scottish soil]. London, 1976: 137, 56–57, 77, 93, 105, 97, 107–108, 136, 125–126, 115–

126, 131, 220–222, 14, 146–147, 297–311, 13, 325–331, 111–112, 133, 220–222
16. Jurasz AT. Memoirs written in English in 1950–1960. The original copy is in the files of a family friend, Mrs Helen Schelling-Scholtz in New York Family documents, pp. 18, 3, 22
17. Prof. Crew, Head of the Institute of Animal Genetics of the University of Edinburgh was among the leading geneticists in Europe. He had warm relationships with the Department of Biology of the University of Krakow. Tomaszewski W.: Profesorowie szkoccy na Polskim Wydziale Lekarskim w Edynburgu [Scottish professors at the Polish School of Medicine in Edinburgh]. Arch Hist Filoz Med, 1994; 3: 317. Stefan Kopeć PhD, Assoc. Prof. at the University of Krakow, worked in Edinburgh for a year before the war, under the supervision of Prof. Crew. Ibidem, p. 314. He was also awarded in 1943 by the President of the Republic of Poland, Władysław Raczkiewicz, with the Commander's Cross of the Order Polonia Restituta in recognition of his accomplishments in international cooperation in the field of science and higher education. Ibidem, p. 312–323.
18. Midro A. Prof. Francis Albert Eley Crew – wielki przyjaciel Polaków z minionej epoki [Francis Albert Eley Crew – a great friend of Poles from the past era]. Arch Hist Filoz Med., 1995; 2: 127
19. Misterska M. Rozwój dermatologii uniwersyteckiej w Poznaniu do końca XIX wieku [The development of University dermatology in Poznań until the end of 19th century]. Doctoral thesis. Poznań, Poznan University of Medical Sciences, 2007: 93
20. Jurasz A. The Foundation of the Polish Medical Faculty within the University of Edinburgh, Scotland. London, 1941: 2, 6
21. Rostowski J. History of the Polish School of Medicine. Edinburgh 1955: 7–8, 19, 8, 25–26
22. Tomaszewski W, Tuleja KW. Medical School of the Polish Paderewski Hospital in Edinburgh. Arch Hist Filoz Med, 1994; 3: 325-331
23. Tomaszewski W.: Profesorowie szkoccy na Polskim Wydziale Lekarskim w Edynburgu [Scottish professors at the Polish School of Medicine in Edinburgh]. Arch Hist Filoz Med, 1994; 3: 312-323
24. Calendar of the Polish School of Medicine at the University of Edinburgh, The Polish School of Medicine Memorial Fund and their connections with the Medical Academy in Poznań. Fakty AM, 2005; 3: 4-5
25. Korzeniowski J. History of the Western General Hospital-Edinburgh and the Polish connection. Darford, Great Britain, 2008: 4
26. Magowska A. (ed). Listy prof. Antoniego T. Jurasza i jego dotyczące z lat 1944–61. [Letters of Antoni T. Jurasz and about him from the years 1944–1961]. Acta Medicorum Polonorum, 2012; 2: 141-165
27. Wielkopolski Słownik Biograficzny [Greater Poland biography dictionary]. Warsaw–Poznań, 1983: 300
28. Full name: Paderewski Testimonial Fund, Inc. – American Memorial to Ignacy Paderewski. The sources also provide the name Fundacja Paderewskiego [Paderewski Fund]. This is explained in the Letters of Prof. …, op. cit., p. 162
29. Tomaszewski W. Pięćdziesiąt lat Polskiego Wydziału Lekarskiego 1941–1991 [Fifty years of the Polish School of Medicine 1941–1991]. Arch Hist Filoz Med., 1994; 3: 297-311
30. Machaliński Z. Nieudana próba przeniesienia Polskiego Wydziału Lekarskiego w Edynburgu do Polski [The failed attempt to move Polish School of Medicine from Edinburgh to Poland]. Arch Hist Filoz Med, 2000; 63 (3/4): 52-57
31. Outpatient clinic in Edinburgh. Dziennik Polski i Żołnierz Polski, 1947; 8 (132): 3
32. Lisowski W. Twórca Polskiego Wydziału Lekarskiego w Edynburgu – prof. med. Antoni Tomasz Jurasz, organizator i dziekan PWL w Edynburgu w latach 1941–1945 [The creator of the Polish School of Medicine in Edinburgh – Prof. Antoni Tomasz Jurasz MD, founder and dean of PWL in Edinburgh in 1941-1945] Skalpel, 2007: 6. www.nil.org.pl/xml/oil/oil72/gazeta/ numery/n2007/n200 706/n20 070 618 [Access: 20.06.2010]

Lt Col Stanisław Zabłocki PhD (1920–2014)

Ppłk dr Stanisław Zabłocki (1920–2014)

Andrzej Kierzek MD, PhD
History Section of the Polish Otorhinolaryngology - Head and Neck Surgery Society; head: Prof. Andrzej Kierzek MD, PhD

Delivered: 02/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 204-206

Corresponding author:
Prof. Andrzej Kierzek MD, PhD
5/6 Rozbrat St. 50-334 Wrocław
telephone: +48 71 322 17 60; 693 52 17 60
e-mail: andrzejkierzek@wp.pl

One of the more eminent military otorhinolaryngologists and historians of this branch of medical knowledge was Stanisław Zabłocki.

He was born on 23 September 1920 in Łowicz as the son of Ignacy, an employee of the Polish State Railways, and Wiktoria née Wojszwiło. At that time his parents were living in Łowicz temporarily, having been evacuated from Vilnius during the Bolshevik invasion of Poland. Following the Soviet-Polish War they returned to Vilnius.

In the years 1927–1931 he was a student at a primary school and from 1931 attended the Vilnius Jesuit High School, where he obtained his school-leaving examination certificate in June 1939. In July he was accepted to the Medicine Department of the Stefan Batory University in Vilnius. From 1 August to 9 September 1939, as a member of the 17th Youth Labour Battalion, he worked at the construction of defensive fortifications on the Polish-Prussian border. The battalion was then ordered to defend the capital. In October 1939 he began his studies, but completed only a single trimester, as the Polish university in Vilnius was closed on 21 December 1939 by the Lithuanian authorities. In the academic year 1940–1941 he studied at the Faculty of Law of the University of Lithuania in Vilnius, after not being accepted by the Faculty of Medicine.

During the Nazi and then the Soviet occupation he worked as an employee on the railways. In 1944 he avoided the arrests of the Polish youth and the deportation to the USSR organized by the NKVD.

In the spring of 1945 he left on his own as a migrant to Poland. In the summer of that year he took another entrance exam, this time at the Faculty of Medicine of the Academy of Medicine in Gdańsk, where he studied in the years 1945–1950. At the time of his studies he was a member of the Brotherly Help

of Students at the Academy of Medicine in Gdańsk, and he was also active in the academic healthcare service. He received his medical doctor diploma, no. 232–52, on 15 January 1952.

On 1 September 1950 he was employed as an assistant at the Department of Otolaryngology of the General Municipal Hospital in Gdańsk, headed by Rufn Mirecki MD, PhD (1909–1910), to whom he was the only assistant. From 1951 he also did consultancy work involving children in the field of laryngology at the Children's Hospital on Kartuska St., and during the four summer months he received patients at the otolaryngology out-patient clinic at the 4th Medical Centre in Gdańsk.

On 4 October 1951 he was called up, and attended the three-month 21st Officer Training Course at the Military Medical Training Centre in Łódź. After completion of the course and being awarded the rank of lieutenant, he was assigned to the Air Force. From February 1952 he held the position of physician at the Air Force Technical School in Zamość, then from spring of the following year the position of physician of the Liaison Squadron in Bydgoszcz, and from January 1958 the position of deputy head of healthcare of the 2nd National Air Defence Corps in Bydgoszcz. His conscientious work resulted in promotions; in 1953 he became a captain and in 1960 a major.

From May 1954, as a volunteer assistant, he continued to specialize at the Department of Otorhinolaryngology of the Institute of Training and Specialization of Medical Personnel in Bydgoszcz supervised by Professor Jan Szymański (1903–1984), and from January 1958 at the same department transformed into the 2nd Otolaryngology Clinic of the Postgraduate Medical School in Bydgoszcz of the Medical University of Warsaw supervised by Prof. Jan Małecki (1902–1982), where he completed his specialization in December 1958. He also worked in out-patient healthcare in Bydgoszcz and Wyrzyska.

As the result of strenuous endeavors he was able to transfer from the Air Forces to the Land Forces, at the disposal of the Commander of the Pomeranian Military District in Bydgoszcz, who on 2 January 1960 appointed him the Head of the Department of Otolaryngology of the 110th Military Garrison Hospital with Public Out-patient Clinic in Elbląg. He managed the 20-bed department and the otolaryngology office for 27 years. Two of his assistants achieved the second degree of specialization and two physicians achieved the first degree; he also trained several specializing physicians from military units. He attended further vocational training courses at the Otolaryngology Clinic of the Centre of Postgraduate Education at the Military Academy of Medicine in Łódź supervised by Col. Prof. Henryk Czarnecki (1922–1990), at the Otolaryngology Clinic in Łódź supervised by Prof. Józef Borsuk (1913–1988), at the Military Sanatorium in Ciechocinek supervised by Lt. Col. Szymon Kubiak MD, PhD (born 1932), as well as in the Otolaryngology Clinic of the Military Institute of Aviation Medicine in Warsaw supervised by Prof. Janusza Kubiczkowa, on middle ear surgery, cosmetic nose surgery, allergies in laryngology, sanatorium treatment and aviation medicine. By order of the Commander of the 110th Military Garrison Hospital he became the Head of the Association of Military Physicians and managed the health education at this hospital. Apart from the hospital, he also worked in otolaryngology clinics in Elbląg, Malbork, Pasłęk and Nowy Dwór Gdański; he was also a consultant at the district hospitals in these towns. For 22 years, until 2000, he was an expert on otolaryngologic examination at the PZU in Elbląg.

In December 1986 he retired with the rank of lieutenant colonel and continued to work part-time until June 1999 as the head of the otolaryngology clinic of the Specialist Clinic at the Regional Polyclinical Hospital in Elbląg.

He was a member of the Polish Otolaryngology Society, then the Polish Otorhinolaryngology - Head and Neck Surgery Society. By resolution of the General Meeting of this society of 25 September 1983, he was awarded the title of Honorary Member of the Polish Otolaryngology Society. He participated in the National Congresses of Polish Otolaryngologists, Days of Pediatric Otolaryngology, and all the Research and Training Conferences of Military Otolaryngologists, in the 1st Convention of Head and Neck Surgeons of the Military Health Service in Solina in 1995, the 2nd Convention of Head and Neck Surgeons of the Military Health Service in Władysławów in 1997 and the 3rd Convention of Head and Neck Surgeons of the Military Health Service in Elbląg in 1999.

He authored 28 scientific publications and 9 obituary reports on Polish otolaryngologists. His important scientific achievements include: "Zespoły i objawy chorobowe w otorynolaryngologii" ["Disease symptoms and syndromes in otorhinolaryngology"] (PZWL, Warsaw 1973, Via Medica, Gdańsk 2004) and "Metody i próby diagnostyczne w otolaryngologii" ["Diagnostic methods and tests in otolaryngology"] (unpublished typescript).

However, his particularly valuable works are those on history and medicine. He entered the annals of the Polish history of medicine with his magnum opus – "Słownik biograficzny otolaryngologów polskich XIX i XX wieku" ["Biographical Dictionary of Polish Otolaryngologists of the 19th and 20th Centuries"] (Komograf, Warsaw 2012), containing 455 biographical entries. This was a result of more than twenty years of laborious historical research. The author analyzed this work in a study sent to "Polski Przegląd Otolaryngologiczny".

He authored 39 biographical entries on Polish otolaryngologists, included in several volumes of the

"Słownik biograficzny polskich nauk medycznych XX wieku" ["Biographical dictionary of Polish medical sciences of the 20th century"] (Warsaw 1997–2004), published by the Institute for the History of Science of the Polish Academy of Sciences and the Department of History of Medical Sciences in Warsaw.

He was not a member of any political party. He was decorated with: the Knight's Cross of the Order of Polonia Restituta and the Gold Cross of Merit; and the medals: for participation in the 1939 Defensive War, of the 10th Anniversary of the People's Poland, of the 30th Anniversary of the People's Poland, the bronze, silver and gold Medals of the Armed Forces in the Service of the Fatherland and the bronze and silver Medals of Merit for National Defence. On the 30th anniversary of his service in the Armed Forces, 4 October 1981, he received congratulations from the Minister of National Defence and a crystal cup with the following inscription: "XXX lat Żołnierskiej Służby" ["30 Years of Military Service"]. On his retirement the commander of the 110th Military Garrison Hospital gave him a watch engraved with the following inscription: "Pożegnanie z bronią ppłk. Zabłockiego. K-mdt 110 W. Sz. z P. 29. XI. 1986" ["A farewell to arms for Lieut. Col. Zabłocki. Commander of the 110th Military Hospital with Out-patient Clinic. 29 November 1986"].

On 15 January 1951 he married Stanisława Maria Bogdańska, the result of which was the birth of two children: Elżbieta Kamila, born in 1951, who became an economist, and Leszek, born in 1955, who became an orthopedist.

Stanisław Zabłocki was a widely-respected physician with impeccable ethics and was considered very righteous as a man. The outstandingly positive opinions about him are not only limited to his patients, grateful for his expertise and kind words, but also his associates and superiors.

He admired history, establishing contact with laryngologists and the families of already deceased physicians of this specialization, meticulously supplementing his historical collection.

In the 93rd year of his life his health began to fail him significantly. Regardless of the certain level of decrepitude in this period he did not lose his pleasant and warm personality. He always said that he had a good life and a lot of luck in it. He cared for his family and his family also cared for him. He was proud of his family and his family was proud of him. In his final moments he was under their constant care.

He died on 9 October 2014. As an officer, He was paid the last tribute with the "general's ceremony".

Stanisław Zabłocki MD, PhD found his permanent place in the annals of military healthcare.

This biographical entry was compiled on the basis of materials sent by Leszek Zabłocki MD, PhD.

As Stanisław Zabłocki MD, PhD also served as a head in civilian healthcare and was widely known in this community, the author decided to include a much more extensive biographical note on him in "Polski Przegląd Otolaryngologiczny".

A full list of publications can be found in the following work: A. Kierzek: Publikacje naukowe historyka otorynolaryngologii polskiej Stanisława Zabłockiego (1920–2014) [Scientific publications of Stanisław Zabłocki, a historian of Polish otorhinolaryngology (1920–2014)], sent to the Materiały Naukowe Sekcji Historycznej Polskiego Towarzystwa Otorynolaryngologów – Chirurgów Głowy i Szyi [Scientific Materials of the History Section of the Polish Otorhinolaryngology - Head and Neck Surgery Society] 2014; Vol. XXX: No. 1–4: 41–44.

Colonel (Retd) Prof. Zbigniew Jethon MD, PhD

Płk w st. spocz. prof. dr hab. n. med. Zbigniew Jethon

Professor Zbigniew Jethon was born on 18 February 1929 in Kołomyja. A graduate of the secondary school in Białogard, he studied at the Medical Academy in Wrocław and received the diploma of medical doctor on 23 March 1953. In the years 1949–1957 he worked at the Department of Physiology of the Medical Academy in Wrocław. In 1960 he received the degree of Doctor of Medical Sciences, with the thesis: "Protective effect of atropine in electric shocks to the heart" (thesis supervisor Prof. A. Klisiecki). Seven years later he received the degree of doctor habilitowany, with the thesis: "Interdependence of hemodynamic and respiratory disorders under the effects of constant respiratory hypertension". After graduation he was conscripted and remained in service until 1980. In 1957 he started work at the Military Institute of Aviation Medicine as the Head of the Laboratory of General Physiology, and two years later he received the second degree of specialization in aviation medicine. From 1966 he worked on the Board of Biology and Space Medicine for the Board of Research and Peaceful Use of Cosmic Space. From June 1967 to June 1970 he was the Commander of the Military Institute of Aviation Medicine. From 1970, for the next 10 years, he worked at the Military Institute of Hygiene and Epidemiology as the Head of the Department of Work Physiology. In 1973 he received the degree of associate professor and in 1983 the degree of full professor. After retiring from the military in 1980 he worked in different positions at the University of Silesia – in 1982 he served as the Dean of the Department of Biology and Environmental Protection. At the same time, he worked as the Head of the Institute of Sports in Warsaw. In the following years he held the highest positions in the Department of Biomedical Foundations of Physical Education at the University of Szczecin, the Department of Hygiene and Ecology of the Academy of Physical Education in Wrocław as well as the Department of Hygiene of the Medical Academy in Wrocław. In the years 1996–2005 he worked as a professor at the Department of Effort Physiology and Hygiene of the Academy of Physical Education in Wrocław. He participated in the works of many Polish and foreign scientific associations, he was a member of civil and military teams dealing with the issues of occupational medicine, sports medicine and environmental protection. He received numerous awards and honorable mentions, both civil and military. His decorations included the Knight's and the Officer's Cross of the Order of Polonia Restituta and the Gold Cross of Merit.

Professor Zbigniew Jethon was an outstanding man, a model scientist and tutor. He followed many directions in scientific research, including:

- lifestyles of children and youths,
- properties of exercise capacity of people who are physically disabled,
- characteristic lifestyles depending on occupation,
- interdependence of post-workout intraorganic changes and induction of apoptosis in muscle fibers,
- influence of early sports specialization on the biological development of children and youths,
- characteristic of regulation of the operation of the circulatory system and the autonomic nervous system in sports training conditions,
- oxidative stress as an effect of the influence of environmental xenobiotics,

- influence of heavy metals on energy metabolism in skeletal muscles,
- specifics of effort safety measures depending on the type of performed work and military service,
- physiological aspects of work under the changed microclimatic conditions of an aircraft cabin,
- physiological foundations for the use of respiratory hypertension in military aviation,
- emergency services in post-hemorrhagic shock.

He also worked on the scientific committees and editorial teams of the following journals:

- Polski Przegląd Medycyny Lotniczej [Polish Journal of Aviation Medicine],
- Polish Hyperbaric Research,
- Problemy Higieny i Epidemiologii [Problems of Hygiene and Epidemiology],
- Fizjoterapia [Physiotherapy],
- Polish Journal of Cosmetology,
- Zastosowania Ergonomii [Applications of Ergonomics].

He was incredibly creative, publishing over 550 original works, studies, monographs and textbooks. He supervised over 50 doctoral and habilitation theses. Until the final years of his life he worked at the Witelon State University of Applied Sciences in Legnica and the College of Physiotherapy in Wrocław, where, with never-ending engagement, he taught and inspired the younger generations to gain knowledge and participate in scientific research.

He was a very demanding professor, but always demanded the most of himself. He was distinguished by his impeccable manners, kindness towards people and infinite amounts of patience. He was a great lecturer who instilled a passion for learning and work in his students. A wide circle of doctors and scientists owe a great deal to him, as he shaped them into becoming valuable people. He devoted the whole of his life to science and was an academic teacher until his final days. His family and friends remember him as a great scientist and a cultivated man with a good heart and a beautiful soul.

He died on 18 January 2015. On 23 January we attended his funeral with a military company at the Osobowice Cemetery in Wrocław.

We bid him farewell in pain and with a feeling of great loss. He will always remain in our memory.

Zdzisław Bednarek
Aleksandra Jethon-Jabłońska

Z. Kopociński, K. Kopociński, Cz. Jeśman: 105th Military Hospital in Żary. Pride of the Land of Lubusz; and Z. Kopociński, K. Kopociński, Cz. Jeśman: Physicians of the 105th Military Hospital in Żary

Z. Kopociński, K. Kopociński, Cz. Jeśman: 105 Szpital Wojskowy w Żarach. Duma Ziemi Lubuskiej, i Z. Kopociński, K. Kopociński, Cz. Jeśman: Lekarze Szpitala Wojskowego w Żarach

Andrzej Kierzek MD, PhD
History Section of the Polish Otorhinolaryngology - Head and Neck Surgery Society; head: Prof. Andrzej Kierzek MD, PhD

Delivered: 02/01/2015
Accepted for print: 10/03/2015
No conflicts of interest were declared.
Mil. Phys., 2015; 93 (2): 209-216

Corresponding author:
Prof. Andrzej Kierzek MD, PhD
5/6 Rozbrat St. 50-334 Wrocław
tel: +48 71 322 17 60; 693 52 17 60
e-mail: andrzejkierzek@wp.pl

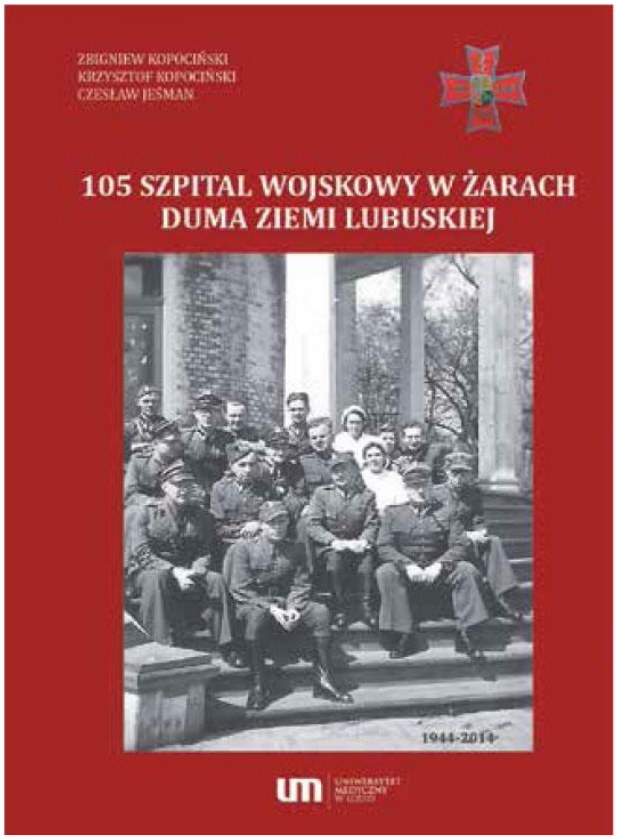
The book by Zbigniew Kopociński, Krzysztof Kopociński and Czesław Jeśman: "105 Szpital Wojskowy w Żarach. Duma Ziemi Lubuskiej", a 599-page work published by the Medical University of Łódź, is a unique title within the scope of the history of military medicine and the history of the Polish hospital service. It presents the history of the 8th Mobile Field Surgical Hospital, which was later transformed into the well-known 105th Kresy Military Hospital with Public Out-patient Clinic in Żary (105th KSzWzP SP ZOZ).

As admitted by the authors in the introduction, the direct inspiration for writing this work were the words of a former commander of the clinic in Żary, Major Bronisław Seyda MD, who "for the sake of history and future generations, chose to write down the most important events in the life of the hospital […] to fulfil the requirements of historians, researchers and readers". These words of a later recognized historian of medicine inspired Zbigniew Kopociński MD, PhD and Krzysztof Kopociński MD, PhD to create a work which bears major significance for the restoration of the collective memory and expansion of the knowledge about the fates of physicians and health care professionals in the years of the Second World War and later.

Earlier than that, the Military Hospital did not have a serious historiography, except for the "Chronicle of the Garrison Hospital" by Seyda and the 35th and 50th anniversary publications. The work by the Kopocińskis and Jeśmian deserves to be mentioned for one more reason: few military hospitals after 1945 have had such a professional study of their history.

As the authors state, the detailed objectives to be presented were:

- organizational structure of the hospital and its changes with time,
- staffing,
- medical service activities of the facility,
- battle trail of the 8th Mobile Field Surgical Hospital as a part of the Second Polish Army,
- development of particular departments, sub-departments, units and laboratories,
- medical staff and their characteristics,
- influence of the socio-political situation on the history of the hospital,
- pioneer methods of diagnosis and treatment implemented at the Military Hospital in Żary against a background of civilian healthcare,
- profiles of the commanders of the hospital.[1]



This is a work created with the use of archival materials from the collections of: Central Military Archive in Warsaw, Archive of the Institute of National Remembrance in Warsaw, Archive of the 105th Military Hospital with Public Out-patient Clinic in Żary, Military Archive in Oleśnica, Archive of the Military Parish in Żary, Jewish Historical Institute in Warsaw, archives of Polish medical universities, as well as the archives in Potsdam and Jerusalem and the military archive in Podolsk. Accounts obtained from former associates of the hospital and/or members of their families, who also provided interesting iconographic material, proved invaluable.

The part that is particularly important for understanding the development of treatment in Żary, and not just limited to the military aspect, is chapter one, in which the development of medicine in this town is analyzed against the background of the history of the town. The work reveals that the development of medicine in Żary was connected to the Franciscan monastery, established in the south-west part of the town as early as 1274. This was a monastery and church complex typical of the mendicant orders, which later constituted an important culturally-active center of the region with an extensive library and archive. The history of medicine in Żary until after the Second World War was compiled by the authors with great care, with the use of many interesting sources.

As correctly noted by the authors, the 8th Mobile Field Surgical Hospital as a sanitary unit of the Second Polish Army wrote a beautiful page in the history of military healthcare. Within less than a year, a modern and functional medical center was established, which demonstrated its skill during actual combat operations. This could have only been done with the support of a highly trained and battle-hardened medical staff, which allowed it to perform tasks more complex than its capacity as defined by its organizational structure.

After numerous peregrinations, on 15 May 1946 the hospital "anchored" itself in Żary in the area of the former Brandenburg Psychiatric Institution (Brandenburgische Landesanstalt), which constituted a part of a monumental palace and park complex created on the initiative of Erdmann II Promnitz, one of the more eminent owners of Żary. With the competence of expert art historians, the authors thoroughly analyzed the architectural details of the building, supplementing them with an interesting iconography.

The beginnings of the stationary hospital are compiled accurately and in an interesting manner. The structures of the stationary Garrison Hospital in Żary were created at the end of the 1940s, mostly due to the extraordinary activity of Maj. Bronisław Seyda MD. The greatest success of the hospital authorities was managing to restore the area from its post-war damage, create conditions for the main departments, develop extensive logistics and provide housing for the employees.

Changes in staffing and structure, supplemented with accurate tables, are compiled in an exemplary manner in the fifth chapter. The authors did not forget about the seals of the Hospital and the coat of arms. The next chapter contains an analysis of the achievements of thirteen successive commanders of the hospital, the most highly appraised among them being Major Seyda and Colonel Józef Błaszczyk MD. The latter was appreciated not only due to him gaining use of the hospital, equipping it with modern equipment and selecting appropriate medical staff, but the resulting implementation of modern diagnostic and therapeutic methods.

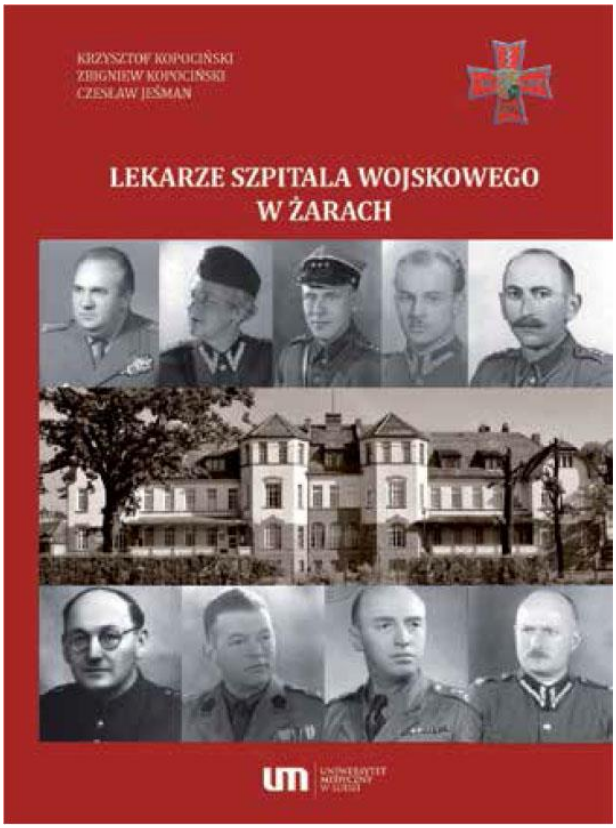
The 305-page chapter seven: "Medical facilities, departments and sub-departments of the Military Hospital in Żary", was compiled with great diligence and accuracy. The authors used numerous archival materials, in particular of the 105th Military Garrison Hospital, 105th Kresy Military Hospital with Public Out-patient Clinic, Military Archive in Oleśnica, but most of all the biographical questionnaires of physicians and professional medical personnel working there over the years, as well as the materials sent by their families. The achievements of the following diagnostic and therapeutic units are

[1] Kopociński Z., Kopociński K., Jeśman C.: 105 Szpital Wojskowy w Żarach. Duma Ziemi Lubuskiej [105th Military Hospital in Żary. Pride of the Land of Lubusz]. Żary 2014, p. 8

discussed in detail: Department of General Surgery, Department of Internal Diseases, Department of Dermatology, Department of Infectious Diseases, Department of Ophthalmology, Department of Otorhinolaryngology, Department of Neurology, Department of Psychiatry, Department of Traumatology and Orthopedics, Department of Cardiology, Nuclear Medicine Institute with Isotope Department, Department of Gynecology and Obstetrics, Department of Intensive Care, Department of Urology, Infant Sub-department, Diagnostic Imaging Department, Laboratory Diagnostics Unit, Pharmacy, Anatomical Pathology Laboratory, Central Sterilization Unit, Reception Desk, Blood Donation Centre, Hospital Emergency Department – Admission Room, Department of Physiotherapy, Primary Health Care and Occupational Medicine as well as Dental Surgery. The reviewer intentionally lists all the organizational units of the 105th Kresy Military Hospital with Public Out-patient Clinic in order to make the importance of this facility evident. This military clinic in Żary currently has the best developed emergency medical service center in the entire Land of Lubusz, providing 24-hour medical care. Equipping departments with modern equipment and well-trained staff, not just physicians but also nurses and representatives of other medical professions, minimizes the necessity of severely ill patients to travel to distant clinical centers.

Chapter seven, showing the development of the Hospital from a small two-department, 100-bed field hospital, the staff of which in the 1940s and 1950s was multinational (Poles, Russians, Jews and Germans), to a large, several-department, 470-bed hospital, was definitely the most difficult to compile for the authors. They were right to show the dominant role of military physicians in this process, especially of the alumni of a good university – the Military Institute of Medicine in Łódź, but also highlighted the role of alumni of other medical academies as well as the physicians and the nurses in civilian health care service in Żary. The qualified specialist doctors working at the facility in Żary, often with academic degrees, allowed many physicians to specialize in different fields of medicine. It should be noted that for many years there was a significant lack of qualified medical staff, related to an aversion to settle in a typical garrison town, as well as the lack of an academic center in the region. It should also be mentioned that there were many physicians connected to the hospital in Żary who were awarded the degree of professor. However, the chaotic and poorly implemented reorganization of the hospital, including the liquidation of important structures, such as the Department of Ophthalmology or the Department of Urology, cannot be omitted.

In the following chapters (eight to sixteen) the authors analyzed the activity of the Military Medical



Board, presented the research and training activity of the hospital staff and described the staff. They underlined the necessity of providing pastoral care. They showed the hospital against a background of socio-political transformations. They analyzed the activity of its branch, the Camp Hospital in Wędrzyn. The activity of the hospital staff in providing medical security for the actions of the Polish Army abroad is also interesting. The authors did not forget the details either; they presented the hospital's commemorative award and its mascot – Iwa Baśka.

The work ends with the conclusions, appendix, list of sources and selective bibliography, list of photographs, figures and tables, as well as the index of abbreviations.

The reviewer of the work, an admirer of art history, especially architecture, regrets that many historic facilities of the hospital, such as the School of Chivalry, were irretrievably lost to other non-hospital business entities.

The 480-page work titled: "The physicians of Military Hospital in Żary" is an appendix so to speak to the book analyzed in the introduction. Its pages present 240 biographical notes, including 208 physicians, 8 dentists and 22 other people with a master's degree in pharmacy, laboratory analysis or rehabilitation. It is fairly easy to present the achievements of many physicians and other healthcare professionals, but it is difficult to analyze

them in the context of medical sciences in Poland and elsewhere in the world. The authors carried out this difficult task very impressively. They passed to posterity numerous profiles, known well not only in the circles of military healthcare. They were right to help the figures of "regular" physicians emerge from oblivion, and which is an indisputable advantage of the book. The authors used the materials gathered in the archives mentioned in the previous work, acquired materials by way of announcements in "Gazeta Lekarska" and "Skalpel", and the Bulletin of the Military Medical Chamber. They also used the resources found on the Internet. It was incredibly valuable to reach the families of representatives of military healthcare presented on the pages of the book who had already passed through the Gate of Great Silence.

It is characteristic that the foundation of the clinic in Żary was initially created by the alumni of the John Casimir University and the Stefan Batory University, Sanitary Training Centre in Warsaw and other universities, physicians who participated in the First World War, the 1920 Bolshevik War and in the Second World War. Approximately 10% of all the presented people were soldiers of the First and the Second Polish Army. As many as approximately 75% of the presented physicians served at different stages of their professional carrier in the units of the 11th Division (currently the 11th Lubusz Armoured Cavalry Division, whose patron is King Jan III Sobieski), the so-called Black Division. It is also interesting that approximately 18% of the presented people were awarded academic degrees and titles.

The authors are content with "having found in different regions of the country and the world many former physicians, who have been forgotten in Żary, regardless of them having rendered considerable services to the clinic in Żary and the town". This is what real historians of medicine do. This is what they state in the introduction to their work: "We hope deeply that we will manage to restore to collective memory the regrettably partly forgotten group of great people in white coats and gowns who for decades saved the lives and health of others [...] and together created one of the best hospitals in the entire Land of Lubusz". They definitely performed the task with an officer's accuracy, as if following the motto of Plutarch – "In place of trees cut down and felled new ones will be quick to grow, whereas men who are lost are not so easy to replace".

These books were written within a three year period. It is worth noting that the Kopocińskis are also physicians active in their profession in a town located far from academic centers. The assistance of Professor Czesław Jeśman, Head of the Department of History of Science and Military Medicine of the Medical University of Łódź proved invaluable. Therefore, they were forced to create their magnum opus[2] in their free time, at the expense of their days off and holidays. They worked in a manner similar to that of medieval monks. The effects are more than visible. Maybe they follow the rule of *labor est etiam ipsa voluptas?*

It is difficult to squeeze the everyday life of the hospital's 70 years into these two books, as it is only a record of fading impressions, a work of imperfect memory. This cordial (the reviewer is using this word with deliberation) record is, however, incredibly valuable and may serve as an example to other creators of book publications of this type.

The reviewer, hoping that there will be a second edition of both books, suggests that an index of names is added to both of them, as it is really needed in order to perceive these works properly.

Both books by the Doctors Kopociński and Professor Jeśman are a tribute to all the generations of employees of the hospital in Żary, the oldest medical facility in the Land of Lubusz, the facility created by several generations of physicians, from the defenders of Poland against the Bolshevik invasion in 1920, to participants of the 1939 September Campaign and the Warsaw Uprising, to the soldiers of the First and the Second Polish Army, physicians constituting a *modus procedenti* for their successors.

The publication of these two valuable titles is important for one more reason. For physicians care too little for the past of their profession, which they studied in depth, especially in Poland, probably thinking that only the present counts, not the future. The sad conclusion preferred in the present day is that encumbering memory with the facts from the past will not contribute anything, and free time can be used in a different, less exhausting way, not on the development of medical thought, even less so on the history of the physicians who contributed to it. Respect to what has passed is more than visible in the case of the authors. The reviewer feels that the creation of both these works brought a good deal of satisfaction to the physicians from Żary. It is hard not to believe the words of Jan Parandowski, who once stated that: "Nothing is more refreshing or gives a greater boost to the spirit than a bath in time".

Dear Colleagues! As you declare in the introduction to the book: "105 Szpital Wojskowy w Żarach. Duma Ziemi Lubuskiej", you hope to restore the collective memory. The author of this review, as well as surely many others, is certain that you created a work that will not only be used by many military physicians, but also by scientists interested in the development of the Polish hospital service.

[2] Or maybe they will create an even more monumental work? The reviewer, convinced of the considerable intellectual capabilities of the authors, wishes them good luck.

ANNOUNCEMENT

You are cordially invited to the

REUNION OF THE 4TH COURSE OF THE MEDICAL FACULTY MILITARY MEDICAL ACADEMY, ALUMNI OF 1967

2–3 OCTOBER 2015 – Łódź

SUGGESTED ACCOMMODATION at the REYMONT HOTEL in Łódź

More information available from:
Anna Michalak, Prof. Krzysztof Buczyłko,
Non-Public Healthcare Institution, Allergology Centre in Łódź
tel: (42) 633 44 02

ANNOUNCEMENT

The 35TH POLISH ALLERGOLOGY SYMPOSIUM

to be held on 10 October 2015 in Łódź at the TOBACO HOTEL

ORGANIZER – Non-Public Healthcare Institution, Allergology Centre, Prof. Krzysztof Buczyłko, Łódź

You are invited to this scientific meeting dedicated to state-of-the-art trends and progress in the treatment of allergic diseases, and is open not only to doctors specializing in allergology, but also those who cooperate with them, including internal medicine doctors, family doctors, pediatricians, dermatologists and laryngologists. The purpose of the meeting is to explore the perception of patients with allergic diseases from the point of view of doctors from different specializations.

Register on the following website
www.alergologia.com.pl
or by calling: +48 42 633 44 02, +48 42 633 90 76

We look forward to meeting you! When registering, please include an e-mail address to which we can send the detailed schedule. Participation in the meeting is free.

Lekarz Rodzinny [Family Doctor]

A new journal for family medicine specialists and primary health care doctors

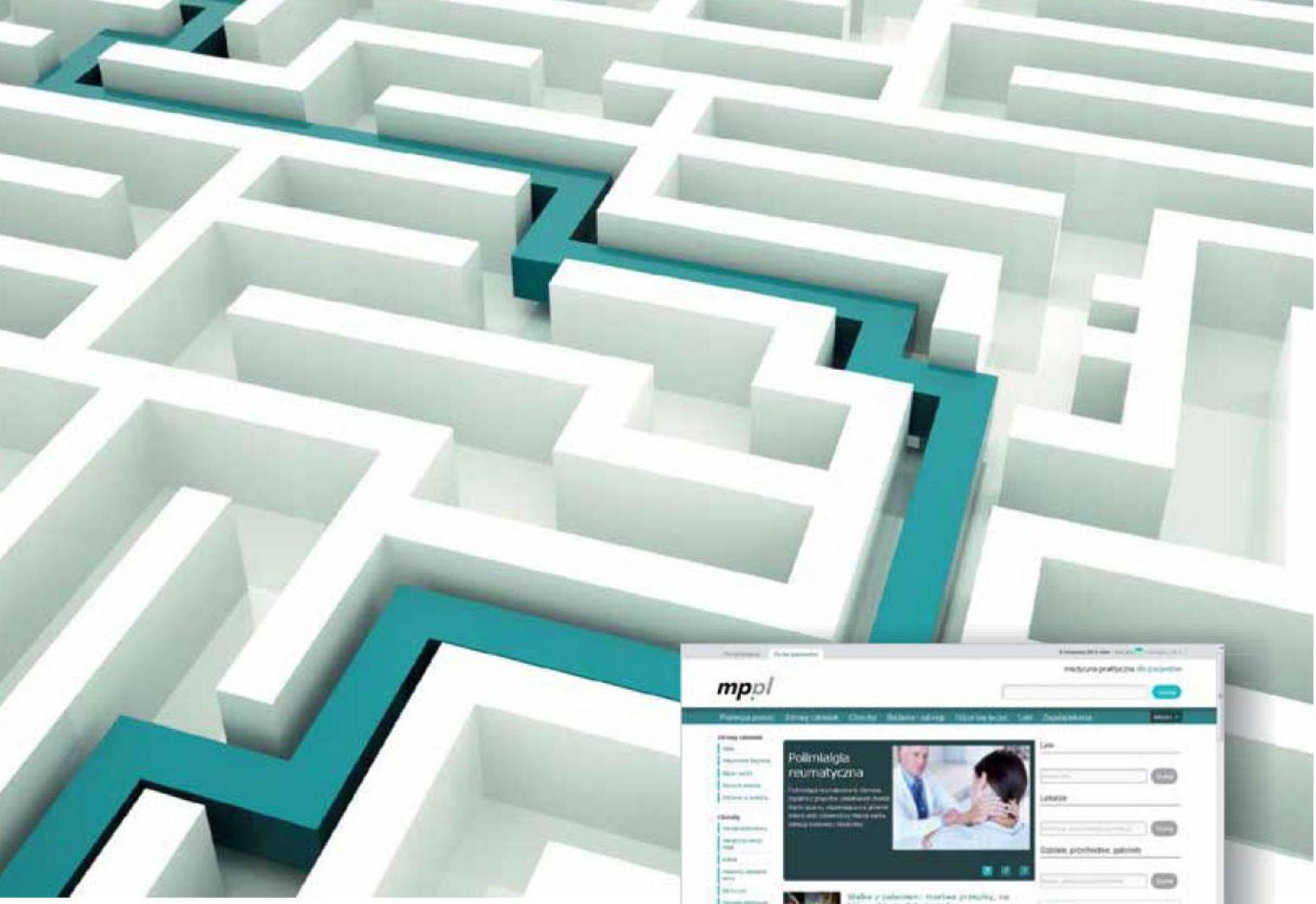
This new bimonthly issue will deal with:

- interdisciplinary issues in primary health care
- interpretation of symptoms
- differential diagnostics
- comments to the guidelines from the point of view of primary health care
- pre-hospital procedures
- symptomatic treatment
- empirical antibiotic therapy
- diagnostic difficulties, interpretation of laboratory tests
- procedures at the early stage of diagnostics
- the order of laboratory tests
- distribution of responsibilities – primary health care/outpatient specialist care
- primary health care case reports
- review articles reflecting the way of thinking of primary care physicians
- red flags
- prevention
- answers to questions from primary care physicians

And much more!

from symptom to effective treatment

Subscribe!
Yearly subscription fee for the Lekarz Rodzinny bimonthly - PLN 159. For the subscribers of the journals of Medycyna Praktyczna [Practical Medicine] - subscription available at a special price of PLN 60
Orders: tel: +48 800 888 000, www.ksiegarnia.mp.pl



Your patient has questions? You lack the time to answer them? Ask your patient to visit mp.pl

Do not sentence your patient to wandering the Internet's maze of unverified information!

A reliable, comprehensive description of more than 200 disease types

Your patient will learn:
- what are the symptoms of the disease
- what are the causes
- how to prevent the disease
- which symptoms should be monitored very closely
- when to call emergency medical services or consult a doctor urgently
- how the tests are performed and how to prepare for them
- what is the course of pharmacological treatment
- what are the correct non-pharmacological procedures
- what to do once the treatment is finalized

The patient may want to enter a thank you note under your card*.

A patient who understands his or her health condition, who is engaged in the course of treatment, will be more willing to follow your recommendations and will understand the necessity of taking medicines or undergoing a procedure.

*** Patients have already submitted almost 5000 thank you notes at the Community of Doctors.**

mp.pl

practical medicine for patients

mp.pl/pacjent

empendium
mobilne

Install free eMPendium on your telephone and take advantage of the:

- MP Drug Index
- ICD-9 and ICD-10 base
- eWUŚ [eVEB]
- TNM
- Expert
- News

mp.pl/empendium
***Free download** on Google Play and in the App store*
(Drug index, ICD-9, ICD-10, eWUŚ [eVEB], News)
and in Windows Phone (Drug index, News)