

Aneta URUSKA<sup>a</sup>, Iwona WOJTOWICZ<sup>a</sup>, Katarzyna ŻYWICKA<sup>a</sup>,  
dr n. med. Michał Marian SKOCZYLAS<sup>b</sup>, dr n. med. Marcin SAWICKI<sup>c</sup>,  
prof. dr hab. n. med. Anna WALECKA<sup>c</sup>

Pomeranian Medical University in Szczecin:

<sup>a</sup>Students' Scientific Circle in Department of Diagnostic Imaging and Interventional Radiology, Polish program

<sup>b</sup>Department of Diagnostic Imaging and Interventional Radiology, Autonomous Public Clinical Hospital No. 1

<sup>c</sup>Department of Diagnostic Imaging and Interventional Radiology

Pomorski Uniwersytet Medyczny w Szczecinie:

<sup>a</sup>Studenckie Koło Naukowe przy Zakładzie Diagnostyki Obrazowej i Radiologii Interwencyjnej, dla studentów polskojęzycznych

<sup>b</sup>Zakład Diagnostyki Obrazowej i Radiologii Interwencyjnej, Samodzielny Publiczny Szpital Kliniczny Nr 1

<sup>d</sup>Zakład Diagnostyki Obrazowej i Radiologii Interwencyjnej

## ABSCESSSES LOCALISED IN LIVER AND SPLEEN AND THEIR PROBABLE ASSOCIATION WITH THE ANNUAL CYCLE

### Abstract

**Introduction and aim:** Intra-abdominal abscesses can lead to serious complications (e.g. sepsis) and death. The aim of the pilot study is to study if the occurrence of hepatic and splenic abscesses depends on the seasons.

**Material and methods:** The study was based on patients with abscesses of liver or spleen in imaging studies (ultrasound and CT scan) performed in the period 2007-2016 in the Department of Diagnostic Imaging and Interventional Radiology of Pomeranian Medical University in Szczecin, taking dates of the examinations into consideration.

**Results:** Out of the total number of studies abscesses in the abdomen (257), 52 studies were liver and spleen abscesses occurring in 42 patients. From the statistical analysis we obtained 17 studies carried out in winter, 8 - spring, 8 - summer and 9 - autumn. Chi-square test of goodness of fit showed a statistically significant increased value of abscesses in the number of tests diagnosed in winter in comparison to the other seasons (chi-square 5.212; p-value <0.1).

**Conclusion:** The occurrence of hepatic and splenic abscesses is the highest in winter.

**Keywords:** liver abscess, spleen abscess, radiology, environmental medicine, ecology.

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## ROPNIE UMIEJSCOWIONE W WĄTROBIE I ŚLEDZIONIE I ICH PRAWDOPODOBNY ZWIĄZEK Z CYKLEM ROCZNYM

### Streszczenie

**Wstęp i cele:** Ropnie wewnątrzbrzuszne mogą prowadzić do poważnych powikłań (m.in. sepsy) i do śmierci. Celem badania jest określenie czy częstość występowania ropni wątroby oraz ropni śledziony zależy od pór roku.

**Materiał i metody:** Przedmiotem badań są pacjenci z ropniami wątroby lub śledziony w badaniach obrazowych (USG oraz TK) wykonanych w latach 2007-2016 w Zakładzie Diagnostyki Obrazowej i Radiologii Interwencyjnej Pomorskiego Uniwersytetu Medycznego w Szczecinie. Pod uwagę wzięto daty wykonania badania.

**Wyniki:** Z całkowitej liczby badań ropni wewnątrzbrzusznych (257) 52 badania stanowiły ropnie wątroby oraz śledziony występujące ogółem u 42 pacjentów. Z analizy statystycznej uzyskano 17 badań wykonanych zimą, 8 wiosną, 8 latem oraz 9 jesienią. Test zgodności chi-kwadrat wykazał statystycznie istotny wzrost liczby badań z ropniami wykonanych zimą w odniesieniu do innych pór roku (chi-kwadrat 5,212 ; p-value <0,1).

**Wnioski:** Częstość występowania ropni wątroby oraz ropni śledziony jest najwyższa zimą.

**Słowa kluczowe:** ropień wątroby, ropień śledziony, radiologia, medycyna środowiskowa, ekologia.

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## 1. Introduction and aim

Splenic abscesses are uncommon and often diagnosed not until during postmortem examinations (incidence under 1 per cent in autopsy series). Hepatic abscesses are more common than splenic and constitute about a half of visceral abscesses. Mortality rate is still high, up to 47%, and can potentially reach 100% among patients who do not receive antibiotic treatment in splenic abscess compared with liver abscess with mortality up to 12%. The frequency of splenic abscesses has recently increased due to rising number of people with immunocompromised systems, such as patients who undergo aggressive chemotherapy, those with intravenous drug abuse and persons with AIDS. Abscesses occur more commonly in males (55% to 60% in several series), with the average age ranging from 25 to 54 years. The primary causes of visceral abscesses include: infections – haematogenous (*e.g. endocarditis, sepsis*) and contiguous (*e.g. infected pancreatitis*), embolic noninfectious events causing ischemia and superimposed infection, trauma, immunodeficiency conditions (*e.g. chemotherapy, transplantation, AIDS*) and diabetes mellitus [1], [2], [4]-[8].

The aim of the pilot study is to study the relationship between the occurrence of splenic and hepatic abscesses, depending on the seasons.

## 2. Material and methods

The study was based on patients with abscesses of liver or spleen in imaging studies (ultrasound and CT scan) performed in from 2007 to 2016. Dates of imaging examinations that revealed these diagnoses were taken into consideration. Clinical data of 37 patients with liver abscesses and 5 with spleen abscesses was reviewed to study the liver and spleen abscesses and correlate the results with annual cycle. There were 9 patients who had more than one examination. Total number of clinical data was 52. Under consideration we took 42 patients and their one imaging data. Descriptive statistics and chi-squared test [*using the calculators on: <http://www.naukowiec.org/> and [www.quantpsy.org/chisq/chisq.htm](http://www.quantpsy.org/chisq/chisq.htm)*] were used for analysis of monthly and seasonal variations of liver and splenic abscesses and comparison of their mean seasonal incidence rates.

## 3. Results

Statistical analysis revealed that there were 17 abscesses in winters, 8 in springs, 8 in summers and 9 in autumns - arithmetic mean 10,5; median 8,5; mode 8 (fig. 1 and 2). Chi-square test of goodness of fit indicated that there is statistically significant increased value of abscesses diagnosed in winter in comparison with other seasons (chi-square 5,212, p-value < 0,1).

The total number of studies with abdominal abscesses was 257 and the liver abscesses were 47 which constitutes 18,28%, and the number of splenic abscesses was 5, that is 1,95%. Abscesses were more frequently seen in men (27) than women (15).

## 4. Discussion and conclusions

Authors of this study observed significant increased value of abscesses diagnosed in winter and autumn - the seasonal variation of abscesses was significant. Abscesses were more frequently seen in men than women.

Despite improved diagnostic methods and fast recognition intra-abdominal abscesses are still dangerous for patients. Subphrenic abscesses, abscesses between intestinal loops or around appendix and intra-pelvic abscesses are described quite often.

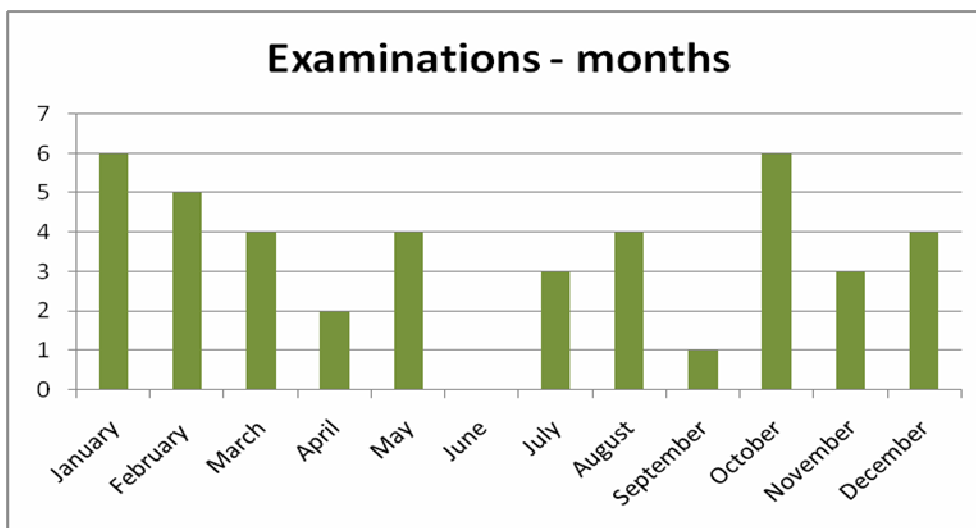


Fig. 1. Number of clinical data examinations depending on the months

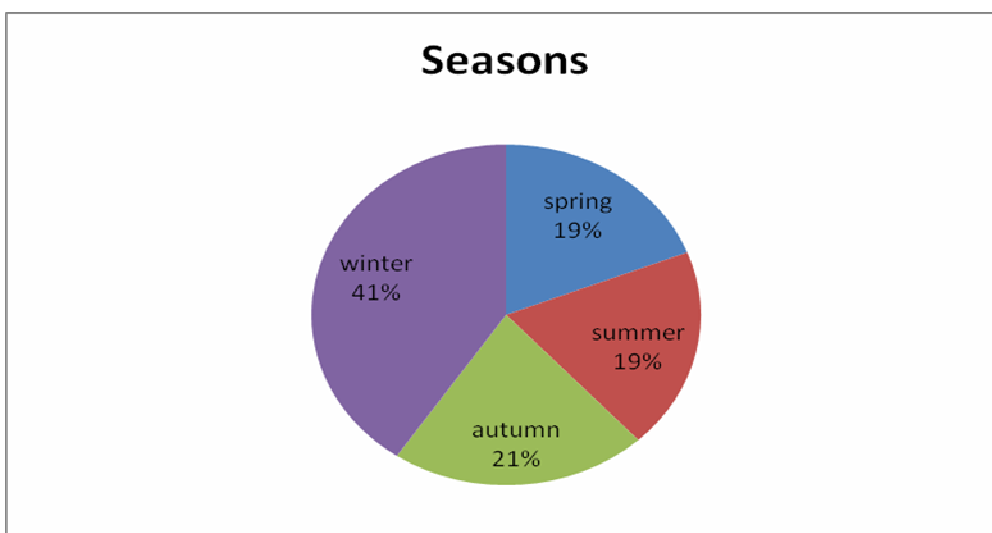


Fig. 2. Number of clinical data examinations depending on the seasons

Abscesses of parenchymal organs described in this study are less frequent. However there is increased number of liver abscesses in recent years due to the increased number of operations on this organ. Abscesses of the spleen remain rare and are associated with increased mortality [6]-[9].

Authors did not find current work on the seasonality of abscesses of the liver or the spleen. Thanks to the development of diagnostic methods and imaging tests in recent years, there are more data to analyze. Only one work in the available literature was focused on seasonality of occurrence of peritonsillar abscess, but the seasonal variation was statistically insignificant. However there was significantly more frequently recovered in the winter and spring than in the summer [3].

Verification of radiological diagnoses through their confrontation with the clinical course of diseases carried out on the basis of medical records of patients can be used for evaluation of their relevance [2], [9].

In further studies it is planned to focus the interest on the risk factors of abscesses of liver and spleen, analyzing demographic data of patients and their diseases, main etiology of infections and causes of likely immunodeficiency conditions.

*Note: Results of this study were presented on the poster session of the 2<sup>nd</sup> International Conference “Human ecology” in Szczecin, 9-10 June 2016.*

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