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Splenic abscess in a child as a cause of fever of unknown origin

Ropień śledziony u dziecka jako przyczyna gorączki o niejasnej przyczynie

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Abstract

Splenic abscess is a rare condition, with peak incidence in the third and sixth decade of life. It is significantly less common in children than in adults. The main causes of abscess include multiorgan infections, immune deficiency, and trauma. Coexisting diabetes, infective endocarditis and immune deficiency are adverse prognostic factors. Aetiological factors of splenic abscess include aerobic and anaerobic bacteria and fungi. The symptoms of splenic abscess are non-specific and include abdominal pain in the upper-left-quadrant, fever, splenomegaly, and increased inflammatory markers. The diagnosis is confirmed by abdominal sonographic and computed tomography findings. Conservative (antibiotic therapy) and surgical (drainage and splenectomy) treatment is used. Splenic abscess is an exceptionally dangerous condition in which early, correct diagnosis and treatment can reduce mortality from several dozen to less than 10%. The presented case illustrates the course of disease in a 6-year-old boy, emphasising the need to include splenic abscess in the differential diagnosis of fever of unknown origin.

Keywords: paediatrics, splenic diseases, abscess, fever of unknown origin, inflammatory markers

Streszczenie

Ropień śledziony jest rzadkim stanem chorobowym; szczyt zachorowań przypada na trzecią i szóstą dekadę życia. U dzieci rozpoznanie to ustalane jest znacznie rzadziej niż u dorosłych. Głównymi przyczynami powstawania ropni są infekcje wielonarządowe, stany obniżonej odporności oraz urazy. Niekorzystnym czynnikiem rokowniczym jest współistnienie cukrzycy, infekcyjnego zapalenia wsierdzia oraz niedoborów odporności. Do czynników etiologicznych ropni śledziony należą bakterie tlenowe i beztlenowe oraz grzyby. Objawy ropni śledziony są niespecyficzne, obejmują ból w lewym nadbrzuszu, gorączkę, splenomegalię, obserwuje się też podwyższone wskaźniki stanu zapalnego. Diagnozę potwierdzają badanie ultrasonograficzne jamy brzusznej oraz tomografia komputerowa. Leczenie obejmuje metody zachowawcze (antybiotykoterapia) i chirurgiczne (drenaż oraz splenektomia). Ropień śledziony jest stanem wyjątkowo groźnym, w przypadku którego przy prawidłowym, szybkim rozpoznaniu oraz leczeniu śmiertelność spada jednak z kilkudziesięciu do poniżej 10%. Przedstawiony przypadek ilustruje przebieg choroby u 6-letniego chłopca, a także wskazuje na konieczność uwzględnienia ropni śledziony w diagnostyce różnicowej gorączki o nieznanym pochodzeniu.

Słowa kluczowe: pediatria, choroby śledziony, ropień, gorączka o nieznanej etiologii, wskaźniki stanu zapalnego

INTRODUCTION

S plenic abscess is a relatively rare condition, with a reported frequency in autopsy series ranging between 0.14% and 0.7%⁽¹⁾. Two morbidity peaks are observed: in the third and sixth decade of life. It is difficult to estimate the incidence of splenic abscess in the paediatric population^(2,3). However, the number of diagnosed cases has recently increased due to the growing number of patients on immunosuppressants and greater availability of diagnostic imaging.

Factors that predispose to splenic abscess include multiorgan infections, gastrointestinal infections, infective endocarditis, cancer, immune deficiency, haematological disorders, injuries and type 2 diabetes^(1,4). Coexisting infective endocarditis, diabetes and immune deficiencies are adverse prognostic factors associated with higher mortality⁽¹⁾. Aetiological factors of splenic abscess include *Streptococcus* spp., *Staphylococcus* spp. as well as anaerobic bacteria and opportunistic pathogens, including fungi (*Candida* spp.)⁽⁴⁾. Typical clinical symptoms include abdominal pain in the upper-left-quadrant. Physical examination reveals splenomegaly and unilateral pleural effusion. However, these symptoms are non-specific and transitory, especially in patients on immunosuppressants or patients with other immune deficiencies^(5,6).

There has been improvement in early diagnosis of splenic abscess due to the development and availability of imaging modalities. There are two basic treatment methods: conservative and surgical. Spleen-sparing treatment in the form aspiration of purulent contents, drainage and the use of antimicrobials, is recommended in children⁽⁵⁾.

CASE REPORT

A 6-year-old boy was admitted to the Department of Paediatrics, Paediatric Nephrology and Allergology of the Military Institute of Medicine due to fever up to 39.3°C persisting for 5 days. A similar incident occurred about 3 months before hospitalisation. At that time, the fever resolved spontaneously. The boy's overall condition was considered relatively good on admission. Physical examination showed mild signs of upper respiratory infection (mucous discharge in the nasal cavities, red throat, and bilaterally opaque tympanic membrane in otoscopy). Furthermore, there was a noticeable, discreet, movable resistance in the region of the left epigastrium. Laboratory findings showed increased inflammatory markers: white blood cells (WBC) 11 thousand, neutrophil smear 74%, C-reactive protein (CRP) 3.9 mg/dL (reference range: 0-0.8), procalcitonin (PCT) 8.52 ng/mL (reference level <0.046), erythrocyte sedimentation rate (ESR) 46 mm/h (reference range: 0-8). Urinalysis showed no signs of urinary tract infection.

Chest radiography and electrocardiography (ECG) were performed to search for the focus of infection. Radiography

showed no signs of densities or stagnation in the pulmonary circulation; no fluid was detected in the costodiaphragmatic sinuses. ECG recording: normal heart axis, impaired intraventricular conduction over the right ventricle not meeting the diagnostic criterion for right bundle branch block, no signs of ventricular hypertrophy, the recording within normal age-adjusted ranges. Markers of myocarditis were not elevated [troponin T: <3.0 ng/L, creatine kinase (CK): 27 U/L, CK-MB: 9 U/L]. No bacterial flora was grown in the blood culture.

Abdominal ultrasound was performed to verify the palpable mass in the upper-left-quadrant (Fig. 1). An enlarged spleen with a well-delineated 88×75 mm focal lesion in its upper pole was detected. The lesion was filled with hypoechoic content mobile upon changing patient's position, suggesting splenic abscess. The boy was consulted by phone with the Department of Paediatric Surgery. There were no indications for urgent surgical intervention at that time. Temporary conservative treatment to be followed by causative surgical intervention was recommended. Intravenous cefuroxime and nonsteroidal anti-inflammatory drugs were used. Medical history was extended to explain the cause of infection. Splenic injury and immune deficiencies were excluded. Laboratory tests showed no haematological disorders [platelets (PLT): 172×10^{9} /L]. Diagnosed with splenic abscess, the boy was transferred in good overall condition to the department of surgery for further treatment; antibiotic therapy was modified. Ceftriaxone and metronidazole were used. The patient was qualified for surgical treatment due to increased inflammatory markers and poor response to antibiotic therapy. Laparoscopic splenectomy was performed. No complications occurred during surgery. The boy was discharged home in good overall condition, with instructions for further care at the haematology clinic and vaccination consultation centre.

DISCUSSION

Fever is one of the most common symptoms in children. They develop raised temperature significantly more often



Fig. 1. Splenic abscess in abdominal ultrasound

than adults. It is estimated that about 70% of paediatric consultations are due to this symptom⁽⁷⁾. Infections, mainly bacterial, are the main cause of fever of unknown origin (FUO) in children. These are followed by autoimmune diseases and cancer^(7–9). According to Chow and Robinson, abscesses account for about 5% of FUO cases, which means that patients with this condition are only a small fraction among all paediatric patients with FUO⁽⁸⁾.

Splenic abscess is rarely considered in the differential diagnosis of FUO in children. This results from the rare occurrence of this condition (0.05-0.7%) and non-specific symptoms^(5,10). Mortality rates in splenic abscess are still high, up to 47%. They may reach 100% among patients who do not receive antibiotic treatment. However, appropriate management can lower mortality to less than $10\%^{(11)}$. Secondary generalisation of localised inflammation through the bloodstream is the most common cause of death⁽⁵⁾.

The clinical picture of splenic abscess is non-specific and includes fever, abdominal pain in the upper-left-quadrant, diffuse abdominal pain and shortness of breath. Physical examination reveals splenomegaly in 60% of patients. Leukocytosis is detected in 88.8% of patients⁽⁵⁾. Fever was the dominant clinical symptom in our patient. Other symptoms described in literature as typical of splenic abscess were absent. The patient presented with no shortness of breath and reported no abdominal pain. A very small mass was palpated in the left upper abdominal quadrant. Overlapping upper respiratory tract infection could have masked the symptoms of splenic abscess and hamper correct diagnosis. Information on a FUO episode, which occurred in the boy three months earlier, was an additional helpful hint in the diagnosis.

Ultrasonography is first-line diagnostic modality in splenic abscess. Computed tomography (CT) and magnetic resonance imaging (MRI) play a contributory role in the assessment of lesion⁽⁶⁾. Ultrasonography may reach up to 95% sensitivity in detecting splenic abscess when performed by an experienced operator, while CT shows nearly 100% specificity⁽¹⁰⁾. Furthermore, some experts recommend ultrasound- or CT-guided diagnostic aspiration biopsy to collect samples for bacteriological testing. Both blood and biopsy aspirate should be cultured^(12,13). The presented clinical case supports the usefulness of ultrasonography as a first-line modality in suspected splenic abscess. A clear image of hypoechoic contents mobile upon changing patient's position required no verification with other imaging modalities. Empirical antibiotic therapy led to symptom resolution and blood cultures were negative; therefore, no diagnostic biopsy was performed.

For many years, splenectomy was the procedure of choice for splenic abscess, but studies have demonstrated that ultrasound- or CT-guided percutaneous drainage shows comparable efficacy⁽¹³⁾. Such management allows to avoid serious postoperative complications in children, such as sepsis or immunodeficiency as a result of splenectomy at a young age. There is a clear tendency to increase the percentage of non-radical splenic interventions over total splenectomy. This results from greater awareness of the important role of spleen in the removal of encapsulated bacteria^(12,14). Percutaneous drainage is more preferable than surgical drainage due to the lack of postoperative complications, shorter hospital stay and lower treatment costs⁽¹³⁾. In the case of failure of any of these methods, partial or total splenectomy remains the standard, especially in multiple splenic abscesses (25% of cases)⁽¹⁵⁾. Although antibiotic therapy is an obligatory element of all these treatment modalities, it is not a substitute for invasive treatment.

CONCLUSIONS

- 1. Splenic abscess may be life-threatening in the paediatric population, but early diagnosis and appropriate therapy allow for recovery.
- 2. Splenic abscess should be included in the differential diagnosis in children with fever of unknown origin, especially those presenting with abdominal pain.
- 3. Abdominal ultrasound, which is characterised by high sensitivity in detecting renal abscess, allows for rapid and easily available diagnosis.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations, which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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