

## CASE REPORTS

### SPLENIC ABSCESS WITH BLEEDING IN A FEMALE PATIENT FOLLOWING CORONARY ARTERY BYPASS GRAFTING AND CHOLECYSTECTOMY – A CASE REPORT AND LITERATURE REVIEW

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Splenic abscess is a potential complication of many disease entities which involve infections. Diagnostics are based on imaging studies. Treatment involves splenectomy and antibiotic therapy. In the case the abscess is limited, and particularly in young patients, percutaneous abscess drainage may be performed.

This paper presents a case of a 66-year old female patient following coronary artery bypass grafting (CABG) complicated with sternum infection and cholecystectomy due to gallbladder abscess complicated with surgical site infection, who underwent long-term treatment in the ICU due to respiratory failure and persistent septic condition. Splenic abscess is a rare complication of abdominal cavity diseases and systemic infections.

**Key words:** splenic abscess, complications, splenectomy.

Splenic abscess is a rare, but potentially life-threatening condition, with a reported frequency of 0.1-0.7% (1). Splenic abscess is observed in the course of many clinical conditions, most commonly as a complication of splenic trauma or blood-borne or direct bacterial infections (1). In conscious patients clinical manifestation involves pain in the left-upper abdominal quadrant, fever, nausea and vomiting. Symptoms are not very specific and often masked by coexisting septic condition of another etiology (2). Splenic abscess is often observed in intensive care unit (ICU) patients. The correct diagnosis is usually made at the advanced disease stage when the patient's condition is very serious and current therapy was ineffective. The diagnostic "gold standard"

is abdominal computed tomography (CT). The first-choice treatment is splenectomy, however other methods, such as percutaneous abscess drainage, are applied in certain cases, particularly in younger patients (3).

#### CASE REPORT

We present a case of a 66-year old female patient hospitalised in the ICU with Cardiac Anaesthesiology Unit, University Hospital No 1 in Bydgoszcz. Medical history revealed recent myocardial infarction without persistent ST elevation with pulmonary oedema, status post circulatory arrest, atrial fibrillation, mitral, aortal and tricuspid valve incompetence, car-

diac failure, type 2 diabetes, status post cerebral stroke with right-sided hemiparesis and obesity. On day 2 following coronary artery bypass grafting – CABG (perioperative prophylaxis: cefazolin administered for two days), based on the ultrasonographic imaging and increased inflammatory indices (leucocytosis, CRP level) the patient was diagnosed with gall-bladder empyema and underwent emergency cholecystectomy. Empirical antibiotic therapy was instituted with piperacillin and tazobactam. Microbiological tests of the material obtained from the removed gall-bladder have indicated the presence of *Enterobacter cloacae*. Post-sternotomy and laparotomy wound infections were observed in the postoperative period. The samples collected for culture from these locations yielded *E. cloacae*. Based on antibiogram results vancomycin has been additionally instituted. Following the institution of targeted systemic antibiotic therapy a moderate improvement was initially observed, with subsequent progressive deterioration of the patient's general condition. From day 55 following cholecystectomy a slight and then a rapid anemia was observed which required blood transfusion accompanied by persistence of inflammatory indices (high CRP, leucocytosis, elevated procalcitonin levels) (tab. 1). Abdominal ultrasonographic examination revealed: splenomegaly with irregular diaphragmatic surface and the accumulation of fluid between the diaphragmatic surface and the diaphragm, fluid surrounding the liver and fluid in the pelvic cavity. Emergency abdominal CT scans were performed, which revealed a large amount of blood in the spleen capsule, encapsulated peripancreatic and sub-diaphragmatic fluid collection, free fluid surrounding the liver, fluid between intestinal loops and in the hypogastrium (fig. 1).

The patient was qualified for emergency surgery on day 56 following CABG. Splenic



Fig. 1. Computed tomography of the abdominal cavity – splenic haematoma and abscess

abscess with haematoma formation and free intraperitoneal bleeding was observed intraoperatively (fig. 2, 3). Total splenectomy and peritoneal drainage were performed with evacuation of approx. 2 litres of clots and partially liquefied blood. No other pathologies have been revealed in abdominal cavity organs. The spleen biopsy specimens for culture yielded *E. cloacae*. Long-term therapy in the ICU was continued; a gradual improvement was initially observed – reduced inflammatory indices and hemodynamic stabilisation. Post-sternotomy wound revision was performed and on day 10 after splenectomy the patient was



Fig. 2. Spleen following removal – superior surface

Table 1. Changes of biochemical parameters in an inflammatory condition

| Phase                       | Leucocytosis<br>(x 10 <sup>3</sup> /µl) | CRP<br>(mg/l) | Procalcitonin<br>(ng/ml) |
|-----------------------------|---|---------------|--------------------------|
| Before cholecystectomy      | 15,9                                    | 167           | -                        |
| Day 5 after cholecystectomy | 11,2                                    | 98            | 0,175                    |
| Before splenectomy          | 32,5                                    | 290           | 6,1                      |
| Day 2 after splenectomy     | 28,75                                   | 327           | 3,02                     |
| Day 10 after splenectomy    | 14,2                                    | 40            | 0,111                    |



Fig. 3. Spleen following removal – inferior surface

disconnected from the respirator. Again, features of cardiac failure progression and pneumonia were observed. The patient received mechanical ventilation; multiple multidrug-resistant Gram-negative bacterial strains were cultured from bronchial washings and wound samples. A targeted therapy was instituted based on antibiogram results (meropenem, cefepime, piperacillin/tazobactam, vancomycin, trimethoprim/sulfamethoxazole). A total post-sternotomy wound dehiscence and no indication of the healing process of the cholecystectomy and splenectomy wound were observed. On day 76 following the primary surgery (CABG) the patient with symptoms of multiple organ failure was declared dead.

## DISCUSSION

Splenic abscess is a relatively rare entity (1). Pathogenesis involves several routes of infection: a) blood-borne, secondary to existing inflammatory foci of other locations (most common), b) due to cellular embolism, e.g. in the course of hemoglobinopathy, secondary microfoci of infarction and infection, c) in consequence of immunosuppression, e.g. administration of immunosuppressants, d) by continuity in the course of abdominal cavity diseases, e) as a result of secondary infection of the damaged parenchyma (following splenic trauma or infarction).

In the presented case the infection probably originated in the surgical site (*E. cloacae*). The patient presented with multiple risk factors for infectious complications: obesity, diabetes, atherosclerosis, circulatory failure, status post circulatory arrest, anergy of the immune sys-

tem due to existing inflammatory process in the infected sternum and abdominal integument, long-term ICU stay and hemodynamic instability. A similar number of aggravating factors is usually found in case reports described in available literature (2, 3, 5).

The bacterial aetiology of splenic infections includes among others the following pathogen genus: *Streptococcus*, *Staphylococcus*, *Salmonella* and *Escherichia coli*. A significantly higher incidence of fungal infections (*Candida* spp. and *Aspergillus* spp.) is observed during immunosuppression. Contrary to other intra-abdominal abscesses, anaerobic bacteria are rarely responsible for splenic abscesses (4). *E. cloacae* is a rare etiological factor (6). This condition usually develops in the middle aged (i.e. 40-50 years old) and the elderly patients. Gender-related differences in incidence were not observed.

Major symptoms include: fever, pain below the left costal arch, splenomegaly, left pleural effusion. Symptoms are non-specific, especially when the infection originates from the abdominal cavity diseases. The presence of the splenic abscess should be considered in the case of a long-lasting, difficult to treat infection of another organ, especially when targeted antibiotic therapy is ineffective. Laboratory results indicate an existing inflammatory process. In the presented case, the typical symptoms could not be observed due to the serious condition of the patient and complete analgesia; the diagnosis was based on additional tests performed in order to establish the cause of deteriorating patient's general condition. Key diagnostic imaging methods include ultrasonography and CT. Increased inflammatory parameters are usually explained by co-existing infections. Next to acalculous cholecystitis and intestinal ischaemia, splenic infection is another diagnostic challenge for the surgeon consulting an ICU patient.

Basic treatment involves splenectomy (6), particularly in septic patients or when active bleeding develops. Improvement of clinical status following splenectomy is typical, and has been also observed in the presented case study. In some cases, e.g. in young patients, percutaneous abscess drainage is also considered, particularly in the case of a limited fluid collection in the splenic parenchyma in stable patients, in whom splenic rupture and bleeding have not been identified (2, 7). Decision on the

spleen-preserving treatment should be weighed carefully and the potential development of a life-threatening septic hemorrhage should be kept in mind. The risk of perioperative death ranges from 0% to 20% and depends to a large extent on the patient's preoperative clinical status (5).

## CONCLUSIONS

In long-term ICU patients with difficult to treat infective complications of various local-

ization, the splenic abscess must be excluded among other causes of deteriorating patient's general status, particularly with accompanying local ischaemia. The spread of infection from distant foci to the spleen may occur due to transient bacteremia. Diagnosis is based on imaging studies, especially ultrasonography and computed tomography. Early diagnosis and splenectomy supported by antibiotic therapy prevent the development of life-threatening septic complications or splenic bleeding due to inflammatory-induced injury.

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