

SEPTIC SHOCK IN THE COURSE OF LIVER ABSCESS RESCUED WITH PERCUTANEOUS DRAINAGE – A LITERATURE REVIEW AND CASE REPORT*

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This study presented a septic shock occurring with striking speed during the percutaneous drainage of a large abscess of the liver in an 18-year-old female patient after an appendectomy performed 3 months earlier using the laparoscopic method because of its phlegmonous and gangraenosus inflammation. The post-operative course was complicated by increased suppuration in places after removal of the trocars. After including the intravenous antibiotic therapy and under the USG control, the percutaneous drainage of the abscess was performed. While withdrawing the guide of the drainage catheter set, the symptoms of septic shock occurred. The pharmacological treatment was applied with continuation of the antibiotic therapy till a negative result of microbiological tests was obtained and the normalization of life parameters. The patient was not qualified for treatment in the ICU. She was discharged in a generally good condition after 24 days of hospitalization. In the case of this patient, the drain covered with the content of the abscess may have contact with the adjacent tiny blood vessels, which may have contributed to the systemic inflammatory response syndrome that was linked with fast-developing septic shock.

Key words: liver abscess, septic shock, percutaneous drainage

Liver abscesses (LA) are a rare health problem but associated with high mortality rates.

The liver is highly-vascularized and is therefore the most common site of abscess development in the course of acute diseases of the peritoneal cavity and other organs. The incidence of LA is estimated at 8-15 cases per 100,000 persons/year. Studies have shown that the male/female ratio of LA incidence is 2:1. LA usually occur in patients between the 2nd and 4th decade of life (1, 2, 3). LA etiology

includes among others: bile duct diseases (21-30% of cases, usually extrahepatic bile duct obstruction usually associated with choledocholithiasis; benign or malignant neoplastic tumour or postoperative adhesions), portal vein infections (*portal pyemia*), blood-borne infections (through the hepatic artery) and idiopathic infections. Liver abscesses may be of various origin: bacterial, amoebic, fungal, parasitic or tuberculous (2, 4, 5). In Poland liver abscesses are usually caused by bacterial infection.

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CASE REPORT

The presented 18-year old female patient was admitted to Clinic of General Surgery, Faculty of Medical Sciences at the University of Warmia and Mazury in Olsztyn for the treatment of a large liver abscess in the right lobe diagnosed in abdominal ultrasonography and CT at the district hospital. On admission to the hospital without significant clinical symptoms, in general good condition. Biochemical tests: inflammatory markers CRP 69.34 mg/l, PCT 0.089 ng/ml; slightly elevated coagulation parameters PT 17.3 s, INR 1.58, APTT 43.7 s; fibrinogen 569 mg/dl. Medical interview revealed that 3 months earlier the patient underwent laparoscopic appendectomy due to phlegmonous and gangrenous appendicitis. The postoperative course was complicated with significant trocar site purulence. During this period the patient received dressing changes in an outpatient setting until she was admitted to the Clinic. Due to coexisting Graves-Basedow disease the patient was also treated at the Endocrinology Outpatient Clinic – on admission the patient was in clinical and biochemical euthyreosis.

Liver abscess measuring 64x73x94 mm with the rim around the abscess of up to 12 mm in the right lobe (Couinaud segments V/VI) was visualized in abdominal ultrasonography and CT (fig. 1). Intravenous empirical antibiotic therapy with Augmentin was introduced. Following premedication an ultrasonography guided percutaneous abscess

puncture was performed under topical anaesthesia with 1% solution of lignocaine to obtain 50 ml of thick, fetid purulent content with its further discharge through a Cystofix CH 10 puncture set placed in the abscess cavity. On removal of the guidewire symptoms of septic shock have occurred: decrease of RR to 60-70 mm Hg, heart rate increased to 120 bpm and skin paleness with lip cyanosis. The patient began to report difficulty swallowing, consciousness disturbances have developed periodically with a very impaired contact with the patient, later with agitation and saturation reduced to 70-80%. Passive oxygen therapy and intensive fluid therapy have been initiated, 200 ml of hydrocortisone was administered. An additional intravenous access was performed and the hospital resuscitation team was called due to worsening of respiratory failure. A follow-up ultrasound examination of the drainage system placed in the abscess cavity has demonstrated its correct location without leakage of the purulent matter or blood into the peritoneal cavity (fig. 2). Treatment of septic shock with fluid therapy was instituted with catecholamines and antibiotic therapy with Augmentin was maintained until microbiological test results were achieved. The RR parameters were maintained at 80-90 mm Hg, heart rate up to 100-110 bpm, diuresis – initially none, then 30-40 ml/h with normalization to 60 ml/h within over ten hours. The patient did not require treatment at the ICU.

Immediately following the procedure an increase in inflammatory parameters in bio-

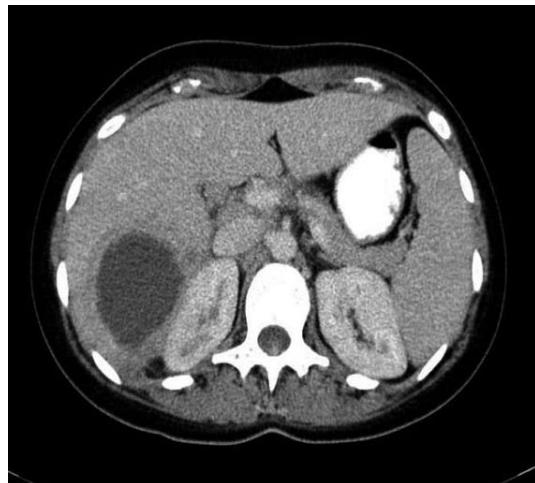


Fig. 1. Abdominal CT with visible large liver abscess in the right lobe



Fig. 2. Abdominal CT following drainage

chemical tests was observed: leucocytosis $28,330/\text{mm}^3$, PCT $> 100 \text{ ng/ml}$, CRP 191.03 mg/l. From the purulent matter group C β -hemolytic Streptococcus and *Bacteroides stercoris* have been cultured. Antibiotic therapy from day 3 was administered according to microbiological tests and sensitivity of both microorganisms to Tazocin and Sulperazon. Several blood and urine cultures and bronchial tree secretion did not show presence of bacteria. Already from day 3 pulmonary parenchymal and pleural cavity lesions and on day 5 a massive parenchymal density within the lungs and presence of fluid in the pleural cavity were observed. On day 5 a small amount of sero-purulent and sanguineous matter was discharged from the abscess cavity. Drainage systems were placed in both pleural cavities due to worsening symptoms of respiratory failure. Nutrition of the patient was partially provided by the enteral route due to inflammatory reaction in the pancreas and liver. During therapy a slow improvement and normalization was observed of clinical condition, biochemical parameters and in imaging tests. The patient was discharged home on hospitalisation day 24 in good overall condition without complaints. A 3 months post-discharge follow-up abdominal and chest CT did not reveal significant morphological lesions (fig. 3). A few months later the patient underwent surgery at the Clinic of General Surgery for Graves' goitre. The postoperative course was uneventful.



Fig. 3. Abdominal CT 3 months postoperatively

DISCUSSION

LA are usually the result of severe complications of acute inflammatory conditions of the abdominal cavity. A liver abscess generally develops through blood-borne infections or infections of the biliary tract: ascending infections of the bile ducts, spread via the portal vein in the course of diverticulitis or appendicitis, pneumonia, purulent pancreatitis, spreading from neighbouring organs and in post-injury conditions. Acute appendicitis is considered by some as a relatively trivial condition, but this is not true. Acute appendicitis may cause multiple early complications, such as superficial, deep surgical site infection, as well as infections affecting distant organs or systems (5). The postoperative course in the presented patient was complicated with significant trocar site purulence and treated only with dressings in an outpatient setting. Randomized prospective studies have demonstrated the following incidence of surgical site infection following laparoscopic appendectomy: 3.81% Li X et al. (6), 4% Martin et al. (7). The mentioned literature confirms that postoperative complications should always be taken into consideration, also those as rare as organ surgical site infection, and consequently liver abscess or abscesses (8). The clinical picture of LA is often non-specific and high rate of suspected LA requires imaging studies in order to make a final diagnosis.

Abdominal ultrasonography and CT is usually the first imaging study performed in clinical practice to evaluate the liver parenchyma structure. Approx. 60% of abscess cases involve a single abscess located primarily in the right lobe. This is due to portal flow and a larger parenchymal volume of the right lobe. The treatment of choice in LA is the percutaneous drainage with targeted antibiotic therapy with control or search of the primary infection source. The studies have demonstrated that percutaneous abscess drainage is both effective and safe (9-12). However as with any invasive intervention bacteria from the abscess cavity may penetrate into systemic circulation, thus potentially resulting in bacteremia or development of a septic shock, which is the most common complication of this type of surgery according to scientific papers (11-14). Fine needle aspiration biopsy is performed for bacteriological evaluation. More

than 60% of cultures from LA contain more than 1 pathogen (15) and these are often of biliary or intestinal origin. The most common bacterial etiological factor is Streptococcus species (29.5%) and Escherichia coli (18.1%) (16).

From the available scientific papers in the 1990s the incidence of complications following surgical and percutaneous LA drainage was determined to be from 40% to 60% (17, 18), which may be associated with age and severity of general condition of these patients at the time of surgery (19). One of the studies demonstrated the occurrence of a septic shock in 7 out of 27 treated patients (26%) following percutaneous drainage despite antibiotic therapy (20). As early as in 1985 Crass has reported a 25% risk of septic shock development in patients subjected to LA drainage procedures (21).

We suppose, also after Thomas et al. (20) that septic shock is probably secondary to significant bacteremia resulting from penetration of microorganisms into systemic circulation during percutaneous drainage. Every physician performing this procedure must be aware of this situation and of the significance of prompt institution of septic shock treatment according to guidelines released by the Polish Working Group for Sepsis. The activity spectrum of antibiotics should be appropriate for the microorganism inoculated from the culture collected during LA drainage. Mueller et al. (22) have already demonstrated that injection of a contrast agent or normal saline to abscess

cavity is associated with the risk of septic shock. We believe that these procedures should be reduced to absolute minimum, related only to administration of antibiotic to the postoperative site of the drained liver abscess which might constitute an important additional part of treatment.

According to our observations in the presented patient a contact might have occurred of the drain covered with abscess contents with the surrounding small blood vessels which contributed to development of a systemic bacteremia combined with promptly progressing shock. Therefore particular attention is paid to surgeon's experience in procedures of transdermal LA drainage and appropriate selection of equipment, patient monitoring with permanent access to vascular bed and pharmacological coverage of the patient prior to the procedure.

CONCLUSIONS

1. Treatment with percutaneous abscess drainage and targeted antibiotic therapy is currently the "gold standard".
2. Septic shock should always be taken into consideration during the procedure of abscess evacuation by percutaneous drainage or laparotomy.
3. Patients in septic shock should be treated at the ICU.

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