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Case Report / Приказ болесника

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Laparoscopic approach in the treatment of echinococcal liver disease – case report and literature review

Лапароскопски приступ у лечењу ехинококне болести јетре – приказ болесника и преглед литературе

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SUMMARY

Introduction Cystic echinococcosis or hydatid disease is a parasitic disease, zoonosis, and is most commonly caused by *Echinococcus granulosus* larvae. It mainly occurs in endemic areas. The most common localization is the liver.

Case outline In this paper, we will present our experience with a 67-year-old female patient diagnosed with an echinococcal cyst in the right lobe of the liver, as confirmed by computed tomography examination of the abdomen. The patient underwent laparoscopic partial pericystectomy with omentoplasty. The operation went without complications, as well as the postoperative period.

Conclusion Laparoscopic partial pericystectomy is a safe and effective treatment of available hepatic hydatid cysts. Considering all the benefits of minimally invasive surgery, laparoscopic partial pericystectomy of hepatic hydatid cysts may be the treatment of choice, over the classical open surgery approach.

Keywords: *Echinococcus granulosus*; liver cyst; laparoscopy; hydatid cyst; laparoscopic fenestration

САЖЕТАК

Увод Цистична ехинококоза или хидатидна болест представља паразитарно обољење, зоонозу и најчешће је узрокована ларвама псеће пантљичаре (*Echinococcus granulosus*). Углавном се јавља у ендемским подручјима. Најчешћа локализација је јетра.

Приказ болесника У овом раду приказаћемо наше искуство са пацијенткињом старом 67 година, код које је дијагностикована ехинококна циста у десном лобусу јетре, што је и потврђено *MDCT* прегледом абдомена. Болесници је учињена лапароскопска парцијална перицистектомија са оментопластиком. Операција је протекла без компликација, као и постоперативни период.

Закључак Лапароскопска парцијална перицистектомија је сигуран и ефикасан третман доступних ехинококних цисти јетре. Обзиром на бенефите минимално инвазивне хирургије, ова процедура може бити третман избора за ехинококне цисте јетре, наспрам класичне отворене операције.

Кључне речи: *Echinococcus granulosus*; циста јетре; лапароскопија; хидатидна циста; лапароскопска фенестрација

INTRODUCTION

Cystic echinococcosis or hydatid disease is a parasitic disease, zoonosis, and is most commonly caused by *Echinococcus granulosus* [1]. Hepatic echinococcosis is the most common localization of echinococcal disease in man. There are other rare causative agents of echinococcal disease: *E. multilocolaris*, *E. vogeli*, and *E. Oligarthus*. The most common in humans is a cystic form of the disease that is caused by *E. granulosus*, much rarer is the alveolar form which is caused by *E. alveolaris*. It can affect all organs and tissues. The most commonly affected are liver (70–80%) and lungs (10–25%), while very rare, in about 5% of cases, it can be found in the spleen, kidneys, mesentery, pancreas, brain, heart, muscles and skeleton [2].

Echinococcus granulosis is common in the endemic and sheep breeding regions of the Mediterranean, the Middle East, Australia, New Zealand, South Africa, and South America.

The symptoms are nonspecific. Usually, the infection occurs at a young age and years before the disease is diagnosed. In clinically manifested disease, there are cysts usually large in diameter, which exert a compressive effect and cause problems in the form of dull pain under the right costal arch, discomfort, and this is the reason why the clinical trials are started. The appearance of jaundice, cough, hemoptysis, and severe abdominal pain with fever are signs of advanced disease with consequent complications and the spread of the disease.

It can be diagnosed in several ways: in addition to a well-processed medical history, also clinical status and clinical testing [X-ray, ultrasound, nuclear magnetic resonance (NMR), computed tomography (CT), laboratory analyzes and serological tests for the presence of anti-*E. granulosus* antibodies by ELISA test] are important [1]. The disease is mainly diagnosed incidentally [3].

It is treated with albendazole as preoperative and also postoperative therapy, then surgically, as well as with the aspiration of the cyst and injection of scolecid (PAIR method) in cysts smaller than 5 cm in diameter, in patients who refuse surgery, or have contraindications for surgery due to other comorbidities. Some papers also describe the thermal destruction of echinococcal cysts by using the radiofrequency ablation (RFA) [4].

In surgical treatment, we have the classic open-approach and laparoscopic approach in resolving echinococcal cysts. Insight into the expert literature shows us that nowadays the number of patients operated by the laparoscopic method in hydatid disease is increasing, due to many advantages in the form of shorter hospitalization of patients, faster recovery, and aesthetic benefits [5]. The laparoscopic approach is mainly performed as the partial pericystectomy with omentoplasty, although larger procedures in the form of partial resections of the liver may be performed laparoscopically. The first described laparoscopic surgery for a hydatid cyst was performed by Katkhoud in 1992 [6].

This paper aims to present a laparoscopic approach as a safe procedure in resolving hepatic echinococcal cysts.

CASE REPORT

A 67-year-old female patient, in which the hepatic echinococcal cyst was radiologically diagnosed in May 2019, was admitted to the Clinic for Digestive Surgery, Clinical Center of Serbia, in January 2020. The inspection of the medical records showed that the patient was treated with four cycles of albendazole. Repeated MDCT examination confirmed an echinococcal cyst sized 58 × 51 × 42 mm in the 6th liver segment, which is slightly larger compared to the previous finding of three months ago (Figure 1). The ultrasound examination verified the echinococcal cyst type III according to the Gharbi classification. Serological tests for the presence of anti-E. granulosis antibodies performed by ELISA test were positive.

Due to the radiological (MDCT) progression in echinococcal cyst growth, with positive serological analyzes from the blood, we decided to perform laparoscopic surgery on February 3, 2020. Because of the prevention of thromboembolic complications, the patient preoperatively received low molecular weight heparin, as well as a prophylactic dose of antibiotics.

After the placement of working ports and the laparoscope, the preoperative finding of the echinococcal cyst in the 6th liver segment on the basic surface was confirmed. After lifting the right lobe of the liver by the use of one gauze holding instrument to prevent hepatic injury, one approaches a cyst which is previously enclosed with gauze soaked in a scolicidal solution (hypertonic or 10% NaCl) (Figure 2). Then a small fenestration was made and suction was placed in the cavity of the cyst where a portion of the content was aspirated without spilling it out (Figure 3). After that, a partial pericystectomy with the evacuation of the content of the cyst (daughter cysts and germinative membrane) was performed. The content was placed in the endo-bag and then removed from the abdomen (Figure 4).

Then, the cavity of the cyst was carefully inspected, cleaned with clean gauze to check for possible biliary fistula. Since the gauze was bile-free, the operation was completed by placing a previously developed part of the large omentum into the cyst cavity, fixed by a pair of sutures (omentoplasty) (Figure 5). After the revision of hemostasis, an abdominal drain was placed. The preparation was sent for histopathological examination, which subsequently confirmed that it was a hydatid hepatic disease.

There were no postoperative complications. The nasogastric probe was removed immediately after the surgery and the abdominal drain was removed on the second

postoperative day. The patient was discharged from the hospital on the third postoperative day with prescribed antibiotic therapy and albendazole. One month after the surgery, an ultrasound examination of the abdomen was performed, as well as the MRCP examination three months after the surgery, and both showed regular findings.

The report was approved by the institutional ethics committee, and written consent was obtained from the patient for the publication of this case report and any accompanying images.

DISCUSSION

Katkhouda was the first who described laparoscopic echinococcal cyst surgery in the liver in 1992 [6].

The goal of hepatic cystic hydatid disease surgery is to eliminate parasites, to prevent the onset of disease recurrence, and to reduce complications and morbidity to a minimum.

A good preoperative imaging technique largely indicates possible complications (e.g. the existence of a cystic-biliary fistula), as well as the decision of the type of surgery planned [7].

An insight into the expert literature here raises the question of the scope of surgery required to achieve the desired goal. Thus, there are two modalities in the surgical management of hepatic hydatid disease: conservative and radical. The choice of surgical treatment depends on the number, localization, diameter, and complexity of echinococcal cysts, as well as on the characteristics of the patient (age, comorbidities) and the experience of the surgeon.

A conservative surgical procedure is a partial pericystectomy with the removal of the roof of the echinococcal cyst and its contents (germinative membrane and daughter cysts) and placement of part of the large omentum in the cyst cavity (omentoplasty). This is an easier and simpler procedure, which is generally sufficient to deal with hydatid liver disease.

Radical surgical procedures represent two types of surgery: total pericystectomy with echinococcal cyst removal in its entirety, and the other is liver resection.

Indications for surgery are mainly echinococcal cysts type II and III, according to Garby's classification, although some authors include type IV, as well as uncomplicated large-sized cysts that compress the surrounding organs, cysts in which the percutaneous treatment is not possible (cysts at risk of spontaneous or traumatic ruptures due to hanging localization on the liver surface, or infected cysts) [8].

According to current literature data, about 10% of cases remain diagnostically unrecognized disease [9].

It is considered that cysts smaller than 5 cm in diameter can be treated by an interventional radiologist under the control of the ultrasound if the cysts are easily accessible (PAIR: puncture, aspiration, injection, and reaspiration procedure). Although this is a less invasive procedure, it also carries some possible complications such as the existence of cystic-biliary fistula after the intervention [10]. Larger diameter cysts are those that are indications for surgical treatment, as well as those which are more difficult to access.

An indication for surgical resolution of an echinococcal cyst (rather than PAIR) is certainly a preoperatively NMR suspected cystic biliary fistula. Its resolution depends on the size and localization of the cyst and the experience of the surgeon. The fistula is usually identified intraoperatively by inspection, after evacuating the cyst contents and placing of white, clean gauze in the cavity of the cyst, after which the biliary content (bile) is observed on the gauze. Cystic-biliary fistula can be identified by intraoperative cholangiography, or by the white leakage test. Surgical resolution after identification of the fistulose orifice is by suture. ERCP is a method that also may help to resolve the fistulous opening [11]. In clinical practice, ERCP is used for preoperatively diagnosed echinococcal cyst rupture into the biliary tract, where the hydatid content (cyst daughter) is seen in the bile ducts, or postoperatively in cases complicated with biliary fistulas or jaundice. In suspected minor cystic-biliary fistula, there is still controversy about routine preoperative ERCP with sphincterotomy [12].

With the new era that began with the first successful laparoscopic surgery due to hepatic echinococcal cysts, a new period begins with more published series and surgeons mastering the technique. However, the curve of learning and accepting the laparoscopic technique is a long process. With the advancement of the technique, the innovation of instruments and the experience of surgeons, radical laparoscopic surgical procedures, such as pericistectomies and hepatectomies for hepatic hydatid disease in selected cases, are

beginning to be reported, with diminishing morbidity and with all the benefits of laparoscopic surgery in the form of faster recovery. Several comparative papers have been published concerning the differences between laparoscopic and classical-open surgery. The results are generally similar, although laparoscopic surgery is preferred because of slightly lower morbidity, in selected cases of course. The surgical approach, as well as the treatment of patients with hepatic hydatid disease, should be individual and tailored to each patient individually, and thus laparoscopic surgery will be of increasing use [13].

Laparoscopic surgery, as a superior approach in resolving echinococcal cysts, is particularly preferred for cysts that are more accessible in the II, III, IVb, V, and VI segments of the liver [14].

Indications for laparoscopic echinococcal cyst surgery are, according to some authors, cysts up to 14 cm in diameter, as well as their availability, that is accessible localization. In these cases, the laparoscopic approach is superior. Also, the existence of a cystic-biliary fistula can be resolved laparoscopically by sutures or clips [13, 15, 16].

According to guidelines, laparoscopic surgery provides a safe and effective approach for almost all types of hepatic hydatid cysts.

This paper demonstrates that laparoscopic surgery for hepatic echinococcal cyst is safe to perform. It is recommended that the white gauze soaked in scolicid agens stands in the cavity of the echinococcal cyst for minimum 5 minutes after pericystectomy. Existence of cysto-biliary fistula can be confirmed by gauze colorisation by bile. We also believe that it is desirable to place an omental patch in the cavity of the cyst as it may prevent abscess formation.

Conflict of interest: None declared.

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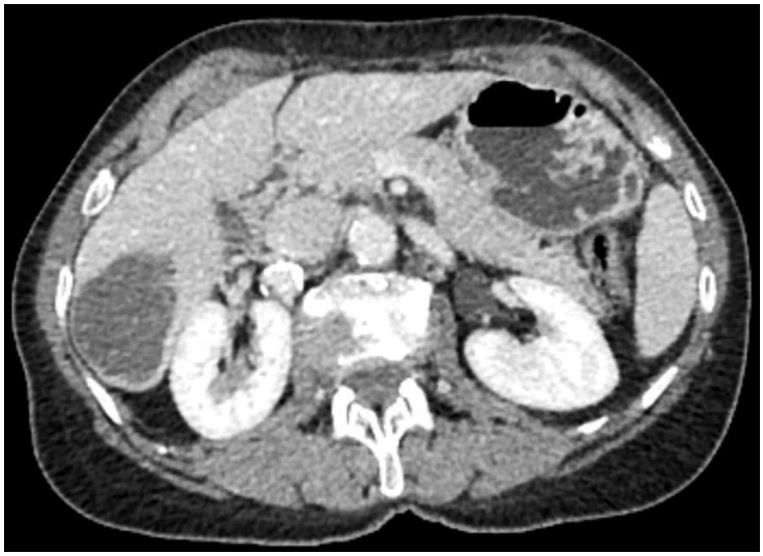

Figure 1. Abdominal CT scan showing a hydatid cyst in segment VI of the liver

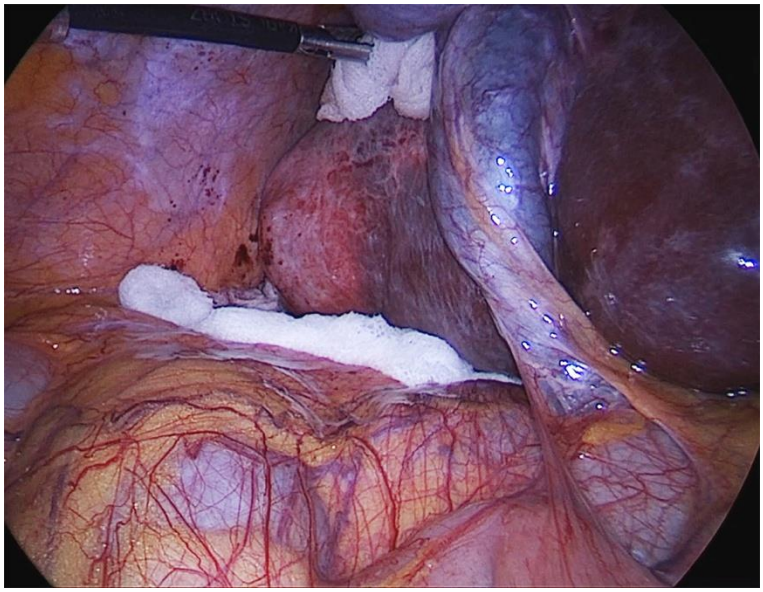

Figure 2. Right lobe of liver pulled up with forceps; gauze soaked with scolicidal solution used for operative field packing and also as protection of instrumental liver injury

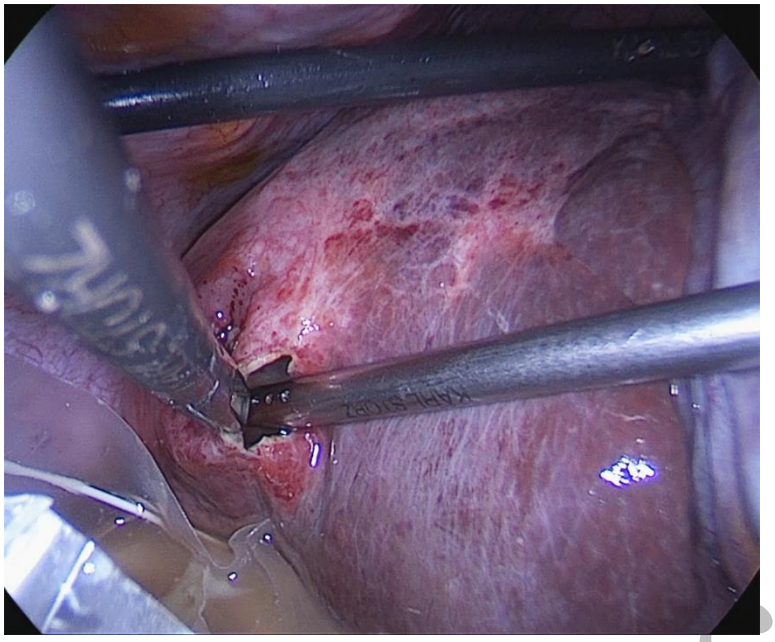

Figure 3. Aspiration of the cyst content

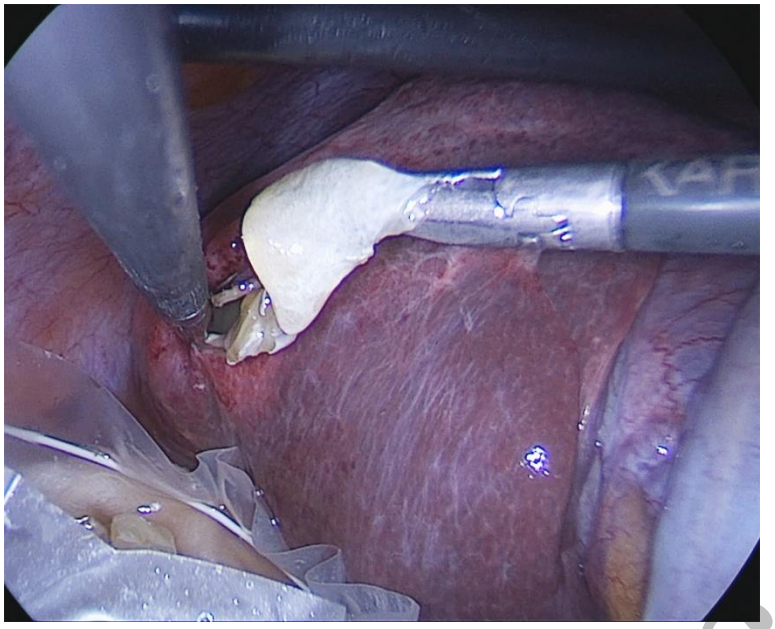

Figure 4. Evacuation of the daughter cysts in to the bag

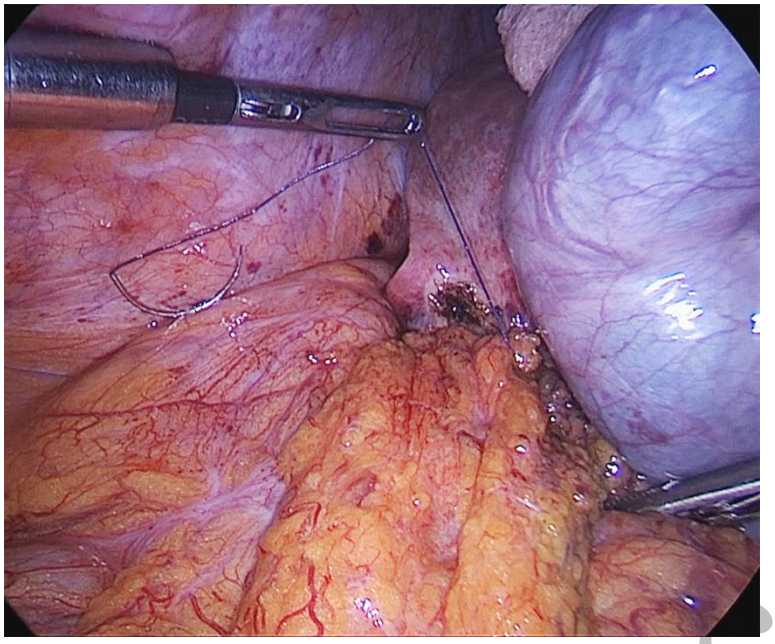

Figure 5. Omentoplasty – omental patch placed in the cyst cavity

