



CASE REPORT / ПРИКАЗ БОЛЕСНИКА

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

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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

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 the liver (70–80%) and lungs (10–25%), while rarely, in about 5% of cases, it can be found in the spleen, kidneys, mesentery, pancreas, brain, heart, muscles and skeleton [2].

Echinococcus granulosus 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, clinical status, and clinical testing (X-ray, ultrasound, nuclear magnetic resonance, computed tomography, laboratory analyses, and serological tests for the presence of anti-*E. granulosus* antibodies by ELISA test) are also important [1]. The disease is mainly diagnosed incidentally [3].

It is treated with albendazole preoperatively, and also postoperatively, then surgically, as well as with the aspiration of the cyst and injection of scolecid (PAIR: puncture, aspiration, injection, and reaspiration procedure method) in cysts smaller than 5 cm in diameter, in patients who refuse surgery, or have contraindications to surgery due to other comorbidities. Some papers also describe the thermal destruction of echinococcal cysts by using the radiofrequency ablation [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 undergoing 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 Katkhouda in 1992 [6].

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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, who was radiologically diagnosed in May 2019 with the hepatic echinococcal cyst, 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 multidetector computed tomography examination confirmed an echinococcal cyst sized 58 × 51 × 42 mm in the sixth liver segment, which is slightly larger compared to the previous finding of three months prior (Figure 1). The ultrasound examination verified the echinococcal cyst type III according to the Gharbi classification. Serological tests for the presence of anti-*E. granulosus* antibodies performed by ELISA test were positive.

Due to the radiological (multidetector computed tomography) progression in echinococcal cyst growth, with positive serological blood analyzes, 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 sixth 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 scolicedal 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

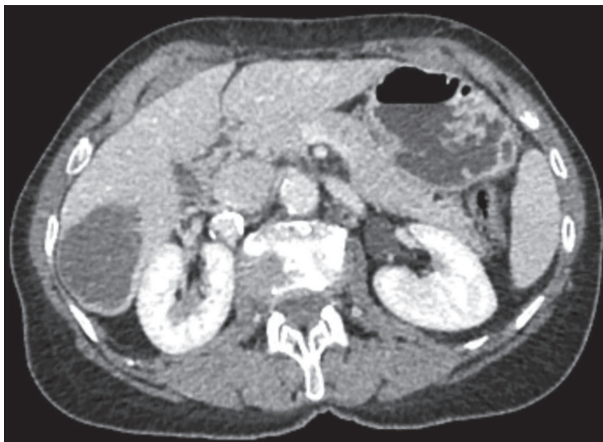


Figure 1. Abdominal computed tomography scan showing a hydatid cyst in segment VI of the liver

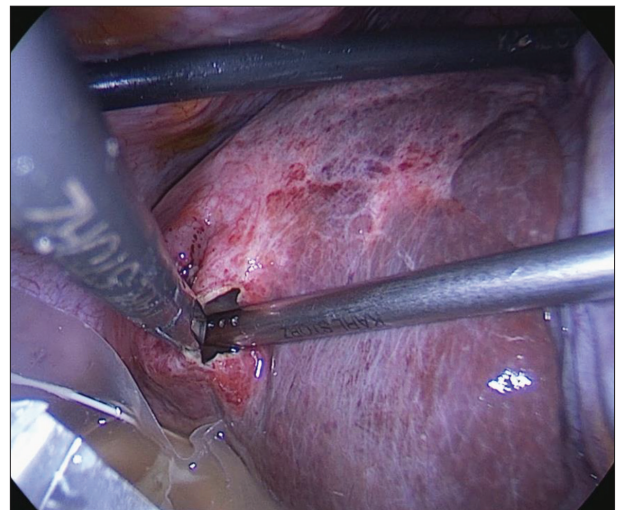


Figure 3. Aspiration of the cyst content

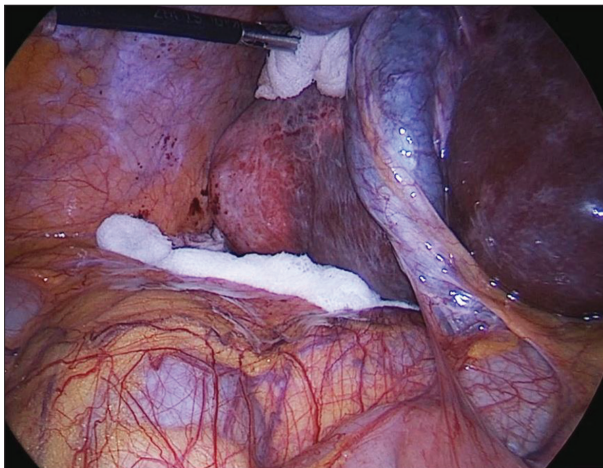


Figure 2. Right lobe of the liver pulled up with forceps; a gauze soaked with scolicedal solution used for operative field packing and also as protection of instrumental liver injury

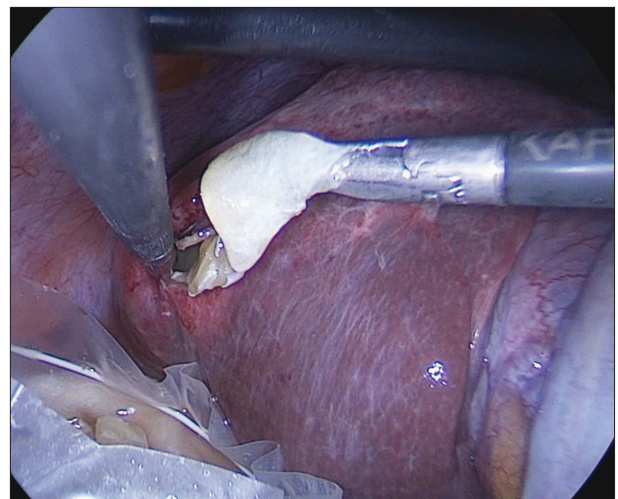


Figure 4. Evacuation of the daughter cysts into the bag

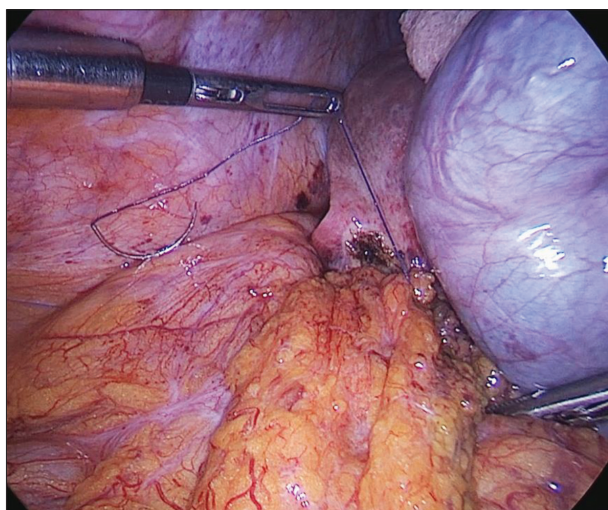


Figure 5. Omentoplasty – omental patch placed in the cyst cavity

(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 magnetic resonance cholangiopancreatography examination three months after the surgery, and both showed regular findings.

This paper was approved by the institutional Committee on Ethics, and written consent was obtained from the patient for the publication of this case report and any accompanying images.

DISCUSSION

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

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 Gharbi'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 the 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 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 nuclear magnetic resonance suspected cystic biliary fistula. Its resolution depends on the size and localization of the cyst, as well as the experience of the surgeon. The fistula is usually identified intraoperatively by inspection, after evacuating the cyst contents and placing of a 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. Endoscopic retrograde cholangiopancreatography is a method that also may help to resolve the fistulous opening [11]. In clinical practice, endoscopic retrograde cholangiopancreatography 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 with complications including biliary fistulas or jaundice. In suspected minor cystic-biliary fistula, there is still controversy about the routine preoperative endoscopic retrograde cholangiopancreatography with sphincterotomy [12].

With the first successful laparoscopic surgery due to hepatic echinococcal cysts, begun a new era, with more series are being published 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 the surgeons, radical laparoscopic surgical procedures, such as pericystectomy and hepatectomy 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 the 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 would be increasingly used [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. In addition, 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 a white gauze soaked in scoliced agents stands in the cavity of the echinococcal cyst for a minimum of five minutes after pericystectomy. Existence of cysto-biliary fistula can be confirmed by gauze colorization 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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Лапароскопски приступ у лечењу ехинококне болести јетре – приказ болесника и преглед литературе

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САЖЕТАК

Увод Цистична ехинокоза 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 болесником старом 67 година, код које је дијагностикована ехинококна циста у десном лобусу јетре, што је и потврђено прегледом мултидетекторском компјутеризованом томографијом абдомена. Болесници је учињена лапаро-

скопска парцијална перицистектомија са оментопластиком. Операција и постоперативни период протекли су без компликација.

Закључак Лапароскопска парцијална перицистектомија је сигуран и ефикасан третман доступних ехинококних цисти јетре. С обзиром на предности 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