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Case Report

Treatment of Pericystic Liver Cavities after Surgical Removal of a Pediatric Giant Echinococcal Cyst - Case Reports and Literature Review

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Abstract

Echinococcus infection is commonly seen in pediatric population and may cause hydatid cysts in the liver. We presented two pediatric patients with giant echinococcal liver cysts. In this review, we aimed analyze large hepatic hydatid cysts (diameter ≥10 cm), giant hydatid cysts in terms of diagnosis, treatment, complications and treatment of pericystic residual cavity.

Keywords: Giant; Residual; Cavity; Echinococcus; Pediatric

Introduction

Echinococcus infection is commonly seen in pediatric population and may cause hydatid cysts in the liver. This infection is an important public health problem in the Mediterranean countries and even in Bosnia and Herzegovina A hydatid cyst is produced from hepatic hydatidosis, a parasitic disease caused by the cestoda Echinococcus granulosus [1,2]. Hydatid cyst are mostly seen in the liver (70%) in humans [3,4]. Because hydatid cysts are generally asymptomatic, diagnosis often comes late, usually not until the cyst grows and increases in diameter. Significant complications are associated with giant Hydatid cyst, such as the cyst's penetration into other organs, cholangitis and anaphylactic shock. High morbidity and mortality may result from these complications [5-7]. In this review, we aimed analyze large hepatic hydatid cysts (diameter ≥10 cm), giant hydatid cysts in terms of diagnosis, treatment, complications and treatment of pericystic residual cavity. Accurate diagnosis and radical surgical resection with pre- and postoperative mebendazole led to a successful cure [8-10]. We will present two patients with giant cyst treatment and successful treatment of large residual liver cavities.

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Case Report I

A 7-year-old girl was hospitalized at the Gastroenterology Department of the Pediatric Clinic in the period for diagnostic purposes (lab. findings, ultrasound and MRI of the abdomen), and for changes in the liver in the form of cystic formations. For the past two years, the girl has pain under the right costal arch during physical activities, she has afebrile. Abdominal ultrasound and abdominal MRI showed liver enlargement, AP diameter of the right lobe measures about 11.2 cm, in CC projection 17.1 cm, parenchyma is inhomogeneous with separation of 4 larger, clearly demarcated, round / oval areas, easily wavy contours, of which is the largest localized in segments VII and VIII with a diameter of about 7.8 cm × 8.8 cm, protrudes beyond the cranial contour of the liver and easily protrudes the right hemidiaphragm. In the ventral aspect of the V segment, the dimensions are 5.2 cm × 3.4 cm, and in the VI segment it measures about 5.1 cm × 5.3 cm, the smaller part of which protrudes beyond the contour of the liver, of which it moderately compresses the gallbladder in the VI segment. In segment II, the area measures 5.4 cm × 6.2 cm and is easily propagated towards the border of the lobes. All changes in the T1 sequence are presented in the hyposignal, in the T2 sequence in the hypersignal and in the post-contrast sequences there is no increase in the signal intensity of the same. Apart from the described areas, other focal changes on the liver parenchyma are not observed. There is no dilatation of the intrahepatic bile ducts and there is no impression that there is communication of cystic changes with the intrahepatic bile ducts. The gallbladder is moderately distended, of adequate wall thickness (Figures 1-3).

The infectologist indicated serological tests: Echinococcus Granulosus Serum (ELISA) IgG 13.3 positive. An infectologist prescribed anthelmintics Albendasol at a dose of 15 mg/kg per day (tablets or syrup) divided into 2 doses, 3 cycles of therapy: one cycle of therapy makes Albendasol 2 × 190 mg 4 weeks then 2 weeks break with B complex. During the break, was performed control of hemogram and hepatogram.

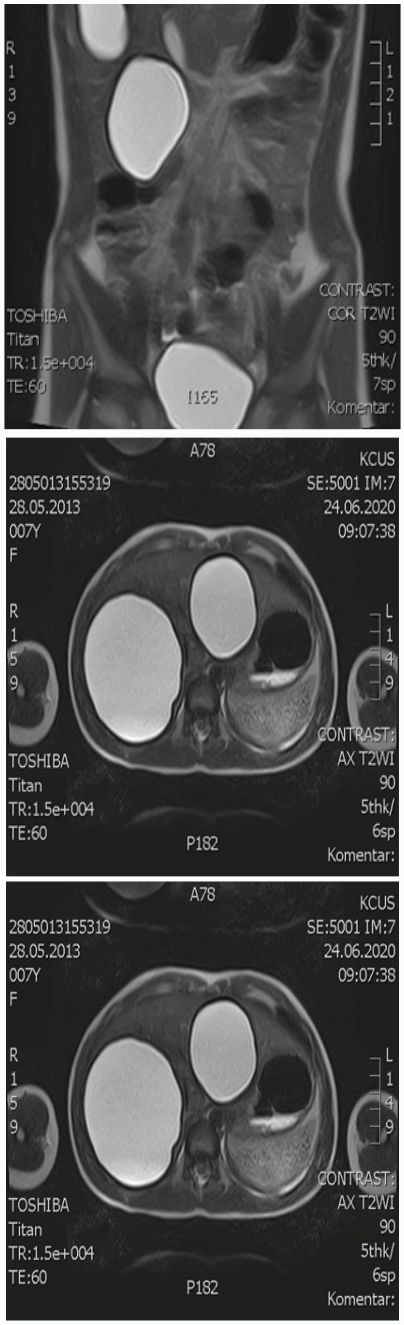

Figure 1,2,3: Abdominal MRI Liver enlarged, AP diameter of the right lobe measures about 11.2 cm, in CC projection 17.1 cm, inhomogeneous parenchyma with separation of 4 larger, clearly demarcated, round / oval areas, easily wavy contours, of which is the largest localized in segments VII and VIII with a diameter of about 7.8 cm × 8.8 cm.

After right subcostal laparotomy and exploration, one on the visceral side of the right liver lobe shows a protruding cyst and the right lobe of the liver, close to the cholecyst, the omentum majus attached to the cyst, then the diaphragmatic side of the right lobe, posterior area and posterior left lobe. Initially, the falciform ligament is dissected and ligated, and the liver is further mobilized by cutting the coronary and right triangular ligaments. The surrounding area around the cyst is fenced with gauze soaked up to 70 ml. 20% NaCl is then instilled on the same needle and allowed to act for a few minutes. The pericyst is then opened and the cyst removed from the cavities, completely. Then a partial pericystectomy is performed, and insight is obtained into the pericystic cavities, which are determined to be dry, no communication with the bile ducts can be seen. The largest cyst is 9 cm in diameter, the others are 5 cm - 6 cm in diameter. During the operation during surgical treatment of the largest cyst, the diaphragm is opened 4 cm - 5 cm, and sutured with return sutures. The postoperative course was satisfactory (Figures 4-11). Antibiotic therapy was prescribed. Control laboratory and radiological findings were satisfactory.

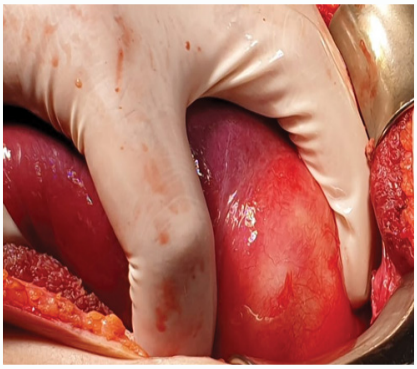

Figure 4: Echinococcus cyst in the right lobe of the liver.

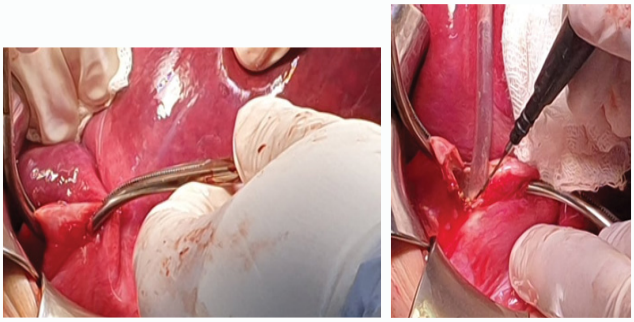

Figure 5,6: Opening of the pericystic wall.

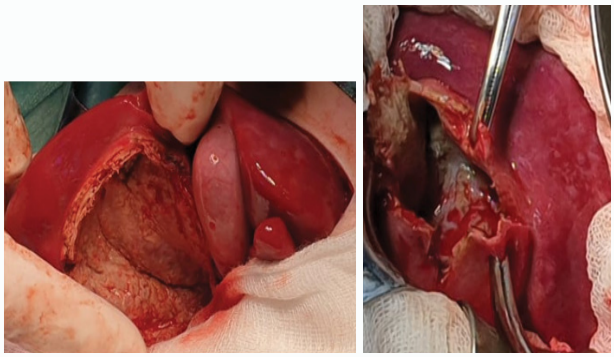

Figure 7,8: Large residual cavities on the visceral and diaphragmatic side of the right lobe of the liver.

Case Report II

A ten-year-old boy first came to our Clinic for pain in the right subcostal region, he did not vomit, he was afebrile, had normal stool. Physical examination: Abdomen is below the plane of the thorax of the soft abdominal wall, with pain below in the right subcostal region on deep palpation. Laboratory tests: WBC=13, CRP 52. Ultrasound and abdominal CT with contrast: Examination was done natively and after application of contrast per os and i.v. *via* the port phase with

Figure 9: Four (4) endocysts.

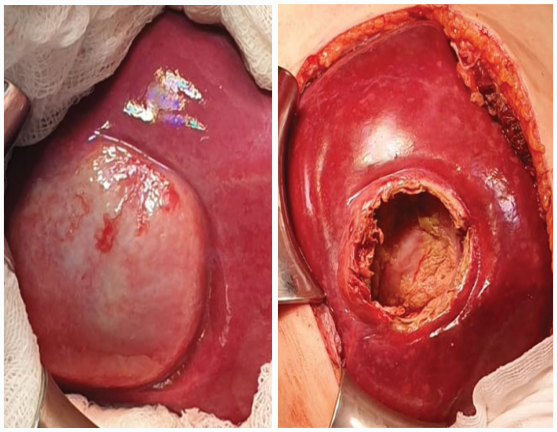

Figure 10,11: Echinococcal cyst of the diaphragmatic side of the liver before and after removal.

a pediatric protocol. CT scans of the liver showed easily enlarged, inhomogeneous parenchyma with visible two cystoid formations larger in the left lobe of segment III and with propagation in segment II with a diameter of 94 mm, smaller in the right lobe of segment V with propagation and segment VI with a diameter of 46 mm and the smaller cyst also contains delicate calcifications in the wall. In segment IV b medially subcapsular millimeter calcification. Gallbladder was with normal CT characteristics. The biliary ducts are not dilated. The enlarged left lobe of the liver compresses and dislocates the stomach to the left, and easily compresses the trunk of the pancreas (Figure 12).

The infectologist indicated radiological and serological tests and then administered, and started the therapy according to the Albendazole tbl 2 × 200 mg protocol for 28 days.

After adequate preoperative preparation and performed protocol with Albendasol, which was excluded as completed 1 cycle 4 days before the surgery. A surgical procedure was performed, on which occasion two cysts were found, one 46 mm in size, a pericystectomy was performed in the I/VI segment of the liver, as well as one larger 96 mm, which occupies the complete left lobe of the liver, the size of a smaller ball. The cystic contents were first aspirated and then scolicidal agents were applied. The pericystic wall was opened, the endocyst removed, a partial resection of the pericystic cavity was performed, which accompanied by careful hemostasis. The pericystic cavity was open after inspection for small bile ducts (Figures 13-15).

Postoperative treatment was satisfactory. The infectologist prescribed the second cycle of Albendasol to start the same day, with triple antibiotic therapy the boy was in good general condition throughout the stay, afebrile, begins per os intake that tolerates, peristalsis was normal. Abdominal tube was removed fifth day. Boy was in well general condition. On the 12th day after the operation, laboratory findings were checked. Surgical sutures were removed, antibiotic therapy was excluded, except Albendasol. A control ultrasound performed showing cystic changes corresponding to after surgery condition and left pleural effusion. An X-ray of thorax performed and it was a normal. The boy was discharged home with the recommendation to contact the Infectious Diseases Specialist to continue the Albendasol protocol and our control in 7 days.

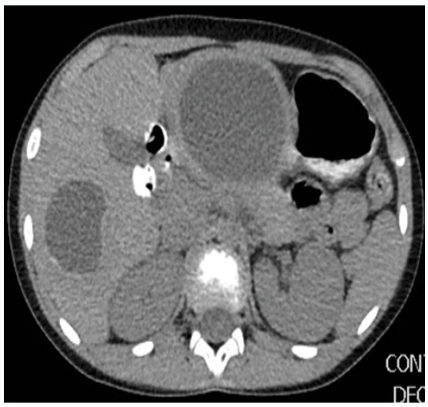

Figure 12: CT scans of the liver easily enlarged, inhomogeneous parenchyma with visible two cystoid formations larger in the left lobe of segment III and with propagation in segment II with a diameter of 94 mm, smaller in the right lobe of segment V with propagation and segment VI with a diameter of 46 mm.

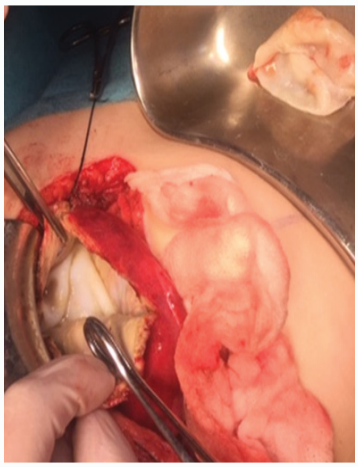

Figure 13: Pericystic cavity with endocyst.

Discussion

The treatment options for hydatid cyst of the liver depend on stage, localization, size and complications of the cysts, and include non-operative and operative methods [11]. Operative methods include classical surgical techniques (total or subtotal cyst-pericystectomy, partial hepatectomy, capsulorrhaphy, capitonnage, omentoplasty); minimally invasive techniques, such as laparoscopic or robotic

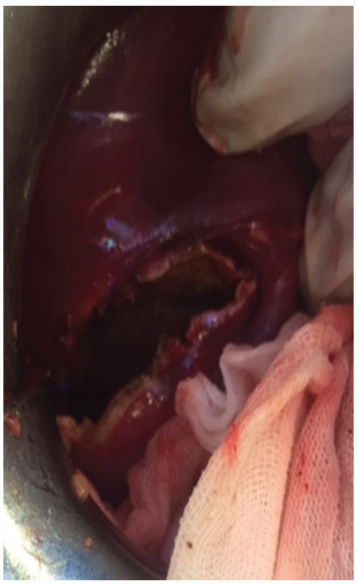

Figure 14: Pericystic cavity after endocyst removal.

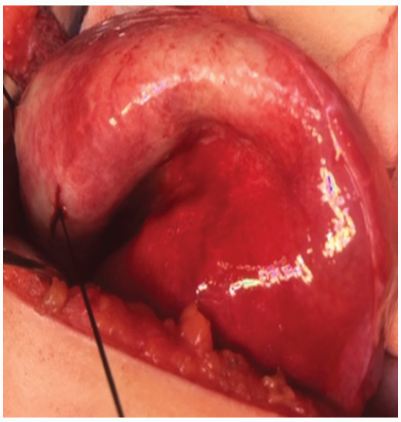

Figure 15: Pericystic cavity after fluid aspiration.

procedures; and other treatment modalities, such as puncture, aspiration, injection and respiration of scolicidal solutions. When used alone, chemotherapy with anthelmintics has limited efficacy. This treatment outcome is better when used as an adjunct to surgery to prevent recurrence [12]. Indications for surgery are the following: active cyst, complicated cyst (infection, compression and obstruction), cyst located near vital organs (central nervous system, spinal cord and heart) and giant cyst at risk of rupture in pleural and/or abdominal cavities. Radical surgical resection remains the mainstay of curative treatment and an accurate preoperative localization is essential [13,14]. Hepatic HD may use two common routes of exophytic growth: the bare area of the liver and the gastro hepatic ligament. Growth through the bare area leads to involvement of the diaphragm and extension into the thorax; growth through the gastro hepatic ligament appears to be the path by which the cyst reaches the stomach. In our case, the giant size cyst involve of the diaphragm. For these reasons, we believe that MRI is mandatory in the case of a complex hydatid cyst.

The management of the residual cavity is a challenging problem especially in patients who present with giant hydatid cysts, as in this case. Cyst size has been identified as a significant predictor of morbidity and mortality [15], and large residual cavities are associated with an increased infection risk. Alternatives include hepatic resection, pericystectomy, partial cystectomy combined with omentoplasty, suture obliteration (capitonnage), introflexion, cystojejunostomy, marsupialization, external drainage, and primary closure after installation of saline solution. A technique has been reported earlier by Losanoff et al. [16] safely used sandwich technique (which preserves the liver parenchyma) in 8 patients to close giant cyst cavities between 1993 and 2000. In this study, there were no reports of sepsis, postoperative bile leak, or other complications. Dead spaces were filled with pedicled omentum. If omentum is not available, gelatin sponges may be used prior to suture. Capitonnage and additional placement of the suture through the pericystic wall of the cavity in order to reduce the cavity can lead to complications such as hematobilia, bleeding, bile leakage, the formation of abscess formation. Also, cavity drainage and omentoplasty prolong the length of surgical treatment with possible complications. Ezer et al. [17] used a similar technique called 'sandwich method' for the obliteration of a large dead space following the removal of a giant cyst. Percutaneous drainage has been reported in the management of giant hydatid liver cysts [18,19]. This method was not considered because the cyst was multi vesicular containing several daughter cysts, whereas the cyst con-tent was likely undrainable. Men et al. [18] performed percutaneous treatment in 13 giant liver cysts which were all univesicular with pure fluid content. They concluded that the approach was effective as it resulted to the elimination of the parasite and the mass effect and alleviation of symptoms. However, the procedure was associated with a long catheterization time. Thus, we performed partial pericystectomy without treatment of residual pericystic cavity. We find that active treatment of pericystic residual cavities is unnecessary. We believe that pericystic cavities can drain on their own and that the contents left behind can be resorbed.

Conclusion

1. The management of the residual cavity is a challenging problem especially in patients who present with giant hydatid cysts.
2. Capitonnage and additional placement of the suture through the pericystic wall of the cavity in order to reduce the cavity can lead to complications such as hematobilia, bleeding, bile leakage, the formation of abscess formation.
3. Our recommendation is that active treatment of pericystic residual cavities is unnecessary because it can drain on their own and that the contents remaining in the residual cavity can be completely resorbed.

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