

TRANSTHORACIC APPROACH TO HYDATID CYSTS IN THE DOME OF THE LIVER

KARACİĞER KUBBESİNDEKİ HİDATİK KİSTLERE TRANSTORASİK YAKLAŞIM

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ABSTRACT

INTRODUCTION: To determine the feasibility of transthoracic approach to the liver hydatid cysts which are located on the dome of the liver and difficult to approach from abdomen.

MATERIAL AND METHODS: A total of 10 liver hydatid cyst cases without thoracic involvement, who were operated by a transthoracic approach (5 male, 5 female), were evaluated retrospectively and the results are reviewed in the light of the relevant literature.

RESULTS: The mean age was 37.7 years (range 16-52 years). One female had 3 cysts, 1 had 2 cysts, and a solitary cyst was present in the remaining patients. All patients were operated on transthoracally. The postoperative course was uneventful in all patients except the 1 case that had 3 hydatid cysts, which was complicated with prolonged drainage from the chest tube. This drainage decreased gradually over 20 days and the chest tube was removed on the postoperative 21st day. The average hospital stay was 9.4 days (range, 6 - 24 days).

CONCLUSION: Hydatid cysts located in the dome of the liver were safely operated on using a transthoracic approach and no serious complications were encountered. It was concluded that if the abdominal approach seems to be difficult, a transthoracic approach should be preferred in order to obtain the hydatid cyst safely and without difficulty.

Key words: Hydatid cyst, transthoracic approach, liver, complication

ÖZET

GİRİŞ VE AMAÇ: Karaciğer kubbesinde yerleşen ve abdominal yolla ulaşılması zor olan karaciğer kist hidatiklerinde, transtorasik yolla yapılan ameliyatlara uygulanabilirliğinin değerlendirilmesi amaçlanmıştır.

MATERYAL VE METOD: Transtorasik yaklaşımla ameliyat edilen toplam 10 hasta (5 erkek ve 5 kadın) retrospektif olarak değerlendirilmiş ve sonuçlar güncel literatür eşliğinde tartışılmıştır.

SONUÇLAR: Hastaların ortalama yaşı 37.7 yıl idi (16-52 yıl). Kadın hastalardan birinde 3, birinde 2 ve üçünde birer kist vardı. Erkek hastaların hepsinde birer tane kist mevcuttu. Tüm hastalar transtorasik olarak ameliyat edildi. Hastalardan 9 tanesi ameliyat sonrası dönemde sorunsuz takip edildi. Karaciğerinde 3 kisti olan kadın hastada göğüs tüpünden uzamış drenaj oldu. Drenaj 20 gün içinde azaldı ve ameliyat sonrası 21. Gün göğüs tüpü çekildi. Ortalama hastanede kalış süresi 9.4 gün idi (6-24 gün)

TARTIŞMA: karaciğer kubbesinde yerleşik kist hidatikler transtorasik yolla güvenle ameliyat edilmiş ve ciddi bir komplikasyon gelişmemiştir. Karaciğer kubbesinde yerleşik kistlerde, transabdominal yaklaşımın zor olacağı düşünülen vakalarda, kist hidatiğin güvenle ve daha kolay şekilde ameliyat edilebilmesi için transtorasik yaklaşımın tercih edilmesi gerektiğini düşünüyoruz.

Anahtar kelimeler: Kist hidatik, transtorasik yaklaşım, karaciğer, komplikasyon

INTRODUCTION

Human hydatid disease is caused by the larval form of the tapeworm genus *Echinococcus*. The most common form, cystic hydatid disease, results from infection with *Echinococcus granulosus*. Hydatid disease continues to be endemic in Mediterranean countries, the Middle East, the Far East, and South America, but it has a worldwide distribution because of travel and migration. Although hydatid disease can develop anywhere in the human body, the liver is the most frequently involved organ (52%–77%), followed by the lungs (10%–40%) (1).

Three therapeutic modalities for treatment of hepatic cystic echinococcosis are chemotherapy, surgery, and percutaneous drainage. Management of hydatid cysts in the liver typically involve a surgical approach. Since the advent of drug therapy effective against *Echinococcus* species, the use of pre- and postoperative chemotherapy with albendazole or mebendazole combined with percutaneous drainage (PAIR-puncture, aspiration, injection, and re-aspiration) of hepatic hydatid cysts is now widely advocated (2,6).

The liver is the organ most often affected by hydatidosis.

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Hydatid cysts located over the posterior aspect of the right lobe of the liver are problematic in respect of providing the most effective, safest surgical therapy for the disease, even for surgeons experienced in approaching this area. Hydatid cysts located in this area can be managed with a transthoracic or transabdominal approach (7). A total of 10 liver hydatid cysts without thoracic involvement are here presented, that were operated on with a transthoracic approach in our hospital and the literature about this approach is reviewed.

MATERIALS AND METHODS

A total of 10 cases of hydatid cyst located in the dome of liver were operated on using a transthoracic approach. The patients comprised 5 males and 5 females with a mean age of 37.7 years (range, 16-52 years). One female had 3 cysts, 1 had 2 cysts, and a solitary cyst was determined in the remaining patients. All cysts were diagnosed by ultrasonography. Computed tomography (CT) was applied to the abdomen to evaluate the nature and exact location of the cyst in order to plan the surgical approach (**Figure 1**). Thoracic CT was applied to assess the presence of thoracic hydatid cysts. The diameters of the cysts ranged between 6 and 18 cm. All operations were primary.



Figure 1. Intraoperative view of hydatid cyst in the dome of the liver.

All patients were operated on transthoracally. The thoracic cavity was entered through the right seventh or eighth intercostal space. The cysts were palpated and the hemidiaphragms were incised adjacent to the underlying echinococcal cyst radially from medial to lateral. The area around the cysts was covered with hypertonic saline (15%) soaked gauzes to prevent spillage of the cyst contents (**Figure 2**). In the patients that had more than one cyst, incisions were performed in accordance with radiological findings and incisions located in the dome of the cysts were preferred. The cysts were punctured and approximately 50 cc of cystic content was removed. Then hypertonic saline was injected into the cysts and left there for 15 minutes.



Figure 2. Thoracic CT showing a giant hydatid cyst in the dome of the liver.

After evacuating the cystic content, partial cystectomies without capittonage were performed except in patients with multiple cysts. Capittonage was performed in these patients. The cavities were explored for any communication with the biliary tract. If such a communication was present, this opening was sutured. The residual cavities were drained with a sump drain that was externalized through the abdominal wall. The incised hemidiaphragms were closed with 1-0 prolene interrupted sutures. The thoracic cavities were closed after inserting closed chest tube drainage. When the drainage from the chest tube and the sump drain was less than 50 cc/day, they were removed. Pathological examinations confirmed the diagnosis of hydatid cyst in all patients. No problem was encountered during the operations. Moreover, if present, adhesiolysis was performed safely and without difficulty.

RESULTS

The postoperative course was uneventful in all patients except the one with 3 hydatid cysts. That case was complicated by prolonged drainage from the chest tube. This drainage decreased gradually over 20 days and the chest tube was removed on the postoperative 21st day. The average hospital stay was 9.4 days (range, 6 - 24 days). There were not any mortality during the hospital stay and early postoperative period. Six of the patients (4 men and 2 women) were followed for one year after the operations. We could not communicate with other patients mostly because of they had come from other cities. Long term follow up of the patients were not remarkable. We did not observe any complication or recurrence.

DISCUSSION

Classification of hydatid cysts is based on ultrasonography (US) images, and CT yields additional information. CT provides information equivalent to that derived by US, but it shows the location and depth of the cyst within the liver more accurately. Computed tomography is essential for planning the surgical

treatment. Although magnetic resonance imaging (MRI) yields good structural details of the hepatic hydatid cyst, it does not add additional information in hepatic lesions (1,2). In the current study, abdominal ultrasonography and tomography were preferred for diagnosis of the patients.

The ideal treatment for hepatic hydatid disease should completely eliminate the parasite and prevent recurrence of the disease with minimum morbidity and mortality. There are three available therapeutic modalities for hepatic hydatid cysts; systemic chemotherapy, surgery, and PAIR, the treatment known as "puncture, aspiration, injection, reaspiration". Selection of the most appropriate treatment for hepatic hydatid cysts depends on the health of the patient, the nature of the cyst(s) considering number, size, location, and presence of complications, and the resources and expertise of the therapeutic team (1,2).

The goals of surgery in hydatid disease are to inactivate the cestode parasites, evacuate the cyst cavity, remove the germinal layer, and obliterate the residual cavity. Surgical interventions consist of conservative, radical and laparoscopic approaches. Conservative techniques involve simple tube drainage, cystotomy, marsupialization (i.e. surgical exteriorization of a cyst by resection of the anterior wall and suture of the cut edges of the remaining cyst to the adjacent edges of the skin, thereby establishing a pouch of what was formally an enclosed cyst), capitonnage (i.e. surgical closure of a cyst cavity by applying sutures so as to cause approximation of the opposition surfaces), deroofting and partial simple cystectomy with or without omentoplasty. Radical procedures include total pericystectomy, enucleation, partial hepatectomy, or lobectomy (3). In the last decade, there has been a shift towards radical surgical procedures because they appear to result in fewer postoperative complications, fewer relapses, and lower mortality than conservative techniques. Laparoscopic drainage of hepatic hydatid cysts is a 'minimally invasive' surgical technique that appears safe and effective (6). In the current study, partial cystectomy without capitonnage was applied to all the patients with a solitary cyst and capitonnage was performed in the patients with multiple cysts. Since the expected complication and recurrence ratios of multiple cysts are higher, we preferred the capitonnage in order to reduce the residual volume and possible complications.

Although two approaches are recommended for the surgical treatment of cysts located over the right posterior aspect or on the dome of the liver: transthoracic or transabdominal, there is a lack of consensus on whether transthoracic or transabdominal approach is the better one. Hydatid cysts located on the VIth, VIIth, and VIIIth segments of the right lobe can be reached by the transthoracic approach (4). Athanassiadi et al had recommended thoracotomy instead of laparotomy for hydatid cysts located on the dome of liver

(subdiaphragmatic) without pulmonary involvement (5). The transthoracic approach through the right seventh or eighth intercostal space was the approach of choice in the past and still is for many surgeons. On the other hand, the transabdominal approach has recently been gaining support among surgeons and seems to be replacing the transthoracic approach (4). Thoracoabdominal approach is another surgical way of choice especially for the large posterosuperior cysts. But this surgical technique has some problems including lung complications such as atelectasis, increased morbidity due to the excess scar and increased post operative pain (3).

The transthoracic approach is the preferred approach in single-stage operations for right lung and liver and in patients with hydatid disease of the liver with thoracic involvement and hepatobronchial fistula caused by hydatid disease (7-10). This approach has also been performed for hepatectomy of Couinaud's segments VII and VIII (11).

Many of the hydatid cysts located over the right superior-posterior aspect of the liver or in patients with multiple laparotomies who need a reoperation for recurrent disease and a cyst that is adhered to the right hemidiaphragm can only be approached from above (12). Kouraklis et al reported an alternative approach for the surgical management of hydatid cysts located to this part of the liver (12). They performed the operation from a right lateral thoracotomy and concluded that this approach offered better exposure of the cyst located on the superior-posterior aspect of the liver, offering the possibility of easier technical performance of a partial cystectomy or total pericystectomy. They created a prolapsus of the right hemidiaphragm into the residual cavity of the cyst. The cavity was partially stuffed with the edges of the right hemidiaphragm. It was reported that the diaphragm with its excessive absorptive capacity could then fulfill the same role as the omentum (12).

Smyrniotis et al. (4) compared the transthoracic and transabdominal approaches for echinococcal cysts located over the superoposterior aspect of the right lobe of the liver. The transthoracic approach was found to be associated with more morbidity than the transabdominal approach. The postoperative complications were more frequent and of greater severity in the patients operated on transthoracally than in the group operated on transabdominally. The most serious complications observed with the transthoracic approach were associated with the respiratory tract and included atelectasis, pneumonia, chest empyema, and bronchobiliary fistula. On the other hand, cutaneous biliary fistulas and subdiaphragmatic collections constituted the major complications associated with the transabdominal approach. The hospital stay was much longer in patients operated on transthoracally. The authors concluded that the transabdominal approach was the approach of choice for surgical treatment of a

liver hydatid cyst, irrespective of its location, together with markedly fewer postoperative complications and a shorter hospital stay than the transthoracic approach. Transthoracic surgery also helps in preventing injury to abdominal structures during the decompression period of cyst (3). Yazkan et al states that in the patients that have simultaneous right lung and liver dome hydatid cysts, transthoracic approach to them in the same operation is a safe and effective surgical method and prevents the patient from a second surgical procedure (13)

As a result, selection of the proper technique is based on the location and morphology of the echinococcal cyst. Nevertheless, the experience of the surgeon seems to be the most important factor when choosing the technique that achieves the best results with minimal morbidity and mortality. In this series, hydatid cysts located in the dome of liver were operated on using the transthoracic approach safely and no serious complications were encountered. It can be concluded that if the abdominal approach seems to be difficult, the transthoracic approach should be preferred to safely remove the hydatid cyst without difficulty.

Conflict Of Interest: The authors have no conflict of interest.

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