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Late ultrasonographic findings in cases operated for hydatid cyst of the liver

Adil Ozturk [a,*], Ebru Ozturk [b], Fadile Zeyrek [c], Ocal Sirmatel [a]

[a] *Department of Radiology, Harran University School of Medicine, Arastirma ve Uygulama Hastanesi, TR-63100 Sanliurfa, Turkey*
[b] *GAP EMAR Merkezi, Sanliurfa, Turkey*
[c] *Departments of Microbiology, Harran University School of Medicine, Sanliurfa, Turkey*

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Abstract

Purpose: The aim of this study was to evaluate and present the images due to surgical intervention and to recurrences in patients who had been operated for hydatid cyst of the liver at least 12 months prior to the imaging process.
Material and methods: A total of 77 patients (46 females, 31 males) with a mean age of 38 years (10–60 years) who had undergone surgical intervention for hydatid cyst of the liver were included in this study. The type and the number of operations were determined by reviewing previous medical records of the patients. Recurrence findings and postoperative images were examined by ultrasonography in all patients.
Results: Of the 77 patients, 68 had undergone surgical operation for hydatid cyst of the liver for once, six cases for twice, one patient for three and another patient for four times. Ultrasonographic examination was considered normal in 9 (11.6%) patients. The most frequent finding in the remaining patients was hypoechoic ($n = 6$) and anechoic ($n = 14$) images with a hyperechoic periphery within the operation area. While a coarse heterogenous area was visualized in 12 cases (15.5%), a sole hypoechoic image was present in 10 patients. Recurrence was detected in 9 (11.6%) patients of whom 7 were asymptomatic. While daughter cysts were detected in two recurrent cases; the remaining were unilocular cysts. An omentum image extending to the operation area was detected in 11 patients. Calcification was present in 14 patients, whereas four cases had less common findings of anechoic tubular structures adjacent to the operation area.
Conclusion: While the liver may seem normal by ultrasonography in the late postoperative period in patients, who had been operated for hydatid cyst of the liver, various images may also be present. These images may be misinterpreted as recurrence or other pathologies. Thus, the radiologist should be familiar with the postoperative ultrasonographic findings of hydatid cyst and should not misinterpret the image of anechoic fluid as recurrence. When in doubt, ultrasonographic follow-up is essential. An early postoperative ultrasonographic examination may be the key point in precluding a misdiagnosis.

Keywords: Liver; Ultrasonography; Surgery; Hydatid cyst; Postoperative liver; Recurrence

1. Introduction

Hydatid disease is a worldwide zoonosis produced by the larval stage of the tapeworm *Echinococcus* and is a public health problem currently. *E. granulosus* and *E. multilocularis* are the causative agents in hydatid disease. The former is common in the great grazing regions of the world and is the most frequent cause of hydatid disease in humans and its life cycle is well documented [1–3]. Once the parasite passes through the intestinal wall to reach the portal venous or lymphatic system, the liver acts as the first line of defense and is therefore the most frequently involved organ. In humans, hydatid disease involves the liver in approximately 75% of cases, the lung in 15%, and other anatomic locations in 10% [1,2]. Hydatid disease of the liver is most frequently diagnosed during abdominal ultrasonographic (US) examination. Ultrasonography is a noninvasive, easy to handle, sensitive and inexpensive imaging technique. Although the definitive treatment of hydatid disease is medical and/or surgical, cyst

* Corresponding author. Tel.: +90 414 3137168/+90 532 3643242 (Mobile); fax: +90 414 3151181.
E-mail addresses: ozturka26@hotmail.com, adilozturk21@yahoo.com (A. Ozturk).

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drainage by the guidance of US is also used currently. Various operation techniques for the treatment of hydatid disease may be used and recurrence is likely despite surgical intervention.

The classical US findings in hydatid disease are well-defined [4–9]. However, the late US findings in patients who had undergone operation for hydatid cyst of the liver are inadequately described in the literature [3,10,11]. While only 6 patients are presented in a study by Beggs et al., İlter et al. describe 33 cases [10,11]; however the latter study is based predominantly on scintigraphic findings. The present study that involves the larges patient group in the literature to our knowledge aims to evaluate and present the images due to surgical intervention and to recurrences in patients who had been operated for hydatid cyst of the liver at least 12 months prior to the imaging process.

2. Material and methods

A total of 77 patients (46 females, 31 males) with a mean age of 38 years (10–60 y) who had undergone surgical intervention once or for numerous times for hydatid cyst of the liver due to *E. granulosus* were enrolled. Patients who had been operated less than 12 months prior to the US examination were excluded. The type and the number of the operations were determined by reviewing previous medical records of the patients. Recurrence findings and postoperative images were examined by US in all patients. Toshiba SSA-340A device with a 3.5 MHz convex transducer (Toshiba, Tokyo, Japan) was used for the US examinations. To provide better imaging properties patients were examined in a fasting state. In addition to the examination of the liver, other abdominal organs were also examined with regard to the presence of hydatid cyst. Suspected recurrences were re-examined every 6 months.

3. Results

Of the 77 patients, 68 had been operated for hydatid cyst of the liver for once, 6 cases for twice, one patient for three and another patient for four times. Preoperatively, diameters of the cysts were between 3 and 17 cm. Seventy two patients had just one cyst and 5 patients had 2 cysts. 68 of these cysts were visualized at the right and 14 of them at the left side. Thirty patients had undergone cystectomy, 9 partial cystectomy, 26 drainage and 12 marsupialization. Besides, omentoplasty and capitonnage had been peformed in 15 cases. Of the 64 operated patients, 10 had 2, and 1 had 3 cysts. The time from the operation to the US examination varied between 12 months and 15 years.

US examination was considered normal in 9 (11.6%) patients. The most frequent finding in the remaining patients was hypoechoic ($n = 6$) and anechoic ($n = 14$) images with a hyperechoic surrounding, within the operation area (Fig. 1a and b). These pseudocyst images had a thicker and irregular wall formation when compared with recurring cysts in operation area. While a coarse heterogenous area was visualized in 12 cases (15.5%), a sole hypoechoic image was present in 10 patients (Fig. 2a and b). Recurrence was detected in 9 (11.6%) patients; 7 of these were asymptomatic. Four of these cases underwent marsupialization, three patients underwent partial cystectomy and two patients underwent total cystectomy. All of the recurring cysts were smaller than the preoperatively detected cyst. All of the recurring cysts originated from the operation area and the neighboring hepatic tissue was imaged heterogeneously. While daughter cysts were detected in two recurrent cases (Fig. 3); the remaining were unilocular cysts (Fig. 4). An image of omentum extending to the operation area was detected in 11 patients (Fig. 5). While calcification was present in 14 patients (18%) (Fig. 6), four cases had less common findings of anechoic tubular structures adjacent to the operation area (Fig. 7). Color doppler US examination revealed that these structures were not vascularized and they were interpreted to be local dilatations of the bile ducts. Recurrence of hydatid cyst and cavity formation could not be distinguished in 3 patients; follow-up examination of these patients 6 months later revealed that the lesion area had

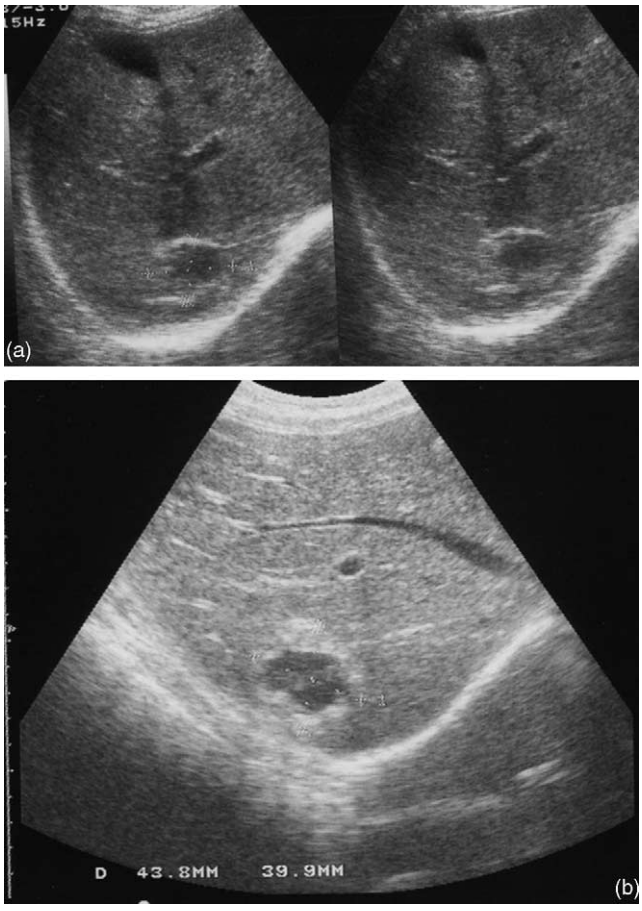

Fig. 1. (a)–(b): Hypoechoic (a) and anechoic (b) images with a hyperechogenic surrounding in the operation area in the liver.