

ORIGINAL ARTICLE

Pitfalls in a Sonographic Diagnosis of Liver Abscess in Children

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Received Jan 11, 2011; received in revised form May 18, 2011; accepted Jun 9, 2011

Key Words

liver abscess;
abdominal
ultrasound;
hepatic tumor;
abdominal
sonography

Background: The purpose of this article is to identify the pitfalls of sonography in the diagnosis of liver abscesses, hematomas, and hepatic tumors, which appear similar and therefore are difficult to differentiate from each other.

Methods: Cases were collected at the China Medical University Hospital between January 2008 and January 2010. Liver abscesses were initially diagnosed by sonograph in selected patients who were younger than 18 years.

Results: There were 15 patients in whom a liver mass was diagnosed by ultrasound, but 6 of them were excluded from further study because of failure to meet any of the screening criteria. Nine patients with a mean age of 11.3 years (range 5–17 years) were initially suspected to have liver abscesses by ultrasound and were enrolled in the study. These nine patients were identified as follows: five with liver abscess, one with liver hematoma, one with hepatic lymphoma, one with perihepatic abscess, and one with undifferentiated liver sarcoma. Ultrasonography alone was sufficient for diagnosis in five patients. Four patients required abdominal CT scanning to confirm final diagnosis.

Conclusion: Different liver lesions may present sonographic images similar to those of liver abscesses. Therefore, it is suggested that patients in whom liver abscesses were diagnosed by ultrasound undergo further evaluation if the clinical condition is less likely.

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Abbreviations: CT, computed tomography; MRI, magnetic resonance imaging; CRP, C-reactive protein; ERCP, endoscopic retrograde cholangiopancreatography; PCD, percutaneous catheter drainage; RUQ, right upper quadrant.

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1. Introduction

Abdominal ultrasound is a common medical procedure to locate abdominal lesions and evaluate gastrointestinal function. Additionally, the procedure will show clear images of the liver. Abdominal ultrasound is used on patients who are clinically suspected of having a liver abscess. The ultrasonic appearance of a typical liver abscess has been described as having the following criteria: acoustic enhancement, abscess wall, peripheral halo, septation, and internal debris.^{1,2} However, some intrahepatic lesions, such as a necrotic hepatic tumor or hematoma, could present with a sonographic appearance similar to that of liver abscess. For this reason, we reviewed nine patients' sonographies with presentations similar to that of liver abscess and attempted to identify the pitfalls by any specific features or methods.

2. Materials and Methods

Between January 1, 2008 and January 1, 2010, a retrospective ultrasound-based study of 15 patients younger than 18 years was conducted. These patients were admitted to China Medical University Hospital with an initial diagnosis of liver mass by sonography.

Liver abscess is screened by using the following criteria: acoustic enhancement, abscess wall, peripheral halo, septation, and internal debris.^{1,2} Six patients were excluded because of failure to meet any of the screening criteria. Nine of 15 patients, on initial suspicion of liver abscess (meeting at least one of the five criteria), were enrolled in our study. Another imaging study was indicated if the patient's clinical course was not compatible with manifestations of liver abscess (Figure 1). In our study, we chose computed tomography (CT) as the secondary screening tool. However, one of the patients in the unconfirmed liver abscess group had been scheduled for serial ultrasonography instead of CT, because his family informed us of the patient's trauma history in time. The clinical characteristics of these nine patients are recorded in Table 1. Results from their imaging studies, microbiologic and pathologic findings, and blood examinations are presented in Table 2. The mean age was 11.3 years (range 5-17 years). An ultrasound machine (HP Sonos 5500, Stockton, CA, United States) was used with gray-scale ultrasound and 3-5 MHz transducers to examine these patients.

3. Results

This series comprised five liver abscesses (Figure 2), one liver hematoma, one hepatic lymphoma, one perihepatic abscess, and one undifferentiated liver sarcoma. In all of these cases, sonographic findings demonstrated various degrees of features of liver abscess, as presented in Table 3. Therefore, the tentative diagnosis of liver abscess was made initially. Fever and abdominal pain were the chief complaints (77.8%). Confirmed diagnoses needed to be further proved by CT in cases 5, 6, 7, and 9 due to unusual clinical presentations or imaging findings. Biopsy was performed for cases 6 and 7. The lesion size ranged

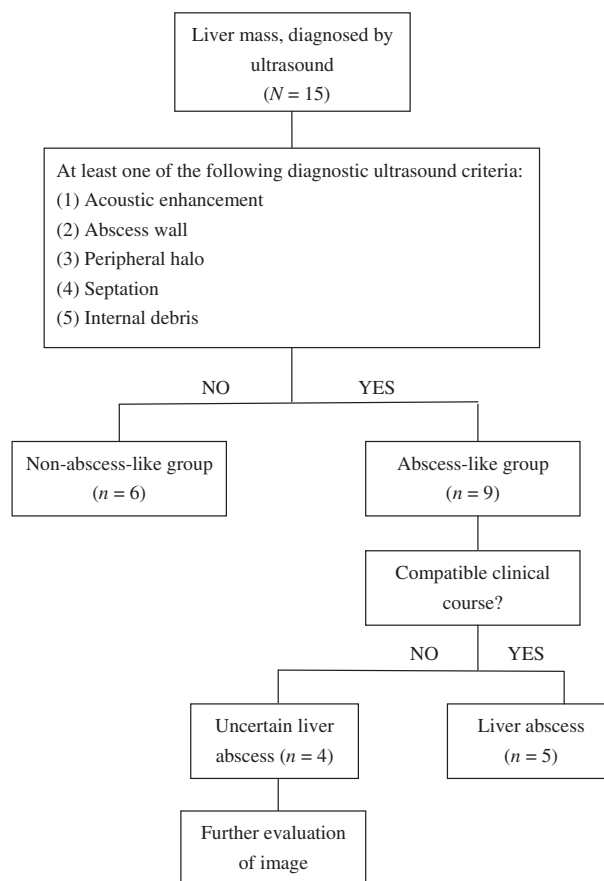


Figure 1 Flowchart for selecting cases.

from 24 mm to 65 mm in diameter on the initial scan. Although diagnostic abdominal CT was not necessary for cases 1, 3, and 4, we still arranged abdominal CT to perform CT-guided percutaneous catheter drainage (PCD).

Hypochoic masses were present in all nine patients. Four patients revealed homogeneous echogenicity, whereas heterogeneous echogenicity was discovered in five patients. Internal echoes were seen in seven patients; septation was noted in cases 5 and 7.

Six of the nine patients (cases 1, 3, 4, 5, 7, and 9) showed variable degrees of distal acoustic enhancement. Acoustic enhancement was not related to the size or degree of echogenicity of the mass. A sharp echogenic wall was seen in five patients (cases 2, 3, 5, 7, and 9). A peripheral halo was present in cases 2 and 6.

Case 6 was a large B-cell lymphoma with some sonographic characteristics of liver abscess, such as multiple heterogeneous hypochoic lesions with a peripheral halo (Figure 3A). There was no vascularity noted on color Doppler imaging. According to the patient's history, end-stage renal disease had been diagnosed and the patient had previously received renal transplantation. Because of immunosuppression therapy, which may lead to the possibility of oncogenesis (sirolimus/tacrolimus/mycophenolate: lymphoproliferative disease), abdominal CT (Figure 3B) and biopsy were performed to differentiate diagnosis of hepatic malignancy. The abdominal CT demonstrated multiple hypovascular tumors in the liver and

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