Clinics in Diagnostic Imaging (48)

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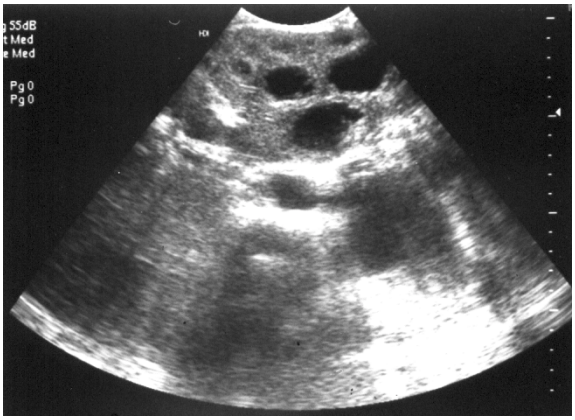

Fig. 1 Transverse US scan of the liver.

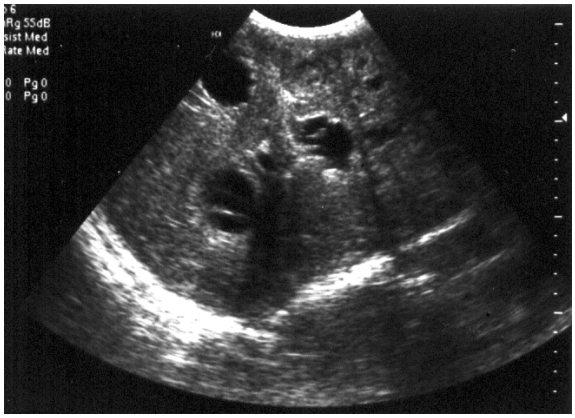

Fig. 2 Subcostal oblique US scan of the right lobe of the liver.

CASE PRESENTATION

A 51-year-old man presented with epigastric distention. Physical examination revealed an epigastric mass. One month earlier, he underwent a left nephrolithotomy and a lower pole mass was incidentally discovered during the operation. Biopsy of the mass revealed transitional cell carcinoma. What does ultrasonography (US) of the liver show?

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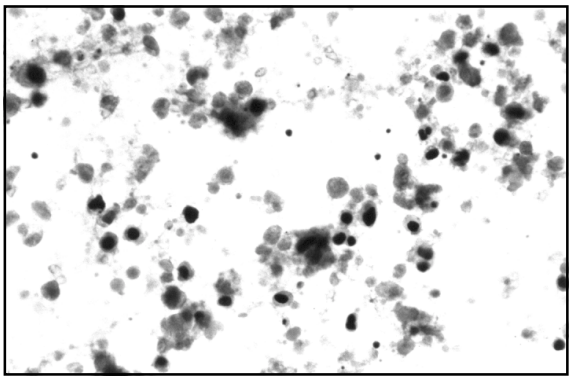

Fig. 3 Fine needle aspiration smear of the liver lesion shows numerous degenerated and dead cells (Papaniculou stain X200).

Table I. Differential diagnosis of cystic liver lesions.

1. Simple cyst
2. Polycystic liver and kidney disease
3. Hydatid (or echinococcal) cyst
4. Liver abscess
5. Haematoma or biloma
6. Choledochal cyst
7. Biliary cystadenoma and cystadenocarcinoma
8. Primary and metastatic liver tumour

IMAGE INTERPRETATION

US scans of the liver (Figs. 1, 2) show multiple cystic masses with mildly-thickened, irregular walls and acoustic enhancement. No mural nodule or calcification is seen.

DIAGNOSIS

Cystic liver metastases.

CLINICAL COURSE

Fine needle aspiration biopsy of the cystic lesions in the liver was performed and necrotic tumour cells were found (Fig. 3). Chemotherapy was planned but the patient refused treatment and was subsequently discharged. He was lost to follow-up.

DISCUSSION

Transitional cell carcinoma of the kidney is the most common malignancy of uroepithelial origin. Distant metastases occur in 50% to 60% of cases during the course of disease, especially in high-grade tumours. The common sites for metastases are bone, lung and liver[1].

Hepatic metastases may be hypoechoic, hyperechoic, cystic, or be of mixed echogenicity[2,3]. Cystic metastases are uncommon and may arise from mucin-producing primaries or be due to necrosis within the tumour. The differential diagnosis of cystic liver tumours includes simple cyst, polycystic liver disease, hydatic cyst, liver abscess, haematoma, biloma, choledochal cyst, and primary liver tumour[4-5] (Table 1).

US has been shown to be superior to CT for determining the morphology of cystic hepatic lesions. Using this imaging modality, features such as thick wall, septa, mural nodule, or the presence of debris, all of which are useful for distinguishing these lesions from simple benign cysts, can be detected[6]. Some of these cystic liver lesions will be discussed.

SIMPLE LIVER CYSTS

The incidence of simple liver cysts ranges from 1% to 14% in autopsy series and are commoner in women compared to men (5:1)[7]. True simple liver cysts are considered to be of congenital origin although they are usually discovered in the fifth through seventh decades of life. They are believed to originate from cystic dilatation of aberrant bile ducts in the liver and are usually solitary. Multiple simple cysts are associated with polycystic kidney disease and are seen in approximately one third of affected individuals. Most liver cysts are

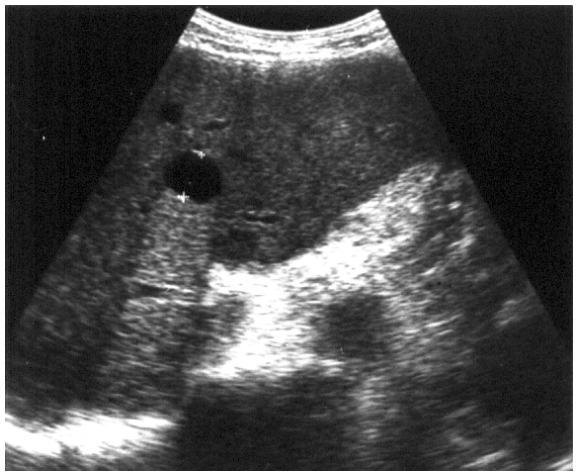

Fig. 4A Simple liver cyst. Transverse US scan of the liver shows a solitary simple cyst (between crosses). It is anechoic with smooth sharply-defined walls and acoustic through-transmission.

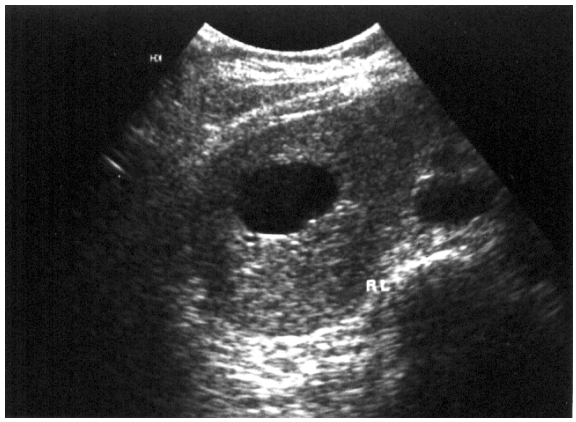

Fig. 4B Simple liver cysts. US scan in another patient shows multiple simple liver cysts with similar ultrasonographic features.

asymptomatic and do not require treatment. Complications of these cysts include haemorrhage and infection. Large cysts may cause symptoms resulting from mass effect[5].

On all imaging modalities, uncomplicated simple liver cysts have thin, imperceptible walls. On US, they are seen as anechoic masses with smooth borders and posterior acoustic enhancement (Figs. 4A,B). The typical CT appearances are (1) a well-defined intrahepatic mass, (2) water density, (3) round or oval shape, (4) smooth, thin walls, (5) absence of internal structures, and (6) no enhancement after intravenous contrast administration[5,8].

HYDATID CYSTS

Hydatid (or echinococcal) cysts represent the larval stage of the Echinococcus tapeworm in which humans are the accidental intermediate host. The definitive host is a carnivore, usually a dog. The adult tapeworm lives in the jejunum of the dog. Its eggs pass through the dog's faeces and when eggs are swallowed by the intermediate host, embryos are freed in the duodenum and pass through the mucosa to enter a branch of the portal vein, most of which arrest in the hepatic capillaries. Some embryos pass through the liver to the lung and less frequently, to other organs[9].

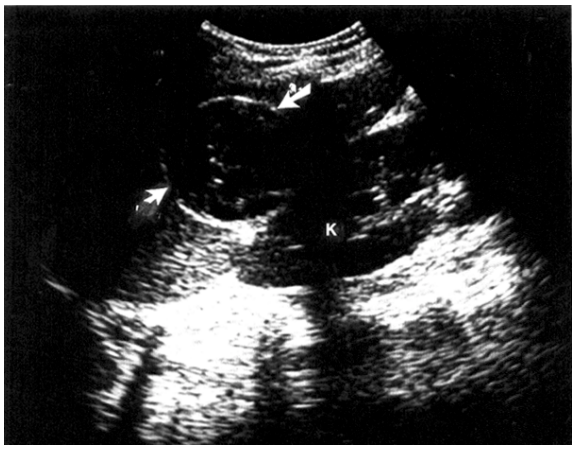

Fig. 5A Hydatid cyst. Oblique US scan of the right lobe of the liver shows a multiseptated fluid-filled cyst (arrows) (K=right kidney).

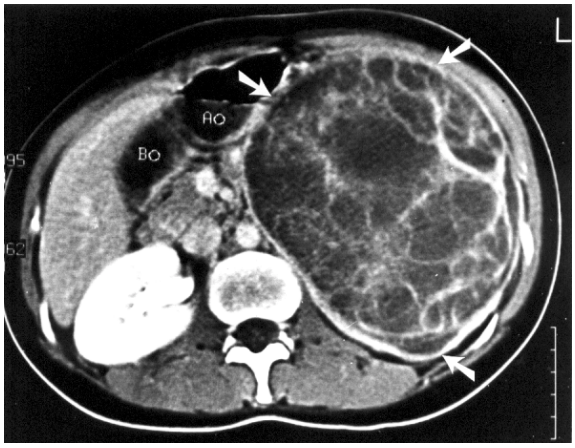

Fig. 5B Hydatid cysts. CT scan of a different patient shows a huge multiseptated cyst (arrows) protruding caudal to the left lobe of the liver. The cyst walls and septae enhance moderately.

Gharbi et al[10] classified the ultrasonographic findings of liver hydatid cysts into 5 patterns, namely: type I: pure fluid collection; type II; fluid collection with a split wall; type III: fluid collection with septa; type IV: heterogeneous echo patterns; and type V: reflecting thick wall. In their series, the type I was the most common variety of hydatid cyst. These variable ultrasonographic findings of liver hydatid cysts may make it difficult to distinguish these cysts from other disease processes. The differential diagnosis varies with the type of echographic patterns. The types II and III patterns (Figs. 5A, B) are characteristic of hydatid cysts. Types I and V patterns are suggestive of hydatid cyst in endemic countries. Type IV is the most difficult to diagnose and may easily be confused with a primary or secondary liver tumour.

The traditional treatment of hydatid cysts is surgery. The role of surgery and its considerable mortality, morbidity and recurrence rates are well-documented. Recently, the long-term results of percutaneous treatment of liver hydatid cysts have been reported. Hydatid cysts smaller than 5-6cm can be successfully treated with puncture, aspiration, injection and reaspiration of hypertonic saline solution. Larger cysts are treated with a two-stage procedure that includes catheterisation and sclerotherapy with alcohol[11,12].

LIVER ABSCESSES

The ultrasonographic appearances of liver abscess are varied and are often nonspecific. Differentiation of a pyogenic abscess from an amoebic abscess or other complex cystic lesions are generally not reliable[13]. Ultrasonographically-guided needle aspiration is helpful for an accurate diagnosis. Five characteristic ultrasonographic features of amoebic abscesses have been described, namely: (1) absence of significant wall echoes, (2) oval or rounded shape, (3) a hypoechoic lesion that is homogeneous and has low-level internal echoes, (4) location near to or touching the liver capsule and (5) enhanced acoustic through-transmission deep to the lesion. However, only 30% of proven amoebic abscesses demonstrate all five features[14].

A blinded comparative study of ultrasonographic findings in amoebic and pyogenic abscesses showed that the two most statistically-reliable features of amoebic abscesses were a rounded or oval shape and a hypoechoic appearance with homogeneous low level internal echoes[15] (Fig. 6). Pyogenic liver abscesses may be classified into either micro-abscesses or larger confluent lesions. Micro-abscesses may be seen as either discrete hypoechoic nodules or ill-defined areas of

Fig. 6 Amoebic abscesses. Subcostal US scan of the liver shows largely hypoechoic rounded masses with well-defined borders. They contain homogeneous low-level internal echoes.

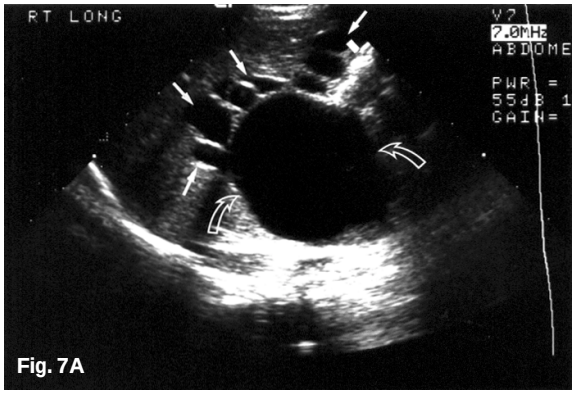

Fig. 7A

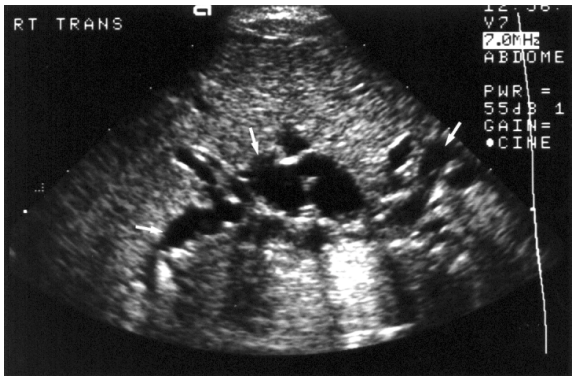

Fig. 7B Choledochal cyst in a 2-year-old girl. Oblique US scans of the liver show (A) a large choledochal cyst (open curved arrows) connected to the (B) dilated intra-hepatic bile ducts (solid small arrows).

distorted hepatic echogenicity with little or no posterior acoustic enhancement. Macro-abscesses demonstrate a wide range of ultrasonographic appearances. They may be seen as hypoechoic to hyperechoic lesions with varying degrees of internal echoes and debris[13].

CHOLEDOCHAL CYSTS

Choledochal cysts are congenital local dilatations of the biliary ductal system and can be categorised into 5 subtypes, based on anatomical distribution of dilatation. There is a 3:1 female predominance with a slight predilection in patients of Asian descent. Choledochal cysts can present from birth to old age but most commonly manifest early in life. Presenting symptoms include jaundice (80%), abdominal mass (50%), or abdominal pain (50%)[16].

On CT and US, a choledochal cyst is seen as a cystic mass in the region of the porta hepatis separate from the gallbladder but which communicates with the intrahepatic ducts (Figs. 7A, B). Hepatobiliary scintigraphy can be used to demonstrate radiotracer uptake within the cyst, confirming the diagnosis[5].

BILIARY CYSTADENOMA

Biliary cystadenoma is a rare cystic biliary epithelial neoplasm which usually occurs in middle-aged women. It is considered by many pathologists to be a premalignant lesion. Surgical resection has been recommended as this lesion may undergo malignant degeneration[5]. From imaging characteristics alone, biliary cystadenoma cannot be differentiated from cystadenocarcinoma. However, the distinction between these two lesions is not vitally important because both are treated with total surgical excision. On imaging, the tumour is usually seen as a large unilocular or multilocular cystic mass. The presence of a nodular mass or coarse calcification along the wall or septa indicates a more likely diagnosis of biliary cystadenocarcinoma[17].

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ABSTRACT

A 51-year-old man presented with an epigastric mass. Ultrasonography showed multiple cystic liver masses due to metastases from transitional cell carcinoma. Causes of cystic liver lesions include simple cyst, polyeystic liver disease, abscess, choledochal cyst, biliary cysadenoma and cystadenocarcinoma, and primary liver tumour. The imaging features of various types of cystic liver lesions are reviewed.

Keywords: liver cysts, liver metastases, ultrasonography, computed tomography

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