CASE REPORT

UNUSUAL HEPATIC LESION WITH FAT FLUID LEVEL - IMAGING FINDINGS AND REVIEW OF LITERATURE

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ABSTRACT

Case Report: There are a variety of liver lesions, both benign and malignant, which may contain fat. The benign lesions range from focal fatty change to hepatocellular adenoma and teratoma. Malignant tumors that can contain fat primarily include hepatocellular carcinoma and primary and metastatic liposarcoma. The imaging characteristics of a lesion, enhancement pattern and pattern of intratumoral fatty change are helpful in narrowing the differential diagnosis. We present an unusual case of a 50 year old female with hepatic lesion having fat-fluid level on imaging. She was investigated using 128-slice Multidetector Computed tomography (MDCT) scanner and 3mm reconstructed images in soft tissue window were viewed on vitrea workstation. The lesion had a large fat-fluid level and showed no post contrast enhancement. Furthermore, MRI was done on 1.5 tesla GE machine, which confirmed the diagnosis. This case report focuses on atypical presentation of hepatic hydatid with fat-fluid level and review of literature for the spectrum of imaging findings. **Conclusion:** Hepatic hydatid cysts can show atypical pattern of fat-fluid level. This case report showed demonstrable fat fluid level within hepatic hydatid cyst on CT imaging, which on further imaging by MRI, showed hydatid membranes in the dependent fluid. **Clinical relevance:** 128 slice MDCT with dynamic protocol, its high resolution and multiplanar imaging plays an instrumental role in diagnosis of hepatic lesions. However, sometimes in very rare cases, further imaging with MRI is required. Although the presence of fat can be demonstrated with computed tomography or ultrasound, magnetic resonance imaging is the most specific imaging technique for demonstration of both microscopic and macroscopic fat.
Key words: Multidetector Computed Tomography (MDCT), Magnetic Resonance Imaging(MRI), Hepatic lesion, hydatid cyst, Fat containing hepatic lesion, fat fluid level.

Introduction

A wide variety of benign and malignant hepatic lesions are known to contain macroscopic or intracellular fat.[1] Benign lesions include angiomyolipoma, lipoma, focal or geographic fatty change, focal nodular hyperplasia, hepatic adrenal rest tumor, adenoma, hydatid cysts, teratoma, xanthomatous lesions in Langerhans cell Histiocytosis and extramedullary hematopoiesis. Malignant liver lesions that can contain fat include metastases, liposarcoma and hepatocellular carcinoma.[1] Most of the fat containing neoplastic lesions show contrast enhancement depending upon the presence of central vessels. Non enhancing lesion with fat could be lipoma, teratoma or hydatid cyst. We present a case report of an unusual case of right hepatic lesion with fat fluid level.

Case Report

A 50 years old female was referred to Radiology department of Rehman Medical Institute Peshawar for Dynamic MDCT of liver. Patient had pain in right

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hypochondrium for few months. Her ultrasound revealed a mixed echogenicity mass in right hepatic lobe with internal hyperechoic areas. CT was performed on a 128 slice Toshiba scanner. Dynamic study was done and upper abdomen was imaged in pre-contrast, arterial, venous and delayed phases whereas whole chest and abdomen was imaged in venous phase. CT imaging showed a well-defined non-enhancing hypodense cystic lesion in right hepatic lobe, just anterior to left hepatic vein and along lateral aspect of intrahepatic IVC. It contained a large fat fluid level, the fat density ranged from -30 HU to -149 HU. A tiny pinpoint calcified focus was seen in its upper part. There was no evidence of daughter cysts. There was no imaging evidence of rupture into the biliary tree.The lesion remained unenhanced on all phases (Fig.1). The intrahepatic biliary ducts and the gall bladder were normal. The patient was referred for MRI. T1WI,

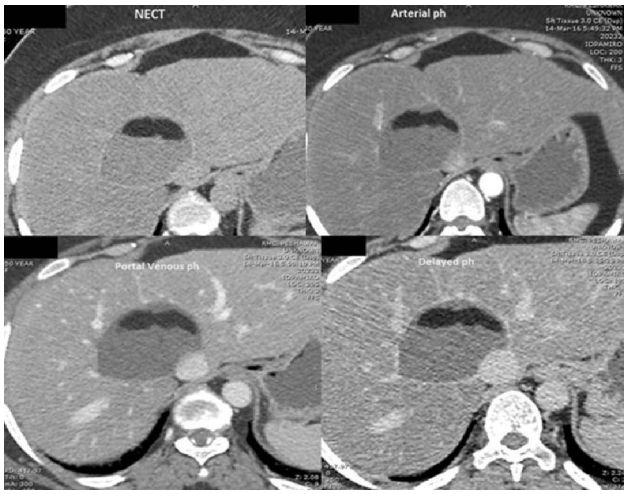

Figure 1: Axial images of dynamic CT liver in pre-contrast, arterial, venous and delayed phases showing a non-enhancing well-defined cystic lesion in right lobe of liver containing a fat fluid level.

T2WI and T2 FAT SAT axial images were acquired. MRI revealed floating T1 hyperintense fat, which showed saturation on FAT SAT images and multiple membranes were seen within the dependent fluid, thus confirming the diagnosis of hydatid cyst (Fig.2). The patient was advised PAIR procedure.

Discussion

Liver is the most frequent location of hydatid cyst. Hydatid disease is a worldwide zoonosis produced by the larval stage of the Echinococcus tapeworm.[2]

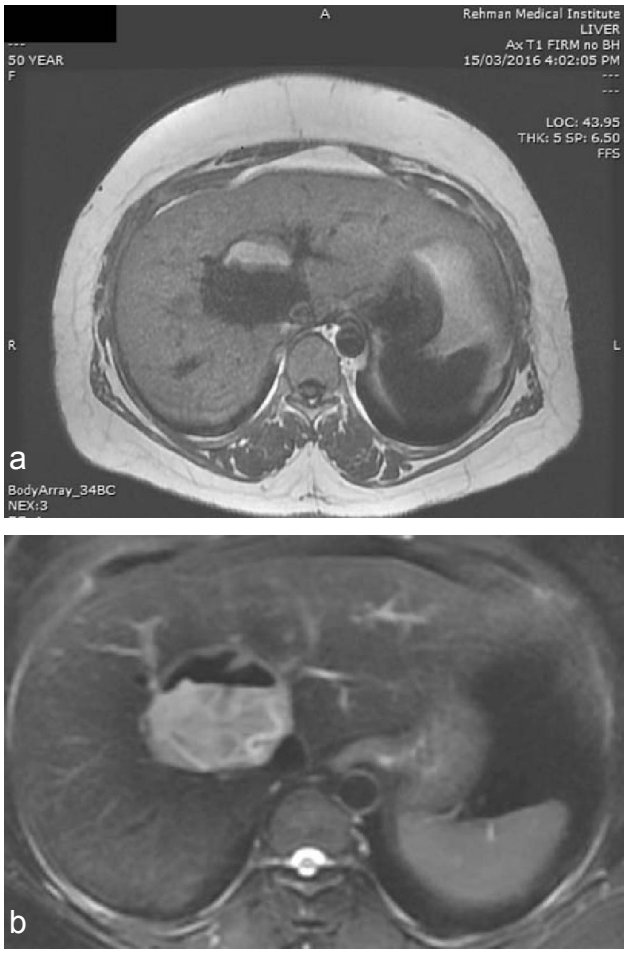

Figure 2: (a) Axial T1 weighted image shows high signal intensity fat in the nondependent part of the lesion. **(b)** T2 weighted image with fat suppression confirms membranes in the dependent fluid of the lesion. Note the suppression of floating fat on this image.

Once the parasite passes through the intestinal wall to reach the portal venous system 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%.[2,3] Right lobe is the most involved lobe of the liver. Imaging findings in hepatic hydatid disease depend on the stage of cyst growth (i.e., whether the cyst is unilocular, contains daughter vesicles, contains daughter cysts, is partially calcified, or is completely calcified [dead]).[4]

The ultrasonographic (US) appearance of hydatid cysts may vary. When the matrix fills the cyst completely, a mixed echogenic pattern is created that mimics a solid mass.[3,5,6] Because differentiation of this lesion from other hepatic masses or abscesses

is usually difficult, it is important to look for daughter vesicles or membranes within the lesion that may help in making a correct diagnosis.[7] Imaging findings in hepatic hydatid disease depend on the stage of the cyst growth. The computed tomography (CT) imaging findings of an uncomplicated hepatic hydatid cyst has been well described in literature and includes a cystic lesion with two layers with or without daughter cysts, hydatid sand, and membranes, with or without wall calcification.[4] Based on the radiological appearance, hydatid cysts are classified into four types: Type I- Simple cyst with no internal architecture with or without hydatid sand or septae. Type II- Cysts with daughter cysts and matrix (IIa- Round daughter cysts arranged at the periphery, IIb- Irregularly shaped daughter cysts occupying the entire mother cyst, IIc- High attenuation oval or round mass with scattered calcification and occasional daughter cysts), Type III- Dead cyst with total calcification Type IV- Complicated cyst with rupture and superinfection.[8]

Lipid material that forms a fat-fluid level within the cyst has also been described as an indirect sign of biliary communication.[9] Fat has a characteristic appearance with each of the major cross-sectional imaging modalities. It usually appears hyperechoic at ultrasound. Fat attenuates sound more than the adjacent liver parenchyma, so partial acoustic shadowing may occur deep to fatty tumors. Since the speed of sound is less in fat than in other soft tissues, speed propagation artifacts and refraction artifacts can occur with fatty tumors. Thus further imaging is required for characterization. Fat is of low attenuation compared with normal liver parenchyma at computed tomography (CT), with a range of -10 to -100 HU, and high in signal intensity on T1-weighted magnetic resonance (MR) images. In addition, several MRI sequences aid in the detection of fat, including fat suppression sequences and chemical shift imaging with opposed-phase gradient-echo (GRE) sequences.[10]

There have been very few cases of fat within ahepatic hydatid cyst reported in the literature.[9] One series described fat-fluid levels in three patients with hepatic hydatid cysts,[9] whereas only two reports of hydatid cysts containing small globules of fat has been described.[11,12] One series of three patients described the presence of fat in the context of ruptureof the hepatic hydatid cyst into the biliary tree.[9] Rupture of a hepatic hydatid cyst occurs in 20% to 50% of patients.[9,13,14] Several causes of rupture have been postulated, including degeneration of the parasitic membranes because of host defense mechanisms, chemical reactions, trauma, or simple ageing of the cyst.[9,15] Three different types of cyst rupture have been described in the literature: contained, communicating, and direct.[4] Contained rupture occurs when the endocyst ruptures and the pericyst is intact, with resultant floating endocyst membranes within.[4] Communicating rupture implies passage of the cyst contents into the biliary radicles that have been incorporated into the pericyst.[4] Direct rupture occurs when both the endocyst and the pericyst rupture, allowing free spillage of material in the peritoneal cavity, pleural cavity, abdominal wall, and hollow viscera.[4] Communication of hydatid cyst with the biliary tree has been described in as many as 90% of hepatic cysts.[9,15] Communicating rupture of a cyst into the biliary system may occur through small fissures or bilio-cystic fistulas (55%) or through a wide perforation into a main biliary branch.[4,9] This communication may be directly visible on imaging. Review of previous studies have shown only one case series of three patients with fat-fluid level within a hydatid cyst[9] and few cases of lipid seen as globules of fat within the cyst have been reported.[10]

There have been two plausible explanations for the presence of fat within a hepatic hydatid cyst. Beric and Blomley[16] proposed that the fat-fluid level in a hydatid cyst in liver is related to degeneration of hydatid membranes as histopathological and biochemical evidence suggests that lipids play an important role in the metabolism of hepatic hydatid cysts.[16,17] Increasing cholesterol in cyst fluid has been associated with maturation and degeneration, therefore, development of fatty attenuation seems to be related to the ageing process of the cyst.[16,17] So, small globules of fat within a hydatid cyst can be explained by degeneration of the membranes as part of the ageing process of the hydatid cyst and presence of cyst wall or cyst content calcification is further proof of the process of ageing.

Mendez Montero et al[9] described a series of three patients with hepatic hydatid cysts, two of which had fat-fluid levels with demonstrable communication with the biliary tree on imaging and surgery, while one did not show a biliary communication but contained fat, was attributed to small non-macroscopic cysto-biliary

communication. The explanation for fat within these hydatid cysts was given by authors that, since fat within a hepatic hydatid cyst cannot be attributed to the natural process of evolution of the cyst; a communication with the biliary tree is the most plausible explanation for the presence of fat.
Review of the existing literature[9,16,17] suggests that fat-fluid levels within a hepatic hydatid cyst detected on imaging studies favor the presence of a biliary communication and, it can or cannot be demonstrated on imaging.

Conclusion

Hepatic hydatid cysts can show atypical pattern of fat fluid level. This case report showed demonstrable fat fluid level within hepatic hydatid cyst on CT imaging, which on further imaging by MRI, showed hydatid membranes in the dependent fluid.

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