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Case report

Localized fibrous tumor of the liver: imaging findings

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Abstract. We report the imaging of a localized fibrous tumor of the liver, focusing on color Doppler US, CT, MR imaging, and angiographic findings. We discuss the differential diagnosis of such a rare, benign lesion of the liver. Detailed imaging of this tumor has not been reported in the literature previously.

Key words: Liver neoplasms – CT – MR imaging – US – Fibroma

Introduction

Localized fibrous tumor of the liver (LFTL), also called solitary fibrous mesothelioma, is a rare lesion of debated histological origin (mesenchymal vs mesothelial), indistinguishable from similar more frequent tumors arising from the pleura [1, 2]. We report the imaging findings of a case of LFTL using US and color Doppler imaging, CT, digital subtraction angiography (DSA), and MR imaging features. We compare our findings with the few cases described in the literature and discuss the differential diagnosis.

Case report

A 69-year-old woman complained of epigastric and right upper quadrant pain and weight loss. On physical examination, a large mass of the right upper quadrant of the abdomen was palpated. Liver function blood tests, levels of alpha-feto-protein, CA19-9 and carcinoembryonic antigen were normal.

Ultrasound showed a 10-cm-diameter heterogeneous hypoechoic lesion, with hyperechoic central areas. The mass was pedunculated arising from segment IV. Color Doppler sonogram (CDS) demonstrated surrounding vessels with low-resistance arterial flow (resistive index: 0.6; Fig. 1). Intrahepatic portal veins were patent on Doppler studies.

Unenhanced incremental CT showed a well-delineated low-attenuating (40 HU) lesion of segment IV. No dystrophic changes in the liver were observed. After intravenous contrast media injection, the tumor appeared heterogeneous, hypodense relative to the adjacent liver, with an enhancing rim and intratumoral septae (Fig. 2). No vascular thrombosis was observed, but strong arterial enhancement of the left liver lobe was observed, probably due to the tumor mass effect on the left portal vein.

Magnetic resonance imaging was obtained with 1.0-T system. On T1-weighted gradient-echo sequence, the lesion was hypointense and homogeneous. The tumor was moderately hyperintense and heterogeneous with hypointense areas on T2-weighted turbo spin echo (TSE; Fig. 3). No hyperintense foci of necrosis were present.

Rapid tumor enhancement was observed on T1-weighted turbo gradient-echo sequence within the intratumoral septae and the peripheral rim during the arterial phase after contrast media injection (Gd-DTPA, 0.1 mmol/kg of body weight). On the delayed T1-weighted gradient-echo sequence, a capsule was depicted and the areas, which were not hyperintense on T2 weighted sequence showed hypointense areas. No tumor washout, but rather contrast staining, was observed (Fig. 4). Preoperative selective celiac arteriogram (Fig. 5) showed an enlarged left branch of the hepatic artery surrounding the tumor. Peripheral vascular supply of the mass was also seen arising from the gastroduodenal artery.

Left hepatectomy was performed. Pathological specimen (Fig. 6) showed a well-defined encapsulated tough whitish lesion that was attached to the fourth segment's capsule by a broad vascular pedicle. Microscopically, the tumor was composed of short spindle cells, heavily collagenized, arranged in parallel and interwoven patterns. Mitotic activity was lower than four mitoses per ten high-power fields. This tumor showed vimen-

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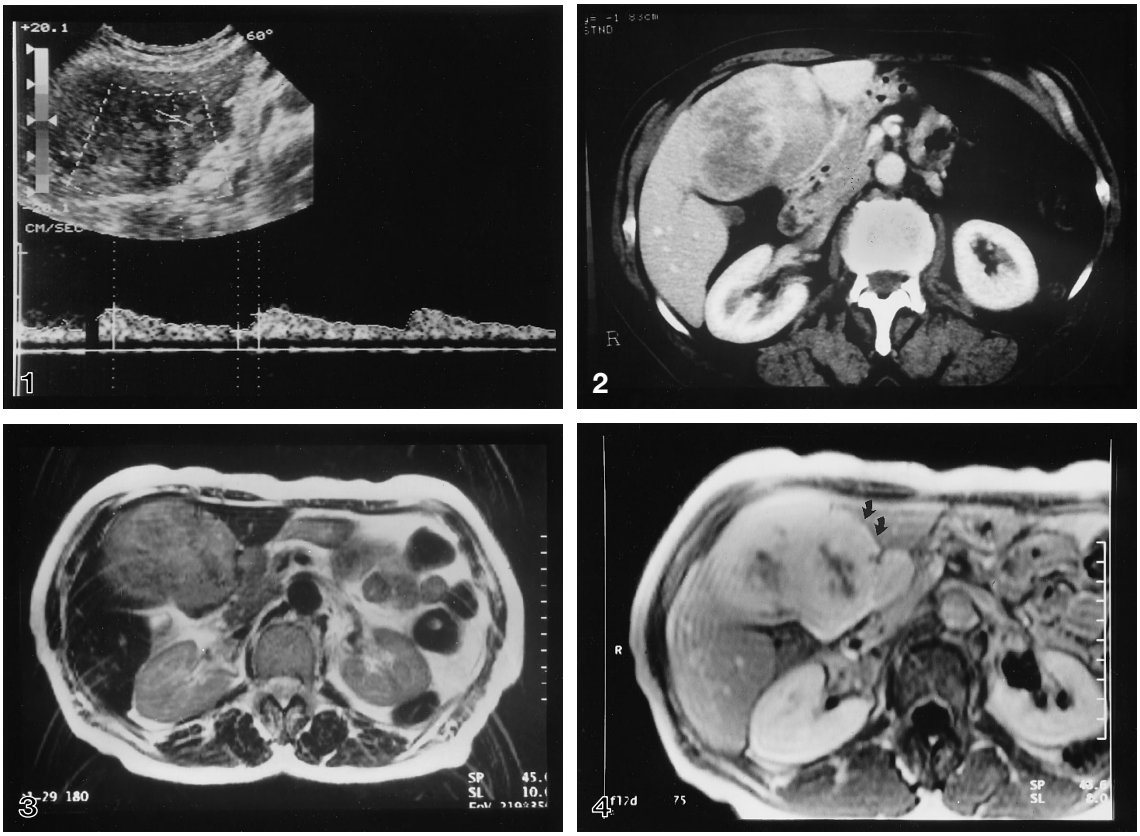

Fig. 1. Color Doppler sonogram analysis demonstrates low-resistance arterial flow in and radial vessels within hypoechoic tumor of segment IV

Fig. 2. On early-phase of enhanced CT, hypervascular rim and septations are visualized sparing large areas. The hyperdense feature of the left liver lobe is probably due to a tumor mass effect on the left portal vein

Fig. 3. On the breath-hold T2-weighted turbo spin-echo sequence, the tumor appears slightly hyperintense with large central areas of relative hypointensity

Fig. 4. On the delayed T1-weighted fast low-angle shot sequence, incomplete filling of the tumor is observed sparing areas which were hypointense on T2-weighting and not hypervascularized. Localized fibrous tumor of the liver demonstrates contrast pooling. The capsule is also depicted *(arrows)*

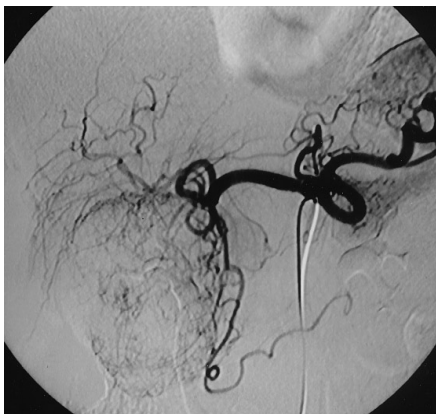

Fig. 5. Celiac trunk angiography shows displacement of the enlarged left branch of hepatic artery due to the tumor mass effect

tin and CD-34 positivity and was negative for epithelial markers. Ultrastructural examination showed fibroblastic-like cells, without mesothelial features. Pathology diagnosed this lesion as a tumor consistent with LFTL, without sign of malignancy. No recurrence was observed after 1 year.

Discussion

The term "localized fibrous tumor" refers to a tumor that was originally described in the pleura to differentiate it from mesothelioma. It has been described in a variety of other sites now being recognized in soft tissue (peritoneum, mediastinum, upper respiratory tract, pericardium) [3]. The LFTL is a rare tumor with only ten reported cases [4, 5]. In these cases no emphasis has been given to the imaging findings. Ultrasound described in one case [4] showed a hyperechoic mass. Enhanced CT performed in two cases showed sharply delineated masses with low-density areas [1, 4], and angiography performed in one case demonstrated hypervascularity [4]. The MRI and CDS techniques have never been reported with LFTL. All the lesions reported were pedunculated originating mainly in the left lobe. One lesion was pathologically described with a fibrous central scar [3]. Spindle cell tumors of the liver are rare lesions. The LFTL has typical features (histological, ultrastructural) and phenotype (vimentine +, CD 34 +), different for mesothelioma (Vimentine +, CD 34 –, cytokeratine +), inflammatory pseudotumor (made of fibroblastes, smooth actine +), and sarcoma

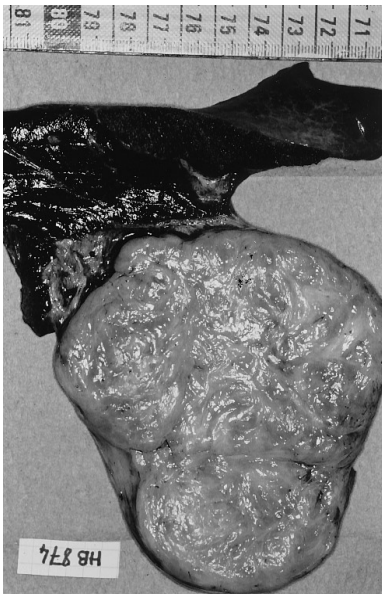

Fig. 6. Gross anatomy shows a broad vascular base arising from the medial left segment. The homogeneous shiny gray-whitish elastic feature is due to an extensive fibrous component

(showing obvious atypia and expressing specific markers) [2, 4].

At angiography, CDS demonstrates peripheral high blood supply of the tumor coming from the left hepatic artery. The MRI technique shows in addition that unenhanced areas within the tumor are not foci of necrosis. Absence of wash-out in this hypervascular encapsulated lesion corresponds to a high rate of fibrous component [6]. Correlation with pathology showed that areas of low intensity on T2-weighted sequence were those where the ratio cell/collagen was lowest (fibro-hyaline areas). Consequently, differential diagnosis includes hypervascular encapsulated fibrous tumor of the liver.

To our knowledge, no benign liver tumor corresponding to this semiology has been reported, but the large spectrum of inflammatory pseudotumors of the liver should include them, especially enhancement on delayed-phase CT scan [7]. Among malignant tumors the most cellular types which may be similar are fibrosarcoma, hemangiopericytoma, or malignant fibrous histiocytoma [3], but imaging of these lesions involving the liver primarily or secondarily has, to our knowledge, not been reported. Sclerosing hepatocellular carcinoma (HCC), also called scirrhous-type HCC, because of dense fibrous stroma histologically, could mimic LFTL even if it is more often seen following radiation exposure, chemotherapy, or infarction [8]. Metastasis, fibrolamellar HCC, and intrahepatic cholangiocarcinoma [9] are usually neither pedunculated nor encapsulated. Diagnosis of LFTL should be suspected when these imaging findings are observed. Although none of the reported LFTL have recurred or metastasized, surgery must be performed because local recurrence and malignant transformation (cystic and myxoid degeneration) have been reported in the more frequent similar pleural tumor [10].

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