

Case reports

Juxta-caval hepatic angiomyolipoma masquerading as hepatocellular carcinoma

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ABSTRACT: Hepatic angiomyolipoma is an uncommon primary benign epithelial liver neoplasm. Most patients with angiomyolipomas are middle-aged women who commonly present with epigastric fullness or pain. Angiomyolipomas are tumors consisting of three tissue types; blood vessels, smooth muscle, and fat. Hepatic angiomyolipomas may be difficult to differentiate from other liver neoplasms by noninvasive imaging. We report a 58-year-old asymptomatic woman with a mass in the right lobe of the liver, found incidentally on routine abdominal sonography. Preoperative radiographic evaluation revealed a 6.5-cm hypervascular lesion abutting the inferior vena cava. Preoperative histologic study demonstrated an epithelial neoplasm suspicious for hepatocellular carcinoma. Metastatic workup was negative. At resection, the tumor was found to be an angiomyolipoma composed of lipoid, vascular and smooth muscle cells. Further staining was positive for HMB-45. Resection margins were negative. The woman had an uneventful recovery and was discharged on postoperative day seven. She currently remains well several months after her right hepatectomy.

(*HBPD Int* 2003; 2: 617–621)

Key words: angiomyolipoma; hepatectomy; radiographic evaluation; multiplanar imaging

Introduction

An angiomyolipoma (AML) is an epithelial neoplasm, typically composed of three types of cellular elements: fat, smooth muscle, and blood vessels.^[1–8] Hematopoietic cells may also be present in AMLs,^[6,9] which have been found in the kidney, liver, heart, lung, genitourinary epithelium, palate, and the GI tract.^[5] Renal AML is often seen with the tuberous sclerosis complex.^[2,4,10]

Ishak^[11] described the first case of hepatic AML confirmed by autopsy in 1976. Since then over

120 cases have been reported in the literature.^[3] The progenitor cell of AML has been suggested to be the perivascular epithelial cell (PEC),^[3,5,12] and as such the hepatic AML has been labeled as a PEComa.

Case report

A 58-year-old woman was referred to our service in January 2003. She had no history of liver disease or hepatitis, did not drink heavily, and had no family history of liver disease. Her medical history was otherwise unremarkable except for a laparoscopic cholecystectomy. She had no abdominal or constitutional complaints. She had been seen by her primary gynecologist who detected adnexal fullness. Ultrasonography revealed a hyperechoic lesion in segments VI and VII of the right lobe of the liver.

Follow-up CT scan confirmed a 6.5 cm × 5.0 cm hypervascular lesion in the right lobe of the liv-

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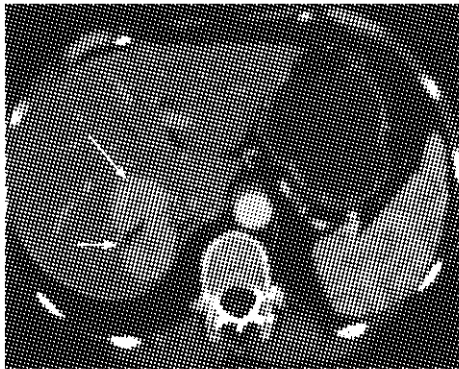


Fig. 1. Axial planar arterial phase contrast enhanced multislice computed tomography. A hyperenhancing lesion (long arrow) in the posterior right hepatic lobe with a small focus of fat attenuation (short arrow).



Fig. 4. Coronal projection volume rendered 3D CT angiogram depicting the strategic relations of the mass (M) to the portal vein (arrow). Spleen (S).



Fig. 2. Coronal multiplanar reconstruction of arterial phase contrast enhanced multislice CT. A hyperenhancing lesion (long arrow) in the posterior right hepatic lobe with a small focus of fat attenuation (short arrow).



Fig. 3. Coronal multiplanar reconstruction of venous phase contrast enhanced multislice CT. There is rapid washout of the lesion (arrow) though there remains some enhancement relative to liver parenchyma.

er (Figs. 1–4), which demonstrated internal fat, and abutted the inferior vena cava without evidence of invasion. In addition, the lesion seemed to involve a large accessory hepatic vein while extrinsically displacing the right adrenal gland.

The mass became isodense on later phase imaging and in the venous phase at about 60 seconds. No portal vein invasion was detected. The uterus was found to be bulky with degenerating fibroid tumors, the largest of which was 9 cm in diameter.

MRI demonstrated a 6 cm × 5 cm mass in the right lobe, which enhanced on T1 weighted imaging post-gadolinium. Technecium red cell scan was negative for metastatic disease.

Laboratory findings were negative for prior hepatitis A, B, or C. Her liver function panel was significant only for an ALT level of 37 u/L (normal <31). The levels of hemoglobin, total and direct bilirubin, alkaline phosphatase and electrolyte were normal. Alpha-feto protein (AFP) level was 9.1 ng/ml (normal <8.0). CEA and CA19-9 levels were normal. Percutaneous biopsy demonstrated an epithelial neoplasm consisting of large cells with abundant eosinophilic cytoplasm, and the differential diagnosis included hepatocellular (HCC), cellular AML, or other epithelial neoplasms. An outside AFP immunostaining initially interpreted as positive was in fact negative on review.

The decision was made to proceed with exploratory laparotomy and planned right hepatic lobectomy. A mass immediately adjacent to the adre-

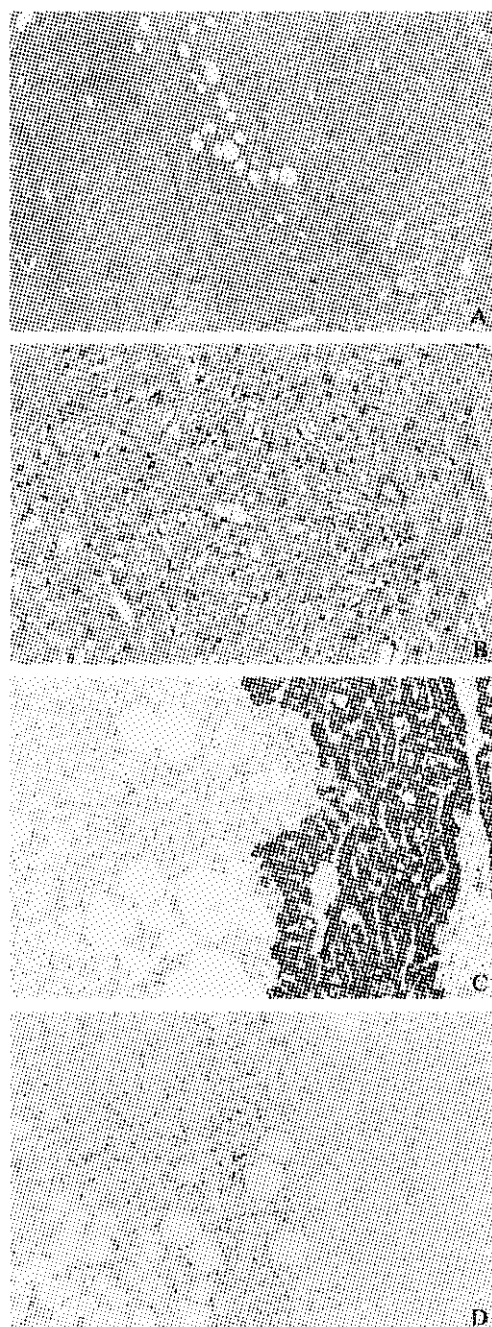


Fig. 5. A low power view showing the tumor on the right with a small area of fatty change. The non-neoplastic liver on the left (A). A higher power view of the tumor showing an epitheloid neoplasm with abundant pink cytoplasm (B). Immunostaining for Hep Par highlight the non-neoplastic liver, while the tumor negative (C). In contrast, the tumor is positive for HMB45, while the non-neoplastic liver is negative (D).

nal gland was detected and biopsied intraoperatively. Histologically, the frozen section showed an epithelial neoplasm different from HCC or adrenal adenocarcinoma. Right hepatectomy was completed en bloc with a portion of adrenal gland. Upon back-table inspection, the lesion was found to be a primary liver tumor rather than an adrenal tumor. The mass was contained within a capsule with grossly negative margins.

The patient had an uneventful recovery and was discharged on postoperative day seven. At last clinic visit, she was without complaint and was back to her usual state of health.

Pathologic findings

The tumor was found to be 5.2 cm in size. The tumor was composed mostly of large eosinophilic cells with abundant cytoplasm. Scattered foci of adipose tissue as well as areas of increased vascularity were noted. Surgical margins were microscopically clear. The background liver was found to be free of cirrhosis but exhibited moderate macro and micro steatosis. Stains for HMB-45 and melanin A were positive (Fig. 5, A–D) and for Hep par and CAM5.2, negative.

Discussion

The first resection for AML diagnosed preoperatively was performed by Karawada in 1980.^[13] AML is a benign tumor composed of three tissue types; fat, smooth muscle, and blood vessels.^[1-3] The fatty content of the tumor can range from 0% to 90%.^[2] Renal AML has been associated with the tuberous sclerosis complex, an autosomal dominant disease characterized by epilepsy, mental retardation, and adenoma sebaceum.^[4,7] Isolated hepatic AML is not generally found with the tuberous sclerosis complex.^[3] Tuberous sclerosis is found in up to 40% of patients with renal AML but in only about 10% of patients with hepatic AML.^[9]

AML of the liver is a hamartomatous lesion of mesenchymal nature.^[3,4] The precursor cell is believed to be the PEC (perivascular epitheloid cell) and as such has been labeled a PEComa.^[3,5,7] AML

cells may represent disparate differentiation from a common precursor in different stages of development.^[3,4] Extramedullary hematopoiesis is common in hepatic AML (40%–75%)^[2,8,14] but may be seen in almost any type of primary liver tumor, likely due to the hepatic sinusoidal endothelium functioning in a hematopoietic fashion in the fetal liver.^[12] Extramedullary hematopoiesis is not found in renal AMLs.^[9]

These changes are usually considered as a solitary lesion, but several authors have reported multiple hepatic AMLs.^[5] Size can vary widely (0.3–36 cm in one series). Presenting signs and symptoms are epigastric pain or fullness,^[6,9,15,16] epigastric or right upper quadrant mass^[3,17,18] or malaise.^[7] Up to 40% of patients with hepatic AML are asymptomatic.^[7,16]

Malignant degeneration has been reported after six years of observation,^[5] and recurrence following resection of tumor mass has been reported.^[16] A case of AML with concomitant HCC has been reported in a hepatitis B positive patient with normal AFP levels.^[19] A giant, hypervascular AML was reported to be associated with DIC.^[20]

Preoperative diagnosis of benign and malignant hepatic tumors is dependent upon both radiographic and histologic studies.^[1,2,4,16,21,22] Differential diagnosis of AML includes fatty degeneration of HCC, hemangioma, liposarcoma, adenoma, focal nodular hyperplasia, fatty focal infiltrate,^[9] angiosarcoma, intrahepatic arterial aneurysm,^[6] metastatic teratoma,^[23] metastatic ovarian carcinoma,^[19] and metastatic melanoma.^[21] In particular, a small HCC with fatty infiltration can be very difficult to distinguish from AML.^[4]

Radiographically, ultrasound typically reveals a hyperechoic, solid, mass with a sharp margin.^[19] Larger AMLs may contain large intratumoral vessels termed “macroaneurysms”, which are seen as an area of increased flow on Doppler ultrasound.^[24]

The classic CT features of hepatic angiomyolipoma of the liver are best demonstrated using dual phase imaging. Non-contrast studies are not usually required but will usually demonstrate a hypodense lesion. Arterial phase imaging will demonstrate a well circumscribed diffusely hyperenhancing lesion and perhaps prominent vascularity (Figs.

1 and 2). The contrast will wash out rapidly though lesions remain hyperenhancing relative to normal liver parenchyma (Fig. 3). CT scan of AMLs generally reveals a low-density mass, less than –20 Hounsfield units.^[7,9,23]

The critical finding is intratumoral fat density (Figs. 1 and 2) though it varies in its amount and conspicuity on imaging. There is usually no capsule.^[25,26] These CT features are different from those of hepatocellular carcinoma and focal nodular hyperplasia. Volume-rendered 3D multiplanar reconstruction and CT angiography (Figs. 3 and 4) can depict the critical relationship of the lesion to the adjacent vasculature.^[27]

Upon angiography, 90% of AMLs are hypervascular.^[7,28] On MRI, AML can be hyperintense on T1 images, especially those with a high fat content.^[24] T2 weighting generally displays a high intensity.^[4] Use of manganese contrast media may demonstrate no uptake by tumor cells, since manganese is preferentially taken up into hepatocytes.^[14]

Histologically, AMLs will demonstrate an epitheloid tumor with the characteristic combination of smooth muscle, fat, and blood vessels. HMB-45 is a monoclonal antibody specific for human melanosomes.^[2,5,16] AMLs stain positive for HMB-45 because the smooth muscle cell component contains premelanosomes.^[16] It has been suggested that positivity of HMB-45 staining should be the primary histologic basis for the diagnosis of hepatic AML.^[6] In several reviews, all AMLs were positive for HMB-45.^[6,12] No other primary tumors of the liver stain positive for HMB-45.^[4]

Conclusion

Hepatic AML is an uncommon primary hepatic neoplasm that has been reported with increasing frequency due to increased use and quality of CT and MRI imaging. Multiplanar reconstruction and CT angiography can help plan surgical resection by revealing the spatial relation of intraparenchymal tumor to vascular structures.

Conservative management of this benign tumor has been recommended as the treatment of choice, although surgical resection should be considered for

symptomatic or large tumors that encroach upon other structures, or in cases where the diagnosis remains uncertain. It should be recognized that malignant degeneration and association with HCC has been reported in rare cases.

Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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Received September 16, 2003

Accepted after revision September 26, 2003