—Case Reports—

Hepatic Angiomyolipoma with a Giant Hemangioma

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Abstract

Hepatic angiomyolipoma is a rare hepatic mesenchymal tumor. We report a case of hepatic angiomyolipoma that was successfully resected along with a giant hemangioma. A 53-year-old Japanese woman was admitted to our hospital for further evaluation of a liver tumor in segment 4. The tumor was detected on positron emission tomography during a health check-up. Abdominal ultrasonography revealed a well-defined mass of mixed echogenicity, 1.5 cm in diameter, in segment 4, and a giant hemangioma of mixed echogenicity, 7 cm in diameter, in segment 7. On enhanced computed tomography, the tumor in segment 4 showed hyperattenuation in the early phase and hypoattenuation in the delayed phase. On magnetic resonance imaging, the tumor in segment 4 showed hypointensity on T1-weighted images, hyperintensity on T2-weighted images, and hyperintensity on diffusion-weighted images. On angiography, the tumor in segment 4 appeared as a circumscribed hypervascular mass in the early phase and a slightly hypovascular mass in the delayed phase. The imaging findings suggested a primary hepatocellular carcinoma. The patient consented to resection of the tumor in segment 4 along with the giant hemangioma in segment 7. These tumors were resected with tumor-free surgical margins by partial resection of segments 4 and 7 of the liver. The cut surface of the resected specimen of segment 4 showed a yellowish tumor consisting of mature adipose tissue. The histopathological diagnoses of the resected specimens were angiomyolipoma in segment 4 and cavernous hemangioma in segment 7. The tumor in segment 4 consisted of mature lipocytes with angiomatous and small lymphocytic components, but no mitotic figures. The tumor showed immunoreactivity to smooth muscle antigen and homatropine methylbromide 45 and no immunoreactivity to AE/E3. The postoperative course was uneventful, and the patient remains well 1 year after the operation.
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Key words: angiomyolipoma, liver, hemangioma, hepatectomy

Introduction

Hepatic angiomyolipoma (HAML) is a rare hepatic mesenchymal tumor. Since Isak et al.[1] reported the first case in 1976, more than 200 cases have been documented, especially in recent years[2-4]. HAML is composed of a heterogeneous mixture of adipose cells, smooth muscle cells, and vessels. HAML can be treated conservatively in the absence of spontaneous hemorrhage or malignant changes[5,6]. The radiologic features of HAML depend on the relative proportion of adipose cells[4]. Consequently, preoperative diagnosis of HAML is occasionally challenging. Differentiation from other liver tumors, especially hepatocellular carcinoma, can also be difficult. We report a case of HAML that was resected successfully along with a giant hemangioma.

Case Report

A 53-year-old Japanese woman was admitted to our hospital for further evaluation of a liver tumor in segment 4. The tumor in segment 4 was detected on positron emission tomography (PET) during a health check-up. The tumor did not absorb fluorodeoxyglucose on PET. The patient had no history of liver disease or hepatitis and did not abuse alcohol. There was no abnormality on laboratory tests. Serum surface antigens for hepatitis B and anti-hepatitis C virus antibodies were negative. Tumor markers (e.g., α-fetoprotein, PIVKA-2, carcinoembryonic antigen, and carbohydrate antigen 19-9) were negative. Abdominal ultrasonography revealed a well-defined mass of mixed echogenicity, 1.5 cm in diameter, in segment 4, and a giant hemangioma of mixed echogenicity, 7 cm in diameter, in segment 7. On enhanced computed tomography (CT), the tumor in segment 4 showed hyperattenuation in the early phase and hypoattenuation in the delayed phase **(Fig. 1a)**. A giant hemangioma was seen in segment 7 **(Fig. 1b)**. On magnetic resonance imaging (MRI), the tumor in segment 4 showed hypointensity on T1-weighted images and hyperintensity on T2-weighted images **(Fig. 2)**. On angiography, the tumor
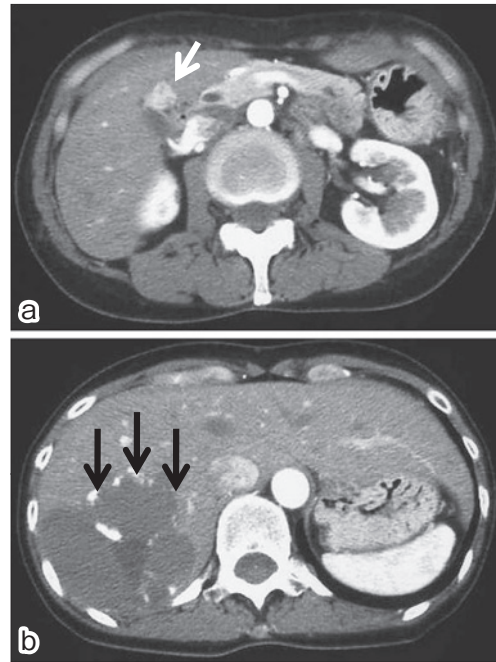

Fig. 1 On enhanced computed tomography, the tion in the early phase and hypoattenuation in the delayed phase **(white arrow)** (a). A giant hemangioma was seen in segment 7 **(black arrows)** (b).
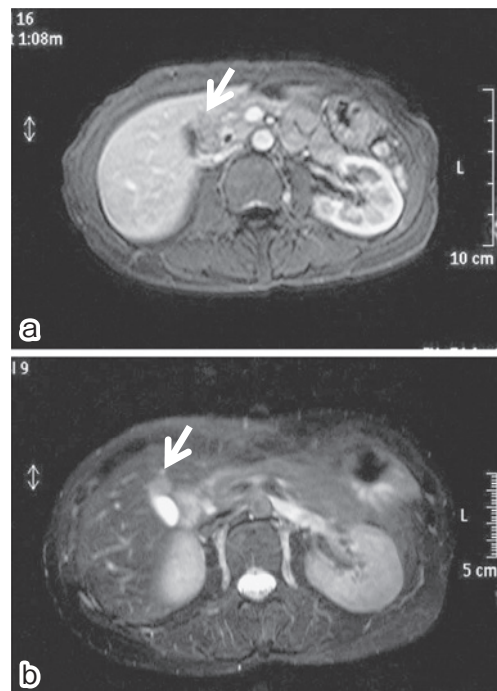

Fig. 2 On magnetic resonance imaging, the tumor in segment 4 showed hypointensity on T1-weighted images **(white arrow)** (a) and hyperintensity on T2-weighted images **(white arrow)** (b).
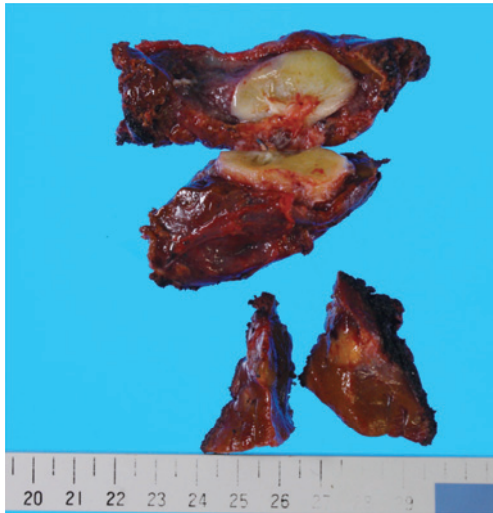
Fig. 3　The cut surface of the resected specimen of segment 4 showed a yellowish tumor consisting of mature adipose tissue.

in segment 4 appeared as a circumscribed hypervascular mass in the early phase and a slightly hypovascular mass in the delayed phase. The imaging findings suggested a primary hepatocellular carcinoma. Fine-needle aspiration biopsy was thought to be dangerous because the tumor in segment 4 was hypervascular and near the surface of the liver. After informed consent was obtained, the patient desired surgical treatment. The patient was scheduled to undergo resection of the tumor in segment 4 along with the giant hemangioma in segment 7.

　Laparotomy was performed, and a solid mass, 1.5 cm in diameter, in segment 4 and a soft mass, 7 cm in diameter, in segment 7 were detected. These tumors were resected with tumor-free surgical margins by partially resecting segments 4 and 7 of the liver. The cut surface of the resected specimen of segment 4 showed a yellowish tumor consisting of mature adipose tissue (**Fig. 3**). The clinical diagnosis of the tumor in the resected specimen of segment 7 was cavernous hemangioma. The histopathological diagnoses were angiomyolipoma in segment 4 and cavernous hemangioma in segment 7. The nontumorous portion was composed of normal liver. The tumor in segment 4 was composed of mature lipocytes with angiomatous and small lymphocytic components but no mitotic figures. The tumor showed immunoreactivity to smooth muscle antigen
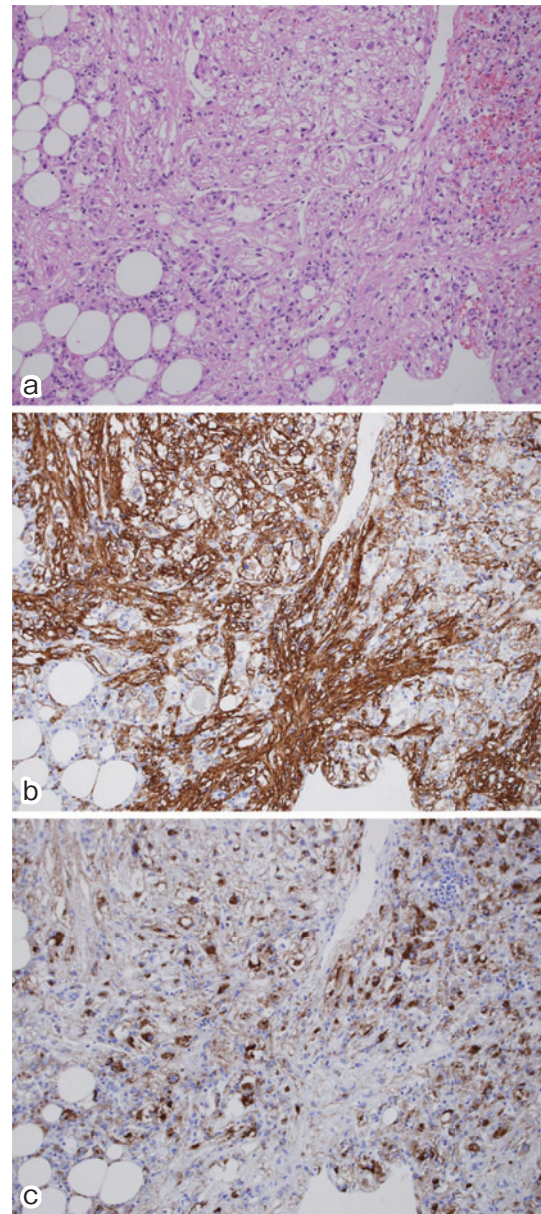

Fig. 4　On histopathological examination, the tumor in segment 4 was composed of mature lipocytes with angiomatous and small lymphocytic components but showed no mitotic figures (a) (HE×200). There was immunoreactivity to SMA (b) (×200) and homatropine methylbromide 45 (c) (×200).

(SMA) and homatropine methylbromide 45 (HMB45), but no immunoreactivity to AE/E3 (**Fig. 4**). The postoperative course was uneventful, and the patient remains well 1 year after the operation.

Discussion

　Angiomyolipoma is a benign mesenchymal tumor,

most commonly arising in the kidney. The liver is the second most common site of involvement, but HAML is much more rare than renal angiomyolipoma. HAML most often occurs in females and is usually solitary. The onset of disease is covert, and most cases lack clinically significant symptoms. The results of laboratory tests are usually normal, and there is no specific tumor marker for HAML. Most patients have no history of viral hepatitis.

Nonomura et al.[4] have reported that typical imaging features of HAML include: 1) high heterogeneous echoes on ultrasonography; 2) mixed low density (CT value <20 Hounsfield units) on CT images; 3) high signal intensity on T1- and T2-weighted MRI; and 4) rich vessels and tumor staining on angiography. A comprehensive evaluation of findings on ultrasonography, CT, MRI, and angiography may enhance the accuracy of preoperative diagnosis, but different contents and distributions of vessels, smooth muscle, and fat in particular (varying from 5% to 90%)[7] can result in diverse imaging profiles of HAML. All of these factors make preoperative diagnosis difficult. Nearly half of all HAMLs have been first misdiagnosed as carcinomas or sarcomas[22]. Thus, it is essential to recognize the pitfalls of HAML diagnosis. If lesions have detectable fat and vascular structures, the diagnosis of HAML is straightforward. The most difficult problem in diagnosis is atypical presentations (including necrosis, hemorrhage in tumors, or myomatous-type tumors)[4,8], which can create difficulty in distinguishing HAML from other hepatic tumors.

Histologically, HAML consists of a heterogeneous mixture of blood vessels, smooth muscle, and adipose cells, varying in proportions and distributions not only among different tumors, but from area to area within the same tumor. This heterogeneity can result in misdiagnosis of HAML as a hepatocellular carcinoma or other type of liver tumor. On the basis of the predominant component, HAML can be categorized into several subclasses, including mixed type (the most common type), lipomatous (more than 70% fat), myomatous (less than 10% fat), and angiomatous. Awareness of broad differences in the

proportion of fat can facilitate the diagnosis of fat-containing tumors of the liver. In the present case, the tumor in segment 4 consisted of mature lipocytes with angiomatous and small lymphocytic components but no mitotic figures. Several studies have reported that HMB45, a human monoclonal antibody to melanocytes, is consistently positive in angiomyolipomas[9,10]. Ren et al.[11] have reported that HMB45 immunostaining was positive in all 26 cases of HAML. Sturtz and Dabbs[9] have reported 15 cases of angiomyolipoma that showed positive immunoreactivity to HMB45. Therefore, HMB45 has become a definitive tool for the diagnosis of HAML. Other markers, such as S100 and SMA, may also be helpful. In our patient, the tumor in segment 4 was immunoreactive for SMA and HMB45. Li et al.[12] have reported that CD117 is positive in only 25% of lesions, making further investigations essential. The origin of HAML tissue remains unclear. HAML is considered a mesenchymal hamartoma, while recent studies have shown that it originates from perivascular epithelioid cells, which can multidirectionally differentiate into vascular smooth muscle and epithelial cells, characterized by the expression of melanoma cell differentiation-associated markers[3].

Most cases of HAML have a good prognosis regardless of the management strategy, including hepatic resection or conservative treatment (observation) after echo-guided needle biopsy[13]. Several authors have suggested that HAML can be managed conservatively with follow-up after fine-needle aspiration biopsy[8,14,15]. Surgical intervention may be needed in selected cases to alleviate the mass effect on neighboring organs[3,13]. The major risks of conservative management are spontaneous rupture and malignant transformation of the mass[3,16–18]. In fact, malignant HAML was first reported in 2000[18]. Because of these risks, surgical resection has also been recommended as the treatment of choice[16,17]. However, in a previous series, one patient died of congestive heart failure after surgery, and another died of recurrent disease 14 months after surgery[16,17]. These findings illustrate the potential risks of surgical management.

Hemangiomas are the most common primary liver

tumor. The size of most hepatic hemangiomas remains stable[19,20]. A giant hemangioma, defined as a hemangioma exceeding 4 cm in diameter, can cause symptoms and require treatment[21]. Complications of hemangiomas include congestion, bleeding, thrombosis, infarction, Kasabach-Merritt syndrome, spontaneous rupture, obstructive jaundice, and gastric outlet obstruction[21–26]. In our patient, a liver tumor was found on PET during a health check-up. Imaging findings suggested a primary hepatocellular carcinoma. After informed consent was obtained, the patient underwent resection of the tumor along with the giant hemangioma. A diagnosis of HAML was confirmed histologically. The patient has remained well since the operation, indicating that surgery was an effective treatment strategy for HAML.

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