Differentiating hepatic angiomyolipoma and hepatocellular carcinoma (HCC) is a critical issue in setting of which hepatocellular carcinoma is epidemic. A routine physical examination revealed a hepatic tumor in an asymptomatic 44-year old woman. Computer tomography (CT) revealed a $9 \times 6.5 \times 7$ cm well-circumscribed heterogeneous soft tissue mass which showed good contrast enhancement. Several low-density foci occupying inferior aspect of lateral segment of liver were also demonstrated. Angiography showed the tumor stain with coarse vessels at peripheral region without arterio-portal shunt. In- and out-phase fast multiplanar spoiled GRASS sequence magnetic resonance imaging (MRI) confirmed fatty component of the corresponding low-density area. Pathology revealed mixed typed angiomyolipoma by characteristic HMB-45 immunomarker stain. While combining CT and MRI clearly demonstrates the presence of fat, the pattern of fat distribution does not allow satisfactory differentiation between angiomyolipoma and hepatocellular carcinoma. Conclusive diagnosis was also not possible to be made by the use of angiography only.

**Key word:** Angiomyolipoma; Hepatocellular carcinoma; Magnetic resonance imaging

Hepatic angiomyolipoma is a relatively uncommon benign fatty hepatic tumor in Taiwan. Varying proportions of adipose tissue, smooth muscle, and blood vessels result in polymorphic imaging findings [1,2,3]. Recognition of fat, soft tissue component and vascularity is crucial for pre-operative diagnosis [1]. Radiologists in areas with low prevalence of hepatocellular carcinoma have reported being able to conclusively diagnose cases of hepatic angiomyolipoma on the basis of CT, MRI and angiographies[2]. However, arriving at a conclusive diagnosis of hepatic angiomyolipoma in settings with epidemic levels of hepatocellular carcinoma is more difficult. In this case study, we were unable to arrive at a conclusive diagnosis on the basis of computer tomography, magnetic resonance imaging and angiographies.

**CASE REPORT**

A 44-year-old woman undergoing an ultrasound during a routine medical check-up was incidentally found to have a 5 cm mass lesion in the liver. Her past health life was uneventful except for a hysterectomy performed for uterine myoma. Physical examination revealed no abnormality, and no clinical features of tuberous sclerosis was identified. Routine blood investigations including liver function tests were within normal limit Serum alpha fetoprotein level was 3.74 ng/ml. Hepatitis B surface antigen and Anti-hepatitis C antibody were both negative.

Dynamic CT scan showed a $9 \times 6.5 \times 7$ cm well-circumscribed heterogeneous soft tissue (CT number 17-52 HU) mass with good contrast enhancement (CT number 85-167 HU) and with several low-density foci (CT number -13-16 HU) occupying inferior aspect of lateral segment of liver (Fig 1). Angiography showed a tumor stain in S3 of liver, supplied by left hepatic artery (Fig 2). MRI was performed by a 1.5T scanner (Siemens, Magneton Vision, Erlangen, Germany). T1 weighted axial fast spin-echo with fat suppression
sequence (TR/TE: 155.2/2.3) showed a soft tissue mass with strong contrast enhancement and low signal intensities which were believed to be either the fatty component or the central necrosis of the tumor (Fig 3A). T2 weighted axial fast spin-echo sequence (TR/TE: 2143/99) showed heterogenous high signal intensity (Fig 3B). Hence, tentative diagnosis included angiomyolipoma and hepatocellular carcinoma. Operation was performed because malignancy could not be excluded (Fig 4). However, the pathology turned out to be angiomyolipoma.

**DISCUSSION**

Angiomyolipoma of the liver is a rare tumor, particularly when compared with that of the kidney [4,5]. No therapeutic intervention is necessary except in cases of very large symptomatic tumors or where a tumor is located on the surface of the liver with a risk of spontaneous rupture [6].

Thus, antemortem and pre-operative diagnosis of this tumor has become more promising with advances of CT and MR technology. Angiomyolipoma of the liver has variable radiological features which mimics various hepatic tumors [7,8,9.] CT scans are very sensitive to the fat element and the tumor is visualized as a low-density mass with fatty attenuation value (less than 10 or 0 Hounsfield unit level). However, the fat content of angiomyolipoma varies considerably from patient to patient, ranging from less than 10 to more than 90 percent of the tumor volume [10]. As a result, determining the nature of the tumor by attenuation may be unreliable, especially in a small lesion because of the partial volume effect. Besides spontaneous hemorrhage is often observed in hepatic angiomyolipoma, which can increase the CT number [5].

Chemical shift MR images obtained with surface coil and in - and out- phase fast multiplanar spoiled GRASS sequence technique can be applied to discern fat component in these situations[11]. By using a

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**Figure 1. a.** A 9 × 6.5 × 7 cm well-circumscribed heterogenous soft tissue tumor (CT number 17-52 HU ) in lateral segment of liver. Several low attenuation foci (CT number -13-16HU) are also depicted (arrows). **b.** This lesion showed good contrast enhancement (CT number 85-167 HU ). **c.** Wash-out of contrast is noted in delayed phase and the low attenuation foci remain un-enhanced throughout the whole examination.
surface coil, high resolution images can be obtained and edge-error can be decreased by using small voxels. Besides, the presence of fat was better revealed by signal intensity change between in- and -out phases even where the fat only comprised a minor portion of the lesion (Fig.6).

However, hepatocellular carcinoma with fatty metamorphosis is the most difficult diagnosis to be differentiated from an angiomyolipoma with imaging modalities since both nodules are hypervascular and contain fatty component [12]. Fatty change is diffuse in small hepatocellular carcinoma (less than 3.5 cm) and focal in larger tumors (greater than 3.5 cm). Angiomyolipoma contains variable amount of fat. Distribution of fat does not provide satisfactory clue for differentiation [3]. Angiography is sensitive while not specific for vascular lesions, especially in terms of differentiation from a malignant lesion [13]. In the report of Nonomura et al, no arteriovenous shunt was found in 20 cases of Angiomyolipoma although 85% of the tumors are hypervascular, which consists with our observation [3]. Arteriovenous shunt might be a highly specific sign for malignant hepatic tumor.

However, HCC usually occurs in patients with chronic liver disease, such as hepatitis B carriers (the most common risk factor in Taiwan). Negative viral serology of this patient made angiomyolipoma a considerable diagnosis. In epidemic area of hepatocellular carcinoma, the role of imaging for suspicious lesion of hepatic angiomyolipomas is as the guidance for fine needle aspiration biopsies. Establishment of the diagnosis may obviate the need for surgical intervention, which is helpful especially in elder patients or those for whom surgery is contraindicated.

**CONCLUSION**

MR images using a surface coil and paired in-out phase images can demonstrate fat component in small, hemorrhagic or cystic lesions better than CT scan alone. It is still difficult to differentiate angiomyolipoma from hepatocellular carcinoma with imaging alone.

**Figure 2.** Digital subtraction angiography showed a large tumor stain in S3 of liver, supplied by enlarged left hepatic artery.

**Figure 3. a.** T1 weighted axial fast spin-echo with fat suppression sequence (TR/TE: 155.2/2.3) showed a soft tissue mass with strong contrast enhancement and the low signal intensities (arrow) were believed to be either the fatty component or the central necrosis of the tumor. b. T2 weighted axial fast spin-echo sequence (TR/TE: 2143/99) showed heterogenously high signal intensity.
REFERENCE


Figure 4. A dissected reddish brown soft tumor measured $9 \times 7 \times 3.8$ cm in size.

Figure 5. a. Angiomyolipoma is composed of mature adipose tissue, thick wall, tortuous blood vessels and large amount of spindle to epitheloid smooth muscle cells. b. Positive immunochemical stain for HMB-45 proves presence of myeloid cells, which is key for the diagnosis of angiomyelolipoma.

Figure 6. The lesion shows scattered areas (black arrow in 6A and white arrow in 6B) of decreased signal intensity on out-phase FMPSPGR (fast multiplanar spoiled gradient recall) MR images. a. ROI (region of interest) measurement on in-phase is 124.3. b. ROI measurement on out-phase is 65.5, indicating a significant signal difference.
鑑別診斷肝的血管肌肉脂肪瘤和肝細胞癌的難處：
病例報告

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分辨血管肌肉脂肪瘤和肝細胞癌在B型肝炎高盛行率的台灣是項困難的挑戰。一位四十四歲的女性在例行性健康檢查中發現肝腫塊。電腦斷層顯示一顆9×6.5×7公分不均勻質地的腫瘤在肝的左葉。動脈相時有顯影增強，但是有幾個低密度的區域一直沒顯影增強。血管攝影顯示緻密的血管增生，但沒有肝動脈和門靜脈擴管生成。
而在磁振造影的In-和Out-phase下確定是脂肪。開刀結果顯示是血管肌肉脂肪瘤。病理切片顯示HMB-45染色陽性，對血管肌肉脂肪瘤的診斷非常有專一性。雖然我們合併電腦斷層和磁振造影可以清楚的分辨脂肪的成分，但是對於和有脂肪變化的肝細胞癌卻無法做有效的辨識；即使血管攝影也無法分辨。主要的原因還是來自於血管肌肉脂肪瘤豐富且組成多變的成分所致。

關鍵詞：血管肌肉脂肪瘤，脂肪，肝細胞癌，磁振造影