Necrotic Hepatic Hemangioma Mimicking Liver Metastasis at the MR Imaging: a case report

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73-year-old male was a victim of sigmoid colon cancer. He received a sigmoid-colectomy 10 years ago. He suffered from watery diarrhea about 3 times per day for 2-3 months recently. Magnetic resonance imaging (MRI) showed a heterogeneously enhanced mass in the transverse colon and a 9x8.2 cm well-marginated mass in the left lobe of the liver. The hepatic tumor showed mixed signal intensity on T1-weighted imaging (T1WI ), low signal intensity with small spotted high signals on T2-weighted imaging (T2WI). Recurrent colon cancer with liver metastasis was impressed. The patient received transverse and descending-colectomy and left hepatectomy. Histopathological examination showed solitary hepatic mass virtually filled with yellowish white necrotic material. A dark-red, blood clot-like substance at the periphery was noted in gross. In microscopic examination, the liver tumor was composed entirely of fibrin clot and blood clot at center with closely aggregated, ectactic and congested thin-walled vessels at small focal area at the periphery of the tumor. Hepatic hemangioma coexisting with a transverse colon mucinous adenocarcinoma was diagnosed by the pathologist.

The MRI findings did not showed the characteristics of hepatic hemangioma. The atypical appearance was due to marked hemorrhagic necrosis of the tumor. We report this unusual case, and suggest to consider the possibility of atypical hemangioma in liver masses with similar imaging patterns.

Key words: Atypical hepatic hemangioma, Colon cancer, Magnetic resonance (MR) imaging, Necrosis.

Cavernous hemangioma is the most common benign tumor of liver [1], and it is usually an incidental finding of imaging study in asymptomatic patients. Differentiating hemangioma from other hepatic neoplasms is important, and computed tomography (CT) and sonography usually permit a definite diagnosis without resorting to angiography. MR imaging is highly reliable for diagnosis of typical hemangioma, which has a sensitivity and specificity of more than 90% [2]. Most cavernous hemangioma showed characteristic findings in MR imaging: very high-signal on T2WI (especially in heavily T2WI), low-signal on T1WI, and peripheral nodular enhancement with fill-in phenomenon, and delayed washout in dynamic study [3]. The presence of typical imaging features of hemangioma can lead to the correct diagnosis and vice versa [4]. Here we presented one case which was mis-diagnosed as solitary liver metastasis from colon cancer because of its atypical MR appearance and the underlying malignancy in the colon.

CASE REPORT

A 73-year-old male was a victim of sigmoid colon cancer and received a sigmoid colectomy 10 years ago. Recently, he suffered from watery diarrhea about 3 times per day for 2-3 months. No obvious body weight loss or abdominal pain was noted. LGI series showed a recurrent transverse colon cancer. He was admitted for further evaluation. After admission, laboratory examination showed normal liver function, normal AFP, high CEA of 27.1 ng/ml (CEA normal range: 0-4 ng/ml),
and strong positivity of stool occult blood (3+). Abdominal sonography revealed an 8.5x7 cm, mixed echoic tumor in the left lateral segment of the liver. Colonoscopy showed a polypoid colon cancer in the transverse colon.

Hepatic MR imaging was arranged with a 1.5-T MR machine (Philips Gyroscan ACS-NT, Netherlands), and a phased-array body coil. Turbo spin-echo (TSE) T2-weighted images (TR, 1800 msec; TE, 100 msec; TSE factor, 23) without and with fat sat-

Figure 1. 73-year-old man with giant hemangioma of left lateral segment of liver and adenocarcinoma in transverse colon who presented with strong positive for stool occult blood, watery diarrhea and high level of serum CEA. a. T1-weighted MR image (T1WI) showed iso to high signal in the center with irregular low signal at the periphery of the tumor in the left hepatic lobe. b. T2-weighted MR image showed generalized low signal intensity with small scattered spotted high signal foci of the tumor. c. Early arterial phase contrast-enhanced T1WI showed negative enhancement of the tumor. d. Porto-venous phase contrast-enhanced T1WI showed two small foci of peripheral nodular enhancement of the tumor. e. Delayed (7-8 mins after IV injection) fat saturated T1WI showed slightly increased prominence of the nodular enhancement of the tumor.
uration under respiratory trigger, heavily T2-weighted images (TR/TE, 3680/120; TSE factor, 23) and T1-weighted images (TR, 210 msec; TE, in phase 2.3 msec and out phase 4.6 msec) were obtained during one breath hold. Dynamic study was done using fast field echo (FFE) images (218/1.5; flip angle, 80°) pre-contrastly, 18-20 seconds (arterial-dominant phase), 50-55 seconds (portal-phase), and 7-8 minutes (delayed phase) after a manual intravenous injection of gadopentetate dimeglumine (Magnevist; Schering, Berlin, Germany; 0.1mmol per kilogram of body weight). Delayed axial and coronal imaging were performed about 7-8 minutes after IV injection. These pulse sequences were performed with a single acquisition during one breath hold.

MRI revealed a well-marginated 9 × 8.2 cm mass in the left lobe of the liver (Fig. 1a-1e) which showed iso to high signal intensity in the center with irregularly low signal intensity in the periphery on T1 WI (Fig. 1a) and generalized low signal intensity with small scattered, spotted high signal foci on T2 WI (Fig. 1b). Contrast enhanced dynamic MR scan showed negative enhancement of the lesion in the early arterial phase (Fig. 1c), two small foci of peripheral nodular enhancement in the porto-venous phase (Fig. 1d), and slightly increased prominence of nodular enhancement in the delayed fat saturated images (Fig. 1e).

MRI also revealed a 5.4x5 cm mass in the transverse colon. Recurrent colon cancer with atypical liver metastasis was impressed by MRI study.

The patient received transverse and descending colectomy and left hepatectomy. A transverse colonic tumor and a 9.8 × 9.0 × 7.5 cm solitary mass in the left lateral segment of the liver were found. The pathology evaluation showed a hemorrhagic necrotic hepatic mass filled with yellowish white and necrotic tissue. Thin irregular shaped blood clot-like substance at the periphery was also noted in gross specimen (Fig. 2a). In microscopic examination, the hepatic tumor was composed entirely of fibrin clot and blood clot at center with closely aggregated, ectatic and congested thin-walled vessels at small focal area at periphery of the tumor (Fig. 2b). The colon specimen showed a whitish tumor with multicystic pooling of mucoid material, which invaded through the muscle layer to the pericolonic fat and retracted the serosal surface. Mucinous adenocarcinoma of the colon coexisting with a necrotic hepatic hemangioma was diagnosed.

**DISCUSSION**

The previous literature reported 7 types of atypical hemangioma on MR imagings, which included [5]: 1). Large, heterogeneous hemangiomas: greater than 4cm [6], well circumscribed, heterogeneous enhancement [7], markedly hypointense on T1WI and markedly hyperintense center on T2 WI [7, 8]. 2). Rapidly filling hemangioma: mostly small (<1 cm in diameter) [9, 10]. 3). Calcified hemangiomas: low signal intensity of calcification part on T2 WI [11, 12]. 4). Hyalinized hemangiomas: only slightly high
signal intensity on T2WI [13], lack of early enhancement [8] and slight peripheral enhancement in the late phase [13]. Cystic or multilocular hemangiomas: one or several fluid-filled cavities [14]. 6. Hemangiomas with fluid-fluid levels [15, 16], and 7. Pedunculated hemangiomas: The lesion can be attached to the liver by a thin pedicle [17, 18].

Our case is one of the large, heterogeneous hemangioma (greater than 4 cm) [6]. The typical imaging features of large hepatic hemangiomas are heterogeneous signal intensity with markedly hypointense center on T1WI, incomplete filling-in in delayed phase of dynamic study and markedly hyperintense on T2 WI [4]. However our case showed iso to high signal intensity on T1 WI (Fig. 1a), predominantly low signal intensity with small scattered spotted high signal foci on T2 WI (Fig. 1b), negative enhancement in the early arterial phase (Fig. 1c) and peripheral small spotted enhancement in the porto-venous phase (Fig. 1d). It is not concordant with any one of the atypical hemangiomas mentioned in the above by Vilgrain V. et al [5].

The atypical imaging patterns of large hemangioma are closely correlated with the macroscopic appearance such as hemorrhage, thrombosis, necrosis, extensive hyalinization, liquefaction and fibrosis [5]. The reasons for central core nonenhancement of the hemangioma were given by Johnson et al. [19], which included: 1). slow flow in the central sinusoids. 2). central fibrosis. 3). central thrombosis. 4). hemorrhage. 5). complete hyalinization.

Compared with the pathologic findings, the lack of central core enhancement in our case was due to its hemorrhagic necrotic nature (Fig 2a) which correlated well with the previous report [5]. The atypical presentation of iso to high signal intensity on T1 WI and low signal intensity with small scattered spotted high signal foci on T2 WI was resulted from the blood clot and fibrin clot occupying the tumor (Fig 2b), which was concordant with the atypical hemangioma mentioned in the report by Coumbaras M. et al [4].

This case was mis-diagnosed as solitary liver metastasis from colon cancer due to the atypical MR presentation resulted from the marked hemorrhagic necrosis of the cavernous hemangioma and the underlying malignancy in colon.

We suggest that the diagnosis of cavernous hemangioma with hemorrhagic necrosis should be considered when the hepatic mass had low signal intensity with small spotted high signal foci on T2 WI, peripheral enhanced foci in porto-venous phase and increased nodular enhancement in the delayed fat saturated images on contrast enhanced MR images.

REFERENCE

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壞死性肝臟血管瘤之核磁共振影像似肝轉移癌：病例報告

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一位73歲結腸癌病患於10年前接受過手術治療，然最近2至3個月他每天約水瀉3次。故他入院接受檢查，核磁共振影像顯示有一個顯影不均勻的樣結腸癌及左肝葉的一個邊緣清楚9 × 8.2公分大小腫塊。此肝腫塊在注射顯影劑前的T1為主影像中（T1W1）是等至高訊號的表現，而在T2為主影像中（T2W1）是低訊號而週邊有點狀高訊號。此病例術前診斷為結腸癌伴癇有肝轉移。然在接受橫至降結腸切除及左肝葉切除手術後，病理顯示為一9.8 × 9.0 × 7.5公分大小的肝腫塊，黃白色壞死組織幾乎佔滿整個腫塊而邊緣有暗紅色血塊狀物，病理診斷為肝血管瘤併有樣結腸潰潰性腺癌。

此肝血管瘤之核磁共振影像並不典型，其非典型表現可能是因腫瘤有顯著出血性壞死。在此我們報告這少見病例，並建議當看到相似影像時要考慮到非典型肝血管瘤的可能。

關鍵詞：非典型肝血管瘤，結腸癌，核磁共振，壞死