# PEDUNCULATED HEPATIC HEMANGIOMA: REPORT OF TWO CASES

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*Abstract:* Pedunculated hepatic hemangioma may be confused with pedunculated hepatocellular carcinoma (HCC) in clinical practice because of their similar ultrasonographic pattern. We report two cases of asymptomatic pedunculated hepatic hemangioma. Both patients presented with intraabdominal masses of unknown nature measuring about 5 cm in diameter. Pedunculated HCC was suspected because of a pedicle and ultrasonographic pattern in both patients, positive hepatitis B surface antigen as a risk factor in one patient, and the high prevalence of HCC in Taiwan. Diagnosis was established by computerized tomography, magnetic resonance imaging, radionuclide scintigraphy, and angiography in both patients and confirmed by histopathology of the surgical specimen in one patient. Pedunculated hepatic hemangioma should be included in the differential diagnosis of a mass located in the upper abdomen.

(J Formos Med Assoc 2002;**101**:437–41)

Key words: pedunculated hemangioma liver ultrasound angiography liver tumor

Hemangioma is the most common benign hepatic tumor. The prevalence of hemangioma is about 7.3% in western [1] and 1.4% in Taiwanese populations [2]. Imaging modalities are highly reliable for the diagnosis in typical hemangioma, especially magnetic resonance (MR) imaging, which has a sensitivity and specificity of more than 90% [3]. However, unusual site or atypical pattern without hyperechogenicity and hyperechoic border on ultrasound may lead to misdiagnosis, due to confusion with other abdominal or hepatic tumors [4]. We report two cases of pedunculated hepatic hemangioma presenting with an intraabdominal mass on abdominal ultrasound.

# Case Reports

### Case 1

A 42-year-old man had a positive result for hepatitis B surface antigen (HBsAg) 20 years before this admission. He had undergone regular follow-up tests of liver function and abdominal ultrasound every year at a regional hospital. Two

small hepatic hemangiomas at the right lobe had been noted for 20 years. Abdominal ultrasound in April 2001 detected a hypoechoic tumor measuring 4 x 5 cm that appeared to be attached to the lateral segment of the left lobe (Fig. 1A). Pedunculated hepatocellular carcinoma (HCC) was suggested by the ultrasonographic pattern. Abdominal computerized tomography (CT) revealed the same mass located between the stomach and liver (Fig. 1B). He was referred to our hospital for further evaluation. After admission, physical examination revealed no palpable mass. Hemogram showed thrombocytopenia (97 x  $10^{9}$ /L). Liver function test and alpha-fetoprotein (AFP) were both within normal limits. Abdominal MR imaging was used to clarify the anatomic relationship of the tumor to neighboring organs. It disclosed five hepatic tumors, two in the left lobe and three in the right lobe, all with low signal intensity on T1-weighted image (T1WI), very high signal intensity on T2WI, and cotton wool and fill-in enhancement. The largest of these tumors was about 5 cm in diameter attached to the lateral tip of the left lobe (Fig. 1C). Hepatic hemangioma was suspected. Radionuclide scintigraphy with Tc-99m labelled red blood cells (RBCs) was arranged to confirm and localize this suspected hemangioma-like lesion. It disclosed an area of tracer accumulation in both immediate and delayed images at the left lobe of the liver, especially in delayed images. Angiography of the celiac trunk and common hepatic artery was arranged to determine the exact

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origin of this lesion by vascular distribution and showed multiple tumors at the lateral segment of the left and right hepatic lobes with peripheral stains and delayed filling-in. The angiographic picture was compatible with hemangioma. Because of the suspected rapid growth of this pedunculated hemangioma, surgery was indicated. On laparotomy, a spherical mass with a whitish central nidus measuring 4 x 5 cm surrounded by a dark-red margin was noted attached to the lateral segment of the left hepatic lobe (Fig. 1D). The remainder of the hepatic surface was smooth. After left lateral segmentectomy, histopathologic examination of the surgical specimen showed typical features of cavernous hemangioma. The patient remained well 9 months after surgery.

### Case 2

A 36-year-old man was admitted because of an intraabdominal mass of unknown origin incidentally found on abdominal ultrasound during health check-up. He was asymptomatic despite the lesion. He had no family history of hepatic tumor or other malignancy. After admission, physical examination revealed no palpable mass. Liver function test, hemogram, AFP, and carcinoembryonic antigen were all within normal limits. HBsAg and anti-hepatitis C antibody were both negative. Abdominal ultrasound revealed a heterogenously hyperechoic tumor measuring 4 x 5 cm near the left lobe of the liver between the stomach and the spleen (Fig. 2A) and another hyperechoic nodule measuring 1 x 1 cm at the medial segment of the left lobe. The larger nodule was suspected to be HCC and the smaller nodule to be hemangioma. Abdominal CT showed a mass located at the anterior and lateral aspects of the stomach with peripheral globular enhancement (Fig. 2B). An extrahepatic tumor was suspected because of the lack of an obvious pedicle connected to the liver. Abdominal MR imaging with thin section was arranged later to evaluate the anatomic relationship of the tumor to neighboring organs and the imaging characteristics of the tumor. It disclosed an intraabdominal tumor measuring 4 x 5 cm lateral to the tip of the left lobe of the liver. The connection between this tumor and the liver was not clearly demonstrated. The tumor had low signal intensity on T1WI and very high signal intensity on T2WI (Fig. 2C). Initial peripheral enhancement and strong delayed filling-in enhancement were noted. An intraabdominal hemangioma or pedunculated hepatic hemangioma was suspected. Angiography of the celiac and common hepatic artery was performed to clarify the exact



Fig. 1. Case 1. A) Subcostal ultrasonography of the left upper quadrant shows a hypoechoic tumor measuring  $4 \times 5$  cm (arrowhead), probably attached to the lateral segment of the left lobe by a wide pedicle. B) Computerized tomography of the upper abdomen shows an intraabdominal mass (arrow) located between the stomach and liver with undetermined nature and origin. C) Magnetic resonance imaging of the upper abdomen on T2-weighted image (T2WI) reveals a mass (black arrow) with low signal intensity on T1WI, very high signal intensity on T2WI, and cotton wool and fill-in enhancement, attached to the lateral tip of left lobe. Another small tumor with high signal intensity (white arrow) is evident at the medial segment of the left lobe. D) A spherical mass (arrow) with a whitish central nidus, surrounded by a dark-red margin attached to the lateral segment of the left lobe was noted on intraoperative photography.

origin of this tumor by vascular distribution. It showed a dense hypervascular tumor stain with marginal enhancement at the lateral segment of the left lobe of the liver compatible with hemangioma (Fig. 2D). Pedunculated hepatic hemangioma was finally diagnosed despite the absence of pathologic verification, which is not usually required for the diagnosis of hemangioma [4]. Surgery was suggested because of the possibility of bleeding but the patient refused it. He was discharged and followed up at outpatient clinics for 1 year. The size and nature of this tumor remained unchanged.

## Discussion

Pedunculated hepatic hemangioma is not common. It has been described as mimicking other abdominal abnormalities, such as hypervascular gastric tumor or adrenal tumor [5, 6]. It is sometimes confused with other pedunculated hepatic tumors, such as HCC, mesenchymal hamartoma, focal nodular hyperplasia,

or adenoma [7]. Correct diagnosis of pedunculated hepatic hemangioma is problematic because of difficulties in defining the origin of a pedunculated mass. The lesion can be attached to the liver by a thin pedicle nearly undetectable by imaging [4]. The first case was reported by Ellis et al in 1985 [6], and our review of the literature revealed only 12 cases reported from 1985 to 2000 [5, 6, 8-14]. These patients, two men and 10 women, ranged in age from 24 to 71 years. Most were asymptomatic and the lesions were found incidentally in all patients except for two with abdominal pain and one with obstructive jaundice. The lesions were located at the right upper quadrant in three, the left upper quadrant in four, and the epigastrium in one. The origin of the pedunculated hepatic hemangioma was from the right posterior segment in one, from the right anterior segment in one, from the bare area of the liver in one, from the left inferior segment in two, and from the left lateral segment in three. The size of pedunculated hepatic hemangioma ranged from 8.5 cm to 15 cm in diameter. All cases underwent surgery but only



Fig. 2. Case 2. A) Subcostal ultrasonography of the left upper quadrant shows a 4 x 5-cm heterogenously hyperechoic tumor (arrow), probably originating from the lateral segment of left lobe with extrahepatic growth. B) Computerized tomography of the upper abdomen with post-contrast imaging reveals an intraabdominal mass (arrow) located at the anterior and lateral aspect of the stomach (S) with peripheral globular enhancement. C) Magnetic resonance imaging of the upper abdomen on T2-weighted image (T2WI) shows an intraabdominal mass (arrow) lateral to the tip of the left lobe of the liver and at the anterior and lateral aspect of the stomach (S) with low signal intensity on T1WI and very high signal intensity on T2WI. D) Angiography of the common hepatic artery shows a dense hypervascular tumor stain (arrow) with margin enhancement at the lateral segment of the left lobe of the liver.

eight were correctly diagnosed preoperatively. The misdiagnosis of the other four patients included adrenal tumor with invasion to liver, cecum cancer with intraabdominal recurrence, intraabdominal mass, and hypervascular gastric tumor. The histologies of these hemangiomas were mostly cavernous hemangioma. Our patients were 42 and 36 years old. Both were male and asymptomatic, and both masses were located at the left lateral segment, measuring about 5 cm in diameter. Only one of our patients underwent surgery.

The diagnostic modalities used to identify pedunculated hepatic hemangiomas included abdominal ultrasound, CT, MR imaging, radionuclide scintigraphy, and angiography. Abdominal ultrasound was used in five cases, CT in all cases, MR imaging in one, radionuclide scintigraphy in three, and angiography in two. Only eight cases were correctly diagnosed preoperatively by these modalities. Among them, two were demonstrated by abdominal ultrasound, nine by CT, one by MR imaging, two by radionuclide scintigraphy, and one by angiography. The origin of the lesion may be difficult to recognize on ultrasound [6]. Although it is possible to diagnose pedunculated hepatic tumor by ultrasound, other imaging techniques such as abdominal CT and/or MR imaging are still needed for confirmation. CT diagnosis is made by demonstrating the typical enhancement pattern (peripheral globular or nodular enhancement), while MR imaging diagnosis is made based on typical signal intensities on both T1WI and T2WI [4]. CT was used in all reviewed cases but MR imaging was performed in only one case. With T2-weighted spin-echo and dynamic gadolinium-enhanced T1-weighted gradient-echo sequences, the sensitivity and specificity of MR imaging are 98% [3, 4]. Radionuclide scintigraphy is an extremely useful noninvasive tool for the confirmation, exclusion, and localization of benign hepatic hemangioma and may also be considered when diagnosis cannot be achieved using other modalities [15]. However, radionuclide scintigraphy for identification of hemangioma is not performed routinely in all centers, especially outside the USA [4]. Only three of the cases identified in our review underwent radionuclide scintigraphy and two were diagnosed correctly. Angiography is an invasive method that can show the characteristic pattern of hemangioma with prolonged opacification and delayed hypervascular stain, and an absence of rapid clearing of blood spaces characteristic of malignant vascular lesions [16]. It also provides information about vascular supply, which is helpful in surgical intervention. In our two patients, pedunculated HCC was suspected initially because of a suspicious pedicle and ultrasonographic pattern, positive HBsAg as a risk factor in one patient, and the high prevalence of HCC in Taiwan. The correct diagnosis of each of these hepatic tumors was made by modalities including MR imaging (Case 1), radionuclide scintigraphy (Case 1), and angiography (both cases).

Most patients with hepatic hemangioma should not require major surgery. The indications for surgical intervention include a palpable mass, particularly if there is a potential for exposure to trauma, rapid growth, pain or epigastric discomfort, marked thrombocytopenia, and rupture with intraperitoneal bleeding [17]. However, the surgical indications for pedunculated hepatic hemangioma and criteria for determining whether a pedunculated hepatic hemangioma carries a high risk of spontaneous bleeding were not mentioned in the reports identified in our literature review. Further investigations about the natural course and operative indications for pedunculated hepatic hemangioma are needed.

In conclusion, pedunculated hepatic hemangioma is an uncommon benign tumor. It should be included in the differential diagnosis of a mass located in the upper abdomen. Imaging modalities including ultrasound, CT, MR imaging, radionuclide scintigraphy, and angiography may be used to diagnose these tumors. Understanding of the characteristic patterns of images can be beneficial in achieving correct diagnosis and avoiding unnecessary diagnostic procedures and treatments.

ACKNOWLEDGMENTS: This study was supported by grants from the Liver Disease Prevention and Treatment Research Foundation, Taiwan.

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