

## Imaging findings of splenic hamartoma

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### Abstract

**AIM:** To assess CT and MR manifestations and their diagnostic value in splenic hamartoma with review of literatures.

**METHODS:** We described a woman who was accidentally found to have a splenic tumor by ultrasound of the abdomen. CT and MR findings of this splenic hamartoma were proved by pathology retrospectively.

**RESULTS:** The CT and MR findings in this case included a ball-like mass with homogeneous mild-hypodensity lesions on non-enhanced CT scans or isointensity on T<sub>1</sub>-weighted images and mild hypointensity on T<sub>2</sub>-weighted images, progressive homogeneous enhancement on multiple-phase spiral CT and MR enhanced scans, and isodense enhancement on delayed post-contrast CT scans and obvious hyperintensity relative to the spleen on delayed MR images.

**CONCLUSION:** Splenic hamartoma has some specific radiological features. However, the diagnosis of this disease must be based on clinical features and confirmed by pathology.

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### INTRODUCTION

Splenic hamartoma is a rare benign vascular tumor<sup>[1]</sup>. Up to now,

less than 50 cases in Chinese literature or about 160 cases in the world have been reported after the first description by Rokitansky in 1861.

Imaging features of splenic hamartoma have been described by several researchers at computed tomography (CT), magnetic resonance imaging (MRI) and sonography<sup>[2-8]</sup> and the imaging appearance of these lesions is considered as nonspecific and a histopathological confirmation is often required<sup>[9-11]</sup>.

This paper described the CT and MRI features of splenic hamartoma in a 40-year-old patient with review of the literature.

### CASE REPORT

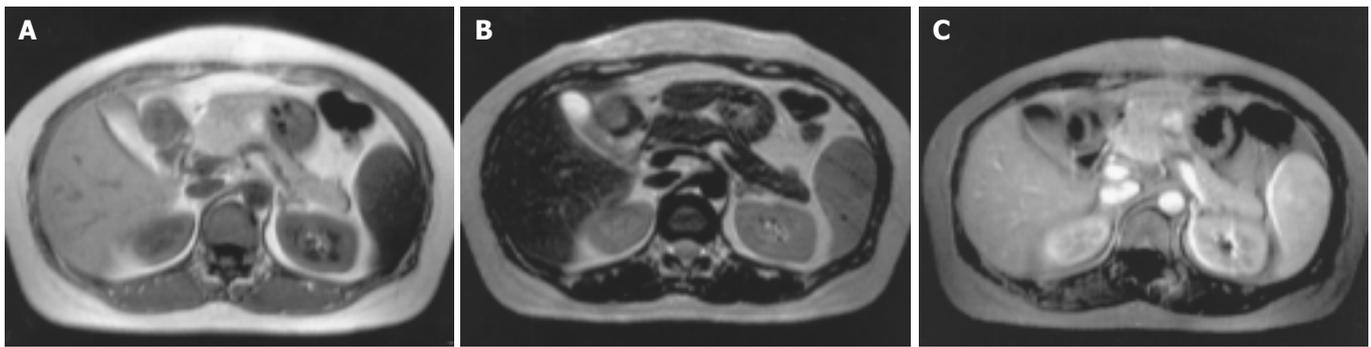
A 40-year-old woman was accidentally diagnosed having a splenic tumor by ultrasound of the abdomen. She did not complained about fever, fatigue, abdominal pain, or weight loss was complained. She denied any history of hepatitis or tuberculosis. Physical examination was entirely normal. There was no evidence of jaundice, peripheral lymphadenopathy or hepatosplenomegaly. Her hemoglobin was 125 g/L, the number of white blood cells was  $7.3 \times 10^9/L$  and the number of platelets was  $176 \times 10^9/L$ . Both stool and urinate routine tests and hepatic and renal function tests were normal. Chest x-ray was also normal.

Spiral CT of the abdomen before contrast medium administration revealed a 3.8-cm diameter, homogeneous mild-hypodensity lesion within the spleen (Figure 1A). During hepatic artery phase following bolus injection of intravenous contrast, the lesion showed a slightly homogeneous enhancement (Figure 1B). During the portal venous phase and hepatic parenchymal phase, the lesion showed a progressively homogeneous enhancement. On delayed images up to 5 min after-contrast injection, the tumor was isodense with the spleen (Figure 1C). CT diagnosis was a splenic hemangioma.

MRI of the abdomen showed a 3.6 cm×3.8 cm×4.2 cm ball-like mass with isointensity on T<sub>1</sub>-weighted images (Figure 2A) and mild hypointensity on T<sub>2</sub>-weighted images (Figure 2B). The lesion demonstrated a diffuse heterogeneous enhancement on images obtained early after contrast medium administration (Figure 2C) and became more uniformly enhanced on the portal venous phase and hepatic parenchymal phase. It was hyperintense compared to the spleen on the delayed images (Figure 3). The MR examination yielded a diagnosis of splenic hemangioma. A 4.0-cm diameter tumor was found in the spleen during operation. The pathologic diagnosis was a splenic hamartoma (Figure 4).



**Figure 1** CT scans of splenic hamartoma. A: Homogeneous mild hypodensity lesion within the spleen found by unenhanced CT scan, B: Mild-homogeneous enhancement of the mass found by enhanced CT scan on hepatic artery phase, C: Isodense tumor with normal spleen on delayed enhanced CT images.



**Figure 2** MR images of splenic hamartoma. A: Round-like mass with isointensity relative to the spleen on MR T<sub>1</sub>-weighted images, B: Mild-hypointense mass on MR T<sub>2</sub>-weighted images, C: Diffuse heterogeneous enhancement of mass by enhanced MR scan on early portal venous phase.



**Figure 3** Obviously hyperintense tumor with normal spleen on delayed enhanced MR images.



**Figure 4** Red marrow tissue and some blood sinusoid structures with lymphocytes and macrophages in hamartoma. Fibrosis was remarkable. (HE, original magnification×100).

## DISCUSSION

Hamartoma of the spleen is a rare benign lesion and the diagnosis is difficult to make preoperatively. Histologically it is composed of an aberrant mixture of the normal tissue components of the spleen, so hamartoma of the spleen is often called splenoma, splenadenoma or nodular hyperplasia<sup>[2,3]</sup>.

Splenic hamartoma occurs most commonly in adults. About 14.3% of the reported cases of splenic hamartoma occurred in pediatric patients<sup>[12]</sup>. Most patients were asymptomatic, they were incidentally found during imaging studies, laparotomy or autopsy<sup>[2,3]</sup>. Our case was accidentally discovered by ultrasound examination of the abdomen. Symptomatic splenic hamartoma was rare but nearly half of splenic hamartoma pediatric patients had symptoms<sup>[12]</sup>. A minority of these lesions had hematologic symptoms such as pancytopenia, anemia, and thrombocytopenia<sup>[12-16]</sup>. Spontaneously ruptured splenic hamartoma has been reported<sup>[17,18]</sup>. Symptomatic splenic hamartoma with renal, cutaneous abnormalities or portal hypertension and

heterotopic ovarian splenoma were described accidentally<sup>[19-21]</sup>.

A few radiological findings in splenic hamartoma have been described<sup>[2-8]</sup>. Sonography was a more sensitive modality than CT in demonstrating the lesion, which showed hyperechoic masses with cystic components occasionally<sup>[2]</sup>. But hypoechoic splenic mass was found and color Doppler sonography showed blood-flow signals inside the mass in a recent report<sup>[4]</sup>. CT could reveal splenomegaly and homogeneous or heterogeneous low-density or isodense masses with calcification<sup>[2,5,6]</sup> or fatty components, which are characteristic CT findings. Dense spreading enhancement on dynamic CT and prolonged enhancement on delayed post-contrast scans were noted in singular mass<sup>[5]</sup>. But low-density masses relative to the spleen were seen in multiple splenic hamartomas after contrast medium administration<sup>[2]</sup>. The CT findings in this case were similar to those in Ohtomo's report<sup>[5]</sup>, which included a homogeneous mild-hypodensity lesion on non-enhanced scans, a progressive homogeneous enhancement on multiple-phase spiral CT enhanced scans and an isodense enhancement on delayed post-contrast scans.

There were two types of MRI findings in splenic hamartomas, fibrous and non-fibrous splenic hamartomas. Histopathologically, fibrous splenic hamartomas had a dominant fibrous tissue and MRI showed isointensity or hyperintensity on T<sub>1</sub>-weighted images, hypointensity on T<sub>2</sub>-weighted images<sup>[3,7]</sup>. We consider hypointensity on T<sub>2</sub>-weighted images is one of the common MRI findings in splenic hamartomas. Non-fibrous splenic hamartomas are more common and MRI showed isointensity on T<sub>1</sub>-weighted images, hyperintensity on T<sub>2</sub>-weighted images<sup>[6,8]</sup>. Both of the tumors demonstrated diffuse heterogeneous enhancement on the hepatic artery phase or early dynamic contrast-enhanced scans, which became more uniformly enhanced on delayed images<sup>[3,5,8]</sup>. This case belonged to fibrous type and the MRI findings were similar to those in Fernandez-Canton's report besides obvious hyperintensity relative to the spleen on delayed images<sup>[3]</sup>. We agree with that diffuse progressive enhancement and prolonged enhancement were the characteristic radiological findings<sup>[5]</sup>.

In short, the following clinical features and radiographic findings may suggest the diagnosis of splenic hamartomas: (1) asymptomatic and incidental findings in adults; (2) possible association with hematologic symptoms such as pancytopenia, anemia, and thrombocytopenia or spontaneous rupture of splenic mass; (3) splenic mass with calcification or fatty components on plain CT, and isointensity on T<sub>1</sub>-weighted images, heterogeneous hyperintensity or hypointensity on T<sub>2</sub>-weighted images; (4) dense spreading enhancement and obviously prolonged enhancement on postcontrast CT and MRI. Though splenic hamartomas have some clinical and CT features, the final and exact diagnosis depends on histopathologic examination.

Splenic haemangioma should be differentiated from splenic hamartomas<sup>[8]</sup>. They have similar clinical and radiological findings. But the latter is manifested by splenic mass with calcification or fatty component on plain CT. The lesions appear isointense on T<sub>1</sub>-weighted images, heterogeneous hyperintense or hypointense on T<sub>2</sub>-weighted images. CT and MRI can demonstrate diffuse enhanced lesions on the hepatic artery phase or early dynamic contrast-enhanced scans. The typical CT and MRI features of the former include early peripheral nodular enhancement, hypointensity on T<sub>1</sub>-weighted images and homogeneous hyperintensity on T<sub>2</sub>-weighted images. Rare calcification and no fatty component of splenic haemangioma are seen on plain CT. In addition, splenic lymphoma and metastases were also considered to be different from splenic hamartomas<sup>[5,8]</sup>. Most of splenic lymphomas are multiple, secondary lesions and often have extra-splenic lymphoma. Splenic metastases usually have a history of primary extra-splenic malignant neoplasms and hepatic metastases. Both splenic lymphoma and metastases seldom have dense spreading enhancement or prolonged enhancement on post-contrast CT and MRI.

## REFERENCES

- 1 **Arber DA**, Strickler JG, Chen YY, Weiss LM. Splenic vascular tumors: a histologic, immunophenotypic, and virologic study. *Am J Surg Pathol* 1997; **21**: 827-835
- 2 **Zissin R**, Lishner M, Rathaus V. Case report: unusual presentation of splenic hamartoma; computed tomography and ultrasonic findings. *Clin Radiol* 1992; **45**: 410-411
- 3 **Fernandez-Canton G**, Capelastegui A, Merino A, Astigarraga E, Larena JA, Diaz-Otazu R. Atypical MRI presentation of a small splenic hamartoma. *Eur Radiol* 1999; **9**: 883-885
- 4 **Tang S**, Shimizu T, Kikuchi Y, Shinya S, Kishimoto R, Fujioka Y, Miyasaka K. Color Doppler sonographic findings in splenic hamartoma. *J Clin Ultrasound* 2000; **28**: 249-253
- 5 **Ohtomo K**, Fukuda H, Mori K, Minami M, Itai Y, Inoue Y. CT and MR appearances of splenic hamartoma. *J Comput Assist Tomogr* 1992; **16**: 425-428
- 6 **Thompson SE**, Walsh EA, Cramer BC, Pushpanathan CC, Hollett P, Ingram L, Price D. Radiological features of a symptomatic splenic hamartoma. *Pediatr Radiol* 1996; **26**: 657-660
- 7 **Chevallier P**, Guzman E, Fabiani P, Dib M, Oddo F, Padovani B. Fibrous splenic hamartoma: imaging features. *J Radiol* 1999; **80**: 1668-1671
- 8 **Ramani M**, Reinhold C, Semelka RC, Siegelman ES, Liang L, Ascher SM, Brown JJ, Eisen RN, Bret PM. Splenic hemangiomas and hamartomas: MR imaging characteristics of 28 lesions. *Radiology* 1997; **202**: 166-172
- 9 **Kumar PV**. Splenic hamartoma. A diagnostic problem on fine needle aspiration cytology. *Acta Cytol* 1995; **39**: 391-395
- 10 **Lee SH**. Fine-needle aspiration cytology of splenic hamartoma. *Diagn Cytopathol* 2003; **28**: 82-85
- 11 **Keogan MT**, Freed KS, Paulson EK, Nelson RC, Dodd LG. Imaging-guided percutaneous biopsy of focal splenic lesions: update on safety and effectiveness. *Am J Roentgenol* 1999; **172**: 933-937
- 12 **Hayes TC**, Britton HA, Mewborne EB, Troyer DA, Saldivar VA, Ratner IA. Symptomatic splenic hamartoma: case report and literature review. *Pediatrics* 1998; **101**: E10
- 13 **Fujii T**, Obara T, Shudo R, Tanno S, Maguchi H, Saitoh Y, Ura H, Kohgo Y. Splenic hamartoma associated with thrombocytopenia. *J Gastroenterol* 1997; **32**: 114-118
- 14 **Beham A**, Hermann W, Vennigerholz F, Schmid C. Hamartoma of the spleen with haematological symptoms. *Virchows Arch A Pathol Anat Histopathol* 1989; **414**: 535-539
- 15 **Wirbel RJ**, Uhlig U, Futterer KM. Case report: splenic hamartoma with hematologic disorders. *Am J Med Sci* 1996; **311**: 243-246
- 16 **Compton CN**, McHenry CR, Aijazi M, Chung-Park M. Thrombocytopenia caused by splenic hamartoma: resolution after splenectomy. *South Med J* 2001; **94**: 542-544
- 17 **Ferguson ER**, Sardi A, Beckman EN. Spontaneous rupture of splenic hamartoma. *J La State Med Soc* 1993; **145**: 48-52
- 18 **Yoshizawa J**, Mizuno R, Yoshida T, Kanai M, Kurobe M, Yamazaki Y. Spontaneous rupture of splenic hamartoma: a case report. *J Pediatr Surg* 1999; **34**: 498-499
- 19 **Kassarjian A**, Patenaude YG, Bernard C, Bell L. Symptomatic splenic hamartoma with renal, cutaneous, and hematological abnormalities. *Pediatr Radiol* 2001; **31**: 111-114
- 20 **Singh K**, Subbramaiah A, Choudhary SR, Bhasin DK, Wig JD, Radotra B, Nagi B. Splenic hamartoma with portal hypertension: a case report. *Trop Gastroenterol* 1992; **13**: 155-159
- 21 **Cualing H**, Wang G, Noffsinger A, Fenoglio-Preiser C. Heterotopic ovarian splenoma: report of a first case. *Arch Pathol Lab Med* 2001; **125**: 1483-1485

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