

# ABDOMINAL SPLENOSIS MIMICKING HEPATIC TUMOR: A CASE REPORT

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Diagnosis of abdominal splenosis is often undiagnosed until treatment for splenic rupture or splenectomy. This report describes a patient with splenosis mimicking hepatic tumor. The patient had a history of splenic trauma with splenectomy and chronic hepatitis C. After routine abdominal ultrasound revealed a liver nodule, further imaging studies, including magnetic resonance imaging, computed tomography and angiography, were performed. After the patient eventually underwent surgery, pathology revealed splenic tissue. Despite its distinguishable clinical features, splenosis is difficult to identify by modern imaging modalities. Therefore, accurate and timely diagnosis of this disease requires constant vigilance.

**Key Words:** computed tomography, hepatocellular carcinoma, magnetic resonance imaging, splenosis, ultrasound  
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Splenosis is the autotransplantation of splenic tissue after traumatic splenic rupture and surgery [1-4]. Splenosis was once thought to be rare, but is now commonly revealed by abdominal ultrasound (US) or abdominal surgery. Autotransplant of splenic tissue may occur anywhere in the body, but is most commonly observed in the peritoneal cavity. Splenosis is easily misinterpreted as a tumor condition. Treatment usually requires surgery and confirmation by pathology. This report describes the surgical treatment of a patient with splenosis mimicking a liver nodule.

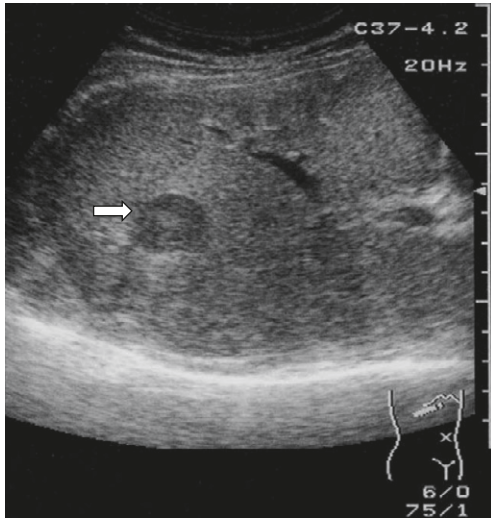
## CASE PRESENTATION

Regular US follow-up of a 64-year-old male hepatitis C carrier revealed a hepatic lesion. The patient had undergone splenectomy after a splenic rupture sustained in a traffic accident 8 years earlier. The patient had no discomfort or symptoms. Except for an incisional scar on the abdomen owing to previous surgery, physical examination was unremarkable. Serum blood count and chemistry findings were normal except for elevated aminotransferase levels (AST, 117 U/L [normal <42 U/L]; ALT, 178 U/L [normal <40 U/L]). The level of  $\alpha$ -fetoprotein was <3.0 ng/mL (normal <20 ng/mL). US examination revealed a small (2.5 cm), hypoechoic and round, clear margin nodule over segment six of the liver (Figure 1). Abdominal magnetic resonance imaging (MRI) revealed an exophytic tumor with intermediate to high signal in the T2-weighted



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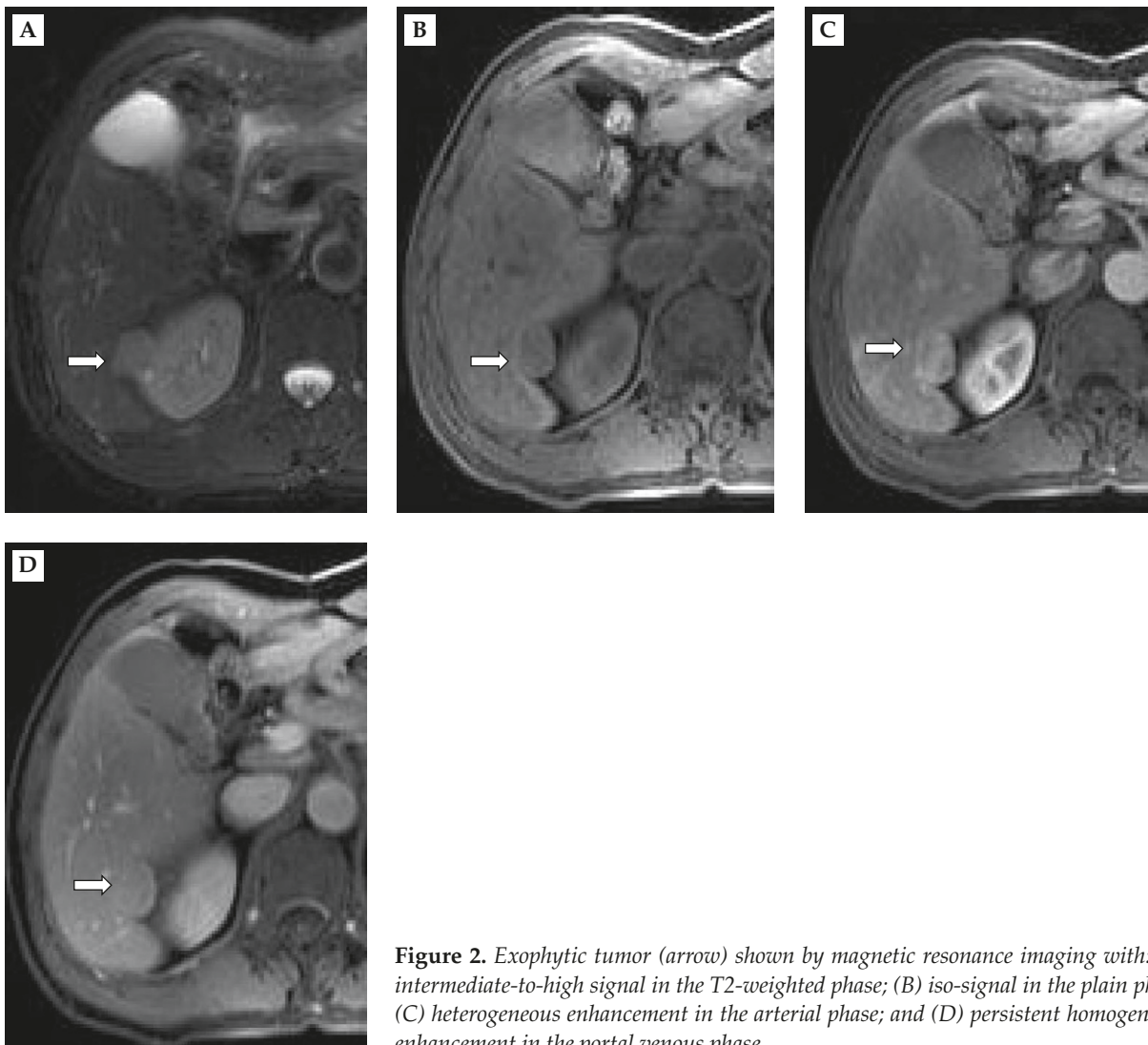
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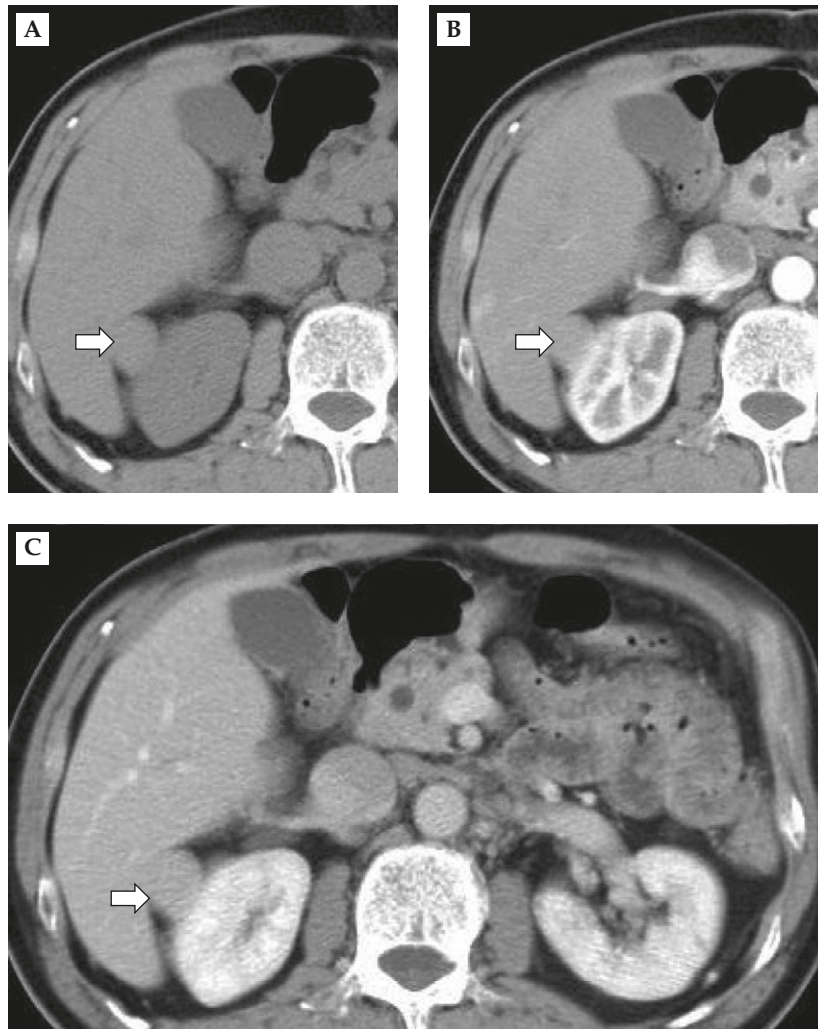
**Figure 1.** Ultrasound shows a small, hypoechoic nodule with clear margins in segment six of the liver (arrow).

phase (Figure 2A), iso-signal in the plain phase (Figure 2B), heterogeneous enhancement in the arterial phase (Figure 2C) and persistent homogeneous enhancement in the portal venous phase (Figure 2D).

Abdominal computed tomography (CT) revealed an exophytic liver tumor between the right lower lobe of the liver and right kidney, isodensity on plain film (Figure 3A) and persistent homogeneous enhancement in the arterial (Figure 3B) and portal venous phases (Figure 3C). Angiography revealed an exophytic tumor stain with blood supply via perirenal vessel (Figure 4). Tumor excision was performed for highly suspected hepatocellular carcinoma (HCC). A mass lesion adhering to S6 of the liver was identified and excised uneventfully. Histopathologic study revealed a capsulated spleen with a marked decrease in the white pulp component (Figure 5). The patient was discharged



**Figure 2.** Exophytic tumor (arrow) shown by magnetic resonance imaging with: (A) intermediate-to-high signal in the T2-weighted phase; (B) iso-signal in the plain phase; (C) heterogeneous enhancement in the arterial phase; and (D) persistent homogeneous enhancement in the portal venous phase.



**Figure 3.** Computed tomography shows an exophytic liver tumor between the right lower lobe of the liver and the right kidney (arrow): (A) isodense on plain film; (B) persistent homogeneous enhancement in the arterial phase; (C) persistent homogeneous enhancement in the portal venous phase.

uneventfully on the seventh postoperative day. Subsequent blood count test results were normal.

## DISCUSSION

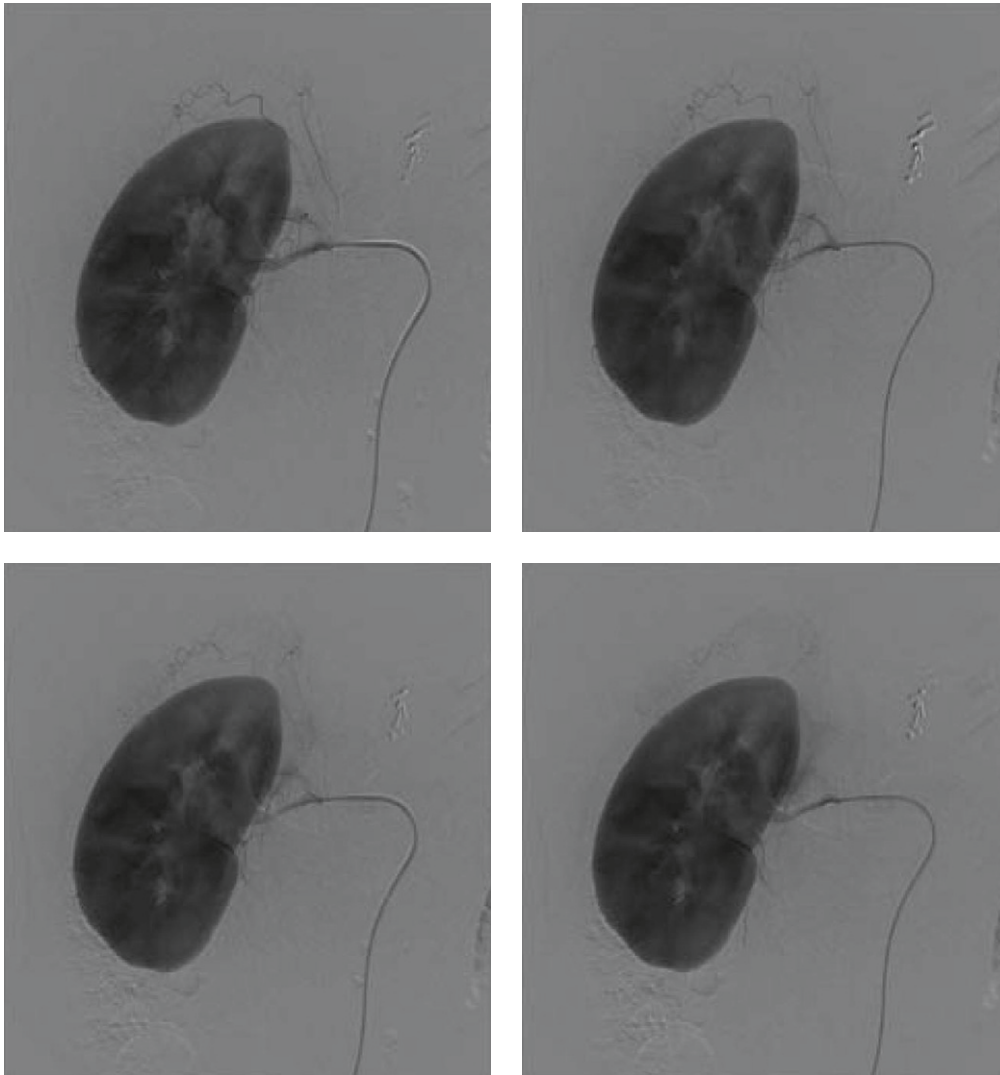
Splenosis is the autotransplantation of splenic tissue following either splenic trauma or surgery [1–4]. Although once considered rare, splenosis is now believed to occur in up to 67% of patients with splenic traumatic rupture; at least 100 cases have been reported to date [5–7]. Splenic autotransplants are usually small and multiple throughout the peritoneal cavity [8]. They can occur anywhere, but most commonly appear on the serosal surfaces of the small intestine, greater omentum, mesentery, undersurface of the diaphragm

and in the pelvis [9]. Thoracic and renal splenoses have also been reported and, depending on location, are often misdiagnosed as tumors.

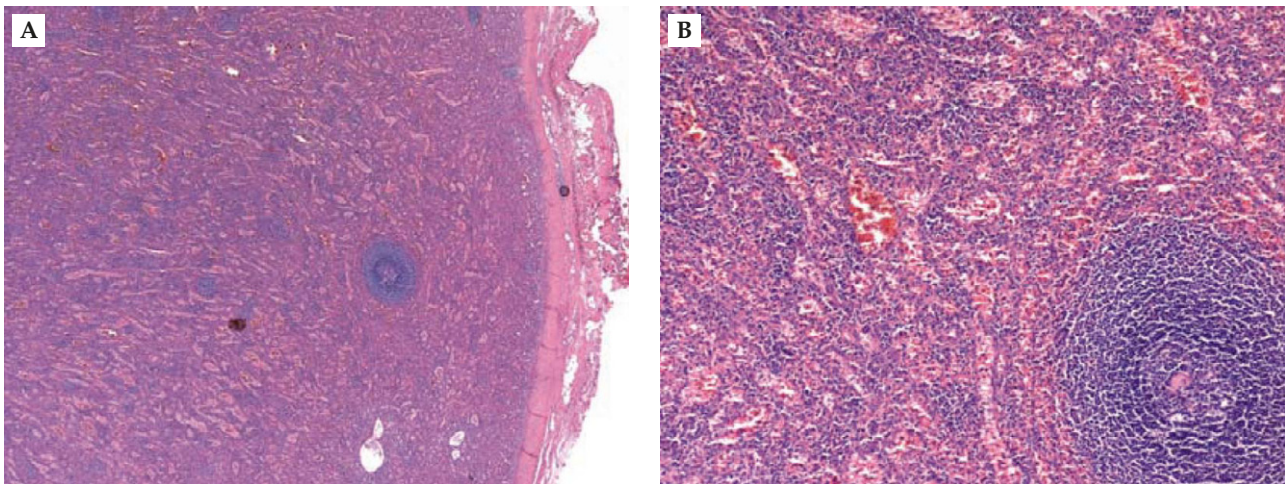
Splenosis is usually asymptomatic. Abdominal pain, recurring Felty syndrome, and intestinal obstruction have been reported [10].

On US, splenosis appears as a hypoechoic and homogeneous soft tissue mass with a thin rim of hyperechoic wall [11]. On CT, splenosis manifests as a variably shaped, multiple, homogeneous soft tissue mass with slightly lower density than the liver on contrast-enhanced scans, especially in the arterial phase [12]. On MRI, splenosis is hypointense to the liver on T1 imaging and hyperintense to the liver on T2 imaging [13].

The splenosis patient described here was a hepatitis C carrier with a history of splenic trauma and



**Figure 4.** Angiography shows exophytic tumor stain with blood supply via perirenal vessel.



**Figure 5.** Microscopy shows an encapsulated spleen with marked decrease in the white pulp component (hematoxylin & eosin): (A) 20 $\times$ ; (B) 100 $\times$ .

splenectomy. A single, small, round, hypoechoic liver nodule was found on routine abdominal US. Further MRI, CT and angiography could not exclude HCC. Surgery was performed, and the pathology revealed splenosis.

Differentiating between splenosis and HCC or other liver tumors by modern imaging modalities, such as US, CT, MRI or even angiography, is difficult because splenosis has no typical radiographic indications. Only histology can confirm splenosis before surgery. As in this patient, surgery is always the least desirable treatment modality. Some researchers have stated that scintigraphic imaging, particularly <sup>99m</sup>technetium heat-damaged red cell scanning, is the most sensitive and specific of all imaging modalities [14]. Other researchers, however, have questioned whether splenic filtering and immunologic function are preserved after splenectomy [15].

In conclusion, splenosis has highly specific clinical indications. The disease usually presents as a small, round and hypoechoic nodule. Modern imaging modalities cannot clearly distinguish this condition from tumors. For accurate and timely diagnosis, physicians should be alert to the possibility of splenosis when treating patients with a history of splenic trauma or surgery. Scintigraphy with heat-damaged red blood cells should also be performed. Fine-needle aspiration biopsy is also recommended to confirm the diagnosis and avoid unnecessary surgery.

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# 以肝腫瘤為表現之腹腔內 Splenosis

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腹腔內 **splenosis** 在脾臟破裂或切除後可能發現。且經常是意外發現。我們提出一個以肝腫瘤來表現之 **splenosis** 病例。病人有因脾臟創傷施行脾臟切除及慢性 C 型肝炎之病史。常規超音波檢查發現肝結節。進一步的影像學檢查包括磁振造影，電腦斷層掃瞄及血管攝影。最後病人接受手術，病理報告顯示為脾組織。近代的影像學檢查無法很好地區別診斷儘管 **splenosis** 有其特別臨床表徵。要作正確的診斷，最重要的還是對此疾病的警覺。

**關鍵詞：**電腦斷層掃瞄，肝癌，磁振造影，**splenosis**，超音波

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