

Abdominopelvic ectopic spleen with a comprehensive imaging examination: a case report

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Abstract

Ectopic spleen is a rare clinical malformation in which the spleen is relocated from its normal anatomical position to other parts of the abdomen. We report a rare case of abdominopelvic ectopic spleen caused by splenic ligament deficiency. A patient experienced intermittent pain in the left upper abdomen that was progressively aggravated. This was confirmed by comprehensive imaging examinations and postoperative pathology. We also performed a review of the literature on the current state of the field. Our data may help to improve the diagnosis and treatment of ectopic spleen.

Keywords

Abdominopelvic pain, ectopic spleen, imaging examination, congestive splenomegaly, torsion, splenectomy

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Introduction

Ectopic spleen is a rare condition,^{1,2} which is widely believed to occur because of laxity or the absence of normal ligaments (congenital or postnatal), such as the splenogastric, splenorenal, or splenocolic ligaments.²⁻⁵ The clinical symptoms of this condition are non-specific and related to the ectopic site or the presence of complications, such as torsion and compression. In this report, we describe a case of abdominopelvic ectopic spleen with progressive abdominal pain that was caused by exacerbation of torsion in an enlarged spleen. The entire procedure of diagnosis and surgical resection were reviewed to improve the current understanding of this condition. We present the following case report by following the CARE Guidelines.⁶

Case report

A 15-year-old female patient with recurrent abdominal pain for the previous 2 years presented to our hospital. The patient had obvious inducement of left upper abdominal pain throughout the last 2 years that was progressive and radiating towards the waist and abdomen. This pain was relieved after lying flat. The patient was referred to the hospital owing to aggravation of abdominal pain, particularly in the afternoon. The patient did not have a fever, was not vomiting, and did not have yellowing of the skin or sclera, breathing difficulties, or other accompanying symptoms. The family history was negative for these malformations.

A physical examination of the patient showed a large, soft mass located in the right lower abdomen with an impalpable lower pole accompanied by tenderness and without rebound tenderness. Murphy's sign was negative and no other obvious abnormalities were found. Laboratory tests, including a blood cell count, electrolytes, and liver function, routine stool and occult blood test, tumor-related markers, serum protein

electrophoresis, and a neurological examination were normal. Multi-detector computed tomography (CT) showed that the spleen was not in its normal anatomical position and was located in the hypogastrium/pelvic cavity (Figure 1a). The maximum cross-sectional area was approximately $19 \times 15 \times 8$ cm. Computed tomography angiography (CTA) showed tortuosity and varicosity of the splenic vessels (Figure 1b-d) and chronic splenic congestion. These abnormal appearances were further clarified by abdominal magnetic resonance imaging (MRI), which showed the relationship between the spleen and peripheral organs (Figure 2). Color Doppler flow imaging (CDFI) showed that the spleen and its internal blood flow were not present in the left upper abdomen, but in the pelvis instead (Figure 3). Surgery was performed because the patient had aggravation of abdominal pain and this may have been associated with torsion of the spleen.

During surgery, the spleen was observed in the right lower abdomen. The spleen reached the pelvic cavity and was approximately $20 \times 15 \times 7$ cm in size with no adhesion. Varices were observed in the gastric fundus and the gastric corpus. The splenic pedicle was separated and dissected. The splenic artery and vein were carefully ligated and the spleen was placed into an extractor and completely removed from the incision. Postoperative pathology confirmed an ectopic spleen and chronic congestive splenomegaly (Figure 4). The patient was discharged postoperatively within 10 days with no complications. The patient's pain did not reoccur during follow-up.

Discussion

Ectopic spleen often occurs in the hilum of the spleen and its adjacent tissues. However, a few cases can occur in the liver, adrenal glands, ovaries, scrotum, or pelvic cavity.^{2,7} In cases where the spleen

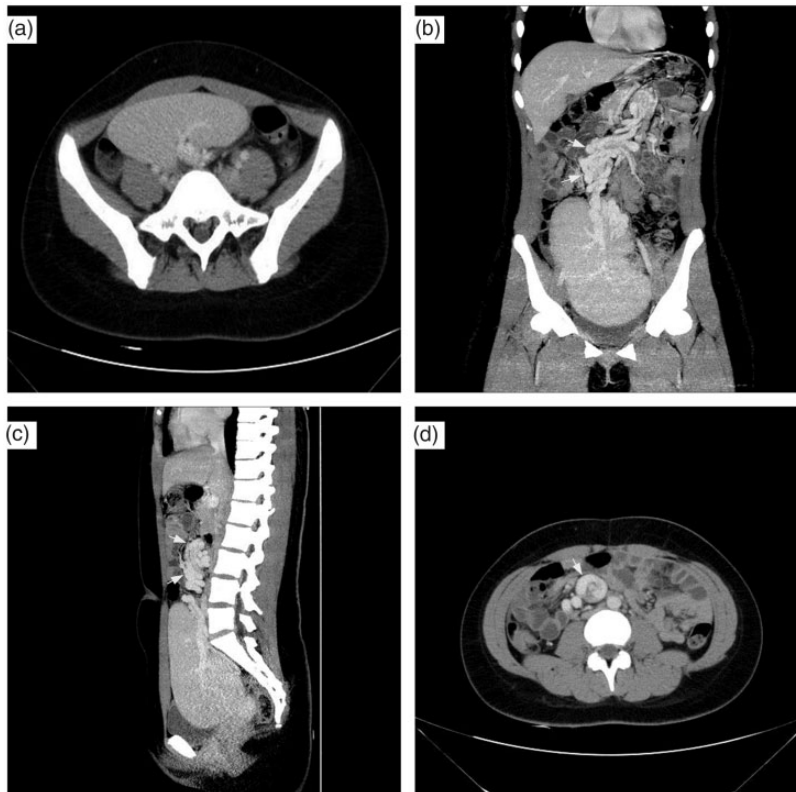


Figure 1. Abdominal plain computed tomography shows that the spleen is located in the hypogastrium/pelvic cavity (a). Multiplanar computed tomography angiography shows splenic varicosity and tortuosity (b–d, light yellow arrows).

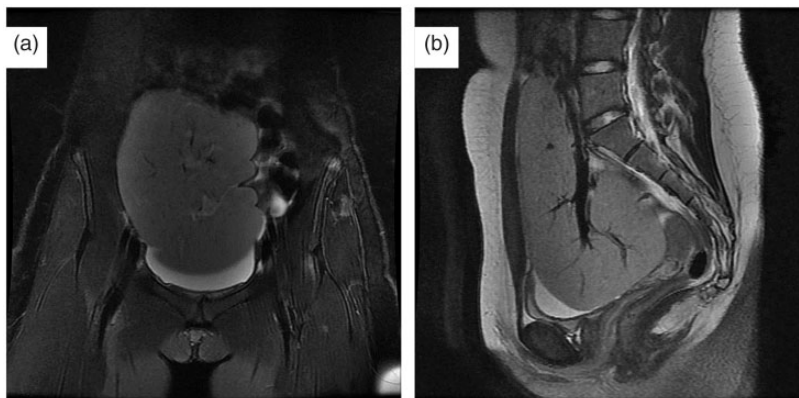


Figure 2. Magnetic resonance imaging shows that the organs around the ectopic spleen are compressed and displaced, and the boundary is clear. Coronal short-T1 inversion recovery (a). Sagittal T2-weighted imaging (b).

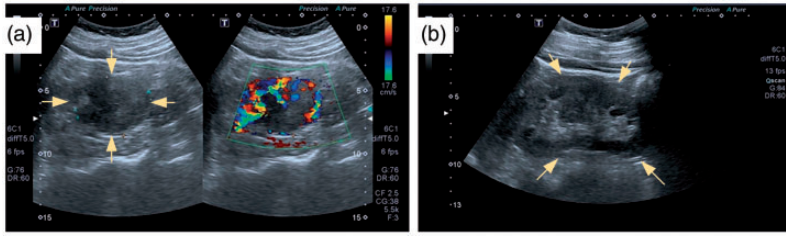


Figure 3. Color Doppler flow imaging shows blood flow in the ectopic spleen, and no obvious infarcted area was found (a and b, light yellow arrows).

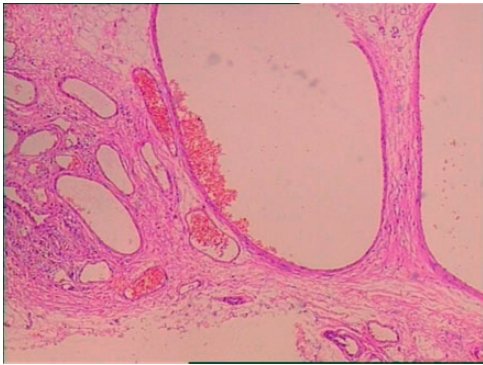


Figure 4. Histopathology confirms a heterotopic spleen and chronic hyperemia of the spleen.

can be returned to the spleen bed, the condition is referred to as wandering spleen. The incidence of ectopic spleen is higher in multiparous women aged between 20 and 40 years.⁸ Congenital factors, such as dysplasia of the dorsal gastric mesentery, and postnatal factors, such as trauma, splenomegaly, and pregnancy, can lead to relaxation or loss of ligaments that fix the spleen, resulting in heterotopia of the spleen.²⁻⁵ In our case, we found that the ligaments around the spleen were absent and were considered as the main cause of a heterotopic spleen.

Most patients with ectopic spleen show no obvious clinical symptoms. However, these patients may have recurrent bouts of abdominal pain, mostly due to brief ischemia caused by intermittent torsion or the

ectopic spleen oppressing the surrounding organs.⁹ In the current case, the intermittent abdominal pain was also caused by distortion of splenic vessels as a result of the twisting of the enlarged spleen that resulted in intermittent ischemia. CTA showed circuitous blood vessels. The incidence of torsion or compression may be progressive if the ectopic spleen is untreated.¹

Surgery is the main treatment option for ectopic spleen, but the optimum surgical approach remains controversial. We decided to perform splenectomy because of the intermittent progressive abdominal pain experienced by the patient along with portal hypertension and the risk of hypersplenism. The choice of laparoscopic or open abdominal surgery for splenectomy is often problematic in patients with splenomegaly. Hand-assisted laparoscopic splenectomy is recommended by the European Association of Endoscopic Surgeons in the case of splenomegaly.¹⁰ The value of laparoscopic splenectomy for patients with splenomegaly has been confirmed.¹¹ However, selection of the specific operation methods for ectopic spleen should be based on the size and location of the spleen and the presence of complications.

In the present case, the risk of laparoscopic splenectomy was high owing to the narrow surgical space caused by the massive splenomegaly¹⁰ and twisted blood vessels. Therefore, open splenectomy was adopted. Recently, splenopexy has been

recommended by some physicians as a supplementary treatment for ectopic spleen,^{9,12,13} which needs to be combined with clinical comprehensive judgment. Splenopexy can be selected for asymptomatic or young patients. However, for patients with a long spleen pedicle or with complications, such as torsion, splenectomy is chosen to avoid recurrence.¹⁴ Early repair of ectopic spleen results in a low incidence of complications.

In conclusion, CTA, MRI, or CDFI is necessary to avoid misdiagnosis and can show the location of the spleen and blood flow in ectopic spleen. CTA can further determine the location and scope of the ectopic spleen. CTA can also show the direction of blood vessels in the ectopic spleen and detect variations and torsions if present. MRI, particularly diffusion MRI sequences,¹⁵ are useful and necessary complementary techniques to distinguish ectopic spleen from other tumor lesions. The imaging features of tortuosity and varicosity of splenic vessels and accompanying anomalies can help physicians to choose the most suitable treatment.

Ethics statement

This study was approved by the Ethics Committee of Yantai Yuhuangding Hospital and all of the patient's details have been de-identified. We obtained consent from the patient for treatment. Written consent for publication of the manuscript and related images was obtained from the patient and/or their relatives, as well as by Qingdao University Medical College Affiliated Yantai Yuhuangding Hospital.

Availability of data and materials

The data related to this case report were obtained from diagnostic examinations that the patient underwent during her hospitalization. Publication of these data has been authorized by Qingdao University Medical College Affiliated Yantai Yuhuangding Hospital.

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Declaration of conflicting interest


The authors declare that there is no conflict of interest.

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