CASE REPORT

Splenic torsion: a rare cause of abdominal pain

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SUMMARY

Splenic torsion is an exceedingly rare but clinically important disease process that should be recognised promptly by the treating physician. In this condition, there is twisting of the spleen along its vascular pedicle, subsequently leading to abdominal pain in the setting of organ ischaemia. Vascular thrombosis and splenic infarction may ensue. Torsion has been described in cases of a known wandering spleen. Abnormal development of the splenic suspensory ligaments may predispose a patient to a wandering spleen. Treatment of splenic torsion is typically surgical, with goals of preservation of the spleen if possible.

We present a case of a young woman who presented with left-sided chest and abdominal pain and was found to have splenic torsion with complete splenic infarction. Surgical intervention was required, and splenectomy was performed. In this case presentation, we outline the multidisciplinary approach needed to care for the patient with this rare condition.

BACKGROUND

Splenic torsion is a rare clinical entity, but it requires thorough investigation in the emergency department (ED) to appropriately diagnose and prevent significant complications. Significant morbidity and mortality can be associated with this diagnosis, and it is imperative for the ED physician to promptly recognise and treat patients presenting with this clinical entity. Furthermore, the clinician needs to be alert of alternative diagnoses, such as acute lymphoma, splenic sequestration crisis, arterial embolism or in situ venous thrombosis, all of which may present in a similar fashion.

In general, a multidisciplinary approach should be considered, using the history and the physical examination to guide appropriate consultation with Radiology and General Surgery. Aggressive treatment is appropriate for most patients with surgical intervention being required in most instances for definitive measures.

CASE PRESENTATION

A 33-year-old woman presented to the ED with 2 days of intermittent left-sided chest and upper abdominal discomfort. The pain would also occasionally radiate into the left mid-back region. She denied any shortness of breath. She reported a medical history significant for tetralogy of Fallot with repair as a child as well a remote history of idiopathic splenic vein thrombosis 4 years prior. Physical examination was significant for abdominal tenderness in the left upper quadrant along with

left lateral chest wall discomfort to palpation. The patient had no evidence of ecchymoses or abdominal distension in the area of her discomfort. There was no reported current use of anticoagulants.

Initial vitals were normal without tachycardia, fever or hypotension. These vitals remained stable during her ED course. Laboratory evaluation was significant for a leucocytosis to $19.9 \times 10^9/L$, haemoglobin of 11.4 g/dL, thrombocytopenia to $102 \times 10^9/L$, normal liver function tests and an undetectable troponin. ECG revealed a normal sinus rhythm without ST-segment elevation or depression.

Given the concern for an intrathoracic and intra-abdominal process, CT of the chest, abdomen and pelvis with contrast was performed. This revealed twisting of the splenic vessels with complete lack of splenic opacification concerning for splenic infarction (figures 1 and 2). This was presumed to be secondary to splenic torsion. There was no evidence of hemoperitoneum or free fluid. There was mild elevation of the left hemidiaphragm but no pulmonary arterial filling defects. Also noted were postoperative changes from her tetralogy of Fallot repair. No notation was made on CT of a possible 'wandering' spleen.

General Surgery was consulted given the findings on the CT imaging. Duplex ultrasonography of the splenic vessels, pain control, intravenous fluids and admission were recommended by the General Surgery team. Initially, a watchful observation approach was taken to avoid any unnecessary surgical intervention.

Duplex ultrasonography revealed absence of flow in the splenic vein at the hilum and high resistance waveform with reversal of diastolic flow in the visualised splenic artery branches. These findings corresponded with the previously noted CT findings concerning for splenic infarction secondary to torsion of the spleen. This gave additional objective information to the General Surgery team to confirm the high likelihood of splenic torsion.

Approximately 12 hours after admission to the surgical service, the patient reported ongoing and worsening pain; therefore, operative evaluation (using a minimally invasive laparoscopic approach) with possible splenectomy was recommended. The patient agreed to this plan, and she proceeded to the operating room.

Intraoperatively, the patient was noted to have an obvious torsed spleen with a dark purple appearance. There were no apparent diaphragmatic or colonic attachments noted to the spleen, suggestive of a 'wandering' spleen. There was note of complete torsion and subsequent swelling at the vascular

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Figure 1 Axial CT imaging of the abdomen revealing vascular pedicle twisting or swirling (red circle).

pedicle where the splenic artery and splenic vein entered the hilum of the spleen. There was no evidence of hemoperitoneum. The hilar structures were stapled and complete transection of the vessels at the hilum was performed. Haemostasis was achieved and there was no significant blood loss. No pancreatic involvement was noted. The abdomen was then closed in the usual fashion.

The patient's hospital course was uncomplicated. She had postoperative thrombocytopenia with a nadir of $62 \times 10^9/L$. She was transfused one pheresis unit of platelets on postoperative day 1; her subsequent platelet counts were greater than $100 \times 10^9/L$. She had presumptive dilutional anaemia while in the hospital

Figure 2 Coronal CT imaging of the abdomen revealing vascular pedicle twisting or swirling (red circle), as well as splenic enlargement with complete lack of splenic opacification indicative of splenic infarction.

with a haemoglobin nadir of 8.1 g/dL, but she did not require packed red blood cell transfusion. She was discharged on post-operative day 2 in good condition, tolerating an oral diet, and with minimal abdominal discomfort.

INVESTIGATIONS

CT imaging and duplex ultrasonography were performed (as described above).

DIFFERENTIAL DIAGNOSIS

The differential diagnosis includes acute lymphoma, splenic sequestration crisis, arterial embolism or splenic venous thrombosis.

TREATMENT

Consultation with General Surgery and Radiology was needed to appropriately treat this patient, along with operative intervention for definitive measures.

OUTCOME AND FOLLOW-UP

In follow-up, patient saw Infectious Disease approximately 1 week after discharge for the following preventative vaccinations given her recent splenectomy: meningococcus vaccine, *Haemophilus influenzae* vaccine and pneumococcal conjugate vaccine. Also, she was seen in the outpatient Surgery clinic in follow-up 3 weeks after her surgery and was doing quite well without any complaints or complications noted.

DISCUSSION

Splenic torsion is a rare but clinically important cause of abdominal pain that should be recognised promptly by the treating clinician. The described incidence rate is less than 0.2%.¹ Predisposition occurs from abnormal development of splenic suspensory ligaments, sometimes called a 'wandering' spleen. However, diagnosis of a 'wandering' spleen is difficult because the patient is typically asymptomatic until splenic torsion occurs. Literature review showed only 51 diagnosed cases of wandering spleen in children from 1900 to 1991.² Abnormal development of the dorsal mesogastrium has been associated with 'wandering' spleen.^{3 4} This risk is also increased in multiparous women, prune-belly syndrome, splenic cysts, Hodgkin disease, malaria and lymphangioma.^{5 6} Additionally, patients may become at risk for developing 'wandering' spleen after certain surgical interventions, and clinicians must be alert to this possibility in the older patient.⁷

Diagnosis of splenic torsion is generally made using contrast-enhanced CT imaging. Duplex ultrasonography of the splenic vessels can also help clinch the diagnosis. The associated complications of splenic torsion include infarction due to arterial occlusion, gangrene, functional asplenism and venous thrombosis. If there is involvement of nearby abdominal structures, pancreatitis, intestinal obstruction or gastric volvulus may occur.⁸ Patients with 'wandering' spleen may also present initially with bowel obstruction or hemoperitoneum.^{9 10}

This condition must be differentiated from other splenic pathology in order to rule out potential aetiologies such as lymphoma or splenic sequestration crisis. Treatment and prognosis of splenic torsion is related to the duration of symptoms and the degree of splenic infarction. Aggressive treatment is appropriate for most patients with surgical intervention being the rule for splenic preservation if possible (splenopexy) or splenectomy in cases of an infarcted spleen.^{11 12} In order to prevent overwhelming post-splenectomy infection in patients who must

undergo splenectomy, vaccination is recommended as a preventative strategy. Splenectomised patients are at particular risk for infection from encapsulated organisms such as pneumococcus, meningococcus and *H. influenzae*, and fortunately vaccines are available for these such organisms.¹³

Learning points

- ▶ Splenic torsion is a rare cause of abdominal pain and may be secondary to insufficient development of suspensory ligaments (also known as a 'wandering' spleen).
- ▶ Diagnosis of splenic torsion is typically made with contrast-enhanced CT.
- ▶ Treatment is usually with aggressive surgical intervention with splenectomy in cases of complete splenic infarction.

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