Torsion of a Wandering Spleen Involving the Pancreatic Tail and Splenic Flexure and Isolated Left-Sided Portal Hypertension due to Chronic Splenic Vein Thrombosis

Manohar Kachare¹ Pooja Jaisinghani¹

¹Department of Radiodiagnosis, Government Medical College Miraj, Miraj, Maharashtra, India

Abstract
Wandering spleen is a rare entity, wherein the spleen is attached only by an elongated vascular pedicle, predisposing it to complications like hilar torsion, infarction, rupture, etc. Pancreatic volvulus is another very rare anomaly, with isolated case reports described in association with wandering spleen. The presentation varies from asymptomatic lump (stimulating a mass) to acute abdomen (due to torsion). We present a case of 26-year-old female patient who complained of pain in abdomen, and was radiologically diagnosed and surgically confirmed to have a torsion of wandering spleen with involvement of pancreatic tail and splenic flexure. Few cases with associated finding of gastric volvulus and sigmoid volvulus have been described previously. Involvement of descending colon in a 9-year-old child has been reported. However, to the authors’ knowledge, this is the first case report describing the combination of wandering spleen with splenic flexure and pancreatic tail involvement in an adult.

Keywords
► wandering spleen
► torsion
► volvulus
► CT
► ultrasound

Introduction
Wandering spleen, also called as floating spleen, ectopic, or ptotic spleen, is a rare clinical entity which is found in < 0.2% of splenectomies.¹ It results from congenital or acquired hyperlaxity of peritoneal splenic ligaments allowing the spleen to essentially drop to the lower abdomen by the force of gravity attached only to its abnormally elongated vascular pedicle.² Rarely, there might be involvement of adjacent organs in the torsed splenic pedicle. Most cases are asymptomatic initially and present to the emergency department only after development of complications. Hence, proper understanding of a wandering spleen and its complications is necessary to choose whether to perform a splenectomy (in case of an infarcted spleen) or splenopexy (in case of a viable spleen).

Herein, we present a case of 26-year-old female patient with torsion of wandering spleen, splenomegaly, splenenculi, and left-sided portal hypertension due to isolated splenic vein thrombosis secondary to volvulus of tail of pancreas and splenic flexure.

Case Report
A 26-year-old multiparous female presented to the emergency department with complaints of lower abdominal pain. There was no history of fever, prior surgeries, or trauma. She had a similar episode of abdominal pain 9 months back which relieved on medication. Patient had undergone elective lower segment caesarean section (LSCS) 1 year ago, in view of previous LSCS and
severe oligohydramnios. Family history was unremarkable.

Physical examination revealed that she was afebrile and vitals were stable. On palpation, a large palpable mobile lump in mid-abdomen and suprapubic area with no significant tenderness around the mass and with no rebound tenderness and guarding was observed. Laboratory findings revealed leukocytosis of 19,400/mm³, anemia (hemoglobin = 10.2), and normal platelet count.

Ultrasonography of the abdomen and pelvis revealed empty splenic fossa, massively enlarged hypoechoic spleen measuring 25 cm in the lower abdomen and pelvis, and mild ascites. Color Doppler study showed absence of color flow in splenic vein suggesting splenic vein thrombosis. Splenic artery showed reduced diastolic flow on Doppler.

Contrast-enhanced computed tomography (CT) scan confirmed the ectopic location of spleen in pelvis. The elongated pedicle had twisted around itself several times giving a whirled appearance diagnostic of torsion. The tail of pancreas and splenic flexure had also twisted along the pedicle suggestive of volvulus. However, no signs of pancreatitis or bowel obstruction were seen. Hyperdense nonenhancing thrombus was noted along the splenic vein. Left gastric and gastroepiploic venous collaterals were also identified suggestive of gastric varices. Mild ascites was also seen. Two splenenculi of size 12 × 9 and 26 × 18mm were seen in splenic fossa.

Diagnosis of torsion of wandering spleen with involvement of pancreatic tail and splenic flexure and chronic splenic vein thrombosis with asymptomatic isolated left-sided portal hypertension was made.

The patient underwent laparotomy and an enlarged spleen with areas of hemorrhagic infarcts was seen in the pelvis and lower abdomen. All the radiological findings described above were confirmed. No reperfusion was demonstrated after detorsion of the spleen and hence splenectomy was done.

The histopathology report suggested that the enlarged spleen was nonviable, had thrombi in blood vessels with extensive areas of hemorrhagic necrosis in the parenchyma (Figs. 1–10).

Fig. 1 Ultrasonographic image shows abnormal location of spleen (star) in pelvis, in close proximity to urinary bladder (arrow).

Fig. 2 Triplex Doppler image showing hypoechoic spleen with absence of color flow on color Doppler and no spectral waveform.

![Image](image1.png)

![Image](image2.png)
Wandering spleen is a rare condition wherein spleen is found in an abnormal location within the abdominal or pelvic cavity due to hyperlaxity, underdevelopment, or absence of splenic suspensory ligaments. It has a bimodal distribution pattern with the first peak in children less than 10 years and the second peak in women of child-bearing age group. Anomalous development of dorsal mesogastrium resulting in failure of its fusion to posterior peritoneum is the hypothesis in congenital cases that present before 10 years. It leads to absence or abnormal development of one or more of gastrospenic, splenorenal, or phrenicocolic ligaments which hold the spleen in its normal position attached to the surrounding viscera. The absence of the splenorenal ligament makes the pancreas not completely retroperitoneal, with its tail localized within the splenic hilum. Acquired

**Discussion**

Wandering spleen is a rare condition wherein spleen is found in an abnormal location within the abdominal or pelvic cavity due to hyperlaxity, underdevelopment, or absence of splenic suspensory ligaments. It has a bimodal distribution pattern with the first peak in children less than 10 years and the second peak in women of child-bearing age group. Anomalous development of dorsal mesogastrium resulting in failure of its fusion to posterior peritoneum is the hypothesis in congenital cases that present before 10 years. It leads to absence or abnormal development of one or more of gastrospenic, splenorenal, or phrenicocolic ligaments which hold the spleen in its normal position attached to the surrounding viscera. The absence of the splenorenal ligament makes the pancreas not completely retroperitoneal, with its tail localized within the splenic hilum. Acquired

**Fig. 3** Noncontrast computed tomography (CT) image shows ectopic location of spleen in pelvis and hyperdense thrombus in splenic vein (arrow) in a torsed splenic pedicle.

**Fig. 4** Curved multiplanar reconstruction (MPR) in venous phase of contrast-enhanced computed tomography (CT) shows abnormal position of enlarged spleen with elongated pedicle, hyperdense non-enhancing thrombus in splenic vein, and splenunculus in splenic fossa. The elongated pedicle is twisted upon itself with hypodense areas of intervening fat.

**Fig. 5** Curved multiplanar reconstruction (MPR) in arterial phase of contrast-enhanced computed tomography (CT) showing enlarged spleen extending from periumbilical region up to pelvis with elongated splenic pedicle in a case of torsion of wandering spleen. Involvement of splenic flexure and pancreatic tail in the torsed pedicle is also seen.

**Fig. 6** Intraoperative image showing torsion of the elongated splenic pedicle in a case of wandering spleen.
cases are most likely due to multiparity, hormonal changes during pregnancy, connective tissue disorders, splenomegaly (due to lymphoma, malaria, chronic myeloid leukemia), trauma, and abdominal wall weakness. Thus, an elongated pedicle predisposes to torsion. In a systematic review, splenic torsion was diagnosed in 56% of pediatric patients with wandering spleen. Torsion usually occurs counterclockwise, leads to chronic stasis in splenic vein, increased backpressure in splenic vein, parenchymal congestion, splenomegaly, and hypersplenism. Impaired venous return results in retrograde filling of short gastric and left gastroepiploic veins. Decompression of splenic venous outflow occurs through the short gastric veins, coronary vein, and left gastroepiploic veins, producing gastric varices. Thus, wandering spleen is an extremely rare cause of left-sided portal hypertension and gastric variceal bleeding.

Imaging plays a key role in establishing the diagnosis. Plain abdominal radiographs may show absence of splenic silhouette and presence of small bowel loops in the left upper quadrant; however, in most cases the findings are not conclusive. Ultrasonography can help demonstrate an empty splenic fossa, localize the position of the wandered spleen,
Table 1 Literature review of cases of wandering spleen with pancreatic volvulus

<table>
<thead>
<tr>
<th>No</th>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Parity</th>
<th>Clinical features</th>
<th>Additional radiology findings</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sheflin et al</td>
<td>1984</td>
<td>33</td>
<td>F</td>
<td>_</td>
<td>Acute abdomen</td>
<td>_</td>
<td>Laparotomy</td>
</tr>
<tr>
<td>2</td>
<td>Parker et al</td>
<td>1984</td>
<td>28</td>
<td>F</td>
<td>_</td>
<td>Nausea, vomiting, abdominal pain, palpable mass</td>
<td>_</td>
<td>Splenectomy, distal pancreatectomy</td>
</tr>
<tr>
<td>3</td>
<td>Moll et al</td>
<td>1996</td>
<td>30</td>
<td>F</td>
<td>Nulliparous</td>
<td>Acute abdomen, thrombocytopenia</td>
<td>Right adnexal mass</td>
<td>Splenectomy</td>
</tr>
<tr>
<td>4</td>
<td>Ugolini et al</td>
<td>2000</td>
<td>40</td>
<td>F</td>
<td>_</td>
<td>Acute abdomen, nausea, vomiting</td>
<td>_</td>
<td>Exploratory laparotomy, splenectomy</td>
</tr>
<tr>
<td>5</td>
<td>Karaosmanoglu et al</td>
<td>2015</td>
<td>22</td>
<td>F</td>
<td>N/S</td>
<td>Acute abdominal pain, distension, nausea</td>
<td>_</td>
<td>Selenography</td>
</tr>
<tr>
<td>6</td>
<td>Gilman and Thomas</td>
<td>2003</td>
<td>24</td>
<td>F</td>
<td>Multiparous</td>
<td>Acute pancreatitis, acute abdominal pain, nausea, and vomiting with p/h/o operated diaphragmatic hernia</td>
<td>_</td>
<td>Splenectomy</td>
</tr>
<tr>
<td>7</td>
<td>Lacresse et al</td>
<td>2007</td>
<td>5</td>
<td>Fch</td>
<td>_</td>
<td>Intermittent abdominal pain with bilious vomiting</td>
<td>_</td>
<td>Laparoscopic splenopexy</td>
</tr>
<tr>
<td>8</td>
<td>Feroci et al</td>
<td>2008</td>
<td>15</td>
<td>M</td>
<td>_</td>
<td>Acute abdomen, distension,</td>
<td>_</td>
<td>Splenectomy</td>
</tr>
<tr>
<td>9</td>
<td>Magno et al</td>
<td>2011</td>
<td>3</td>
<td>Mch</td>
<td>_</td>
<td>Persistent vomiting, upper abdominal pain, and pancreatitis</td>
<td>_</td>
<td>Laparoscopic splenopexy</td>
</tr>
<tr>
<td>10</td>
<td>Gorsi et al</td>
<td>2014</td>
<td>16</td>
<td>M</td>
<td>_</td>
<td>Acute abdomen (mesentricoaxial)</td>
<td>Gastric volvulus</td>
<td>Open laparotomy, splenectomy, splenopexy, gastrojejunostomy</td>
</tr>
<tr>
<td>11</td>
<td>Flores-Rios et al</td>
<td>2015</td>
<td>22</td>
<td>F</td>
<td>N/S</td>
<td>Acute abdomen and vomiting</td>
<td>Mesentericoaxial gastric volvulus, right-sided descending colon, and sigmoid colon</td>
<td>Upper GI endoscopy</td>
</tr>
<tr>
<td>12</td>
<td>Torri et al</td>
<td>2015</td>
<td>13</td>
<td>F</td>
<td>_</td>
<td>Abdominal pain, nausea, fever</td>
<td>_</td>
<td>Laparoscopic splenectomy</td>
</tr>
<tr>
<td>13</td>
<td>Aswani et al</td>
<td>2015</td>
<td>14</td>
<td>F</td>
<td>_</td>
<td>Acute abdomen with bilious vomiting</td>
<td>Diaphragmatic hema with an intrathoracic gastric volvulus</td>
<td>Herniorrhapsy, gastropexy, and splenopexy</td>
</tr>
<tr>
<td>14</td>
<td>Ahmadi and Tehrani</td>
<td>2016</td>
<td>14</td>
<td>F</td>
<td>_</td>
<td>Periumbilical pain</td>
<td>Sigmoid volvulus</td>
<td>Exploratory laparotomy, splenectomy</td>
</tr>
<tr>
<td>15</td>
<td>Seif Amir Hosseini et al</td>
<td>2018</td>
<td>9</td>
<td>Mch</td>
<td>_</td>
<td>Acute abdomen</td>
<td>Distal MPD dilatation, descending colon involvement</td>
<td>Exploratory laparotomy, splenectomy</td>
</tr>
</tbody>
</table>
and demonstrate splenomegaly if present. Echotexture of the spleen gives a clue in regards to the extent of complications, for example, a hypoechoic spleen with dilated hypechoic thrombus in splenic vein suggests splenic vein thrombosis with infarction due to torsion. Color Doppler study helps to evaluate the blood flow in the parenchyma and in the splenic vessels. Tomographic examinations such as contrast-enhanced CT or magnetic resonance imaging (MRI) help us identify involvement of adjacent visceras and correctly identify accessory splenic tissue, if present. CT confirms the abnormally positioned spleen, most commonly in the pelvis due to the effect of gravity. The “whirl sign” of the splenic pedicle is highly specific and characteristic for splenic torsion. It has been described in cases with involvement of pancreatic tail and part of descending colon.9 Careful evaluation of signs of pancreatitis and/or bowel obstruction is essential. Poor enhancement of splenic parenchyma, hyperattenuating pedicle on unenhanced CT due to acute thrombosis, or peripheral enhancement of splenic parenchyma (“pseudocapsule sign”) are the features suggesting vascular compromise and splenic. Contrast-enhanced MRI is helpful to assess viability of splenic tissue.10 Depending on the organ’s viability, surgical treatment options like open or laparoscopic splenopexy can be done if the spleen shows proper reperfusion after detorsion.11 However, partial subtotal resection or splenectomy is considered when the spleen is substantially infarcted. Vaccination against capsulated pathogens like pneumococcus, Haemophilus influenzae, and meningococcus is highly recommended postsplenectomy.12

A comprehensive review of published cases of wandering spleen with pancreatic tail involvement has been shown in Table 1. Previously, only one case with involvement of descending colon has been documented by Seif Amir Hosseini et al in a 9-year-old male child. We present the first case showing involvement of splenic flexure in an adult.

Table 1

<table>
<thead>
<tr>
<th>No</th>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Parity</th>
<th>Pack et al2019</th>
<th>Recurrent abdominal pain and distension</th>
<th>Abdominal pain and past history of trauma</th>
<th>Abdominal pain and post</th>
<th>Acute abdomen</th>
<th>Acute abdomen</th>
<th>Recurrent abdominal pain</th>
<th>Sclerotic flexure involvement</th>
<th>Sclerotic flexure involvement</th>
<th>Multiparous 36 weeks ANC</th>
<th>Multiparous pregnant female patient of 36 weeks gestation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Taydas et al.</td>
<td>2018</td>
<td>22</td>
<td>F</td>
<td>N/S</td>
<td></td>
<td>Left upper quadrant pain, Vomiting, constipation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Colombo et al.</td>
<td>2019</td>
<td>18</td>
<td>F</td>
<td>Nulliparous</td>
<td></td>
<td>Left upper quadrant pain, Nausea, vomiting, constipation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Mg et al.22</td>
<td>2019</td>
<td>35</td>
<td>F</td>
<td>N/S</td>
<td></td>
<td>Abdominal pain and post history of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Asafu-Adjei et al.</td>
<td>2019</td>
<td>14</td>
<td>F</td>
<td>N/S</td>
<td></td>
<td>Abdominal pain and post history of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Saldiva et al.</td>
<td>2019</td>
<td>14</td>
<td>F</td>
<td>N/S</td>
<td></td>
<td>Abdominal pain and post history of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Shen et al.</td>
<td>2021</td>
<td>37</td>
<td>F</td>
<td>Nulliparous</td>
<td></td>
<td>Abdominal pain and post history of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Our case</td>
<td>2021</td>
<td>26</td>
<td>F</td>
<td>Multiparous</td>
<td></td>
<td>Abdominal pain and post history of trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Abbreviations: F, female; M, male; Mch, male child; MPD, main pancreatic duct; Multiparous 36 weeks ANC, multiparous pregnant female patient of 36 weeks gestation. |

Table 1 (Continued)

Conclusion
Splenic torsion with involvement of neighboring anatomical structures and congestive splenomegaly with splenic vein thrombosis is a very rare condition. Accurate preoperative imaging is mandatory. Ultrasonography should be the first choice of investigation, followed by contrast-enhanced CT scan to look for viability of the splenic tissue and complications of torsion.

Conflict of Interest
None declared.

References

Journal of Gastrointestinal and Abdominal Radiology (ISGAR) Vol. 5 No. 3/2022 © 2022. Indian Society of Gastrointestinal and Abdominal Radiology. All rights reserved.
Torsion of a Wandering Spleen Involving the Pancreatic Tail and Splenic Flexure

Kachare, Jaisinghani

27 Ng MRA, McCullers M, Gamenthaler A. Wandering spleen with 720-degree torsion treated with splenectomy and distal pancreatectomy. Am Surg 2019;85(08):e430–e432
29 Saldivar-Martínez DE, Galindo-Sánchez HM, Fonseca-Sada I, Marcos-Ramírez ER, Vázquez-Fernández F. Infarcted wandering spleen and pancreatic volvulus in a patient with concomitant Grynfelt-Lesshaft haernia. Cir Cir 2021;89(S1):20–22