

## Radiology for the surgeon

### Soft-tissue case 56

#### Presentation

A 32-year-old man was brought to the emergency room late at night with severe abdominal pain of about 4 hours' duration. The pain started suddenly in the left side of his abdomen about 2 hours after he went to sleep, having had a light dinner. He vomited 3 times; the vomitus consisted of undigested food and "yellowish liquid." Vomiting did not relieve the pain, nor did the antacid syrup that he drank. He passed clear urine once after the onset of pain.

Physical examination revealed guarding, tenderness and a vague mass in the left lower quadrant. Plain radiographs of the abdomen (not shown here) revealed a few dilated small-bowel loops but was otherwise not contributory. Two ultrasound (US) scans, sections from the left lower quadrant, are shown.

What is the diagnosis?



FIG. 1. Ultrasound scan section in the left lower abdomen.

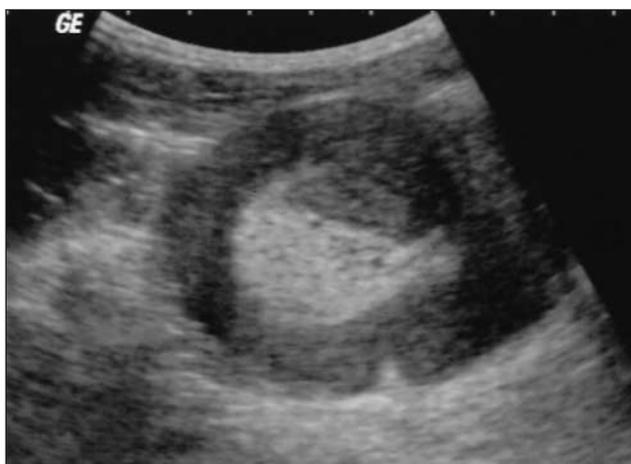


FIG. 2. Cross-sectional ultrasound image of the same abnormality shown in Fig. 1.

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## Diagnosis

### Small-bowel intussusception

Ultrasonograms showed telescoping of a short segment (about 12 cm) of ileum into the more distal segment. Fig. 1 shows the point of entry of the intussusceptum into the intussusciens, in longitudinal section. Fig. 2 is a cross-sectional image of the intussusception showing the “crescent-in-donut” appearance of hyperechoic mesenteric fat within the intussusciens. US images also showed a suspicious hypoechoic lesion at the apex of the intussusceptum (Fig. 3).

US diagnosis of small-bowel intussusception was made, with the probability of a tumour as the lead point. Laparotomy was performed. A short segment of ileo-ileal intussusception was identified and removed. The resected specimen (Fig. 4) included a smooth polypoid tumour, which was the lead point. Histopathological examination showed it to be a gastro-intestinal stromal tumour.

Intussusception is the invagination of one bowel loop and its mesentery into the lumen of bowel distal to it.<sup>1</sup> It occurs when a proximal segment of intestine (intussusceptum) telescopes into the intestinal segment distal to it (intussusciens). Examples include colocolonic, ileocolic and enteroenteral intussusceptions.<sup>2</sup>

Accounting for 80%–90% of bowel obstructions in children, it is a relatively rare cause of intestinal obstruction in adults, comprising about 5%.<sup>1</sup> Unlike those in children, adult intussusception is associated with a definable pathologic lesion as the lead point in 70%–90% of cases.<sup>1,2</sup> Its clinical presentation is generally non-specific and chronic, including abdominal pain with or without nausea and vomiting. The predominant symptoms are usually those of bowel obstruction; consequently, misdiagnosis is common at presentation.<sup>2</sup> Radiological studies such as computed tomographic scans, barium studies, abdominal US, plain film and radionuclide studies may be useful in its preoperative diagnosis. Intussusception is correctly diagnosed preoperatively in only one-third of cases.<sup>2</sup>

Clinical presentation and plain abdominal radiography are diagnostic in 50%–60% of patients with bowel obstruction. In cases of suspected small-bowel obstruction, when clinical and plain radiographic findings are nonspecific and unhelpful, US is useful in confirming obstruction and may sometimes identify the cause.<sup>3</sup> When obstructed, small-bowel loops are completely fluid-filled: plain abdominal radiographs do not allow a definite diagnosis despite strong clinical suspicion. US can provide rapid evaluation with a high degree of diag-

nostic confidence.<sup>3</sup> The US appearance of intussusception, whether ileo-ileal or ileocolic, is diagnostic.<sup>1</sup>

Enteric intussusception is characterized in longitudinal section by an oval “tumour” that in cross-section has a “target” appearance with infolding of bright luminal interfaces giving multiple concentric rings. In adults, a lead-point mass is common and should be sought.<sup>4</sup> The intussusceptum contained within the intussusciens has been variously described on a cross-sectional image as a target-like mass, double-concentric rings, crescent-in-donut sign (Fig. 2) and bowel-within-bowel. A “pseudo-kidney” configuration has been described in the longitudinal oblique image. Appearance will vary depending on the duration of symptoms. The longer the intussusception has persisted, the more edema is present, determining the degree of wall thickening. On cross-section it most frequently appears as 2 rings of low echogenicity separated by a hyperechoic ring.<sup>3</sup>

The most common cause of intussusception in the small bowel is a polypoid tumour, whether benign or malignant.<sup>1</sup> Benign small-bowel neoplasms account for some 0.5%–2% of all gastrointestinal neoplasms. Leiomyoma (gastrointestinal stromal tumour), adenoma and lipoma are the most common benign small-bowel

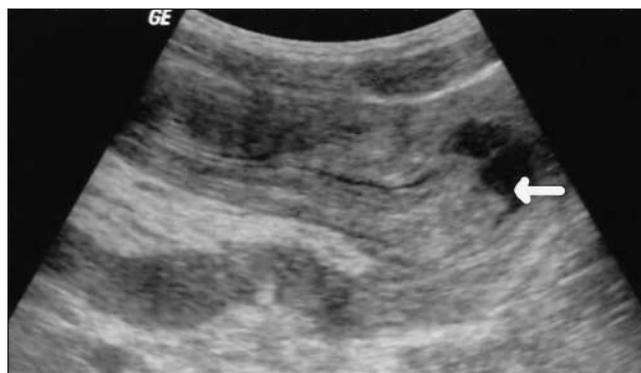


FIG. 3. Longitudinal section of the intussusception, showing a suspicious hypoechoic lesion at the apex of the intussusceptum (arrow).



FIG. 4. Photograph of the resected segment of small bowel (cut section) showing the smooth polypoid tumour that was the lead point of the intussusception.

neoplasms. As well as causing intussusception, these can be incidental findings. Leiomyomas present as small, eccentric, well-marginated tumours, usually situated in the jejunum.<sup>3</sup> They can also develop a central ulceration and are difficult to distinguish from malignant smooth-muscle tumours.

In the past, cross-sectional imaging played a complementary role to barium examination in the diagnosis of small-bowel disorders. At present, the roles of US and computed tomography are changing, and can be considered as competing with traditional

barium examinations. US imaging is noninvasive, mobile and readily available in most centres, and is used as the initial investigation in a variety of abdominal conditions. In patients with symptoms of acute small-bowel obstruction (in whom plain abdominal films are unhelpful), US is recommended. If US findings are not conclusive and additional information is needed to decide on further management, computed tomography of the abdomen with intravenous contrast is recommended.<sup>3</sup>

**Competing interests:** None declared.

## References

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# Essential reading

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- CMAJ
- Canadian Journal of Surgery
- Journal of Psychiatry & Neuroscience

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