

## CASE REPORT

# Volvulus of ileum: a rare cause of small bowel obstruction

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## SUMMARY

Small bowel volvulus is a rare but life-threatening surgical emergency. Owing to its rarity, it is seldom entertained as a differential for small bowel obstruction. The aetiology may be either primary or secondary, with secondary being more common in the Western world. Prompt diagnosis and urgent surgical treatment is required if bowel necrosis is to be prevented, which is associated with increased mortality. We present a case of primary ileal volvulus with a gangrenous segment and a brief overview of the current literature.

## BACKGROUND

Small bowel volvulus although rare should be a differential for any presentation of acute abdominal pain and especially small bowel obstruction. Central abdominal pain resistant to narcotic analgesia should heighten the suspicion of the diagnosis. Prompt diagnosis and treatment are required to prevent unnecessary resection and associated increased morbidity and mortality. If the bowel is infarcted, resection is required, but the optimum treatment for cases with viable small bowel is uncertain, the alternatives being either resection, fixation or simple detorsions. Ultimately, the final decision lies with the operating team which highlights the need and importance of these cases reported in the medical literature.

## CASE PRESENTATION

A 55-year-old man with no known comorbidities presented to our facility with a 2-day history of sudden onset, severe, central abdominal pain radiating to both lower quadrants of the abdomen, associated with nausea and vomiting. There was no history of previous abdominal surgeries, unintentional weight loss or a family history of cancer. It should also be noted, the patient was not fasting or on any particular diet. The remaining history and review of systems were unremarkable. Physical examination revealed an ill-looking man, a tachycardia of 115 bpm with the remaining vital signs within normal limits. The abdomen was distended and demonstrated signs of peritonism with the absence of bowel sounds.

## INVESTIGATIONS

Blood investigations revealed an elevated white cell count and arterial blood gas analysis showing mild metabolic acidosis. Plain abdominal radiographs demonstrated dilated loops of small bowel. A CT scan of the abdomen was ordered which showed twisting of the ileum around its mesentery—the whirl sign (figure 1).

## DIFFERENTIAL DIAGNOSIS

- ▶ Small bowel obstruction secondary to tumour
- ▶ Small bowel volvulus

## TREATMENT

The patient was resuscitated and optimised prior to emergency laparotomy. At laparotomy it was noted that patient had a long mesentery and a narrow root with the whole ileum twisted around its mesentery (figure 2). Excluding the distal 25 cm of the ileum, the entire ileum was gangrenous (figure 2). Resection (figure 3) and primary anastomosis of ileum was then performed.

## OUTCOME AND FOLLOW-UP

The postoperative period was uneventful and the patient was discharged on the fifth day postoperation. At a 3-year follow-up, our patient has recovered well with no further abdominal symptoms.

## DISCUSSION

Volvulus is an axial twist of a portion of the gastrointestinal tract along its mesentery. The involved segment of the bowel may be either completely or partially occluded with associated arterial or venous occlusion. The most common site for volvulus is the colon.<sup>1</sup> Small bowel volvulus is rare and only few cases have been reported worldwide. Volvulus of the small bowel accounts for <7% of all cases of small bowel obstruction.<sup>2</sup> Interestingly, the prevalence of this clinical entity varies according to geographical location. In the USA and Western Europe, this is a rare cause of small bowel obstruction. However, countries in the Middle East, Asia and Africa the prevalence is higher.<sup>3</sup> This difference may be due to a difference in dietary practices which include ingestion of high-fibre foods after a prolonged period of fasting as occurs during the month of Ramadan.<sup>3</sup> Ramadan is a month long Islamic observance which involves fasting from food and drink from dawn to sunset.



**Figure 1** CT scan of the abdomen showing the twisting of the ileum around its mesentery (whirl sign).



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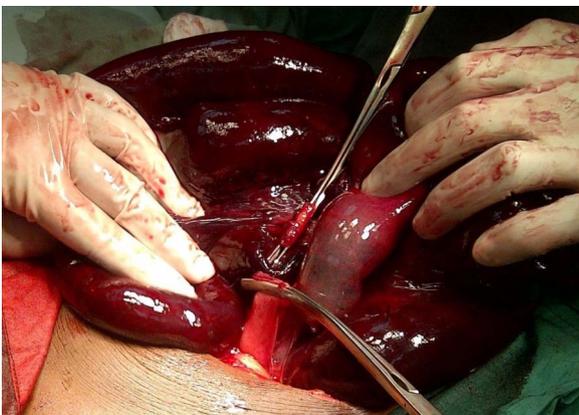


**Figure 2** Intraoperative photograph showing volvulus of ileum (gangrenous).

Small bowel volvulus can be attributed to either primary or secondary causes. Primary volvulus is defined as volvulus occurring in the absence of anatomical defects whereas secondary volvulus is that occurring secondary to anatomical defects. The secondary type is more common in the Western society.<sup>4,5</sup> The theory behind primary small bowel volvulus occurring is based on strong abdominal muscles, high peristaltic tone as well as the presence of a bulky meal in the small bowel. The bulky bolus of food enters the proximal small bowel, causing the loop to descend inferiorly. This displaces empty small bowel loops upwards, initiating the rotation of the mesentery and causing volvulus. Another postulation suggests that in some populations, a longer mesenteric length and shortness of the mesenteric root would allow for abnormal mobility of a segment of small bowel predisposing to volvulus.<sup>3</sup> Secondary volvulus has often been attributed to congenital malrotation, Meckel's diverticulum, leiomyomas of the mesentery, postoperative adhesive bands as well as malignancy.<sup>6–8</sup> *Ascaris* infestation has been reported as a rare cause of small bowel volvulus.<sup>9</sup> There was no identifiable pathology in our case to cause the volvulus; however, the long mesentery and narrow root may have predisposed this patient to volvulus.

The most common symptom associated with small bowel volvulus is acute onset severe abdominal pain with the other cardinal symptoms of intestinal obstruction being less prominent.<sup>3</sup> The severity of abdominal pain is directly related to the duration of vascular compromise but unrelated to the degree of intestinal obstruction.<sup>8</sup>

Plain abdominal radiographs may be normal or may show small bowel obstruction; however, they are not helpful in



**Figure 3** Intraoperative photograph showing resection of gangrenous ileum.

demonstrating the cause. Rarely an abdominal radiograph can show dilated bowel loops with a 'spiral nebula' in the midabdomen.<sup>10</sup> Colour Doppler sonography can be used to demonstrate a whirlpool sign, an objective sign of midgut volvulus. The sensitivity, specificity and positive predictive value of the clockwise whirlpool sign for midgut volvulus are 92%, 100% and 100%, respectively.<sup>11</sup> It should be noted, however, that sonography is operator dependent and this may result in a missed diagnosis resulting in fatal outcomes.<sup>12,13</sup> Timely diagnosis of small bowel volvulus is necessary as bowel necrosis is associated with increased mortality.<sup>3</sup>

The investigation of choice is a CT scan with a sensitivity of up to 80% with the most characteristic finding being a whirlpool sign and the presence of gas indicating infarction.<sup>14</sup> It is a non-specific sign and has been reported in conditions such as postoperative adhesions, transverse colectomy as well as previous right hemicolectomy.<sup>15</sup> Another reported CT scan finding is a triangular configuration of the bowel loops due to possible compression of the bowel loops secondary to the twist at the site of torsion.<sup>16</sup> The 'beak' sign is also another sign on CT scan showing the tapering of three dilated bowel segments, which appear similar to a curved beak of a bird, noted in barium enema examinations of sigmoid volvulus.<sup>17</sup>

However, the physician should be aware of the false negatives and not neglect good clinical judgement based on clinical findings. This is evident in this particular case where investigations were non-specific and laboratory values were not indicative of any pathological process.

Prompt diagnosis and surgical management is necessary to prevent the eventual ischaemia and gangrene due to small bowel volvulus. The mortality associated with small bowel volvulus has been quoted as high as 42–67%.<sup>18–21</sup> Mortality from this clinical entity is directly related to the time elapsed from symptom onset to surgical intervention.

The mainstay of management is surgery. Some authors have recommended management of primary volvulus in the absence of necrotic bowel with simple devolvulation, others recommend resection and anastomosis in all small bowel volvulus regardless of whether gangrenous bowel is present or not.<sup>8</sup> In primary volvulus, fixation is recommended if resection is not performed, with reports of recurrence as high as 30% of patients who underwent simple devolvulation only.<sup>11</sup> When gangrene is present, the management is clearcut, and resection is mandatory. The treatment of secondary volvulus centres on the correction of the underlying cause, which will guide further management. Ultimately, the final decision will rest on the managing surgical team at laparotomy. As a result, this highlights the importance of reporting these cases so that surgeons can be aware of the different options and the reported outcomes associated with each.

### Learning points

- ▶ Volvulus of the small bowel is a rare cause of small bowel obstruction.
- ▶ Small bowel volvulus more commonly seen in patients with prior abdominal surgery.
- ▶ A high index of suspicion is required in order to diagnose and adequately treat this condition.
- ▶ Exploratory laparotomy should be performed as early as possible in order to decrease further morbidity and mortality.

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