Laparoscopic management of terminal ileal volvulus caused by Meckel's diverticulum

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ABSTRACT

Complications from a Meckel's diverticulum include diverticulitis, bleeding, intussusception, bowel obstruction, a volvulus, a vesicodiverticular fistula, perforation or very rarely as a tumour. We report a case where a Meckel's diverticulum presented with a terminal ileal volvulus in a 32-year-old man without the presence of a typical vitelline band or axial torsion of the diverticulum causing the volvulus. It was successfully managed laparoscopically.

KEYWORDS

Meckel's diverticulum – Ileal volvulus – Small bowel obstruction – Minimally invasive – Laparoscopic

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Meckel's diverticulum (MD) is the most common congenital malformation of the gastrointestinal tract.¹ Although it presents more commonly in a paediatric age group, a diverticulum can become symptomatic in adults, presenting as diverticulitis, bleeding, intussusception, bowel obstruction, a volvulus, a vesicodiverticular fistula, perforation or very rarely as a tumour. We report a case where a MD presented with a terminal ileal volvulus without the existence of the typical vitelline band or axial torsion of the diverticulum causing the volvulus that was successfully managed laparoscopically.

Case History

A 32-year-old man presented with colicky right-sided abdominal pain associated with vomiting and absolute constipation for the preceding 24 hours. He reported many previous episodes of similar abdominal pain, associated with vomiting and constipation, that were followed by diarrhoea, which resolved spontaneously.

The patient had required admission two years previously with similar symptoms, at which point a computed tomography of the abdomen and pelvis (CTAP) demonstrated small bowel obstruction with a transition point at the distal ileum, suggestive of ileal volvulus. As the patient's symptoms resolved spontaneously, he was discharged within 24 hours. Owing to persistent epigastric pain, outpatient ultrasonography of the upper abdomen and upper gastrointestinal endoscopy were requested, both of which were unremarkable. The patient was reviewed in the outpatient

clinic at three months and as he was symptom free, he was discharged with advice to return if symptoms recurred.

On examination, there were no hernias. The patient was tender to deep palpation in the epigastrium and right side of the abdomen. The inflammatory markers were elevated (white cell count $11.5 \times 10^9/l$, C-reactive protein 16mg/l). Urgent CTAP was requested, which demonstrated similar findings to the previous imaging with high grade small bowel obstruction secondary to volvulus of terminal ileum with the whirlpool sign of the small bowel mesentery (Fig 1).

A diagnostic laparoscopy was performed. The infraumbilical Hasson technique was used to generate the pneumoperitoneum. Two further ports were inserted under vision: a 12mm port for the left iliac fossa and a 5mm port in the right upper quadrant. The intraoperative findings were twisted small bowel mesentery adherent to the anterior abdominal wall at the right iliac fossa (Fig 2) and minimal adhesions in the left iliac fossa. On further dissection of the right iliac fossa adhesions, a MD was found, causing torsion of the small bowel mesentery (Fig 3). There was no axial volvulus of the diverticulum or signs of active inflammation. The adhesions were dissected and the diverticulum was resected with single firing of an Echelon Flex™ 60mm stapler (Ethicon Endo-Surgery, Cincinnati, OH, US) with a staple height of 2.5mm (Fig 4).

The patient recovered well and was discharged on the third postoperative day. Two months after the operation, he was reviewed in the outpatient clinic with no further symptoms being reported. The histology of the specimen revealed a normal MD with no heterotopia and no

evidence of ischaemia, active inflammation, dysplasia or malignancy.

Discussion

MD is present in 2–4% of the population.¹ It is a result of incomplete obliteration of the omphalomesenteric duct during the seventh week of gestation and it is classically located two feet proximal to the ileocaecal valve.² The complications of a MD in adults include diverticulitis, bleeding, intussusception, bowel obstruction, a volvulus, a vesicodiverticular fistula, perforation or very rarely a tumour, and the incidence ranges between 4% and 16%.¹ The most frequent complications in adults are obstruction (14–53%), ulceration (<4%), diverticulitis and perforation.¹

The most common causes of intestinal obstruction in the presence of MD include intussusception and a persistent vitelline band that connects the diverticulum to the umbilicus, which can either cause a small bowel volvulus around the fibrous cord or trap the small bowel, causing internal herniation.¹ Rarer causes have been reported and include stricture at the level of the diverticulum, inguinal herniation of the MD in a Littre's hernia and obstruction from a Meckel's enterolith, bezoar or tumour growing in the MD.

In a retrospective review from the Mayo clinic among symptomatic adults patients with a MD, 5.5% presented with a small bowel volvulus.³ The most common mechanism of volvulus formation is twisting of the small bowel around the

fibrous cord.¹ Rarer causes were axial volvulus of the diverticulum and tumours arising from the diverticulum.

The mechanism of volvulus formation in our patient cannot be explained by any of the above mechanisms as the volvulus was at the level of the terminal ileum, away from the umbilical area, and there was no diverticular band identified at laparoscopy and no proven dysplasia or malignancy in the subsequent histology results. There is a report of a MD causing a small bowel volvulus because it was adherent to the umbilical port following a previous laparoscopy.⁴ However, our patient had no previous surgical history. He did have significant adhesions on the lower abdominal wall, which could have been caused by one or more previous episodes of Meckel's diverticulitis. It is likely that these adhesions caused the MD to be adherent to the anterior abdominal wall, which caused a recurrent small bowel volvulus.

Laparoscopic treatment of a small bowel volvulus is documented in primary volvulus or in cases where the volvulus resulted from a congenital band,⁵ with good outcomes. Although laparoscopic treatment of volvulus secondary to

MD has been reported, these cases were associated with a persistent vitelline band, inflammation of the diverticulum or previous surgery.⁴ This is the first case where a MD has caused a small bowel volvulus in a patient with no previous abdominal surgery and no signs of a persistent vitelline band or inflammation that was treated laparoscopically.

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