Neonatal intestinal obstruction secondary to a floppy meckel's diverticulum successfully treated by minimal access surgery

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SUMMARY

Meckel's diverticulum has several known complications including diverticulitis and perforation. The presence of mesodiverticular band or a band from the diverticulum to the anterior abdominal wall is also described and can cause obstruction or rotation of the small bowel leading to volvulus. Meckel's diverticulum is also well known as the lead point for intussusception. It may be lined by ectopic gastric mucosa and can cause life-threatening gastrointestinal bleeding. We report a neonate who presented with acute intestinal obstruction secondary to a large, mobile Meckel's diverticulum which due to a direct compression effect on the adjacent small bowel caused mechanical intestinal obstruction. Diagnosis was confirmed at laparoscopy, and treated by curative surgical resection. This is the first report of a large mobile Meckel's diverticulum causing small bowel obstruction due to direct compression that was managed by minimally invasive surgical resection.

BACKGROUND

This is a rare and unexpected consequence of a large mobile Meckel's diverticulum, the management of which benefited from laparoscopic assessment and treatment with minimal access surgery to resect the pathological diverticulum.

CASE PRESENTATION

A newborn baby boy with no significant antenatal history was born at term in our institution via normal vaginal delivery with birth weight of 3.4 kg. The baby took the first three feeds normally. However, when he was 16 h old, it was noted that his abdomen was distended and he became irritable and refused feeding. He did not vomit or pass meconium. He was kept nil by mouth overnight and remained comfortable; however, his abdomen was still distended the following morning. Surgical consultation was sought and on examination, the baby was alert and conscious, pink on room air and not syndromic. The capillary refill was less than 2 s; however, there was mild dehydration and the abdomen was grossly distended. There were no palpable abdominal masses, the anus was patent with normal rectal examination and no gush of air, mucous or meconium occurred at the time of rectal examination.

INVESTIGATIONS

A full blood count and serum electrolytes were normal. However, plain abdominal film showed multiple left-sided gas shadows with a single loop of significantly dilated bowel on the right side of the abdomen (figure 1). This finding raised the

possibility of terminal ileal atresia, colonic atresia or a duplication cyst. A large bowel water-soluble contrast enema study was performed on the same day which revealed normal calibre colon with no evidence of colonic atresia (figure 2). Abdominal ultrasound was also performed and identified dilated small bowel loops in the right lumbar region and right hypochondrium but no masses or the single large dilated small bowel loop as seen on the plain abdominal radiograph.

DIFFERENTIAL DIAGNOSIS

Potential differential diagnoses included distal small bowel stenosis/atresia or duplication cyst of the distal ileum which may cause intraluminal obstruction, or a congenital band that resulting in extra luminal compression on the distal small bowel.

TREATMENT

The baby was initially observed and kept nil by mouth and fluid resuscitated with 10 mls/kg fluid boluses of normal saline and then received maintenance hydration. An orogastric tube was passed initially which did not drain any fluid. At 12 h after its insertion, the orogastric tube started draining bilious aspirate and the child became irritable. The abdominal distension worsened, there was no passage of meconium and the rectum remained empty. In view of the deteriorating clinical situation a decision was made to proceed to a diagnostic laparoscopy which was undertaken on day 3 of life under general anaesthesia. A 3 mm laparoscope was introduced via a 5 mm Hasson's trocar through a small supraumbilical incision. An 8 mm Hg, pressure pneumoperitoneum was induced with a gas flow rate of 0.2l/min to 2 l/min. At laparoscopy, the caecum, appendix and terminal ileum were obscured by an abnormal appearing dilated segment of mobile small bowel. Using a port-free technique a 3 mm working instrument was introduced to assist assessment of the bowel. Manipulation of the dilated segment of small bowel revealed the terminal ileum with a large distended Meckel's diverticulum. Distal to the obstruction point the ileum, caecum and appendix were collapsed. The supraumbilical incision was enlarged; the small bowel delivered through the wound and a Meckel's diverticulum approximately 50 cm from ileo-caecal valve was identified. Proximal to the diverticulum was 15 cm of dilated ileum and a clear impression was noted on the small bowel where the Meckel's diverticulum had caused compression (figure 3). Resection of the diverticulum was undertaken extracorporeally. Intraluminal

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Figure 1 Plain abdominal x-ray: a huge dilated bowel is seen on the right side of the abdomen pushing the rest of the bowel to the left.

patency of the proximal bowel was confirmed by the insertion of a silicon catheter and primary anastomosis was achieved with absorbable 5/0 sutures.

OUTCOME AND FOLLOW-UP

The patient recovered well post surgery. He passed meconium on postoperative day 3 and the orogastric aspirates gradually lessened. He started breastfeeding on postoperative day 5 and was discharged home on postoperative day 7. Histopathological examination of the resected specimen showed a fragment of small intestine with a blind ended out pouching measuring 15 mm×13 mm that was lined predominantly by gastric-type

Figure 2 Lower contrast enema study: no evidence of microcolon or colonic atresia, that is, normal calibre colon up to ileo-caecal valve.

Figure 3 Intraoperative picture after the bowel was exteriorised: MD is Meckel's diverticulum. MD and affected small bowel is very dilated and has flopped over towards the mesentery causing significant obstruction of the small bowel; area of obstruction is marked as X.

mucosa consistent with Meckel's diverticulum. At follow up 1 month later, he was well, active and cheerful. He was breast-feeding fully and his weight had increased to 4.2 kg. He opened his bowel normally and examination of his abdomen was unremarkable with a small well healed scar.

DISCUSSION

Meckel's diverticulum has been extensively described since the 15th century. Many articles have been published regarding the origin of Meckel's diverticulum and its well recognised complications.^{1–4} It is the commonest congenital abnormality of the intestinal tract and is most commonly complicated by intestinal haemorrhage from heterotopic gastric mucosa within the diverticulum.^{3,4} One case from 1969 described a presentation similar to our case where a free Meckel's diverticulum was found to cause a kink in the adjacent small bowel.¹ Meckel's diverticulum has commonly been reported as a cause of intestinal obstruction including as lead point in intussusception, by an inflamed diverticulum perforating and causing adhesive small bowel obstruction, by a small bowel volvulus around an adhesive band attached to a Meckel's diverticulum or by direct compression of the small bowel by a band arising from the Meckel's diverticulum.^{1–8}

Meckel's diverticulum is rarely seen in neonates and extremely rarely causes acute intestinal obstruction. In our patient, the Meckel's diverticulum did not have an attached congenital band. The choice of investigation to diagnose Meckel's diverticulum depends on the clinical presentation. In cases with unexplained gastrointestinal bleeding, radionuclide based imaging is useful³ whilst minimally invasive surgery has gained popularity for both simple and complicated presentations.^{8–14} This is the first report describing laparoscopic treatment for a Meckel's diverticulum in a neonate. We believe diagnostic laparoscopy is advantageous in this type of case as it minimises incision size; in the neonate the procedure is technically more challenging particularly in the context of small bowel obstruction, extracorporeal resection of the Meckel's diverticulum and anastomosis via the enlarged port site is advised.

Learning points

- ▶ Neonatal Meckel's diverticulum without an associated congenital band or obvious inflammation is a rare cause of acute intestinal obstruction.
- ▶ A patient with bowel obstruction from an unknown cause should undergo diagnostic laparoscopy regardless of the patient's age; provided the surgeon is trained to do advanced minimally invasive surgery or minimally access surgery in younger patients including neonates.
- ▶ In a situation where laparoscopic resection of the Meckel's diverticulum is not possible, extracorporeal resection and anastomosis is advised.

Competing interests None.

Patient consent Obtained.

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