CASE REPORT

Meckel's diverticulum with intussusception in a 5-year-old patient with Down's syndrome

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SUMMARY

Meckel's diverticulum is understood to be the commonest congenital malformation within the gastrointestinal tract with a prevalence of 2%, as found on autopsy studies. Although many cases are asymptomatic, complications can occur including haemorrhage, diverticulitis, chronic ulceration and intestinal obstruction. Intussusception is also a complication, but extremely rare. We present a rare case of Meckel's diverticulum causing intussusception, which was surgically resolved, in a 5-year-old girl. Our aim through this case report is to generate greater awareness of this complication and to provide some potential guidance towards its treatment.

BACKGROUND

The incidence of Meckel's diverticula resulting in complications is 4–6% with a more classic presentation in infants under 2 years old.^{1 2} A much smaller percentage of these complications includes intussusception, where the presentation of per rectal (PR) bleeding is more common within the paediatric age group compared to adults.³ We present a case of Meckel's diverticulum with intussusception in a 5-year-old girl, which in itself is a rare finding. The severity of bleeding caused the patient to present as clinically anaemic; consequently, she required conservative blood transfusion management prior to surgery.

CASE PRESENTATION

A 5-year-old girl with a history of Down's syndrome presented with a large volume of fresh PR bleeding of 1 day duration. On clinical examination, her abdomen was soft, non-tender with no palpable masses to suggest organomegaly. A clinical assessment of the patient revealed a temperature of 36.9°C, heart rate of 130 bpm, respiratory rate of 16 breaths per minute and blood pressure reading of 114/70 mm Hg. Urine dipstick tests were normal. Blood investigations, abdominal radiography, chest radiography and ultrasonography of the abdomen were requested.

The patient was subsequently admitted when her haemoglobin (Hb) level dropped from 12 to 9 g/dL with new onset presentation of bilious vomiting. Other cardiovascular, respiratory and genitourinary examinations were unremarkable.

INVESTIGATIONS

Blood investigations including white cell count, inflammatory markers, amylase and renal and liver function tests were unremarkable. Abdominal and

chest X-ray showed no evidence of radiographic signs to indicate bowel obstruction or perforation. Ultrasonography of the abdomen revealed intussusception within the right iliac fossa ([figure 1](#)).

TREATMENT

The patient received intravenous fluid resuscitation with 200 mL of 50% packed red cells for urgent blood transfusion as part of her conservative management. Thus a diagnostic lower transverse laparotomy was conducted, which showed ileocaecal intussusception, with presence of a bleeding Meckel's diverticulum within the invaginated bowel ([figure 2](#)). During surgery, the intussusception was manually reduced, an appendectomy performed with resection of Meckel's diverticulum in the form of a wedge resection and a conclusive primary anastomosis. The patient did well postoperatively and was discharged home 5 days after surgery.

OUTCOME AND FOLLOW-UP

The patient made an unremarkable recovery with no evidence of abnormal PR bleeding or other abdominal pathology to suggest a recurrence after the 6 month follow-up period. Her Hb levels returned to baseline during the postoperative period and was consistent at 11.8 g/dL at the 6-month follow-up appointment.

DISCUSSION

Meckel's diverticulum is an outpouching of all three layers of the enteric mucosa characterised by a persistent remnant of the vitellointestinal duct. It is the most common congenital anomaly of the gastrointestinal tract, occurring in 2–3% of the

Figure 1 The typical appearance of intussusception. Note the concentric alternating echogenic and hypoechoic bands (target sign), and blood inside the bowel lumen.

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Figure 2 Ileocolic intussusception with Meckel's diverticulum as a leading point.

population with a classic symptomatic presentation before 2 years of age.³

The types of symptoms vary across the population, dependent on clinical presentations such as haemorrhage, diverticulitis, chronic ulceration and intussusception.⁴ In a paediatric presentation of intussusception there may be acute onset of abdominal pain, vomiting or painless red currant stools.^{5 6} The latter clinical sign was present in our patient's case with 1 day duration of fresh PR bleeding. Owing to the high volume of bleeding in a short period of time, our patient presented with clinical anaemia, where her baseline Hb level dropped from 12 to 9 g/dL. Bleeding causing anaemia is a very well-known complication that is established in Meckel's diverticulum.^{7 8}

A literature search was conducted using PubMed and Google Scholar Databases with keywords "Meckel's diverticulum intussusception" as our primary search criteria. Using additional filters to limit our search to the past 50 years, a total of 36 case reports to the best of our knowledge were found. A few associations have been made of gastrointestinal anomalies such as Hirschsprung's disease and Meckel's diverticulum present in Down's syndrome with trisomy 21.⁹

In a comparative review of 100 paediatric cases of Meckel's diverticulum, 17 cases presented with intussusception, 24 with bowel obstruction, 44 with gastrointestinal bleeding and 15 with diverticulitis and/or perforation.⁵ Overall, there was a higher male predominance with a higher incidence of abdominal pain and vomiting. However, this contrasts with our reported case of a 5-year-old girl with Down's syndrome whose presenting complaint was only of fresh PR bleeding. From the review, in terms of surgical options, 9 of the 17 intussusception cases were treated with segmental bowel resection and a further five were manipulated using wedge-shaped excision.

A diagnostic laparoscopy was not chosen as the patient was admitted as an emergency case after normal hours. An expert anaesthetist would have been required to assist with the procedure, however, this option was not available for this paediatric age group at the time. Despite the experience of the paediatric surgeon dealing with laparoscopic procedures, an open surgical technique was employed.

The decision to undergo segmental bowel resection or wedge-shaped excision is now commonly dependent on a parameter known as the height-dimension ratio and clinical impression of whether an ectopic tissue mass is present.^{10 11} If the Meckel's diverticulum has a wide base or presence of an ectopic mass, it is preferred that segmental bowel resection be performed, which may be accommodated with an end ileostomy. Whereas if the

diverticulum is found to have a narrow base without a palpable mass, a wedge-shaped excision is performed with primary anastomosis of the transverse ileum; this was consequently the treatment plan for our patient.¹²

The latter also has an advantage of giving the surgeon a direct view of the bowel mucosa to allow for easier evaluation of the margins for resection. Therefore, this is one of the reasons why an open laparotomy is commonly performed in comparison to laparoscopy. Furthermore, the opportunity for manual reduction to relieve the intussusception, as in our case, is only possible when a large operative field is present initially.

In our case report, a wedge-shaped excision was a suitable choice for this patient especially as there was no evidence of peritonitis on physical examination, which would have been suggested by rebound tenderness or inflammation of the diverticulum during surgery.

Learning points

- ▶ Intussusception of a portion of the small bowel due to Meckel's diverticulum is a very rare complication.
- ▶ There are different surgical approaches (wedge-shaped excision or segmental bowel resection) that can be employed for the removal of Meckel's diverticulum with the height dimension ratio and presence of ectopic tissue being used as factors to determine which is the best approach.
- ▶ Laparotomy is the most commonly used diagnostic and treatment method for acute cases such as ours. Although it is more invasive than a laparoscopic approach, it enables the surgeon to better visualise the pathology and also, as in this case, to palpate the Meckel's diverticulum for the presence of ectopic tissue. Both of these are key factors in deciding which surgical treatment route to take.

Contributors MOA wrote the manuscript and performed the literature research. HIA reviewed, checked and edited the initial script. SAH supervised the entire process, contributed to the discussion and was also involved in selection of images used in the case report and acquiring informed consent from the patient's parent. YAO was responsible for writing, reviewing and editing the final manuscript and had a supervising role. All authors have read and approved the final manuscript.

Competing interests None.

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