

Meckel's Diverticulum – Rare Complications and Review of the Literature

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SUMMARY: Meckel's diverticulum is the most common congenital anomaly of the gastro-intestinal tract. It arises as a result of incomplete dissolution of the vitello-intestinal duct. Approximately 4% of patients with Meckel's diverticula develop complications, most commonly obstruction, gastro-intestinal bleeding and inflammation. We describe three unusual presentations of Meckel's diverticulum – perforation due to ingested foreign body, a smooth muscle neoplasm simulating an ovarian tumour, and a Littre's hernia.

Introduction

Medical students are taught the "Rule of Two" (1) for Meckel's diverticula: the diverticulum is two inches in length, lies two feet from the ileo-caecal valve, is present in two per cent of the population, has a male:female predominance of 2:1, and may contain two types of ectopic mucosa (gastric or pancreatic). Meckel's diverticula are commonly encountered as incidental findings at laparotomy, but some 4% produce complications, the most frequent being gastro-intestinal bleeding inflammation and small bowel obstruction (2). We describe three patients we treated who had rare complications of Meckel's diverticula.

Case 1

A 35-year old male engineer was admitted with a 24-hour history of lower abdominal pain, maximal in the right iliac fossa. He denied any gastro-intestinal or urinary symptoms. Examination revealed a mild pyrexia and a moderate tachycardia. There was tenderness across the lower abdomen, with guarding and rebound tenderness in the right iliac fossa. Bowel sounds were normal. Haematological testing showed a leucocytosis of 13,900 per cu mm.

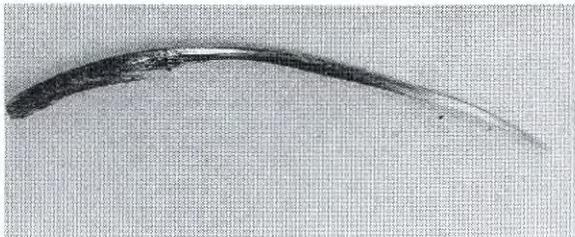


Fig 1. Fish bone which perforated a Meckel's diverticulum.

A diagnosis of acute appendicitis was made but at operation the appendix was normal. A Meckel's diverticulum four centimetres long was found with a three centimetre long "thorn" (Fig 1) protruding through the wall. A second "thorn" penetrated the terminal ileum. The diverticu-

lum was resected and the ileal perforation was oversewn. The patient made an uneventful recovery.

Histological examination showed acute inflammatory changes in the diverticulum. The "thorns" were sent to the Natural History Museum in London for identification. Chemical analysis showed them to contain calcium apatite, most probably of fish bone origin.

Case 2

A 58-year old post-menopausal woman was referred for gynaecological opinion of a pelvic mass. She gave a year history of lower abdominal discomfort. On examination a mass arising from the pelvis was palpable in the right iliac fossa. On vaginal examination the uterus was bulky and retroverted and the mass was readily palpable in the right adnexa.

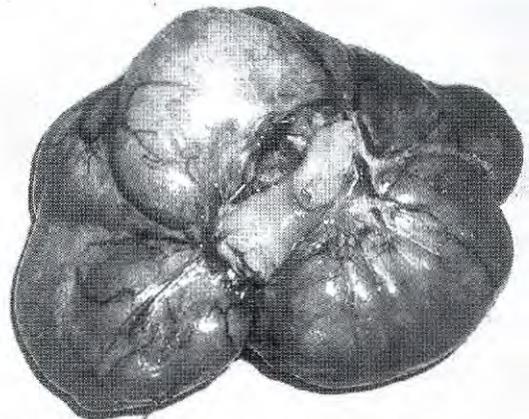


Fig 2. Spindle cell tumour arising in Meckel's diverticulum.

Examination of the urine was unremarkable. The ovarian tumour marked Ca-125 Antigen was in the normal range. Ultrasonography revealed a mass at the right adnexa measuring 78 x 80 x 93 millimetres, with a mixed echo pattern and areas of calcification. The left ovary appeared normal, but no ovary could be identified on the

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right. This suggested that the mass was a tumour of the right ovary. At operation however, both ovaries were found to be normal, but a large mass in a Meckel's diverticulum was excised (Fig 2).

The pathology report confirmed a small bowel diverticulum 25mm in length with a solid mass arising from the wall. Histology showed that this was a spindle cell tumour, originating from smooth muscle. Immunohistochemistry was positive for smooth muscle antibody.

Case 3

A 95-year old lady presented with a two day history of colicky central abdominal pain, abdominal distension and profuse vomiting. On examination the abdomen was distended, with visible peristalsis, and active, high-pitched bowel sounds. No scars were apparent, and palpation elicited only minor generalised tenderness, with no guarding and no masses. In the right femoral triangle was a four centimetre diameter non-pulsatile swelling which was moderately tender; no cough impulse could be elicited.

The blood count showed a leucocytosis of 15,800 per cu mm. Blood urea and electrolytes and serum amylase were normal. Abdominal radiographs confirmed dilated small bowel loops suggestive of obstruction.

The diagnosis of small bowel obstruction secondary to a strangulated femoral hernia was made. A laparotomy revealed an obstructing femoral hernia containing an ischaemic Meckel's diverticulum. The strangulated segment was resected and the hernia repaired, and the patient made a rapid and uneventful recovery.

Discussion

In 1700, the French surgeon Alexis Littre (1658-1725) reported two cases of a small bowel diverticulum lying in a femoral hernia sac. He thought that the outpouchings of the bowel were acquired from the juxtaposition of the bowel and the femoral canal. Johann Friedrich Meckel (3) (1781-1833) described diverticula of the distal ileum in 1812 and suggested that the diverticulum might have a congenital origin. Meckel's diverticulum is a true diverticulum in that it consists of all intestinal layers. It is the most common congenital anomaly of the gastro-intestinal tract (4) and arises from incomplete obliteration of the vitello-intestinal duct. The duct usually disappears at the fifth to ninth week of intra-uterine life, but its dissolution may be incomplete, giving rise to a variety of anomalies (Table 1).

Table 1
Anomalies resulting from incomplete obliteration of the vitello-intestinal duct

Meckel's diverticulum
entero-umbilical fistula
umbilical sinus
persistent fibrous cord
mesodiverticular vascular band
omphalomesenteric duct cyst
strawberry umbilical tumour

Meckel suggested that the diverticulum might have a complication rate as high as 25%, but recent publications (5) suggest that 4% is a more accurate figure (Table 2). Because of the risk of complications, Ludtke *et al* (6) recommended prophylactic resection of Meckel's diverticulum even if asymptomatic, unless there were contra-indications. This policy is supported by other authors (7, 8), but Leijonmarck *et al* (9) calculated that the risk of complications in adult patients is only 0.03% and diverticulectomy was associated with a 6% rate of complications. They recommended that symptomless diverticula should not be resected. Mackey and Dineen (10) and Pickard and Simpson (11) agreed that diverticulectomy in the absence of complications or risk factors was not justified. Factors associated with a higher risk of complications include male sex, age below forty, a diverticulum more than two centimetres in length or with a narrow neck, the presence of heterotopic mucosa, or the existence of a diverticular band.

Table 2
Complications associated with Meckel's diverticulum

haemorrhage
obstruction
diverticulitis
umbilico-enteric fistula
perforation
intussusception
foreign bodies
neoplasia - benign or malignant
peptic ulceration
Littre's hernia

Comment

Case 1. Performance of a Meckel's diverticulum is a rare occurrence. The first case was reported in 1899 by Blanc (12). In 1982, McDowell and Bush (1) reviewed forty cases of perforation of Meckel's diverticulum in the world literature and found that most cases had simulated acute appendicitis and that 65% were due to fish-bones.

Case 2. In a review of 2507 cases of gastro-intestinal smooth muscle tumour Skandalakis and Gray (13) reported that 28% were in the small bowel, with 0.8% (21) arising in Meckel's diverticula. Of these, 6 were benign tumours and 15 malignant. The distinction between benign and malignant smooth muscle tumour can be difficult to determine, and their subsequent behaviour hard to predict (14). Prognosis is related to the prevalence of mitoses, cellular atypia, the presence of necrosis and tumour size (15).

Case 3. Although Littre described this condition arising in a femoral hernia, most of the cases reported as "Littre's hernias" have involved inguinal hernias. In 1980, Perlman *et al* (4) described only the forty-fourth case of true Littre's hernia since the original account in 1700. The incidence of complications of Meckel's diverticulum is said

to decrease with advancing years (9,16). We believe this lady of 95 years is the most elderly patient recorded to present with a complication of a Meckel's diverticulum.

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