Meckel's Diverticulum

This is the vestigial remnant of the vitellointestinal duct. It is the most frequent malformation of the gastrointestinal tract. If present, it is located in the distal ileum, usually within 100 cm of the ileoceleal valve.

Epidemiology

Autopsy records show an incidence of about 1.2-2% in the general population.[1, 2] For asymptomatic diverticula there is no gender predominance. For symptomatic diverticula, studies show a 1.4:1 male-to-female ratio.[1, 3] The risk of complications ranges from 4-16% in various studies, and is higher in children than in adults.[1]

Presentation[1, 4]

Asymptomatic

Meckel's diverticulum is a common incidental finding at laparotomy. The vast majority of those with Meckel's diverticulum are asymptomatic. Complications are most likely to occur when the diverticulum contains heterotypic tissue. This is most often gastric, but may also be pancreatic, jejunal or colonic mucosa. The lifetime risk of developing a complication that requires surgery is thought to be 4-6%.

Haemorrhage

This accounts for 25-50% of all complications. It is more common in children younger than 2 years (in which age group it is the most common complication) and in males. The patient usually reports bright red blood in the stools. The amount may vary from minimal recurrent episodes to a large shock-producing haemorrhage. Meckel's diverticulum should always be excluded in a child presenting with massive painless rectal bleeding.

The blood may be bright red if the bleeding is brisk, or darker if it is milder and transit time is slow. Melena-like tarry stool may also be seen if gastric tissue present in the diverticulum ulcerates, or if it produces acid which causes damage to the adjacent ileal mucosa.

Intestinal obstruction

This presents in 10-43% of symptomatic patients. The frequency of complications of Meckel's diverticulum varies widely in the literature. Studies varyingly report intestinal obstruction or haemorrhage as the most common complication in adults.

The presenting symptoms are usually abdominal pain, vomiting and constipation. Various mechanisms produce the obstruction, including a fibrotic band attaching the diverticula to the abdominal wall causing a volvulus of the small bowel and intussusception in which the diverticulum is the lead point. An intussusception may present with redcurrant jelly stools or a palpable lump in the lower abdomen.

Diverticulitis

Symptoms include diarrhoea, abdominal cramps and periumbilical tenderness. The pain may be anywhere in the abdomen but, when located in the right iliac fossa can mimic appendicitis ('Meckel's diverticulitis'). This can go on to cause adhesions, leading to obstruction.

Perforation

This can occur spontaneously or due to a foreign body such as a fish bone.
**Umbilical anomalies**
Anomalies may include fistulas, cysts, sinuses and fibrous bands between the diverticulum and the umbilicus. There may be a history of recurrent infection, chronic sinus formation, abdominal wall abscess formation and infection or excoriation of the peri-umbilical skin.

**Neoplasm**
This is extremely rare and has been reported in approximately 0.5-5% of complicated diverticula. Various types of tumour can occur, including sarcoma, leiomyoma, leiomyosarcoma, carcinoid and fibroma.

**Miscellaneous**
Other complications that have been reported include the formation of stones and phytobezoar, vesicodiverticular fistulas and 'daughter diverticula' (formation of a diverticulum within a Meckel's diverticulum).

**Investigations**
Meckel's diverticulum should always be considered in the differential diagnosis of patients presenting with rectal bleeding or intestinal obstruction.

Investigations are dictated by the type of complication. For paediatric patients presenting with haemorrhage and a suspected Meckel's diverticulum, technetium-99m pertechnetate scintigraphy is the modality of choice, but this is less sensitive in adults.\(^5, 6\)

In cases of Meckel's diverticulum causing intestinal obstruction, the diagnosis is rarely made pre-operatively. If an enterolith is present in the diverticulum it can sometimes be detected on plain abdominal X-ray. Meckel's diverticulum is difficult to see on CT scan but routine scanning during investigation of the obstruction may reveal a volvulus, intussusception or a true knot.\(^5\)

Neoplasms are rare and the chances of detecting them on imaging are small. A large tumour will sometimes be seen on scintigraphy, CT scanning or in barium studies.

Investigations are tailored to the requirements of the individual patient and barium studies and ultrasonography are sometimes employed in all these situations to clarify equivocal findings or as less invasive investigations in paediatric patients.

One study reported the use of wireless capsule endoscopy to detect Meckel's diverticulum in children.\(^7\)

**Management**
Complications such as haemorrhage, diverticulitis, intestinal obstruction and umbilico-ileal fistulas are absolute indications for resection.

Management of coincidentally discovered Meckel's diverticulum remains controversial. Some feel numbers needed to treat do not justify the risk, as mortality rates are low.\(^6\) Other authors suggest the increased risk of malignancy justifies aggressive treatment.\(^8\)

In asymptomatic individuals, some advise resection of a diverticulum discovered incidentally should be considered for those presenting a higher risk of complication, such as:

- Patients aged younger than 40.
- Diverticula longer than 2 cm.
- Diverticula with narrow necks.
- Diverticula with fibrous bands.
- Suspected ectopic gastric tissue.
- Inflamed, thickened diverticula.

For a symptomatic Meckel's diverticulum, laparoscopic resection has been shown to be safer, less invasive and more cost-effective than laparotomy.\(^5\)

**Postoperative complications**
These are not uncommon. Complications of surgery are reported in 1-8% of asymptomatic patients.\(^5\) Complications include ileus, suture line or intestinal anastomotic leak, intra-abdominal abscess or pulmonary embolism.

Late postoperative complications include intestinal adhesions leading to small bowel obstruction.

**History\(^{[1, 9]}\)**
In 1809, Johann Friedrich Meckel published a paper concerning a diverticular remnant of the omphalomesenteric duct sited at the ileum. The document was quite detailed and included a description of the anatomy and embryonic origin. It thus came to be known by his name, although it was first described as an unusual diverticulum of the small intestine by Fabricius Hildanus in 1598.

**Further reading & references**

9. Meckel's diverticulum; whonamedit.com

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