

Perforated Meckel's Diverticulum: A Surgical Emergency In Coimbatore Medical College Hospital.

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Abstract: Meckel's diverticulum is the most common congenital malformation of gastrointestinal tract. It is due to incomplete obliteration of the vitelline duct during the 5 week of the gestation. It usually remains silent and asymptomatic but it can cause complications in the form of ulceration, haemorrhage, intussusception, intestinal obstruction, perforation and, very rarely, vesicodiverticular fistulae and tumours. These complications, especially bleeding, are more common in the paediatric age group than in adults; however it is not uncommon to miss the diagnosis of Meckel's diverticulum in adults. Here, we reviewed the literature regarding the complications of this forgotten clinical entity in adults with potential diagnostic difficulties and management strategies.

Keyword: Meckel's diverticulum, Perforation, Congenital abnormality, Acute abdomen Gastric & Pancreatic heterotopia.

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I. Introduction

Meckel's diverticulum was first described in a paper published in 1809 by the German anatomist, Johann Friedrich Meckel, the younger (1781-1833), who described it as a remnant of the omphalo-mesenteric duct³, although such an abnormality had been mentioned quite early by Fabricius Hildanus in 1598 and in 1671 by Lavater (who did not recognize its embryological origin). However, it was not until almost 100 years later that the understanding of Meckel's diverticulum increased with the discovery of ectopic gastric mucosae by Salzer and associated ulceration of ileum by Deetz¹. In the fetal life, the omphalo-mesenteric duct connects the yolk sac to the intestinal tract and usually it obliterates in the 5th to 7th week of life. If obliteration fails, the congenital anomalies develop, leading to the residual fibrous cords, umbilical sinus, omphalo-mesenteric fistula, enterocyst and most commonly, Meckel's diverticulum.

CLINICAL DIVERSITY:

Meckel's diverticulum is lined mainly by the typical ileal mucosa as in the adjacent small bowel. However, ectopic gastric (most common—57% according to textbooks, but 20% according to recent data⁴)—duodenal, colonic, pancreatic, Brunner's glands, hepatobiliary tissue and endometrial mucosa may be found, usually near the tip¹. According to J F Meckel, the incidence of the complications due to Meckel's diverticulum was 25%, but in the recent literature it ranges from 4%-16%. Its occurrence in males and females is equal, but incidence of complications is three to four times greater in males. The most frequent complications in the adults are: obstruction due to the intussusception or adhesive band (14%-53%); ulceration (<4%); diverticulitis; and perforation. In children it is the most common presentation, especially in those younger than 2 years of age (almost 50%). The large proportion of the rest of the symptomatic Meckel's diverticulum occurs in those aged 2-8 years. Bleeding from ectopic gastric mucosa is not common in adults. Carcinoid tumour, sarcoma, stromal tumours, carcinoma, adenocarcinoma, intraductal papillary mucinous adenoma of pancreatic tissue and vesicodiverticular fistulae are also rare complications^{6,7}. Other rare complications include inversion of Meckel's diverticulum, torsion, volvulus of ileum around Meckel's diverticulum or fibrous cord and perforation - spontaneously or by foreign body such as fish bone⁸⁻¹¹. The main mechanism of bleeding is the acid secretion from ectopic mucosa, leading to ulceration of adjacent ileal mucosa. It is possible that the recurrent intussusception may cause trauma, inflammation, mucosal erosion and bleeding. The pathogenic role of *Helicobacter pylori* in the development of gastritis and bleeding in the ectopic gastric mucosa is still debatable^{12,13}. NSAIDs' effect on the ectopic gastric mucosa is yet to be proved¹⁴. Bleeding from Meckel's diverticulum can cause the iron deficiency anaemia¹⁵, but it may also cause megaloblastic anaemia due to the bacterial overgrowth and vitamin B12 deficiency as a result of the dilatation and stasis in adjacent obstructed ileal loop. The presence of bleeding with hypoalbuminaemia and low ferritin due to ongoing slow unrecognized

bleeding may lead to the diagnosis of inflammatory bowel disease. There have been reported cases of active and chronic inflammatory bowel disease in Meckel's diverticulum.

HISTORY:

I. Case Report

A 23 years old male presented with abdominal pain for 3 days. He also had history of vomiting and fever for 1 day. No history of Tuberculosis, Diabetes, Asthma, weight loss, no history of previous abdominalsurgery.

GENERAL EXAMINATION:

Patient was conscious, oriented

Febrile, Hydration good.

VITALS:

Temp: 99.5 F

Pulse rate: 106/mt

Blood pressure: 110/80mmHg.

Respiratory rate: 26/mt.

SPO2: 97% in Room air.

SYSTEMIC EXAMINATION:

CVS: S1 S2 +, Tachycardia +.

RS: Bilateral air entry +, Tachypnoea +

Per Abdomen:

Restriction of respiratory movements of abdomen.

Generalised guarding and rigidity present.

Generalized Tenderness present.

Liver dullness Obliterated.

Bowel sounds absent.

Per Rectal:

No Fecal stain.

INVESTIGATIONS:

- TLC: 15000
- X-Ray Abdomen Erect which shows the presence of free gas under the right dome of diaphragm
- Rest of the investigations within normal limits

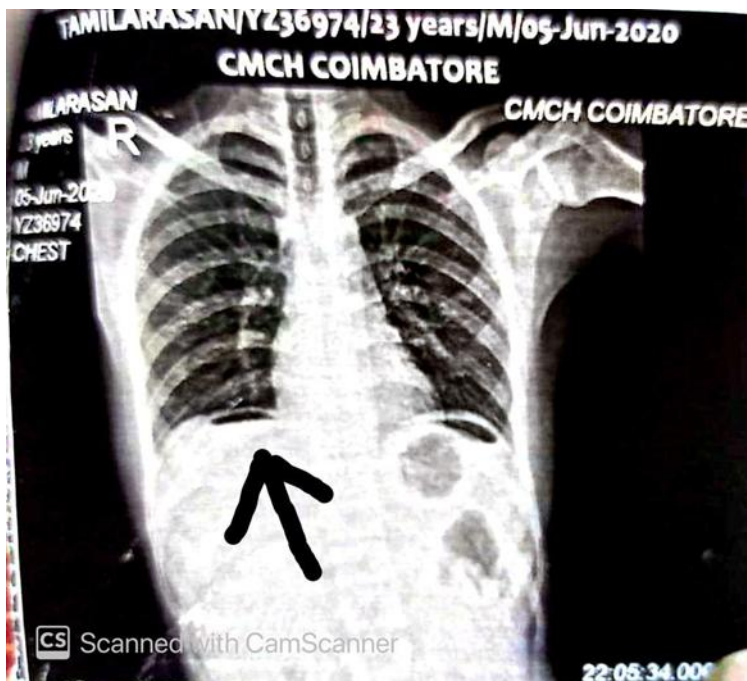


Fig 1: X_ray Abdomen Erect showing free gas under diaphragm

TREATMENT:

Emergency Exploratory laparotomy done under General Anesthesia.

Intra op findings: Perforated Meckel's Diverticulum.

Procedure done: Segmental resection of ileum containing Meckel's diverticulum with end to end ileo - ileal anastomosis done. Care taken not to leave the heterotropic mucosa behind.



Fig 2: Intraoperatively perforated Meckel's Diverticulum

Postoperatively the excised part was sent for HPE and diagnosed as a case of Meckel's diverticulum perforation with heterotopic tissue containing gastric and pancreatic mucosa.

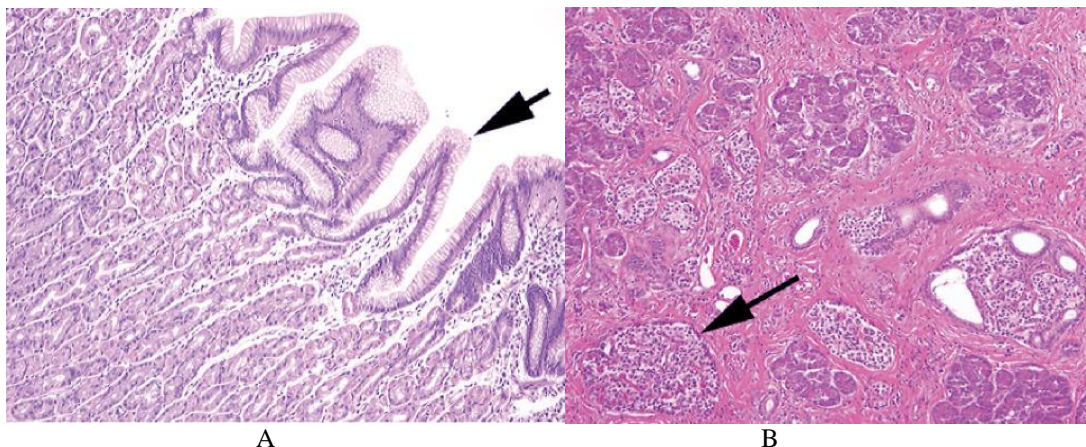


Fig 3: Histopathological examination of the excised specimen.
A: Heterotopic ectopic gastric fundic mucosa in Meckel's diverticulum.
B: Heterotopic ectopic pancreatic acinar cells and islets in Meckel's diverticulum.

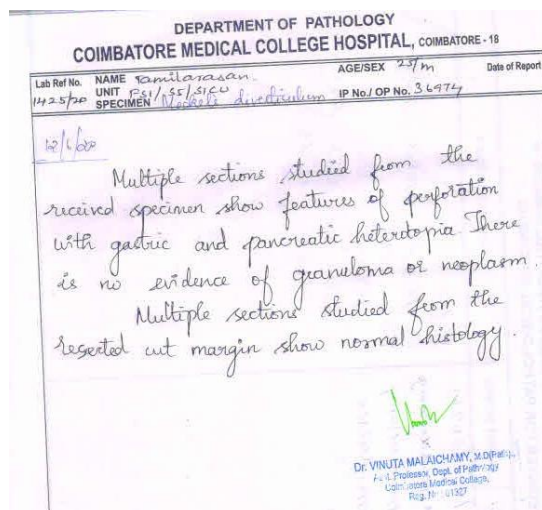


Fig 4: Histopathological report of the excised specimen.

II. Discussion

Meckel's diverticulum is the most common congenital malformation of the gastrointestinal tract - most studies suggest an incidence of between 0.6% and 4%. It is also the most common cause of bleeding in the paediatric age group. This is due to the persistence of the proximal part of the congenital vitello-intestinal duct. It is a true diverticulum, typically located on anti-mesenteric border, and contains all three coats of intestinal wall with its separate blood supply from the vitelline artery. It is known by the rule of two: present in 2% population, 2 ft from the ileo-caecal junction and 2 inch long, although many anatomical variations exist. The various anomalies includes, a fibrous band from distal ileum to the anterior abdominal wall, an umbilical-intestinal fistula, a mucosa lined cyst, or sometimes an umbilical sinus of these the commonest anomaly is Meckel Diverticulum.

MANAGEMENT:

The treatment of choice for the symptomatic Meckel's diverticulum is the surgical resection. This can be achieved either by the diverticulectomy or by the segmental bowel resection and anastomosis, especially when there is palpable ectopic tissue at the diverticular-intestinal junction, intestinal ischaemia or perforation. There has been an ongoing debate about the excision of Meckel's diverticulum when found as an asymptomatic incidental finding. During an operation, it is usually impossible to determine by inspection or palpation whether incidentally found Meckel's diverticulum is at increased risk of the complications or not. Mackey and Dineen have suggested statistically significant risk factors such as males less than 40 years, diverticulum longer than 2 cm and that containing ectopic mucosa. However, Park et al. favoured removal of incidental asymptomatic Meckel's diverticulum in males, patients younger than 50 years, diverticulum greater than 2 cm and presence of histological abnormal tissue. Stone et al. did not recommend removal of incidental asymptomatic Meckel's diverticulum in women. However, most authors do not agree with these figures; postoperative morbidity after incidental resection varies between 0% and 6%, with significant morbidity, up to 33% after resection of a complicated Meckel's diverticulum and the lifetime complication risk estimated to be up to 16%. The definitive Mayo clinic survey provides good evidence to support the role of prophylactic diverticulectomy.

III. Conclusion

The clinical presentations of Meckel's Diverticulum differed by age and gender. Intestinal hemorrhage occurred more frequently in the pediatric population and in cases of Meckel's Diverticulum that contained ectopic gastric mucosa. Inflammation of MD and acute appendicitis had similar clinical presentations, and they were undistinguishable clinically. An adequate knowledge of embryological, clinical, pathologic and radiologic characteristics of Meckel's diverticulum will aid the early and accurate diagnosis of complicated cases.

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