



# International Journal of Surgery Science

E-ISSN: 2616-3470  
P-ISSN: 2616-3462  
© Surgery Science  
www.surgeryscience.com  
2019; 3(3): 204-206  
Received: 12-05-2019  
Accepted: 15-06-2019

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## Mesodiverticular band of Meckel's diverticulum: A cause for small bowel obstruction

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DOI: <https://doi.org/10.33545/surgery.2019.v3.i3d.170>

#### Abstract

Meckel's diverticulum is one of the commonest congenital anomaly of the small intestine. The surgical complications of Meckel's diverticulum include hemorrhage, intestinal obstruction and diverticulitis. Intestinal obstruction due to Meckel's diverticulum merits special mention due to the variability in the pathology leading to the obstruction. A case of Mesodiverticular band of Meckel's diverticulum causing acute small bowel obstruction is presented with a view to highlight the peculiar pattern of the surgical pathology.

**Keywords:** Meckel's, diverticulum, complications, obstruction, treatment

#### Introduction

Meckel's diverticulum is one of the most common congenital anomalies of the gastrointestinal tract. It arises due to the failure of the Vitellointestinal duct to obliterate completely. The diverticulum is situated on the Antimesenteric border of the ileum with an incidence of 1-3% [1]. There is no sex predilection, though complications are more frequently seen in males. Meckel's diverticulum is an incidental finding in the majority of cases. Hemorrhage, small bowel obstruction and diverticulitis are the common complications. The diverticulum usually contains heterotopic gastric and pancreatic mucosa. The presence of a Mesodiverticular band from the diverticulum is quite uncommon. However, if present, the incidence of acute small intestinal obstruction is significantly high.

#### Case Report

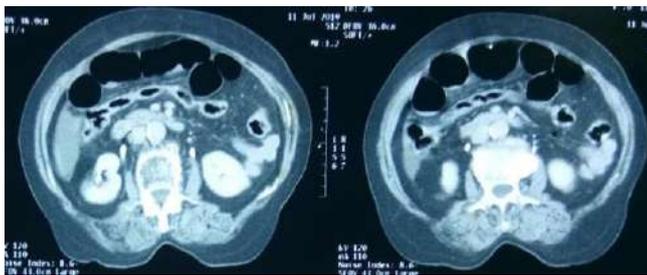
An 80 year old lady was referred to the surgical unit with features suggestive of acute intestinal obstruction. She gave a history of distension of abdomen, obstipation and vomiting since five days.

On admission to the hospital, patient had a Ryle's tube in place. The pulse was 96 beats/min, BP was 110/60 mmHg, with pallor and dehydration present. There was no icterus. Physical examination revealed a uniformly distended abdomen with tenderness. There was no rebound tenderness, guarding or rigidity. Per rectal examination revealed an empty rectum. Plain X- ray abdomen revealed multiple air filled bowel loops with fluid levels, suggestive of small bowel obstruction. (Figure 1) There was no evidence of free gas under diaphragm. Contrast enhanced computerized tomography (CECT) revealed small bowel obstruction. (Figure 2) Laboratory investigations were done. Hemoglobin 12.7gm%, total leukocyte count: 12,300, Serum creatinine 1.4mgm%, hematocrit 38.3%, serum electrolytes – Na-132, K-2.9, Cl-112. Liver function tests were normal. Aggressive intravenous resuscitation and correction of electrolyte abnormalities was carried out till a satisfactory urine output of more than 500cc was achieved. Patient underwent exploratory laparotomy under general anesthesia. At laparotomy, the proximal small bowel loops were massively distended up to the constricting lesion. The constricting lesion was a Mesodiverticular band from a Meckel's diverticulum causing complete kinking of the small intestine. (Figure 3) This was situated approximately one and a half feet from the Ileocecal junction. In addition there was a stercoral perforation approximately one foot proximal to obstructing lesion in the distended part of small intestine.

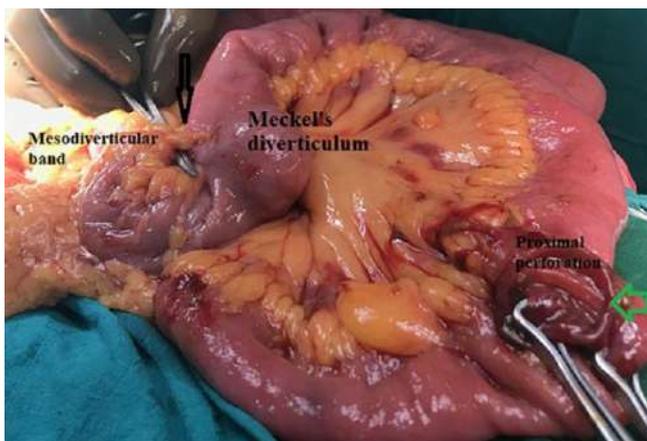
A resection anastomosis of the diverticulum along with the adjacent portion of the small intestine was done. In view of the patient's age, prolonged obstructed state preoperatively and hemodynamic instability, the edges of the proximal perforation were freshened and exteriorized in the form of a loop ileostomy. A thorough peritoneal lavage was given with normal saline. A tube drain was placed in the pelvis. Peritoneal cavity was closed with non-absorbable sutures. Post-operative period was rough. Patient had an episode of hypertension with oliguria, which was treated with normal saline infusions and two blood transfusions. Patient regained hemodynamic stability within 48 hours. The stoma started functioning on day two. Patient was commenced on oral feeds. Staple removal was done on day ten. Patient was kept till staple removal in view of her age and stormy postoperative course.



**Fig 1:** Abdominal X ray showing air fluid levels suggestive of obstruction.



**Fig 2:** CECT showing dilated bowel loops



**Fig 3:** Mesodiverticular band attached to the Meckel's diverticulum.

**Discussion**

Meckel's Diverticulum was originally described by Fabricius Hildanus in 1598 <sup>[1, 2]</sup>. However it was named after Johann Meckel who determined its embryonic origin in 1809 <sup>[1, 2]</sup>. Meckel's diverticulum is one of the commonest anomalies of the small intestine. It is a true diverticulum as it has all the layers of the bowel wall. The average length of the diverticulum may range from 1-10 cm. The diverticulum is usually found within 100cm of the ileocecal valve on the antimesenteric border of the ileum. Majority of Meckel's diverticulum are asymptomatic. Estimated risk of complications arising from Meckel's diverticulum is 4% <sup>[3]</sup>. As the majority of these patients are asymptomatic, not much importance has been laid on the preoperative diagnosis. Bleeding usually arises from heterotopic gastric mucosa. The heterotopic pancreatic mucosa rarely causes complications. Inflammation leading to diverticulitis may present with sepsis and abdominal signs.

Bowel obstruction accounts for 40% of symptomatic Meckel's diverticulum <sup>[3]</sup>. A range of mechanisms can lead to obstruction. Trapping of the bowel loop by a Mesodiverticular band as in the case presented, volvulus of the diverticulum around the band, intussusception, knotting and extension into a hernia sac (Littre's hernia) <sup>[4]</sup>. Presence of a Mesodiverticular band is not seen so commonly. In the case presented, a clear band is seen giving rise to kinking of the small bowel. (Figure 1) Volvulus of the small bowel can typically occur around a diverticulum attached to anterior abdominal wall. A smaller sized diverticulum can serve as an apex for intussusception. Incarceration of a Littre's hernia can also lead to a surgical emergency. Knotting, though extremely rare, has been described in the context of Meckel's diverticulum <sup>[4, 5]</sup>. This knotting requires the presence of three anatomical features in the Meckel's diverticulum. The diverticulum needs to be long, mobile, and free with an ampulla at its distal end. The diverticulum forms a ring into which its own end projects. A loop of intestine can enter the center of this ring, thereby pushing the free end of the diverticulum before it. This eventually leads to a phenomenon best described as 'tying the knot'. The diverticulum may at times surround the pedicle of the intestinal loop in such a way so as to encircle it in a single knot. In a few cases, two loops of bowel may be involved, one above and one below the origin of diverticulum. One loop enters the knot by preliminary rotation while the other is caught in a single knot <sup>[4, 5]</sup>.

Plain X-ray abdomen will reveal small bowel obstruction only. A high resolution sonography or CECT will just reveal obstruction by virtue of distended fluid filled bowel loops. A blind ending fluid or gas filled structure in continuity with the small intestine may be picked up in a few cases. CECT will also help in diagnosing intussusception <sup>[6]</sup>. Imaging in Meckel's diverticulum may not always be rewarding with respect to identifying the Meckel's diverticulum.

If patient is hemodynamically stable with acceptable distension of abdomen, a diagnostic laparoscopy can be attempted <sup>[6, 7]</sup>. However in a patient with advanced small bowel obstruction presenting with a tense abdomen it may not be physically possible to pass in a laparoscope. Patients presenting with obstructive symptoms of Meckel's diverticulum will invariably require an exploratory laparotomy. Resection anastomosis is the best option for Meckel's diverticulum taking into consideration the presence of heterotopic mucosa at the base of Meckel's <sup>[8]</sup>. If a patient presents with perforation following acute intestinal obstruction then a temporary proximal diversion as was done in the case presented is advisable. This obviates the chance of

anastomotic leakage in a septic patient. The morbidity rate in small bowel obstruction due to Meckel's diverticulum ranges from 14 - 53% with an accompanying high mortality rate of 1.5 - 11.5% [8].

### **Conclusion**

Obstructive complications of Meckel's diverticulum usually presents with acute small intestine obstruction. Imaging may not confirm the diagnosis in the majority of patients. Diagnostic laparoscopy followed by exploratory laparotomy is the safest approach to deal with such cases. A formal resection anastomosis of the diverticulum is essential to prevent further complications.

### **Acknowledgements**

The authors would like to thank the Dean of D.Y. Patil University School of Medicine, Navi Mumbai, India for permission to publish the case report. The authors would also like to thank Mr. Parth Vagholkar for his help in typesetting the manuscripts.

**Conflict of interest:** None

**Funding:** Nil

**Consent** of patient for sought.

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