

Research Article

Abdominal Exploration Unveils the Uncommon Twelve Cases of Rare Meckel's Diverticulum Presentations

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Received: 05.10.25, Revised: 19.11.25, Accepted: 20.12.25

Abstract

Meckel's Diverticulum, representing the persistence of the Vitello intestinal (Omphalomesenteric) duct is the most common congenital GIT anomaly which is seen in about 1-3% of the general population. The presentation of Meckel's diverticulum as such is in diverse ways and in rare circumstances, it may present in more diverse forms. There are so many rare complications/presentations reported in the literature. We present here our experience of twelve rare presentations of Meckel's diverticulum on abdominal exploration in emergency vis a vis review of the literature.

Keywords: Meckel's Diverticulum, Meckel's Bleeds, Rare Presentations, Strangulation, Enterocutaneous Fistula.

INTRODUCTION

Meckel's Diverticulum (MD), representing the persistence of the Vitello intestinal (Omphalomesenteric) duct is the most common congenital GIT anomaly seen in about 1-3% of the general population ^(1,2). MD generally remains clinically silent and invariably, it is a mere fortuitous discovery during a laparotomy performed for another reason or rarely it may incidentally be diagnosed by imaging studies⁽³⁾. Although most common presentations associated with complicated MD are bleeding, intestinal obstruction, and diverticulitis ⁽⁴⁾ that is often mistaken for appendicitis and patient can land up with perforation if untreated⁽⁵⁾.

The lifetime risk of complications in patients with Meckel's diverticulum is estimated to be 4%. In adults and children, intestinal obstruction & GIT hemorrhage respectively are the most commonly observed complications⁽⁴⁾. Though sporadic yet a wide range of very rare complications associated with

Meckel's diverticulum have been reported in the literature like vesico-diverticular fistula, enteroliths ^(6,7), obstructing mesodiverticular band in elderly ⁽⁸⁾, subcutaneous abscess in Meckel's⁽⁹⁾, entrapped chicken bone in the Meckel's diverticulum causing vesico-enteric fistula⁽¹⁰⁾ patent omphalomesenteric duct causing recurrent intestinal obstruction ⁽¹¹⁾, Meckel's diverticulum with vitelline cyst ⁽¹²⁾, umbilical sinus with granuloma in adults ⁽¹³⁾. Very rarely neoplasms both benign as well as malignant like leiomyoma, lipoma, sarcoma, and carcinoid tumor can also be noted in Meckel's diverticulum ⁽¹⁴⁾.

Material & Methods (A Case Series)

We are presenting here a case series 12 rare complications/presentations of Meckel's diverticulum, all of them presented as acute surgical emergency and operated in emergency settings vis a vis reviewing literature on the subject (Table-I) {Figs;1-1

Table I: Twelve Rare Presentations of Meckel's Diverticulum.

S.No	Age(yrs)	Sex	Presentation	Diagnosis	Management
1	60	M	Acute intestinal obstruction	Mesodiverticular band causing Intestinal strangulation	Resection of meckel's with end-to-end ileo-ileal anastomosis
2	21	M	Severe Abdominal Pain	Mesodiverticular band with internal herniation	Resection of meckel's with end-to-end ileo-ileal

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1 1	3 4	M	Pain whole abdomen					Wide	Mouth		Resectio n		of
								Meckel' s	with	Food	Meckel's with end-		
								Bolus Obstruction			to-end	ileo-ileal	
											anastomosis		
1 2	2 4	M	Abdominal pain,				fever	Right parietal		wall	Resectio n		of
			and vomiting.					collection		with	Perforated Meckel's		
								Meckel' s			with with end-to-end		
								diverticulitis.			ileo-ileal		
											anastomosis		Meckel'
											s diverticulum.		

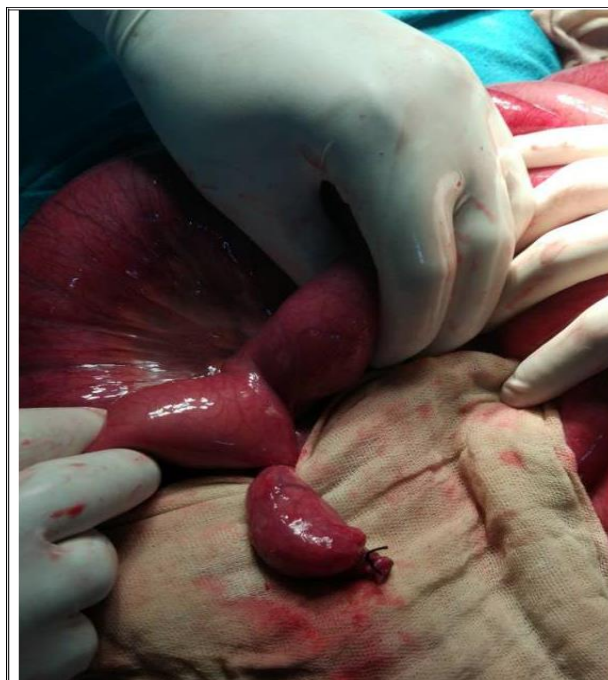


Fig 1- CASE No 1- -Mesodiverticular Band Causing Intestinal Strangulation In The Elderly.

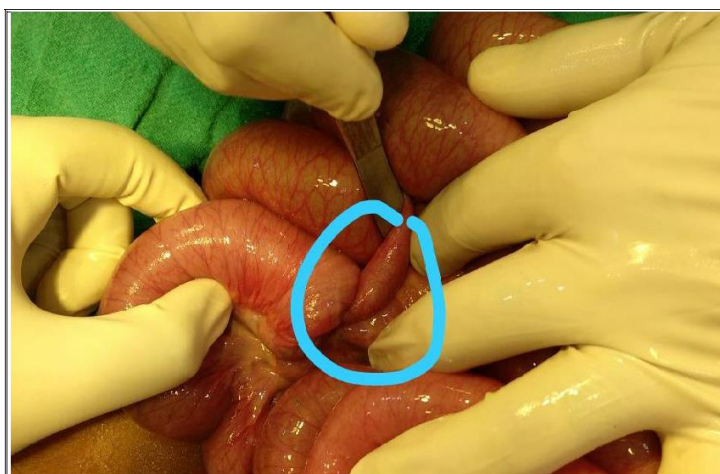


Fig 2- CASE No 2- Mesodiverticular Band With Internal Herniation With Obstruction.



Fig 3 - CASE 3: Meckel's Presenting as Enterocutaneous Fistula in Adulthood.



Fig 4 - Case No 4: Meckel's presenting as Litter's hernia and Intestinal obstruction.



Fig 5 - CASE No 5- Meckel's As Lump Abdomen (Hematoma).

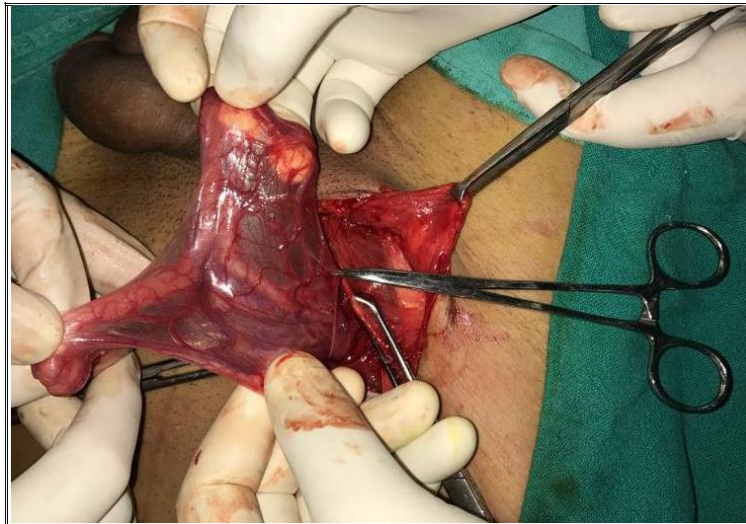


Fig 6 - CASE No 6- Litter's Hernia With Intestinal Obstruction.



Fig 7 - CASE No 7- Meckel's Cyst.

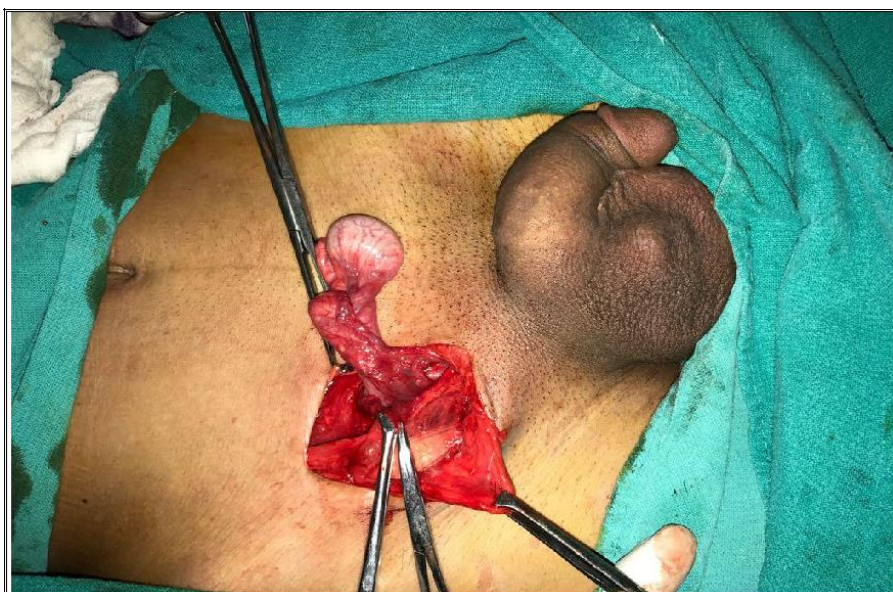


Fig. 8 - CASE No 8 - Perforated Littre hernia in the obturator canal.

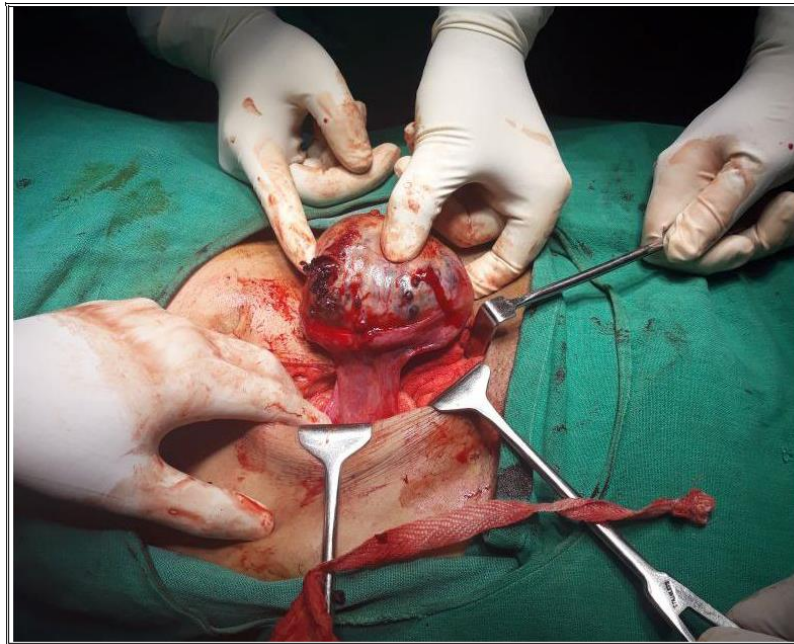


Fig 9 - Case No 9 - Meckel's Diverticulum Presenting As Intraperitoneal Hemorrhage And Hematoma.



Fig. 10 - Case No 10 - Meckel's Diverticulum Presenting with Mesodiverticular Band and Obstruction.



Fig. 11 - Case no 11 - Wide Mouth Meckel's with Food Bolus Obstruction.

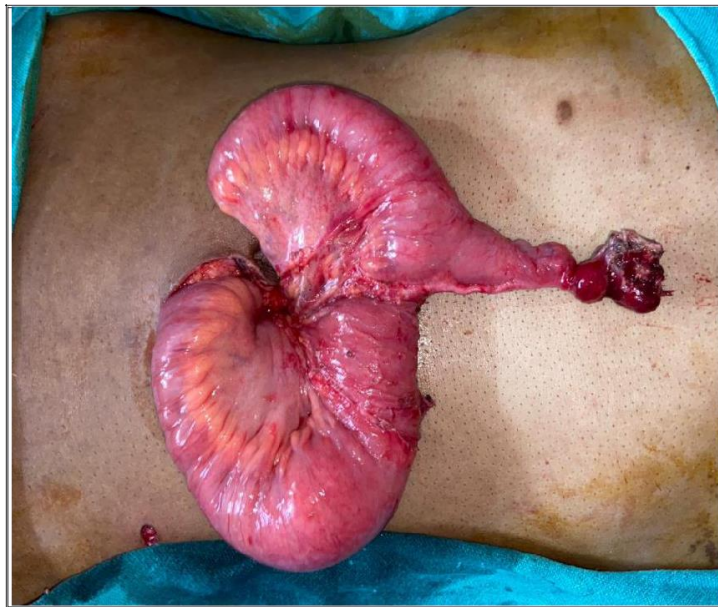


Fig. 12 – Case No 12 – Right Parietal Wall Collection With Meckel's Diverticulitis.

DISCUSSION

The present experience is based on 12 rare clinical presentations of Meckel's Diverticulum encountered over a period of 05 years. The age of presentation ranged from 5-68 years including 09 males and 03 females. From amongst 12 cases, 03 were Mesodiverticular band with obstruction, 02 with Hemorrhage and hematomas, 02 with Litter's Hernia, 01 with Herniation of Perforated Meckel's in Obturator canal, 01 as urachal cyst with enterocutaneous fistula, Meckel's Cyst, perforated Meckel's Diverticulum and food bolus in wide mouth Meckel's presenting as intestinal obstruction. Rarest amongst them are enterocutaneous fistula presenting in adulthood, Meckel's Cyst, Meckel's Hematoma and Perforated Meckel's in obturator canal.

Hildanus (1598) initially identified Meckel's diverticulum (MD) but it was Johann Friedrich Meckel, the younger (1781–1833), who established its embryological origin in 1809. MD comprises the three layers of the intestinal wall and is a true diverticulum that results from an incomplete obliteration of the omphalomesenteric duct⁽¹⁵⁾.

Although 90% of the cases are asymptomatic, yet it can cause a multitude of complications, from rare to rarest, including few of them repeated in this case series as well. Park et al. reviewed the data of 1476 patients with MD and found that the most common clinical presentation in children was obstruction and in adults, bleeding⁽¹⁶⁾. Another review done on 600 patients of MD by Ymaguchi et al. also showed the most common complication to be obstruction, found in 36.5% of cases⁽¹⁷⁾. Obstruction can occur through various mechanisms. MD may act as the leading point

for intussusception or may cause volvulus of gut around the band by which it remains attached to the umbilicus. The diverticulum along with the gut may also get entrapped within the mesentery or get strangulated in an internal or external hernia⁽¹⁸⁾. It is when the diverticulum protrudes into a hernia, we call the condition as Littre's hernia.

The characteristics of Meckel's are described by a mnemonic, the "rule of 2's", which states that it is found in 2% of the population, 2 feet (about 61 cm) from the ileocecal valve and is 2 inches (about 5 cm) long, 2 common forms of ectopic tissue (gastric & pancreatic), and the most common age at presentation being 2 years⁽¹⁾. Though based on empirical evidence and allows compromise for the sake of simplicity, the literature does give some credit to the

Approximation as a rule of thumb. The consensus prevalence of Meckel's diverticulum is 2%, with various studies reporting it from 0.3% and 2.9% in the general population based on its findings during appendectomies (19-24) or abdominal surgery⁽²⁵⁾. Zani et al (26) have reported it to be 1.2% in a review of earlier autopsy studies. Similarly, other characteristics also find small variations, as far as the length from the ileocecal valve, size of Meckel's and the age (29). The majority of studies have reported symptomatic Meckel's from 9.0% to 71.1% of all resected specimens⁽³⁰⁻³⁵⁾ where more than half of all symptomatic patients were found to be younger than 10 years⁽³⁶⁻³⁹⁾. Alemayehu et al⁽²⁷⁾ while searching in the Pediatric Hospital Information System Database for children with symptomatic Meckel's, found 60.1% of children presenting with obstruction, 35.6% presenting with GI-

hemorrhage, and 8.4% presenting with inflammation. In the largest adult series, each series containing >20 symptomatic patients, 35.6% of adults present with obstruction, 27.3% present with GI hemorrhage, and 29.4% present with inflammation^(28-32,36,37,38-43). Inflammation and Littre hernia (hernia involving the bowel segment bearing Meckel's) are more common in adults^(27,29), while cancers develop in older patients⁽⁴⁴⁾. As such obstruction, hemorrhage, and inflammation account for 69.5% to 100% of symptomatic patients in each of the largest retrospective patient series.

Given varied presentations, diagnosis is challenging and is often incidentally found during workup for symptoms thought to be of another cause. Though low sensitivity & specificity, yet role of ultrasound, X-ray, Angiography, CT, and magnetic resonance imaging as diagnostic modalities cannot be denied^(20,30,34,45), as they can show small-bowel obstruction and intussusception and lead to correct surgical interventions⁽³⁷⁾. Finding a normal appendix on such tests can encourage the radiologist to consider differential diagnoses like symptomatic Meckel's^(20,46). Angiography may identify the source of GI-hemorrhage, and the vitelline artery branching off the superior mesenteric artery, when present, is pathognomonic for Meckel's⁽⁴⁵⁾. The majority of reported series documented low cumulative diagnostic value of nuclear scans with Tc-99m pertechnetate^(22, 47, 48-53). Hence direct observation of the Meckel's during surgery will yield the correct diagnosis either by laparoscopy, laparotomy, or with balloon endoscopy of the small intestine.

The real controversy surrounding uncomplicated Meckel's concerns the option of treating silent Meckel's with prophylactic resection when discovered during surgery. Some advice against prophylactic resection, argues that the morbidity is too high and that the reward is too low. Zani et al⁽²⁶⁾ take this position after conducting a systematic review and finding a 5.3% risk of postoperative complications, wound infection being most common after prophylactic resection and a 1.3% risk of developing symptoms after leaving it in situ. Symptomatic Meckel's needs to be resected, either laparoscopically or by open surgery, with or without a wedge or segment of the adjacent intestine^(36, 58, 59). Together with postoperative ileus, it accounted for 66% of all postoperative complications, and the morbidity was found to be higher than for Meckel's left in situ⁽²⁶⁾. Furthermore, many surgeons take a

differentiated approach to prophylactic resections. In the study by Ueberrueck et al⁽²⁴⁾, a perforated or gangrenous appendix was considered a contraindication for prophylactic resection of Meckel's, thereby selecting gangrenous and perforated appendices for the non-resection group and less severe cases of acute appendicitis for the resection group.

Rarer forms of symptomatic Meckel's, including umbilical abnormalities involving the vitelline duct⁽⁶⁰⁾, parasite infections involving Meckel's⁽⁶¹⁾, Meckelian cancers⁽⁴⁵⁾, as well as uncertain cases⁽³¹⁾, account for the remainder. Rare presentations like patent vitelline duct may communicate between the small intestine and the umbilicus and lead to umbilical discharge. This condition and others, like umbilical hernias involving Meckel's, are congenital and diagnosed quickly after birth⁽⁶⁰⁾. Meckelian cancers, which are cancers originating from or involving the Meckel's, have a mean age at diagnosis of 60 years⁽⁴⁴⁾.

CONCLUSION

Meckel's diverticulum (MD) is a true diverticulum found in about 2% of the population, often discovered incidentally, hence pre-operative diagnosis can be challenging even in acute surgical abdomen. Symptomatic MD typically requires surgery, while the approach to asymptomatic and that too incidentally detected is still an issue of debate due to varied reasons. Rare to extremely rare case reports finds sporadic mention in the literature from time to time. Abdominal explorations in emergency for acute surgical abdomen can surprise the operating team with unusual or extremely rare presentation of Meckel's that needs surgical management.

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79. How to cite this article Kumar S, Panchal M, Mishra P, et al. (August 18, 2025) The Many Faces of Meckel's Diverticulum: Clinical Presentations and Complications. Cureus 17(8): e90370. DOI 10.7759/cureus.90370
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