IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 15, Issue 1 Ser. 1 (Jan. – Feb. 2026), PP 90-93
www.iosrjournals.org

A Typical Blood Supply Of Meckel's Diverticulum Due To A Persistent Vitelline Artery In A Mesodiverticular Band: A Case Report

Dr. Priyadharshan Iyappan, Dr. Pramod Kumar Yadav, Dr. Ratna Chopra, Dr. Rishab Kumar Singh, Dr. Middela Muni Siva Teja

Abstract
Introduction:
Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract. A mesodiverticular band, representing a persistent vitelline artery remnant, is a rare but clinically significant association that may cause inflammation, obstruction, ischemia, or volvulus. Surgical management often requires resection with bowel anastomosis; however, literature describing specific anastomotic techniques remains limited.
Case Presentation:
A 14-year-old male presented with features of acute appendicitis and underwent emergency open exploration. Intraoperatively, an inflamed Meckel's diverticulum was identified, associated with a vascular mesodiverticular band arising from the mesentery and supplying the diverticular tip, along with an enlarged adjacent mesenteric lymph node. Segmental ileal resection including the diverticulum was performed, followed by end-to-end bowel anastomosis using a double-layer technique—inner continuous Schmieden sutures and outer seromuscular Lembert sutures.
Outcome:
The patient was kept nil per oral for five postoperative days. Oral feeding was resumed on postoperative day six, and he was discharged on postoperative day seven with no anastomotic leak or postoperative complications
Conclusion:
Early recognition of a vascular mesodiverticular band in complicated Meckel's diverticulitis is essential, as en-bloc segmental resection prevents hemorrhage and obstruction.Primary restoration of bowel continuity with a secure hand-sewn Schmieden (inner continuous) ± Lembert (outer) anastomosis is safe and effective, yielding excellent results.
Keywords: *Meckel's diverticulum; mesodiverticular band; vitelline artery; intestinal anastomosis; Schmieden technique*

Date of Submission: 18-01-2026 Date of Acceptance: 28-01-2026

I. Background

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract, resulting from incomplete obliteration of the vitelline duct, with an incidence of approximately 2% in the general population [1]. Although often asymptomatic, MD may present with complications such as diverticulitis, bleeding, obstruction, or perforation [2]

A mesodiverticular band, representing a persistent vitelline artery connecting the diverticulum to the mesentery, is an uncommon but clinically significant finding due to its vascularity and potential to cause ischemia or strangulation [3].In complicated cases, segmental ileal resection with primary anastomosis is recommended rather than simple diverticulectomy [4]. Hand-sewn bowel anastomosis using the Schmieden technique, a continuous full- thickness inner layer, reinforced with an outer seromuscular Lembert layer, provides secure mucosal apposition and serosal inversion, contributing to reduced leak rates and reliable healing [5].

Table1: Incidence of Meckel's Diverticulum and Mesodiverticular Band

Parameter	Reported incidence
Meckel's diverticulum in general population	~2% [1]
Symptomatic Meckel's diverticulum	4-16% of MD cases [2]
Complicated Meckel's diverticulum (diverticulitis, obstruction, bleeding)	30-40% of symptomatic MD [4]
Presence of mesodiverticular band (vitelline artery remnant)	~5-10% of MD [1,3]
Vascular mesodiverticular band causing complications	Rare (<5% of symptomatic MD) [3,6]
Meckel's diverticulitis with vascular mesodiverticular band requiring resection and anastomosis	Extremely rare (isolated case reports) [6]

II. Case Report

A 14-year-old male presented to the emergency department with a 24-hour history of acute right lower-quadrant abdominal pain associated with nausea and anorexia. There was no history of prior abdominal surgery, gastrointestinal bleeding, or significant comorbidity. On examination he was afebrile, hemodynamically stable and had localized tenderness with guarding in the right iliac fossa.

Laboratory investigations showed leukocytosis ($14 \times 10^3/\mu L$). A clinical diagnosis of acute appendicitis was made and ultrasound whole abdomen done which suggestive of acute appendicitis. The patient was taken for emergency open exploration.

On exploration the appendix was found to be inflamed. On systematic inspection of the terminal ileum, approximately 50 cm proximal to the ileocaecal valve, a Meckel's diverticulum was identified on the antimesenteric border. The diverticulum appeared inflamed with surrounding serosal hyperemia and edema. Notably, a firm fibrovascular band extended from the mesentery to the tip of the diverticulum; on careful ligation the band bled briskly, confirming a persistent vitelline (mesodiverticular) artery. Two enlarged mesenteric lymph nodes (~1 cm) was palpable at the mesenteric attachment of the band.

Given the presence of active inflammation, a vascular mesodiverticular band and regional lymphadenopathy, we elected to perform en bloc segmental resection rather than a simple wedge diverticulectomy. A 10–12 cm segment of ileum containing the diverticulum and mesenteric attachment was resected with adequate margins and the mesodiverticular artery was ligated close to its origin. Resected part along with excised lymph node sent for histopathology. Bowel continuity was restored by an end-to-end ileo-ileal anastomosis fashioned by a double-layer hand-sewn technique: an inner continuous full-thickness inverting suture (Schmieden technique) using 2-0 polyglactin and an outer interrupted seromuscular Lembert layer with 2-0 silk for reinforcement. Appendicectomy was performed in the same setting. Estimated blood loss was minimal and there were no intraoperative complications.

Postoperatively the patient was kept nil per oral for five days with intravenous fluids and antibiotics. Oral intake was resumed on postoperative day six; bowel function returned uneventfully and he was discharged on postoperative day seven in good condition.

Histopathological examination demonstrated acute inflammatory changes of a true Meckel's diverticulum with reactive mesenteric lymphadenitis; ectopic gastric mucosa noted and no malignancy was identified. At follow-up (2 weeks and 3 months) the patient remained asymptomatic with normal bowel function and a well- healed incision.

III. Discussion

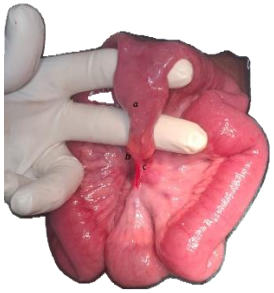

Fig 1: Intraoperative photograph showing Meckel's diverticulum with a vascular mesodiverticular band extending from the mesentery to the tip of the diverticulum (persistent vitelline artery)
a - MD, b - mesodiverticular band, c - enlarged lymph node.

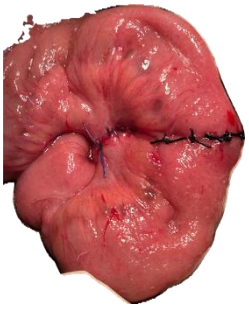

Fig 2: post-anastomotic photograph showing complete end-to-end ileo-ileal anastomosis performed using a double-layer hand-sewn technique (inner Schmieden and outer Lembert sutures).

Mesodiverticular (vitelline artery) bands are an exceptionally rare cause of symptomatic Meckel's diverticulum in adults. A recent systematic review identified only about 20 reported adult cases of mesodiverticular band- associated complications [7]. This congenital remnant of the vitelline vessels can tether the diverticulum to the adjacent mesentery, leading to internal herniation, strangulation or torsion of the bowel. In our 14-year-old patient, the persistent vascular band caused diverticulitis without any small-bowel obstruction. Recognition of this anomaly is important, since the diagnosis is usually made intraoperatively and delay can result in gangrene or perforation [7].

Surgical resection remains the treatment of choice for symptomatic Meckel's diverticulum [7][8]. In most cases with a relatively narrow neck, a simple wedge (diverticulectomy) is adequate. However, in complicated situations such as inflammation at the base, a wide- necked diverticulum, or an associated mesodiverticular band, segmental ileal resection with primary anastomosis is advised [8]. As Arslan et al. noted, "wedge resection is generally sufficient, but in some patients segmental ileal resection and end-to-end anastomosis may be required" [8]. In our patient, the band was released and a 10cm ileal segment (including the inflamed diverticulum) was removed to ensure that all compromised tissue was excised, followed by a tension-free anastomosis.

An isoperistaltic end-to-end anastomosis using the classic Schmieden (double-layer hand-sewn) technique was performed. Schmieden's method employs an inner continuous full-thickness suture line (including mucosa, submucosa, muscle and serosa) to create an inverting "inner lip," followed by an outer inverting Lembert seromuscular layer for reinforcement [9]. This two-layer, inverting closure neatly apposes serosal surfaces and has long been taught as a reliable way to seal the bowel. (Indeed, Lembert's 1826 double-layer inverting suture and Halsted's principles of gentle tissue handling and good vascularity remain the foundation of safe anastomosis) [10]. Although modern staples offer speed, the evidence shows no clear advantage of stapled over hand-sewn techniques in leak or stricture rates[9,10]. For example, a large randomized trial found no significant difference in complication rates between single-layer and two- layer hand-sewn anastomoses[9], and reviewers agree that stapled and sutured closures have comparable safety[10]. Stapled devices may reduce operative time but at much higher cost [9]. In resource-limited settings or cases with edematous bowel, many surgeons still favor hand-sewn suturing. The Schmieden double-layer technique remains globally relevant because it requires only standard suture material yet provides a robust inverting closure. As Varela et al. emphasize, hand-sewn anastomosis is an "essential and fundamental skill" – a safe, tension-free technique ensures patency and healing without reliance on special devices [9].

In our patient's resection specimen, histopathology confirmed ectopic gastric mucosa within the diverticulum. This finding is consistent with reports that roughly half of symptomatic Meckel's diverticula contain gastric heterotopic [11]. Ectopic gastric tissue predisposes to acid-related ulceration and bleeding, and its presence in adults with diverticulitis underlines the congenital origin of these lesions.

In summary, this case illustrates a very rare adult complication of Meckel's diverticulum – a persistent vascular mesodiverticular band – which required segmental ileal resection and hand-sewn anastomosis. We reinforce that in complicated or gangrenous Meckel's, resection including the adjacent ileum is indicated [8], and that the traditional Schmieden anastomotic technique (inner continuous full-thickness layer + outer Lembert layer) remains a safe, time- honored method for bowel closure [9][10]. Awareness of this anomaly and familiarity with sound anastomotic principles are key to managing such unusual cases successfully.

IV. Conclusion

Meckel's diverticulitis with a vascular mesodiverticular band is an uncommon but clinically important variant that can cause bleeding, obstruction, or strangulation. In symptomatic cases— particularly with inflammation, demonstrable arterial supply, or regional lymphadenopathy—en bloc segmental ileal resection is preferred over simple diverticulectomy to remove ectopic mucosa and the vitelline arterial remnant. Primary

restoration of continuity with a dependable hand-sewn approach, exemplified by an inner continuous Schmieden suture reinforced by an outer seromuscular Lembert layer, achieves secure mucosal apposition and serosal inversion in inflamed fields. Early recognition and resection with sound anastomotic technique lead to excellent outcomes, as shown in this case.

Reference

[1]. Sagar J, Kumar V, Shah DK. Meckel's Diverticulum: A Systematic Review. J R Soc Med. 2006;99:501–505.
[2]. Park JJ, Wolff BG, Tollefson MK, Walsh EE, Larson DR. Meckel Diverticulum: The Mayo Clinic Experience. Ann Surg. 2005;241:529–533.
[3]. Sethi NT, Et Al. Meckel's Diverticulum With Mesodiverticular Band. MJAFI. 2011;67:75–76.
[4]. Cullen JJ, Et Al. Surgical Management Of Meckel's Diverticulum. Ann Surg. 1994;220:564–568.
[5]. Traverso LW, Hargrave K. Single-Layer Versus Double-Layer Intestinal Anastomosis. Am J Surg. 1985;149:722–724.
[6]. Zieliński M, Kaczmarek K, Głowacka K, Kaczmarek M. Small Bowel Segment With Meckel's Diverticulum Volvulus Related To A Short Mesodiverticular Band: A Case Report. J Med Case Rep. 2023;17:109
[7]. Bamarni S, Hungfong SS, Mino J, Misra S. Systematic Review Of Mesodiverticular Band: A Rare Cause Of Small Bowel Strangulation And Hemoperitoneum In Adults. Int J Short Rep 2021;6(4):E33.
[8]. Arslan HE, Zeren S, Ekici MF, Algın MC. Intestinal Obstruction Due To Mesodiverticular Band: A Rare Cause Of Small-Bowel Obstruction. Turk J Colorectal Dis 2020;30:138-142.
[9]. Varela C, Nassr M, Razak A, Kim NK. Double-Layered Hand-Sewn Anastomosis: A Valuable Resource For The Colorectal Surgeon. Ann Coloproctol 2022;38(3):271-275.
[10]. Martin JP, Connor PD, Charles K. Meckel's Diverticulum. Am Fam Physician 2000;61(4):1037-1042
[11]. Hernández JD, Valencia G, Girón F, Et Al. Meckel's Diverticulum: Analysis Of 27 Cases In An Adult Population. Front Surg. 2023;10:1327545. [Epub 2023 Dec 18]