Case Report

Patent Omphalomesenteric Duct Arising from the Caecum and Opening at the Umbilicus in a Newborn: A Case Report and Literature Review

Kubilay Gürünlüoğlu[1], Ramazan Ozdemir[2], Sevgi Demiroz Taşolar[3], Zehra Bozdağ[4], Zekine Begec[5], Mehmet Akif Türköz[3], Semra Gürünlüoğlu[4], Mehmet Aslan[6]

[1]Department of Paediatric Surgery, [2]Department of Paediatrics, Division of Neonatology, [3]Department of Radiology, [4]Department of Pathology, [5]Department of Anaesthesiology, [6]Department of Paediatrics, Division of Emergency, Faculty of Medicine, İnönü University, Malatya, Türkiye

Abstract

This case report describes a patent omphalomesenteric duct (POD) connecting the umbilicus to the caecum, rather than the classically described umbilicus-to-ileum configuration. A 10-day-old neonate presented to the emergency department with faecal discharge from the umbilical opening. Contrast fistulography through the umbilical orifice demonstrated that the patent tract communicated with the caecum. This preoperative imaging was particularly valuable, as it directly informed the surgical approach. Rather than using a standard periumbilical or lower midline incision, the surgeons performed a right-sided infraumbilical incision extending toward the right lower quadrant, which shortened operative time and facilitated the procedure technically. The tubular tract was resected and the caecal defect primarily repaired. The neonate recovered uneventfully and was discharged on the fifth postoperative day without complications. This case highlights two key clinical points. First, the anatomy of a patent omphalomesenteric duct may not always follow the classic umbilicus-to-ileum pattern, and preoperative imaging is essential for accurate delineation of the tract before surgery. Second, surgical intervention should be considered for all patients with POD, given the well-documented risk of future complications, particularly intestinal obstruction. This report adds a novel anatomical variant to the existing literature and demonstrates how preoperative imaging can guide tailored surgical management in neonatal POD cases, ultimately improving outcomes and reducing operative morbidity in this rare but clinically significant congenital condition.

Keywords: Patent omphalomesenteric duct, Newborn, Caecum, Vitellointestinal duct

Introduction

In the human embryo, a connection between the midgut and the yolk sac forms during the third week of intrauterine life; this structure is termed the vitellointestinal (omphalomesenteric) duct.[1] As placental implantation occurs and the placenta becomes fully functional, the omphalomesenteric duct normally undergoes involution.[1] This process typically takes place between the fifth and seventh weeks of gestation.[1] However, in approximately 1–2% of individuals, complete regression fails to occur, and a residual structure may persist as an umbilical sinus communicating with the abdominal wall/ umbilicus, a fibrous band, or a cyst.[1] These persisting structures are collectively referred to as omphalomesenteric duct remnants.[1]

If the duct fails to regress completely and remains fully open (patent), this condition is termed a patent omphalomesenteric duct (POD).[1]

Omphalomesenteric duct remnants are observed in approximately 2% of individuals, whereas a completely patent omphalomesenteric duct (POD) is exceedingly rare.[1] In reported cases, patency has typically been described between the umbilicus and the ileum.[2–18] Embryologically, the omphalomesenteric duct serves as a transient connection between the yolk sac and the midgut. The distal duodenum, jejunum, ileum, caecum, ascending colon, and part of the transverse colon are derived from the midgut.

Address for correspondence: Kubilay Gürünlüoğlu
Department of Pediatric Surgery, Faculty of Medicine, İnönü University, Malatya, TürkiyeEmail: kgurunluoglu@hotmail.com

Received: 29-04-2026 **Revised:** 08-06-2026 **Accepted:** 25-07-2026 **Available Online:** 11-09-2026

Access this article online

Quick Response Code:

Website: https://www,afrjpaedsurg.com

DOI: https://doi.org/10.67481/ajps.v23i1.7

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: editor@afrjpaedsurg.com

How to cite this article. Gürünlüoğlu K, Ozdemir R, Taşolar SD, Bozdağ Z, Begec Z, Türköz MA, *et al*. Patent Omphalomesenteric Duct Arising from the Caecum and Opening at the Umbilicus in a Newborn: A Case Report and Literature Review. Afr J Paediatr Surg 2026;23(1):68-73.

Therefore, it is theoretically possible for a patent omphalomesenteric duct (POD) to communicate with the caecum. To our knowledge, however, a POD extending between the umbilicus and the caecum has not been reported previously (Search made in Pubmed database). The aim of this case report and literature review is to describe the diagnostic evaluation of a patient with a patent omphalomesenteric duct (POD) extending between the umbilicus and the caecum, to present the key findings of the surgical management, and to highlight clinically relevant points from the literature that may facilitate the treatment of similar patients.

Case Report

This case was prepared and presented in accordance with the CARE Case Report Guidelines. A 10-day-old neonate presented to the emergency department with cherry-red mucosa and discharge from the umbilicus. On initial evaluation, the patient was in good general condition, and a cherry-red orifice was noted at the umbilicus (Figure 1). Careful inspection revealed faecal discharge from the orifice. Subsequently, contrast material was injected through the opening, and a fistulogram was obtained. The contrast was seen to opacify the caecum and then outline the entire colon (Figure 2). Based on these findings, an omphalomesenteric duct remnant was suspected, and surgical management was planned. Following routine preoperative preparation, the patient underwent surgery under general anaesthesia. After standard monitoring was established, a modified rapid sequence induction was performed because of the increased risk of regurgitation and aspiration. Following preoxygenation with 100% oxygen, anaesthesia was induced with fentanyl (1 μg/kg) and propofol (2–3 mg/kg), and neuromuscular blockade was achieved with rocuronium (1.2 mg/kg). Tracheal intubation was performed using a videolaryngoscope under low-pressure controlled ventilation. Anaesthesia was maintained with sevoflurane (1–2 MAC) in a 50% air/50% oxygen mixture. A right transverse incision was made at the level of the umbilicus, and the peritoneal cavity was entered through a circum-umbilical extension incorporating the umbilicus. To facilitate excision of the cherry-red umbilical mass, 4-0 suspension sutures were placed in the lesion and gentle traction was applied. An incision was then made at the junction of the healthy skin and the mass, and the underlying subcutaneous tissue and fascial layers were divided with cautery to gain access to the abdominal cavity. On exploration, the intra-abdominal organs and bowel were found to be normal.



Figure 1: Preoperative appearance of the patent omphalomesenteric duct orifice in the patient

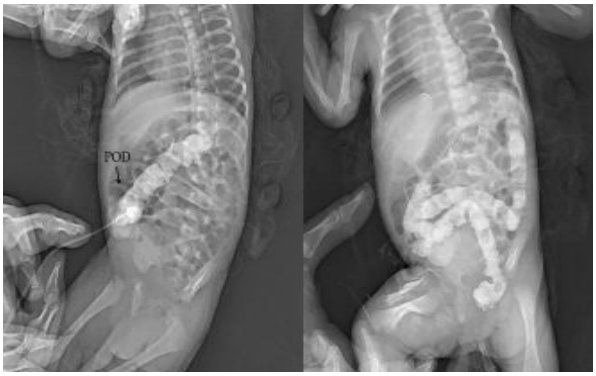


Figure 2: In this patient, fluoroscopy demonstrated that contrast material administered through the umbilical opening (black arrow) passed directly into the cecum and then progressed through the colon to the rectum

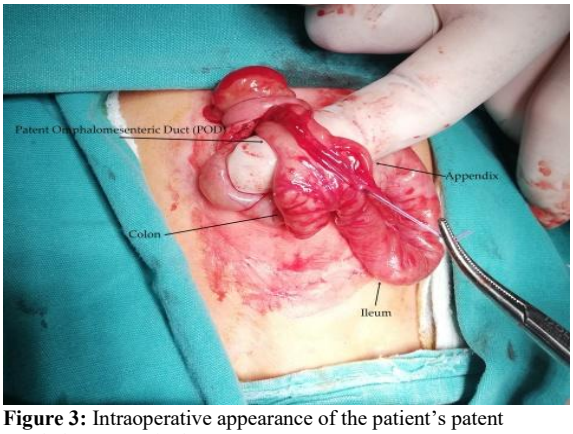


Figure 3: Intraoperative appearance of the patient's patent omphalomesenteric duct

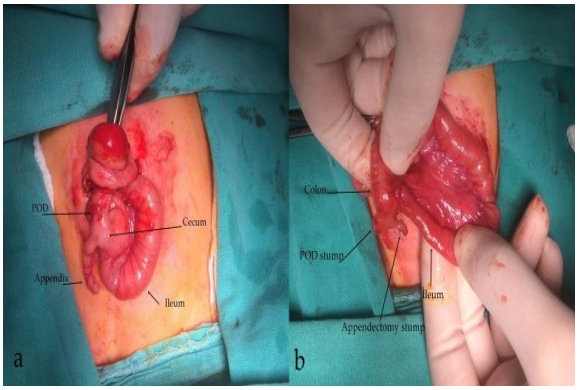


Figure 4: (a)Intraoperative view of the patient's patent omphalomesenteric duct from a different angle. (b) Appearance of the cecum and ileum after completion of the resection.



Figure 5: Postoperative appearance of the umbilical region.

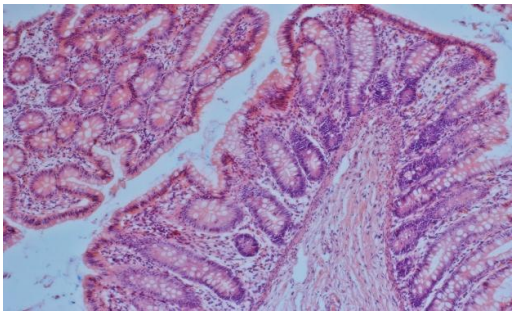


Figure 6: Colonic mucosa identified on histopathological examination of the resected patent omphalomesenteric duct (H&E, ×100 magnification).

A tubular intestinal segment extending from the umbilicus to the caecum, with an independent blood supply, was identified. After ligation of its vascular pedicle, the segment was resected, and the caecal defect was repaired with interrupted 4-0 synthetic absorbable multifilament sutures (Figures 3–4). During resection of the patent omphalomesenteric duct (POD) orifice, impaired perfusion developed in a portion of the appendix. Therefore, because of concern regarding possible postoperative appendiceal perforation, an appendectomy was performed using 4-0 synthetic absorbable multifilament sutures.

Table 1. Summary of the systematic review conducted for POD

Author	Age at first admission	Case publication date	POD association and clinical presentation	Number of cases reported
Sequeira JH	1-day-old	1896	POD with Ectopia Vesicae	1
CLARK DV e*t al.*	1-day-old	1946	POD with strangulated umbilical cord hernia	1
Kittle CF e*t al.*	1-day-old	1947	POD-Faecal discharge from the umbilicus	1
Howard S e*t al.*	3-day-old	1953	POD with prolapse of ileum through umbilicus	1
HAGEMEYER FW	1-day-old	1954	POD with prolapse of ileum through umbilicus	1
Elebute EA	1-day-old	1965	POD with prolapse of ileum through umbilicus	1
Davis RM e*t al.*	1-day-old	1967	POD with prolapse of ileum through umbilicus and omphalocele	1
Varughese M	1-day-old	1968	POD-Faecal discharge from the umbilicus	1
Lal MM e*t al.*	1-day-old	1976	POD with prolapse of ileum through umbilicus	1
Mustafa R	20-day-old	1976	POD ileal obstruction	3
Rao PL e*t al.*	1-day-old	1979	POD-Faecal discharge from the umbilicus	1
Narasimharo KL e*t al.*	1-day-old	1983	POD with prolapse of ileum through umbilicus	1
Dombrowski MP	1-day-old	1987	POD and umbilical hemorrhage	1
Storms P e*t al.*	1-day-old	1988	POD with prolapse of ileum through umbilicus	1
Gangopadhyay AN e*t al.*	1-day-old	1991	POD-Faecal discharge from the umbilicus	1
Benson JM e*t al.*	5-week-old	1992	POD with prolapse of ileum through umbilicus	1
Perreea J	1-day-old	1993	POD-Faecal discharge from the umbilicus	1
Tsang TM e*t al.*	1-day-old	1994	POD-Faecal discharge from the umbilicus	1
Fleming F	1-day-old	2001	POD-Faecal discharge from the umbilicus	1
Nursal TZ	44-year-old	2002	POD-Faecal discharge from the umbilicus	1
Giacalone G e*t al.*	1-day-old	2004	POD-Faecal discharge from the umbilicus	1
Houssaini NS	2-months-old	2004	POD-Faecal discharge from the umbilicus	1
Ameh EA e*t al.*	9-day and 11-year-old	2005	POD-Faecal discharge from the umbilicus	12

NG J e*t al.*	1-day-old	2006	POD-Faecal discharge from the umbilicus	5
Kulkarni ML e*t al.*	1-day-old	2007	POD-Faecal discharge from the umbilicus	1
Mohite PN e*t al.*	5-months-old	2007	POD with prolapse of ileum through umbilicus	1
Kannan L e*t al.*	1-day-old	2008	POD and choanal atresia	1
Menezes M e*t al.*	1-day-old	2008	POD-Faecal discharge from the umbilicus	9
Murphy FJ	1-day-old	2009	POD-Faecal discharge from the umbilicus	2
Ali A e*t al.*	11-months-old	2010	POD-Faecal discharge from the umbilicus	1
Agrawal S.	4-month-old	2010	POD-Faecal discharge from the umbilicus	1
Bowman P e*t al.*	1-day-old	2011	POD-Faecal discharge from the umbilicus	1
Ting YH e*t al.*	1-day-old	2013	POD-Faecal discharge from the umbilicus	1
Patel RV. e*t al.*	10-day-old	2013	POD with prolapse of ileum through umbilicus	1
Marshall AS	1-day-old	2013	POD with prolapse of ileum through umbilicus and omphhalocele	1
Periquito IR	1-day-old	2014	POD-Faecal discharge from the umbilicus	1
Mirza B e*t al.*	1-day-old	2015	POD with prolapse of ileum through umbilicus and omphalocele	2
Roy D e*t al.*	1-day-old	2015	POD with prolapse of ileum through umbilicus	1
Pathak A e*t al.*	2-months-old	2015	POD with prolapse of ileum through umbilicus	1
Rekhi HS. e*t al.*11-day-old		2015	POD and para umblical abcess	1
Kadian YS e*t al.*	2-months-old	2016	POD-Faecal discharge from the umbilicus	16
Bhankar H. e*t al.*	one-month-old	2016	POD tubular adenoma	1
Bhandari TR e*t al.*	22- year- old	2017	POD ileal obstruction	1
Walia DS. e*t al.*	1-year-*old	2017	POD and patent urachus	1
Singh S e*t al.*	20-days-old	2017	POD-Faecal discharge from the umbilicus	2
Mammadov E e*t al.*	1-day-old	2018	POD with prolapse of ileum through umbilicus and omphhalocele	1
Srestha S e*t al.*	2- year- old	2019	POD with prolapse of ileum through umbilicus	1
Sim SK e*t al.*	1-day-old	2019	POD with prolapse of ileum through umbilicus and omphhalocele	1
Basu S e*t al.*	1-day-old	2021	POD with prolapse of ileum through umbilicus	1
Daniyan M e*t al.*	22-year-old	2021	POD ileal obstruction	1
Zvizdic Z	1-day-old	2021	POD with Umbilical cord hernia	1
Trinder MW. e*t al.*	61-year-old	2021	POD umbilical abscess	1
McNickle L e*t al.*	1-day-old	2022	POD with prolapse of ileum through umbilicus and omphalocele	3
Rege SA	60-year-old	2022	POD and patent urachus	1
Srivasta P e*t al.*	1-months-old	2023	POD adenoma-carcinoma	1
Beyari B e*t al.*	1-day-old	2023	POD and Patau's Syndrome	1
Aryal K e*t al.*	30-year-old	2024	POD ileal obstruction	1
Sarkar A e*t al.*	7 days	2024	POD-Faecal discharge from the umbilicus	13
Dudhani S e*t al.*	1 day	2024	POD and patent urachus	1
Chen F e*t al.*	10 days	2024	POD with prolapse of ileum through umbilicus	1
Yigzaw WA e*t al.*	1-day-old	2025	POD with prolapse of ileum through umbilicus and omphhalocele	1
Meshram RB	3-day-old	2025	POD-Faecal discharge from the umbilicus	3
Alatrash M e*t al.*	26-year-old	2025	POD ileal obstruction	1
Rahman RA	20-day old	2026	POD ileal obstruction	1
Kalim AS e*t al.*	1-day-old	2026	POD with Umbilical cord hernia	2

The bowel was then returned to the abdominal cavity. After excision of the umbilical lesion, the subcutaneous tissue and fascia were closed separately with 3-0 absorbable multifilament sutures.

The umbilicus was reconstructed with a circumferential purse-string suture using 4-0 absorbable multifilament material, and a single fixation suture was placed at the center of the umbilicus to secure it to the fascia (Figure 5). The abdominal wall was subsequently closed in anatomical layers.

Histopathological examination of the excised mass revealed that the luminal bowel segment connected to the caecum was lined by ileal mucosa, whereas the remaining portion showed colonic architecture with areas of ulceration (Figure 6).
Postoperatively, the patient recovered uneventfully, resumed oral feeding on postoperative day 3, and was discharged in good condition on postoperative day 5.

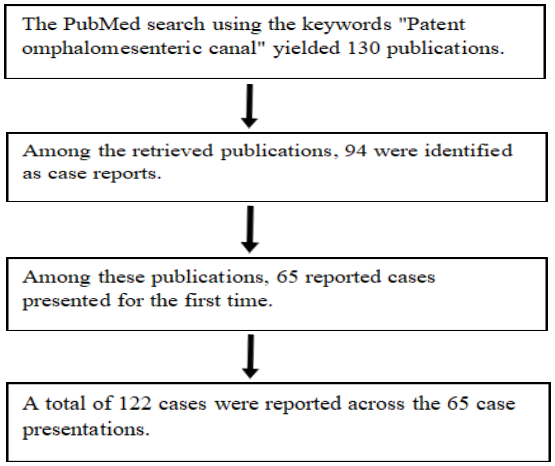


Figure 7: Flow diagram of the literature search process performed in the PubMed database.

Discussion

The clinical findings in our case may offer valuable practical guidance for both the diagnostic and therapeutic management of similar patients. In patients presenting with faecal discharge from the umbilicus, contrast radiography can provide a significant advantage in preoperative planning. In addition, identifying the organ connected to the umbilicus allows selection of the most appropriate incision, thereby facilitating the surgical procedure. In our case, the umbilicus was found to be connected to the caecum. Considering the usual fixation of the caecum in the right lower quadrant, we chose an incision extending from just inferior to the umbilicus toward the right lower quadrant. This approach provided excellent exposure, enabling isolation and resection of the duct, complete visualization of the operative field, and uncomplicated primary repair of the caecum. An unexpected intraoperative finding was impaired circulation in a segment of the appendix following resection of the duct. Although appendectomy is not routinely necessary in such cases, we elected to perform an appendectomy because of concern that compromised appendiceal perfusion might subsequently lead to perforation.
The PubMed database served as the primary source for the literature review, and the review process is summarised in Figure 7. A PubMed search using the keyword phrase “patent omphalomesenteric duct” yielded 130 publications. After screening, it was determined that not all of these were case reports; 94 publications were identified as case reports. Among these, 65 publications were found to present original cases. These 65 reports included a total of 122 cases of patent omphalomesenteric duct. The chronological distribution of all identified cases, along with the extracted data, is presented in Table 1.
Our review of the literature showed that the number of patients reported with this type of umbilical discharge is not negligible.[2-15] The first case of patent omphalomesenteric duct (POD) reported in the literature was described by Sequeira in 1896.[2] Following this initial report, no additional POD cases were published until 1946.[3] After 1946, cases were reported intermittently through the 2000s, generally with only a few cases appearing each decade. [4-10] Beginning in the early 2000s, the number of reported POD cases increased, and nearly half of all published cases appeared after 2015.[11] Although the number of reported POD cases appears to have risen over time, we speculate that this increase is relative rather than absolute, reflecting growth in the number of publications rather than a true increase in incidence.

The ages of patients reported in the literature ranged from 1 day to 61 years. [3,12] In younger patients, POD most commonly presented as faecal discharge from the umbilicus, whereas older patients more often presented with intestinal obstruction or ileal prolapse.[3,13,14] Notably, one reported patient with POD presented with a tubular adenoma.[15]
In addition, patent omphalomesenteric duct (POD) has been reported in association with other congenital anomalies, including patent urachus, omphalocele, and umbilical cord hernia.[16-18] However, to the best of our knowledge, our search of the PubMed database identified no previously reported cases of a patent omphalomesenteric duct (POD) extending between the umbilicus and the cecum. In this regard, our case appears to be unique. In all previously reported cases, the patent duct communicated with the ileum.[2-18] Because the ileum is relatively mobile within the abdominal cavity, a trans-umbilical or sub-umbilical incision generally provides sufficient exposure and does not usually create technical difficulty. In contrast, when the omphalomesenteric tract originates from the caecum, the fixed location of the caecum in the right lower quadrant may limit exposure through a purely trans-umbilical or sub-umbilical incision and may make surgical access more challenging. Therefore, extending the incision from the umbilicus approximately 1–2 cm toward the right lower quadrant may provide excellent surgical exposure.

Conclusion

Based on our experience in the present case, we suggest that after the initial clinical evaluation, the first diagnostic step should be delineation of the tract anatomy by instilling a

radiopaque contrast agent. Based on our experience with the present case, we suggest that, following the initial clinical assessment, the first diagnostic step should be to delineate the tract anatomy using a radiopaque contrast agent. Detailed visualization of the tract can facilitate selection of the most appropriate surgical incision, provide optimal exposure, potentially shorten operative time, and make the procedure safer and technically easier. Again, based on our review of the literature, we believe that patients diagnosed with patent omphalomesenteric duct (POD) should undergo surgical treatment because the condition may lead to life-threatening complications in the future, such as intestinal obstruction.

Acknowledgements

We thank Muhammed Dündar, Turan Yıldız, Necmettin Akpınar, and Hasan Ateş for their contributions to the preparation of this case report and to the management of the patient.

Funding

This research received no external funding.

Conflicts of interest

None declared

Informed Consent Statement

Written informed parental consent was obtained for publication of this case report.

Ethics approval

Ethical approval was obtained from the İnönü University Local Health Sciences Scientific Research and Publication Ethics Committee (12/04/2022; decision no. 2022/3402).

References

1. Snyder CL. Meckel's Diverticulum. In Grosfeld JL, O'Neill JA, Fonkalsrud EW, Coran AG editors. Textbook of Paediatric Surgery. 6. Ed. Mosby, Philadelphia: 2006. Vol 2, Chap.82: pp: 1304-12.
2. Sequeira JH. Case of Ectopia Vesicae, with Patent Vitelline Duct. J Anat Physiol. 1896; 30: 362-8.
3. Clark DV. Exstrophy of the ileum through a patent omphalomesenteric duct with strangulated umbilical hernia; case report. J Int Coll Surg. 1946; 9: 251-6.
4. Kittle CF, Jenkins HP, Dragstedt LR. Patent omphalomesenteric duct and its relation to the diverticulum of Meckel. Arch Surg (1920). 1947; 54(1): 10-36.
5. Howard S, Moss PD, O'Donnell S. Patent vitello-intestinal duct with associated fistula and prolapse. Lancet. 1953; 265(6793): 968-9.
6. Elebute EA, Ransome-Kuti O. Patent vitello-intestinal duct with ileal prolapse. Arch Surg. 1965; 91: 456-60.
7. Lal MM, Dhall JC. Ileal prolapse through patent vitello-intestinal duct: a report of 3 cases with review of literature. Indian Pediatr. 1976; 13(7): 571-3.
8. Narasimharao KL, Chandramouli P, Chatterjee H. Double prolapse of small bowel through patent vitello-intestinal duct. Indian J Med Sci. 1983; 37(7): 120-1.
9. Gangopadhyay AN, Kulshreshtha S. A newer surgical approach for patent vitello-intestinal duct anomalies. Surg Gynecol Obstet. 1991; 173(1): 69-70.
10. Nursal TZ, Yildirim S, Tarim A, Noyan T. Laparoscopic resection of patent omphalomesenteric duct in an adult. Surg Endosc. 2002; 16(11): 1638.
11. McNickle L, Visa A, Clarke S, Yardley I, Tan YW. Exomphalos with intestinal fistulation: Case series and systematic review for clinical characterization, management and embryopathogenesis. J Pediatr Surg. 2022; 57(4): 661-669.
12. Trinder MW, Balasuriya HD, Warner M. Patent vitellointestinal duct presenting as an umbilical abscess: a novel operative approach to a rare adult presentation. ANZ J Surg. 2021; 91(9): E610-E611.
13. Mohite PN, Bhatnagar AM, Hathila VP, Mistry JH. Patent vitellointestinal duct with prolapse of inverted loop of small intestine: a case report. J Med Case Rep. 2007; 14: 1:49.
14. Bhandari TR, Shahi S, Gautam M, Pandey S. A rare case report of patent vitellointestinal duct causing bowel obstruction in an adult. Int J Surg Case Rep. 2017; 39:231-234.
15. Bhankar H, Goyal S, Zaheer S, Sugandhi N, Mandal AK. Occult Adenoma in Patent Vitellointestinal Duct Presenting as an Umbilical Fistula: Cause for Concern? Fetal Pediatr Pathol. 2016; 35(4): 272-6.
16. Dudhani S, Bachagala K, Suman BK, Rashi R, Sinha AK. Patent Urachus with Patent Vitellointestinal Duct: A Rare Simultaneous Occurrence. Afr J Paediatr Surg. 2024; 18. doi: 10.4103/ajps.ajps_78_23.
17. McNickle L, Visa A, Clarke S, Yardley I, Tan YW. Exomphalos with intestinal fistulation: Case series and systematic review for clinical characterization, management and embryopathogenesis. J Pediatr Surg. 2022; 57(4): 661-669.
18. Kalim AS, Fauzi AR, Gani R, Haksari EL, Makhmudi A, Gunadi. Findings of a patent omphalomesenteric duct in children with umbilical cord hernia showing different prognosis. BMC Pediatr. 2026; doi: 10.1186/s12887-026-07037-5.