Case Series

Patent vitellointestinal duct treated during infancy: Case series with literature review

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ABSTRACT

Patent vitellointestinal duct (PVID) is the rarest of all vitelline duct anomalies, resulting from the complete failure of regression of the vitelline duct. Approximately three-fourths of the PVID cases are clinically present during the neonatal period. The present report is a series of three neonates (all boys) operated upon by the author, for the PVID during the study period. All three neonates presented with mucus, flatus, and fecal discharge through the umbilicus. The preoperative diagnosis of PVID was made, due to the classical clinical history and examination findings of fecal/flatus discharges through the umbilicus. All three neonates were operated upon through a sub-umbilical incision. Two neonates underwent resection of the patent duct along with a small adjacent segment of the ileum and ileoileal anastomosis, and one of the neonates underwent a wide wedge resection of the ileum and ileal repair. During the follow-up period, two of the children were doing well. The parents of one of the neonates discontinued the treatment and left the hospital against the medical advice, a week after the operative procedure. Neonates diagnosed with PVID, who mostly presented with fecal discharges through the umbilicus, may also present with the additional features of mucosal/bowel prolapse through the umbilicus.

Key words: Omphalomesenteric duct, Patent vitelline duct, Patent vitellointestinal duct

Meckel's diverticulum, the most common among all the vitellointestinal duct (VID) anomalies, and the most common congenital malformation of the gastrointestinal tract is a result of the failure of obliteration of the enteric side of the VID [1-3]. The persistent or patent VID (PVID) is the rarest (5%) of all the VID anomalies and is the result of the complete failure of obliteration of the VID [1,4,5]. In the literature, the above-mentioned congenital anomaly is also described by various names, namely, patent omphalomesenteric/omphaloenteric duct, patent VID, PVID, omphalo-ileal fistula, umbilical-enteric fistula, and umbilicointestinal fistula [5,6]. Approximately three-fourths of the cases are clinically present during the neonatal period [6]. PVID is also detected after infancy and in older children, but it is not frequent and is extremely rare in adults/older people [5,7,8]. The clinical presentation varies from mucus/flatus/fecal discharge through the umbilicus to the acute intestinal obstruction [9]. The standard surgical procedure executed for PVID is the resection of the patent duct along with resection of an adjacent small segment of the ileum or wedge resection of the ileum, and ileo-ileal anastomosis or ileal repair [6,9].

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The author reports three neonates who underwent surgery for PVID, along with a brief literature review and reported here due to the rarity of PVID.

CASE SERIES

During the study period from January 2020 to December 2023, three neonates were operated upon by the author for the PVID. The demographics, clinical presentation and findings, and the operative procedures executed are detailed in Table 1.

Clinically, all neonates presented with fecal discharges through the umbilicus. During the clinical examination, mucosal prolapse in one, and minor bowel prolapse in two neonates were also evidenced, but none of them had features of bowel obstruction. The clinical diagnosis of PVID was obvious in all the neonates, due to the classical history and finding of fecal discharge through the umbilicus, and PVID. All neonates were operated on as a routine surgical procedure and the PVID was approached through a sub-umbilical skin incision. During the follow-up period, two of the children were doing well. The parents of one of the neonates discontinued the treatment and left the hospital against the medical advice, a week after the operative procedure (Figs. 1 and 2).

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Table 1: Demographics and other details of neonates operated for the patent vitelline duct

Month/year	Age/sex	Clinical features	Surgical procedure executed	Remark
February, 2022	25 days/male	Fecal discharge through the umbilicus and Umbilical mass, Mucosal prolapse –Yes (Fig. 1)	Resection of patent vitelline duct, an adjacent small segment of the ileum, and ileo-ileal anastomosis done	Discharge
June, 2022	10 days/male	Fecal discharge through the umbilicus and umbilical mass Bowel prolapse –Yes (Fig. 2a)	Resection of patent vitelline duct, an adjacent small segment of the ileum, and ileo-ileal anastomosis done	Left against medical advice
September, 2023	28 days/male	Fecal discharge through the umbilicus and umbilical mass, Bowel prolapse –Yes (Fig. 2b)	Resection of patent duct, wedge resection of the ileum, and ileal repair done	Discharge

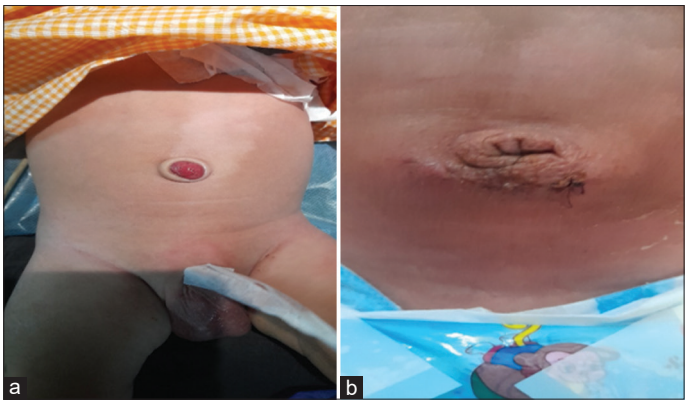

Figure 1: (a) Clinical photograph showing small umbilical mass without mucosal prolapse (case 1); (b) Postoperative photograph showing partially healed sub-umbilical skin incision (case 1)

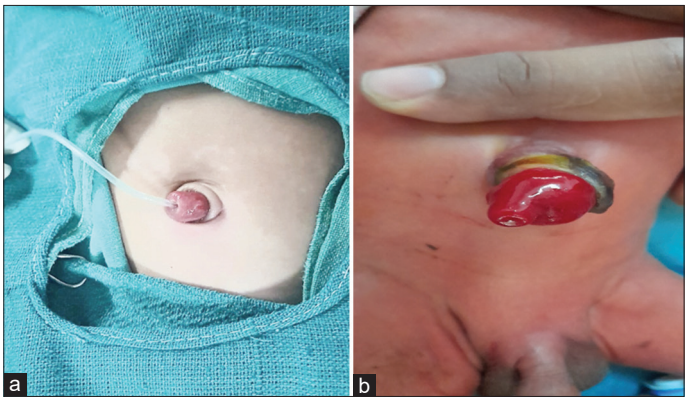

Figure 2: (a) Clinical photograph showing patent vitelline duct and infant feeding tube inside the lumen (case 2); (b) clinical photograph showing patent vitelline duct with bowel prolapse (case 3)

DISCUSSION

During early fetal life, a VID connects the yolk sac to the midgut loop. However, it should disintegrate by the 5th to 7th week of intrauterine life [1,4,10]. If it fails to do so, various anomalies may occur relating to the VID [1,4,10]. The most common of these anomalies is Meckel's diverticulum, which is the result of the enteric side of the VID not being obliterated [1-4,10]. Persistent or PVID is the rarest of all VID anomalies [4-6,10], occurring in approximately 1 in 15,000 (0.0066%) hospital births [10]. A recent systematic literature review of the past 50 years (1971–2021), comprised of n=280 infants, treated for the PVID, found/revealed that 72% of cases were diagnosed and treated during the neonatal period. Further review revealed that 90% of the infants were treated for PVID during the first 3 months of their life [6]. The literature review further supports that three-fourths of PVID cases were boys [6,10].

Infants diagnosed with PVID may present with clinical symptoms such as mucus, flatus, and fecal discharge through the umbilicus to the features of intestinal obstruction [6,10]. According to a literature review, more than half of the cases presented with discharges through the umbilicus. The same review also revealed that during the clinical examination, 42% of the cases had bowel prolapse through the patent duct/umbilicus, a severe complication in untreated cases [6].

The pre-operative/clinical diagnosis of the PVID is obvious and possible to diagnose in most cases. The classical clinical presentation with the discharges of flatus/feces through the umbilicus is one of the classical clinical findings [6]. The findings of fecal discharges through the umbilicus and bowel prolapses through the umbilicus, which are detected during the clinical examination, are pathognomonic of PVID [6,10]. The literature review revealed that, to confirm the diagnosis, a dye study/ fistulogram was carried out in as many as 28% of infants [6]. The PVID cases may also require differentiation from the other causes of umbilical discharges such as umbilical granulomas, umbilical polyps, patent urachus, and appendico-umbilical fistula [11-15].

The standard surgical procedure executed for PVID is resection of the patent duct, resection of an adjacent small segment of the ileum or wedge resection of the ileum, and ileo-ileal anastomosis or ileal repair. A systematic literature review of n=280 cases confirmed that resection of the persistent vitelline duct, and adjacent small segment of the ileum was carried out in 43% of the cases, and the bowel continuity was restored by doing ileo-ileal anastomosis. The resection of the persistent duct, wide wedge resection of the ileum, and ileal repair were opted for in 32% of the cases [6]. The above surgical procedures are best accomplished through the sub-umbilical/infraumbilical incision. PVID can also be resected through trans-umbilical approach, supra-umbilical right transverse abdominal incisions, laparotomy, and laparoscopically [6].

CONCLUSION

PVID frequently presents with fecal discharges through the umbilicus but may also present with prolapse of small bowel mucosa/bowel. The literature review also supports that the PVID should be excised surgically at the earliest, preferably during

the neonatal period, to prevent complications and morbidity associated with the PVID.

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