

Persistent patent omphalomesenteric duct versus persistent patent urachus in infants

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Abstract

Introduction: Persistent patent omphalomesenteric duct (PPOMD) and persistent patent urachus (PPU) are rare congenital anomalies that present with a persistent connection between the umbilicus and the embryonic structures of either the intestinal or the urinary tract. The two conditions are most commonly diagnosed in infancy.

Aim: We exhibit a comparative clinical case report of a 3-month-old male with PPOMD and a 2-month-old male with PPU with comparable clinical presentations. No concomitant congenital anomalies were registered. The cases aim to highlight the importance of accurate diagnosis in relation to the similar clinical presentation and the appropriate surgical management of these anomalies.

Results: Both patients underwent physical examination, laboratory and imaging studies, which demonstrated similar results, with the fistulogram study in Case 1 confirming a PPOMD diagnosis. The two conditions were conclusively differentiated during the following surgical explorations.

Conclusion: The two conditions (PPOMD and PPU) demonstrate similar clinical presentation and belong to a broader differential diagnostic spectrum, which requires prompt diagnosis and treatment in order to prevent complications.

Keywords

Omphalomesenteric duct, vitelline duct, patent urachus, congenital anomalies, pediatric surgery, surgical management

Introduction

Persistent patent omphalomesenteric duct (PPOMD) and persistent patent urachus (PPU) are uncommon congenital anomalies resulting from incomplete regression of embryonic structures during fetal development.

PPOMD (otherwise known as persistent vitellointestinal duct or persistent vitelline duct) presents as a persistent communication between the intestine and the umbilicus. It

acts as a communicating tract between the embryonic yolk sac and the primitive midgut during early human development and is normally obliterated during the eighth week of gestation. The incomplete obliteration of the vitelline duct produces a spectrum of congenital anomalies, including PPOMD and most commonly, Meckel's diverticulum. The incidence of vitelline duct anomalies is about 2% of the population, with complete patency being observed in less than 0,1% of the population [1-2].

PPU in its own right refers to a single condition in a rare group of disorders, which result from the failure of the involution of normal embryologic structures that serve to empty the fetal bladder. PPU involves a persistent connection between the bladder and the umbilicus. A review study conducted at the Hospital for Sick Children in Toronto, Canada determined the prevalence of all urachal anomalies in their general pediatric population was 1.03%, with patent urachus representing only 1.5% of all diagnosed urachal anomalies. However, at this time there are large discrepancies between the prevalence percentages of PPU and the associated anomalies in the related studies, past and current [3-4].

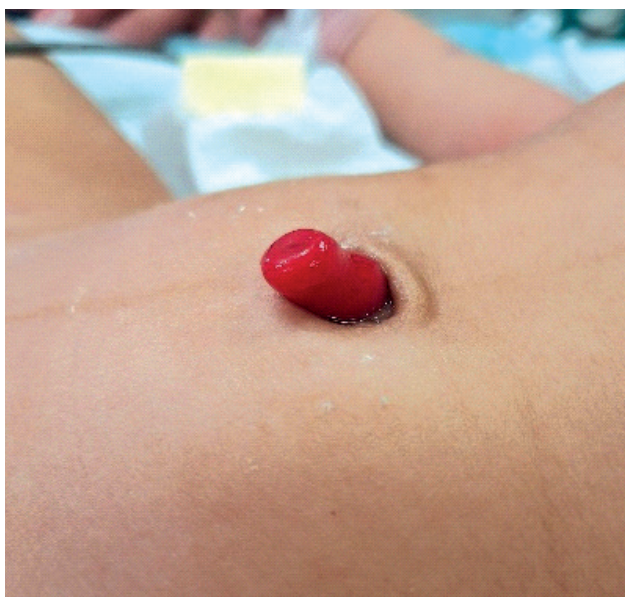


Figure 1. A protruding mucous lesion in the umbilicus, which produced feculent discharge in Case 1.

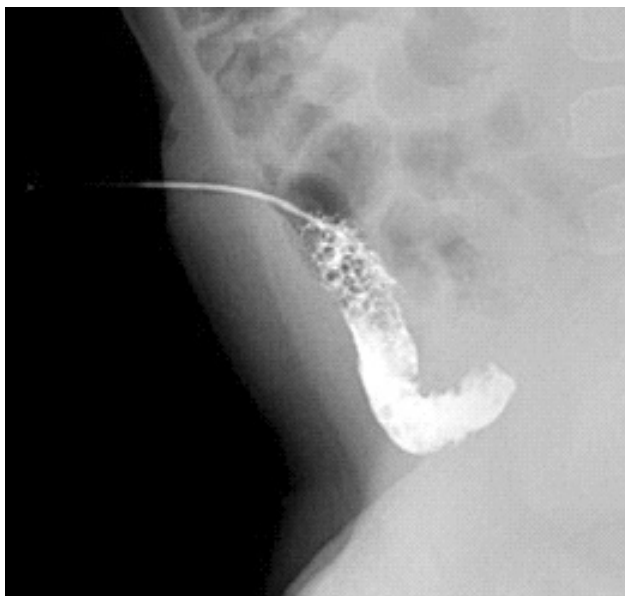


Figure 2. Fistulogram confirming the communication between the umbilicus and the intestine.

Although rare, the abovementioned conditions require surgical intervention to prevent complications such as infection, bleeding, bowel obstruction, umbilical herniation and others. These anomalies are often misdiagnosed as more common conditions, such as umbilical granuloma, which delays appropriate treatment and increases the risk of complication.

Clinical case description

Case 1

A 3-month-old male infant presented to our pediatric surgery clinic with a red lesion in the umbilical region and a history of intermittent brown umbilical discharge since birth. Physical examination revealed a protruding mucous lesion with a central fistulous opening, which produced feculent discharge (Fig. 1). There were no signs of abdominal distension or tenderness. Ultrasound and blood studies were unremarkable. Fistulography was performed, the results of which confirmed the diagnosis of PPOMD (Fig. 2).

The patient underwent surgical exploration through a small median laparotomy, during which the patent vitelline duct was identified (Fig. 3), excised from the umbilicus and resected en bloc with the connected segment of the ileum, followed by an end-to-end two-layer ileoileal anastomosis (Fig. 4). An incidental appendectomy was performed. No concomitant anomalies were observed. The umbilicus was reconstructed using the remaining circular skin fold.

Finally, the abdominal incision was restituted. Postoperative recovery was uneventful. The patient resumed enteral feedings on the first postoperative day, which were gradually increased. No complications were registered on follow-up.

Case 2

A 2-month-old male infant was presented to our clinic for evaluation of a mucous producing red umbilical lesion, initially diagnosed as umbilical granuloma and unsuccessfully treated with silver nitrate. Physical examination revealed a round red lesion with mucoid discharge and a small fistulous opening (Fig. 5). Abdominal examination was unremarkable, with no evidence of urinary symptoms or abdominal tenderness. Imaging studies and routine blood tests produced no abnormal finds. The patient underwent surgical exploration through a small median laparotomy, during which the patent urachus was identified, liberated from the anterior abdominal wall, ligated at its base at the bladder wall and excised. No other pathological findings were observed in the abdomen. The resulting stump of the urachus was re-peritonised, followed by abdominal wall restitution. The postoperative course was uncomplicated, with the patient resuming enteral feedings the same day.

Discussion

PPOMD and PPU are rare congenital anomalies that require a high index of suspicion for diagnosis, as they are most commonly misdiagnosed as umbilical granuloma and treated accordingly. Clinical presentation typically includes umbilical discharge, which may be feculent in PPOMD and mucoid in PPU. The cases discussed above had highly similar clinical presentation, with the second case presenting 2 months after the first. Imaging studies such as ultrasound and contrast studies are valuable

in confirming the diagnosis. However, in uncomplicated cases with classical presentation, the aforementioned studies play a less significant role in the planning of surgical intervention. Surgical treatment aims to cease umbilical discharge and prevent complications such as bleeding, bowel obstruction, urinary infection, umbilical herniation, urachal or vitelline cyst formation and others. When one of the anomalies discussed above is suspected in a patient, it is recommended for the other anomaly to be included in the differential diagnostic considerations.

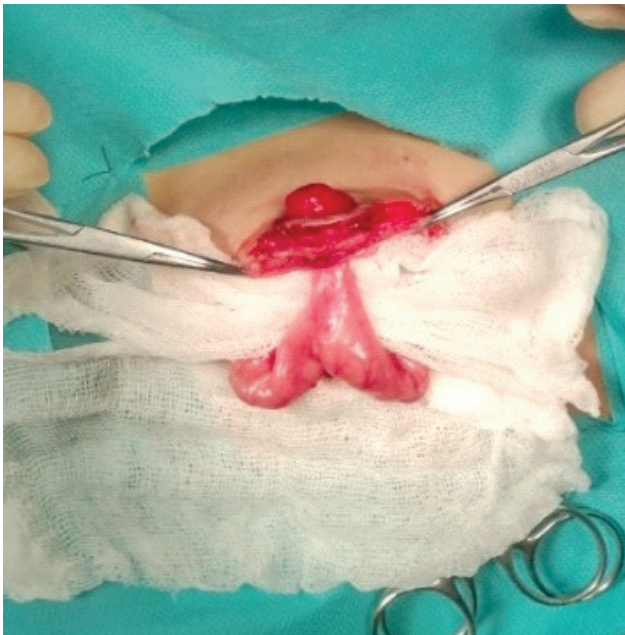


Figure 3. An intraoperative image of the PPOMD.



Figure 4. The finished anastomosis.



Figure 5. The mucus producing umbilical lesion in Case 2.

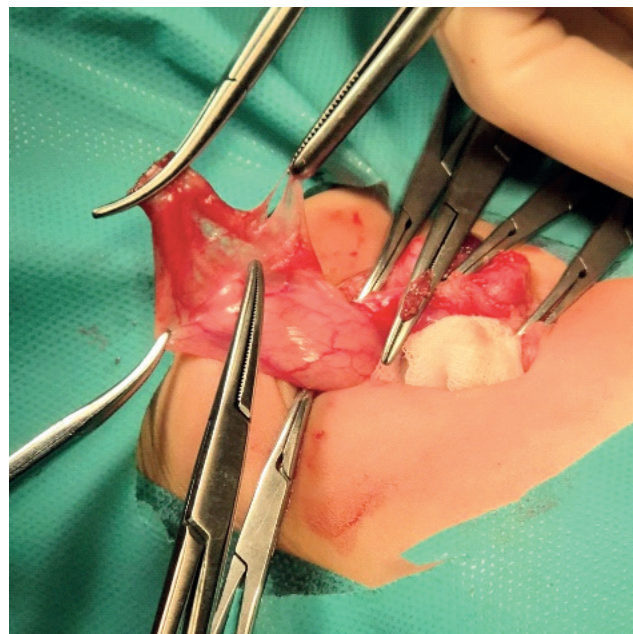


Figure 6. An intraoperative image of the patent urachus.

Conclusion

Persistent patent omphalomesenteric duct and persistent patent urachus require prompt diagnosis and surgical intervention to prevent complications. The cases discussed here highlight the similar clinical presentation of uncomplicated PPOMD and PPU in infants, which places them as differential diagnostic alternatives along with other, less rare lesions in the umbilical region.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

The authors declared that no informed consent was obtained from the humans, donors or donors' representatives participating in the study.

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

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Author contributions

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Data availability

All of the data that support the findings of this study are available in the main text.

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