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MESENTERIC MECKEL'S DIVERTICULUM WITH PATENT URACHUS – A RARE ASSOCIATION

Paediatric Surgery

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ABSTRACT

Background: The association of the three anomalies, i.e., mesenteric Meckel's diverticulum, persistent vitelline artery and patent urachus has never been reported previously. Case presentation: A six-month-old infant presented with the complaint of clear fluid discharge from umbilicus since birth. With a pre-operative diagnosis of patent urachus, he underwent laparoscopy, which documented additional findings of persistent vitelline artery and mesenteric Meckel's diverticulum. Resection of the ileal segment with mesenteric Meckel's diverticulum and end to end anastomosis was done. Patent urachus with bladder cuff was excised, and bladder was repaired. The postoperative recovery was uneventful, and the child is doing well on follow-up. **Conclusion:** The case highlights the importance of laparoscopy in diagnosis of mesenteric Meckel's diverticulum with patent urachus and persistent vitelline artery.

KEYWORDS

Mesenteric Meckel's Diverticulum, Patent urachus, Vitelline artery

Background

During embryogenesis, the umbilical cord has a vitello-intestinal duct (communication of yolk sac and developing gut), vitelline vessels and allantois (primitive extra-embryonic urinary bladder which develops to urachus). The vitello-intestinal duct and allantois obliterate before seven weeks of gestation. Meckel's diverticulum (MD), an anomaly of the vitello-intestinal duct, was first described by Johann Friederick Meckel in 1809 [1]. It is located on the anti-mesenteric border of the ileum in approximately 2-4% of the population [2]. However, MD located on the mesenteric side of ileum is rare, and only a few cases have been reported. Moreover, mesenteric MD associated with patent urachus and vitelline artery has never been reported before.

Case presentation

A six-month-old male child presented with the complaint of discharge from the umbilicus since birth. The discharge was clear and odourless. It had no mucoid, purulent, blood or faeces stain. The child had no history of excessive crying, abdomen distention, hematochezia or melena. On examination, the child's general condition was good with adequate nutrition and built, and vitals were stable. The abdomen was soft, non-tender, non-distended, and no lump was palpable. Umbilicus was inverted with moist skin. No signs of inflammation, active discharge, bleeding, umbilical granuloma or polyp was seen at the umbilicus.

Complete blood count, liver function test and kidney function tests were normal. Ultrasonography revealed a patent urachus. A micturating cystourethrogram was done to rule out the posterior urethral valve or bladder outlet obstruction, which can be associated with the patent urachus.

The patient was planned for laparoscopy and excision of patent urachus with bladder cuff. Under general anaesthesia, the patient was catheterized. A 10mm port was inserted at Palmer's point, and the camera was introduced. A patent urachus and vitelline artery (VA) were seen attached to the umbilicus (Figure 1). VA was followed until it entered the mesentery, and MD was seen in the adjacent area (Figure 1). MD was 40 cm proximal to the ileocecal junction, located on the mesenteric side. VA was divided using a harmonic scalpel. Excision of urachus with bladder cuff was done, and bladder was repaired. Resection of the ileal segment with MD and end to end anastomosis was done. The specimen was sent for histopathological diagnosis (Figure 2).

The patient was started orally on postoperative day four, and feeds were gradually increased. The bladder catheter was removed on postoperative day ten, and the child was discharged after he passed urine. Histopathology showed a patent urachus with bladder cuff and MD with the ectopic gastric mucosa. At a follow-up of one year, the child remains asymptomatic. Informed consent was taken from the father of the patient for publication.

Discussion

Embryologically, MD is a remnant of the vitellointestinal duct. The vitellointestinal duct connects the developing gut to the yolk sac. It usually obliterates before the 7th week of gestation. Its failure to obliterate results in the formation of a true diverticulum, which is popularly known as MD. It is supplied by VA. During the course of development, VA obliterates, and the superior mesenteric artery becomes the primary vascular supply to MD [3]. However, 10% of cases of MD have been seen to be associated with the persistent VA [4]. MD has been described to be typically located on the antimesenteric border of the intestine. Chaffin described the first case of mesenteric MD in 1941 [3]. It has been proposed that the mesenteric location of MD is a result of traction induced by persistent VA or mesodiverticular band during embryological development [3, 5]. While only 23 cases of mesenteric MD have been reported in literature till date, intraoperatively, none of the reported cases with mesenteric MD had persistent VA or mesodiverticular band [3, 4].

Urachus is the remnant of the allantois. Normally allantois involutes by 4-6 fetal weeks. Patent urachus has an incidence of 1-2 per 1,00000 [6]. Patent urachus should be resected along with bladder cuff to prevent urachal adenocarcinoma in future [7]. The occurrence of vitelline and urachal remnant together is rare [7]. None of the 23 cases of previously reported mesenteric MD had an associated patent urachus. Treatment comprises of surgical excision of both MD and patent urachus by laparoscopy or laparotomy.

Complications associated with MD are diverticulitis, obstruction (intussusception, volvulus), perforation, haemorrhage and malignancy [3]. The mesenteric location of MD can lead to erosion of mesenteric vasculature during inflammation, thus having devastating consequences. Surgery should be done even in asymptomatic patients, as the risk of complications is higher with MD on the mesenteric side. MD can be managed by diverticulectomy as well as resection and end to end anastomosis. Vascular damage can occur on diverticulectomy on the mesenteric side. So, resection and end to end anastomosis were done in most reported cases. The atypical location can lead to confusion and difficulty in differentiating it from other lesions like duplication cyst, jejunoileal diverticulosis [8]. Knowledge of different associations is crucial as it can help surgeons anticipate and identify these anomalies. The present case is the first report of the rare association of three anomalies, i.e., mesenteric MD, persistent VA and patent urachus.

Conclusions

The learning lesson from this case was that in patients with a persistent vitelline artery, we must look for MD. Laparoscopy is useful in the diagnosis and management of vitelline and urachal remnants. Though mesenteric MD is very rare, it must be resected if found incidentally to avoid catastrophic complications.

Abbreviations: MD: Meckel's diverticulum, VA: vitelline artery

Figures

Figure 1: A- Vitelline artery (VA) was followed until it entered the mesentery, and Meckel's diverticulum (MD) was seen in the adjacent area; B- Patent urachus (PU), bladder (BL), vitelline artery (VA), median umbilical ligament (^)

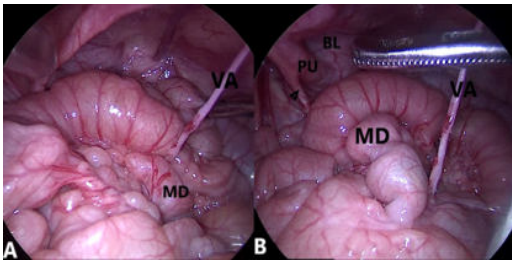
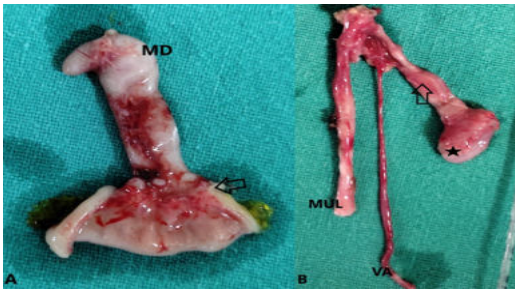


Figure 2: A- Meckel's diverticulum (MD) on mesenteric side (arrow); B- Median umbilical ligament (MUL), Vitelline artery (VA), Patent urachus (arrow) and bladder cuff (*)



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