



**Title: Rare coexistence of patent urachus with Meckel's diverticulum in a 7 year old child**

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**ABSTRACT**

Background: Patent urachus and Meckel's diverticulum are both rare congenital anomalies, and the coexistence of both pathologies make it most exceptional. Case presentation: A 7 year old child, reported abdominal pain at the right flank for 4 days with associated discharge from the umbilicus. He was diagnosed as having urachal cyst with UTI. Imaging showed a patent urachus, and during umbilical exploration, an incidental finding of Meckel's diverticulum was found. Conclusion: Coexistence of both patent urachus and Meckel's diverticulum is very rare. It is important for clinicians to be alert of such diagnosis when a child presents with UTI and abdominal pain, which are common presentations, and tailor management accordingly. Laparoscopic approach is the preferred choice of treatment as it enables surgeons to explore accordingly.

**KEYWORDS**

Patent urachus, Meckel's diverticulum, congenital disorder

**INTRODUCTION**

A child who presents with an acute abdomen often poses a challenge even to an experienced clinician. Detailed history, clinical examination and aid of imaging are essentials in diagnosing a clinical condition. Most children with umbilical granulation tissue/polyps will often have minimal discharge (stain to clothes), but with significant discharge that resembles urine or faecal material, should alert clinician possible of urachal remnant or vitelline remnants. The urachus is a tubular structure that extends from the dome of the bladder to the umbilicus, which will be obliterated to become the median umbilical ligament. The incomplete involution of this embryological structure will result in urachal abnormalities such as a patent urachus. The incidence of patent urachus among the paediatric population is about 10-15% of all urachal abnormalities. Children often present with urine discharge from the umbilicus associated with a urinary tract infection. The most common complications are delayed umbilical healing, infection, which may progress to tumour [1].

Meckel's diverticulum, is the most common congenital abnormality of the gastrointestinal tract due to persistence of vitello-intestinal duct. It is a true diverticulum which contains all layers of a small bowel wall, which arises from an antimesenteric border. Usually, this duct regresses around the fifth to eighth week of pregnancy. Common symptoms include painless

lower gastrointestinal bleeds, intussusception, and features mimicking acute appendicitis [2,3].

The incidence of patent urachus and Meckel diverticulum coexisting concurrently is very rare and often poses challenges in terms of diagnosis and management. We report a case of a 7 year old child presented with UTI, abdominal pain and umbilical discharge which clinically appears as urachus remnants and discuss our management strategies.

## CASE

A 7 year old boy, term child with an uneventful birth history, presented with abdominal pain at the right flank for 4 days. He gave a history of fall on his right side while playing with his sibling. He had no fever, vomiting, dysuria or frank hematuria, and he remained active. The child was brought to a GP clinic, and was treated for urinary tract infection with suspicions of a posterior urethral valve. Subsequently, he was referred for specialist management of UTI in a young child. Upon examination, the abdomen was soft, with tenderness over the right flank. There were no features of peritonism. Serous discharge was seen over the umbilical region but there was no pus upon milking.

A urine dipstick revealed: leucocyte 3+, protein 1+, blood 2+. Other blood parameters were normal. The provisional diagnosis was urachal cyst with UTI.

An abdominal ultrasound (Figure 1) done for the child showed that there is a blind ending hypoechoic collection beneath the umbilicus measuring 0.9 x 0.5cm which suggested urachal sinus. There is no demonstrable communication to the urinary bladder, and bilateral kidneys scanned are normal. The urinary bladder is underfilled with wall thickening which suggests cystitis.

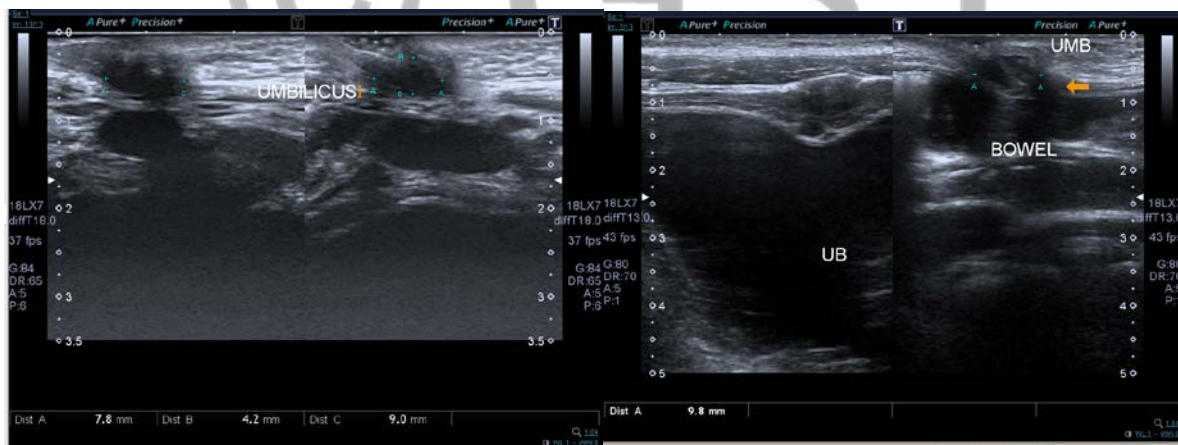


Figure 1 showed blind ending hypoechoic collection beneath the umbilicus which shows urachal cyst/sinus.

UB: Urinary Bladder

The child was then discharged with syrup Cefuroxime and was given an elective date for excision of the urachus tract a month later. The child was admitted one day prior to the operation date. Pre-operative assessments and blood parameters were normal. Intraoperatively, an incision was made along the infraumbilical, noted a patent urachus tract connecting from the umbilicus to the dome of the bladder. Upon further exploration, an incidental finding of Meckel's diverticulum adhered to the base of the umbilicus. It was a broad base Meckel measuring 2-3cm with a length of 5cm (Figure 2). No obvious lumen

connected to the umbilicus. The operating team decided for an excision of urachus tract and wedge resection of Meckel's diverticulum, and both samples were sent for histopathological examination. The child had an uneventful recovery and was discharged home day-3 with no complications on follow up.

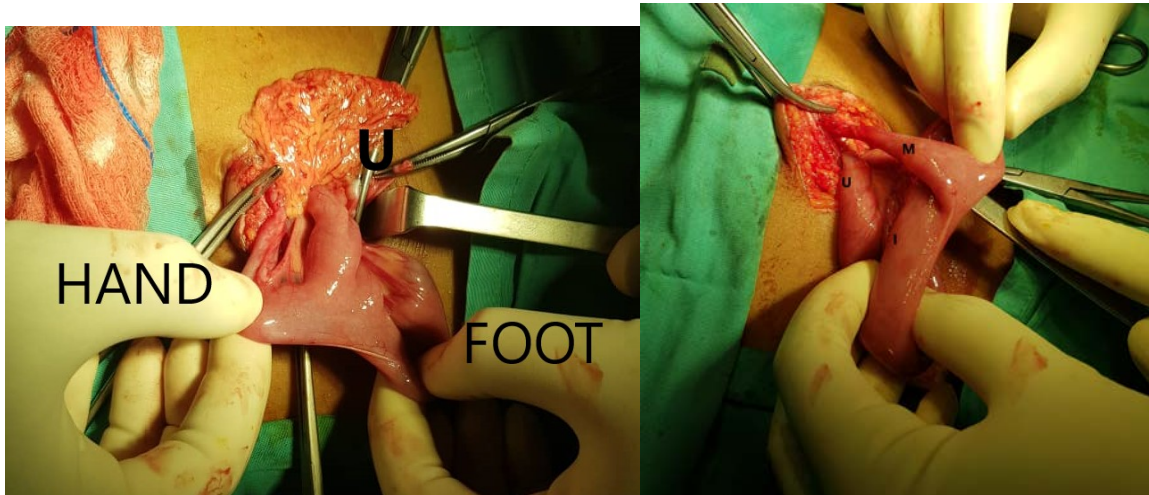


Figure 2: Meckel diverticulum adhered to the base of umbilicus. Cut section of urachus shown above grasped by two artery forceps.  
(U: Umbilicus, M: Mecke's diverticulum, I: Ileum)

For the first sample, histopathological examination shows a blinded ended small bowel composed of small bowel mucosa, submucosa and muscularis propria. The mucosa is regularly-spaced, with villoglandular crypt architecture. There is gastric heterotopia at the tip composed of foveolar pits with gastric glands lined by chief cells and occasional parietal cells. No granuloma, dysplasia or evidence of malignancy is seen which is consistent with Meckel diverticulum with ectopic gastric tissue. For the second sample, HPE shows fibrocollagenous and fibroadipose tissue with mild chronic inflammatory infiltrates. Some congested vascular channels are observed. Few unremarkable nerve bundles are noted. No granuloma, nuclear atypia or evidence of malignancy are seen, which are consistent with urachus. Upon follow up after 1 month post operatively, the child was well with no evidence of complication.

## DISCUSSION

In 1983, Rich et al. found that in 35 children with anomalies of the urachus, two had omphalomesenteric remnants of Meckel's diverticulum. In their analysis of 66 cases having remnants of the vitelline duct, Pinte' r et al. (1977) encountered one patient with an associated persistent urachal duct. Children with patent urachus or patent omphalomesenteric duct often have colourless to fecal discharges from the umbilicus which may predispose them to get infection, and if left unattended, will eventually lead to perforation which may result in peritonitis[4].

Ultrasonography has high diagnostic value in detecting patent urachus prenatally, thus enabling detailed counselling among parents, paediatricians and paediatric surgeons to determine mode of management, be it conservative or surgery [5] .

The urachal remnant in the present case was an patent urachus remnant, which lay between the bladder and umbilicus. Because of the potential for volvulus development around this pathology, the diverticulum was resected from the ileum and the urachus was excised up to the bladder and tied (Figure 2).

The mode of management among reported cases have been laparoscopy or laparotomy. Ozel et al suggested that all urachal pathologies in Meckel's diverticulum should be surgically excised in view of the risk of perforation, peritonitis, fistula formation, volvulus and even cancer [5]. In the paediatric population, the incidence of urachal cancer is remote as compared to the adult population. Asymptomatic children do not require prophylactic excision of urachal abnormality [6]. Sato et al suggested that conservative follow-up is recommended for urachal remnants under 1-year olds except when there are repeated infections. The umbilical approach is enough for infants whereas laparoscopic surgery is recommended in older children [7].

## **CONCLUSION**

Coexistence of both patent urachus and Meckel's diverticulum is very rare. It is important for clinicians to be alert of such diagnosis when a child presents with UTI and abdominal pain, which are common presentations, and tailor management accordingly. Laparoscopic approach is the preferred choice of treatment as it enables surgeons to explore surrounding structures effectively and minimise frequency of surgery..

## **ABBREVIATION**

UTI: Urinary tract infection  
GP: General practitioner  
GIT: Gastrointestinal tract

## **CONFLICT OF INTEREST STATEMENT**

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There are no conflicts of interest to declare.

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## **ETHICS APPROVAL**

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Ethics approval was not required from the institution for the publication of this case report.

## **CONSENT**

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Informed consent was obtained from the patient for the publication of this case report and accompanying images

## ACKNOWLEDGEMENTS

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