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# Clinical Communications: Pediatrics

## AN INFECTED URACHAL CYST IN A 4-YEAR-OLD GIRL PRESENTING WITH RECURRENT ABDOMINAL PAIN

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☐ **Abstract—Background: Urachal cysts are remnants of urachal ducts and usually present when they get infected or undergo malignant transformation. Case Report: A 4-year-old girl presented to the Emergency Department (ED) with intermittent abdominal pain, fever, dysuria, and umbilical swelling. She was diagnosed with an abscess related to an infected urachal cyst by ultrasound. The patient was treated with antibiotics, and the abscess was drained by Interventional Radiology with ultrasound guidance. She recovered uneventfully and was discharged home. The urachal cyst was excised a month later. Why Should an Emergency Physician Be Aware of This?: Though urachal cysts are rare, it is important to consider this entity in the differential diagnosis of acute abdomen and recurrent abdominal pain in the ED setting.** © 2019 Elsevier Inc. All rights reserved.

☐ **Keywords—urachal cysts; recurrent abdominal pain; pediatric emergency department**

### INTRODUCTION

Urachal cysts are remnants of the urachal duct. The urachal duct connects the bladder and the umbilicus during the fetal period and is located behind the abdominal wall between the peritoneum and the transverse fascia (1). A urachal cyst ensues when both ends of the urachal duct close but the central portion remains patent. It extends from the dome of the bladder to the umbilicus but doesn't communicate with them (2). Though the exact incidence is not known, it is estimated to be one in 5000 births; it is twice as common in males (3).

Most commonly, patients with urachal cysts are asymptomatic for years and present only when they get infected. Classic symptoms include fever, abdominal mass, redness, and discharge from the umbilicus. Although treating the infection is important, the cyst eventually needs to be removed, as urachal remnants can become malignant. Though the malignancy rate is only 0.5%, the presentation is usually delayed until local invasion and metastasis has occurred. Hence, early detection of infected cysts with removal is recommended.

### CASE REPORT

A 4-year-old girl with no significant past medical history presented to the Emergency Department (ED) with periumbilical pain, swelling, and fever. The mother reported that the patient had intermittent abdominal pain for 1 year and was initially diagnosed with constipation by her pediatrician and prescribed polyethylene glycol. The patient continued to have intermittent bouts of abdominal pain characterized by her holding her umbilicus and crying. At the time, the pain was not associated with fever,

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vomiting, bloody stools, or weight loss. The patient developed dysuria 10 days prior to the present ED presentation and went to an urgent care center. She was diagnosed with a urinary tract infection and placed on antibiotics.

After completion of the antibiotic course, the patient developed umbilical swelling and redness, which was diagnosed as a skin tag by an urgent care center (Figure 1A and B). The patient was referred to an outside ED for continued dysuria, umbilical swelling, and now, new fever. An ultrasound was performed and the patient was transferred to our ED for further care. The outside hospital ultrasound interpretation was "thick-walled complex fluid collection extending from the umbilicus to the dome of the urinary bladder and measures approximately 8.5 cm in length from the umbilicus to the top of the bladder and 4.2 cm in maximal thickness … may represent an infected urachal cyst" (Figure 2A).

The patient was admitted and underwent drainage of the fluid collection by Interventional Radiology using ultrasound guidance (Figure 2B). A drain was placed, and cultures obtained. She was initially started on broad-spectrum antibiotics. However, antibiotics were changed after cultures grew *Proteus mirabilis* sensitive to trimethoprim-sulfamethoxazole, and she remained afebrile on this course (Table 1). Her drainage output decreased, and the drain was removed prior to discharge, as repeat ultrasound showed no further signs of abscess. She was discharged on trimethoprim-sulfamethoxazole with plans for excision of the cyst at a later date.

## DISCUSSION

During normal fetal development, the urachal duct eventually becomes a vestigial structure, the median umbilical ligament (1). If it fails to obliterate, a urachal remnant occurs. The four types of remnants are patent urachus (50%), urachal cyst (30%), urachal sinus (15%), and vesicourachal diverticulum (3–5%) (1). In a patent urachus, the entire urachal duct remains patent, connecting the bladder to the umbilicus, resulting in drainage of the urine from the umbilicus. A urachal cyst ensues when the urachal canal persists without any communication with the bladder or umbilicus. A urachal sinus is the result of closure of the portion of the urachal duct adjacent to the bladder, but the portion of the duct connected to the umbilicus remains patent. A urachal diverticulum occurs when the umbilical portion of the duct closes but the portion of the urachal duct communicating with the bladder remains patent (3). One-third of cases with urachal cyst remnants are associated with urethral anomalies, namely, posterior urethral valves and urethral atresia. Similarly, only a third of cases are diagnosed in childhood and adolescence.

Other than patients with a patent urachus presenting urine leaking from the bladder, most cases of urachal remnants go undetected, often for long periods of time, until they become infected or undergo malignant transformation (4–6). Once infected, they can cause abdominal pain, dysuria, fever, and a painful mass in the umbilical region. Very rarely, they may present as a fever of unknown origin without any other symptoms (7).

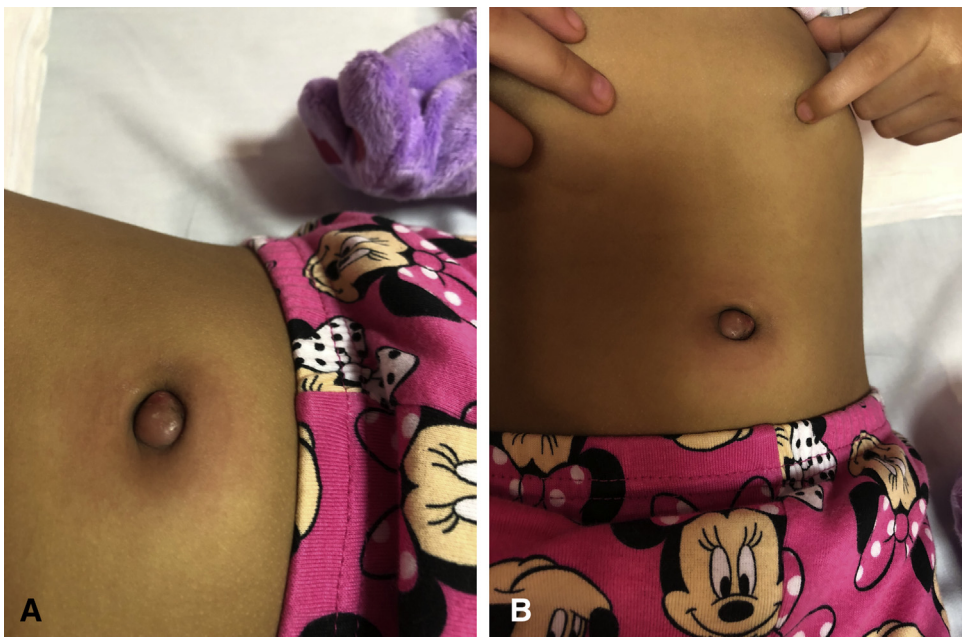


**Figure 1. (A, B) Image of pea-sized swelling of umbilicus with surrounding redness.**

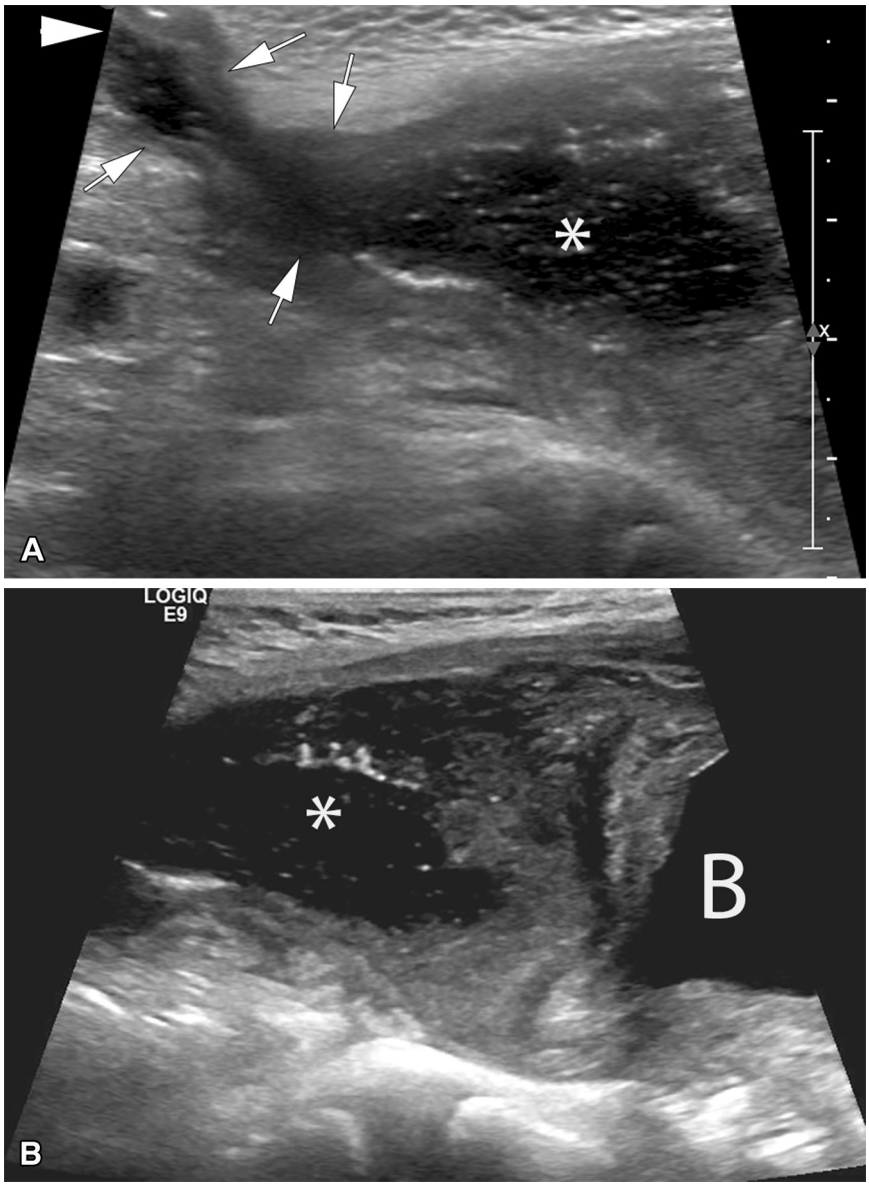


**Figure 2. (A) Sagittal ultrasound image from the region of the umbilicus toward the dome of the bladder. There is a partially fluid-filled tract (arrows) extending from the region of the umbilicus (arrowhead) to a fluid-filled cyst (*). The punctate echogenic foci within the cyst fluid suggest superimposed infection. (B) Sagittal ultrasound image (slightly inferior to [A]) from the region of the fluid-filled urachal cyst (*) to the dome of the bladder (B).**

Differential diagnosis includes omphalitis, patent omphalomesenteric duct, and umbilical granuloma (8).

Diagnosis is confirmed by ultrasound or computed tomography (CT). Ultrasound is useful to delineate the type of urachal duct remnant. With urachal cyst, fluid-filled cavity will be seen. In cases of diverticulum, a contiguous fluid-filled track with the bladder will be seen (best seen when the patient has a full bladder) (9). CT and magnetic resonance imaging are other imaging modalities that can confirm the ultrasound findings (1). Finally, patients with patent urachus need voiding cystourethrogram to diagnose accompanying urethral anomalies. Complete blood count with differential and a urine analysis are usually done to complete the work-up.

The treatment is usually management of infection with antibiotics and drainage of the abscess, if present. Infection of urachal cysts can be associated with both Gram-negative and -positive organisms, so initially, antibiotic coverage should be broad-spectrum, followed by narrowing antibiotic therapy based on culture of abscess contents.

**Table 1. Laboratory and Imaging Results**

| | |
|---|---|
| Radiograph abdomen | Nonobstructive bowel gas pattern, average volume of stool |
| Urine analysis | 1+ protein, 0°5 WBC/HPF, 5–10 RBC/HPF, mucus 4+ |
| Urine culture | No growth after 48 h |
| Body fluid culture | Many WBCs seen, *Proteus mirabilis* isolated |
| Body fluid culture | No obligate anaerobes isolated |
| Body fluid fungal culture | No yeast or fungus isolated |
| Surgical pathology report | Features consistent with clinical impression of chronically inflamed urachal cyst |

WBC = white blood cells; HPF = high power field; RBC = red blood cells.

Infected urachal cysts can rarely rupture and can cause peritonitis, and can mimic appendicitis, ovarian torsion, or Meckel diverticulum. Reinfection rates are close to 30%, and because there is a small chance of malignancy, surgical removal of the cyst is definitive. Malignant transformation to mucinous adenocarcinoma is 1 in 5 million, and prognosis for this condition is poor. Laparoscopic removal of the cyst is performed after the acute infection has subsided.

## WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Though urachal cysts are uncommon, it is important to keep this in the differential diagnosis of patients presenting with recurrent abdominal pain or acute abdomen in the ED. Whereas imaging is usually ordered in patients presenting as an acute abdominal emergency, in patients with recurrent abdominal pain, imaging should be considered if the work-up is negative.

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