

Persistent Urachal Sinus in an Adult Female: Presentation and Surgical Management Strategy

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Abstract

Background: Urachal anomalies are rare embryological pathologies resulting from incomplete involution of the allantois. While typically diagnosed in the pediatric population, they remain an infrequent and often misdiagnosed cause of umbilical malady in adults, with an estimated incidence of 1 in 150,000. Among the different anomalies, the urachal sinus is a distinct clinical entity that remains quiescent until triggered by secondary infection. **Case Presentation:** A 26-year-old female presented with a sub-acute history of persistent, malodorous umbilical discharge and chronic periumbilical pain. Physical examination revealed an inverted umbilicus with mild deep tenderness but no seropurulent discharge. CT scan identified an infra-umbilical sinus tract connected to the bladder dome via a fibrous band. Urine cultures were sterile. A definitive open surgical excision was performed with the bladder retrogradely distended with 250 mL of sterile saline via a transurethral catheter. The sinus tract was excised in its entirety. The postoperative course was uneventful, with complete resolution of symptoms. **Conclusion:** A high index of clinical suspicion is required for adults presenting with persistent umbilical discharge. CTU is the gold standard for defining the anatomy of the remnant. We recommend the use of intraoperative bladder distention as a simple and effective technical pearl to prevent iatrogenic bladder injury and ensure the total excision of the urachal tissue, thereby minimizing the risk of recurrence and future malignant transformation.

Keywords

Urachal Sinus, Adult, Umbilical Discharge, Computed Tomography Urography, Bladder Distention

1. Introduction

The urachus is an embryonic midline structure, derived from the involution of the allantois and the fetal bladder (cloaca). In normal development, this structure obliterates by the fifth month of gestation, transforming into a non-functional, vestigial fibrous cord known as the medial umbilical ligament. Failure of this obliterative process results in a spectrum of urachal anomalies, which are traditionally categorized into four types: patent urachus, urachal cyst, vesicourachal diverticulum, and urachal sinus.

While urachal remnants are primarily of pediatric concern with an incidence of approximately 1 in 5000 live births, they can be seen, albeit exceptionally rarely, in the adult population. Adult presentations are estimated to occur in only 1 in 150,000 individuals and often present a significant diagnostic challenge [1]. Unlike the neonatal period, where a patent urachus typically presents with urinary leakage, adult urachal anomalies (specifically the urachal sinus) often remain asymptomatic until complications such as secondary infection, abscess formation and lithiasis occur.

The clinical presentation in adults is frequently non-specific, often mimicking other abdominal pathologies such as omphalitis, omphalomesenteric duct remnant, umbilical granuloma or umbilical pilonidal sinus [2]. However, a history of chronic, malodorous umbilical discharge and periumbilical pain should raise a high index of clinical suspicion for a persistent urachal remnant. Modern imaging, particularly Computed Tomography Scan, has become indispensable in the preoperative mapping of these tracts, allowing surgeons to differentiate between simple inflammatory sinuses and those with a deeper connection to the bladder dome.

The definitive treatment for symptomatic urachal remnants is complete surgical excision. This is necessary not only because of the high rate of recurrence associated with conservative management but also because of the rare risk of an eventual malignant transformation into urachal adenocarcinoma.

We hereby report the case of a 26-year-old female with a symptomatic urachal sinus. We highlight the diagnostic role of CT scan and describe the technical advantage of retrograde bladder distention as a safety maneuver to ensure complete excision and prevent iatrogenic bladder injury.

2. Clinical Presentation

A 26-year-old female presented to our surgical outpatient department at the Douala General Hospital with a 3-month history of persistent, offensive purulent umbilical discharge associated with a mild, constant, dull periumbilical pain. There were no associated lower urinary tract symptoms (LUTS), fever, or other constitutional symptoms. Initial management in a primary health facility a week later consisted of an undocumented course of antibiotherapy and analgesics. Symptoms subsided with its recurrence a week after completion of treatment. This prompted referral to our health facility.

Past neonatal history reveals she was diagnosed of an umbilical granuloma,

treated with silver nitrate stick. She also reported spontaneous umbilical discharge and pain at 15 and 18 years of age, lasting 2 weeks each and disappearing spontaneously.

On physical examination, the patient looked well, was afebrile with normal vital parameters. Her body mass index (BMI) was 32 kg/m². Abdominal examination revealed an inverted umbilicus with mild periumbilical tenderness on deep palpation (**Figure 1**). There was no periumbilical erythema, discrete palpable mass, or discharge from the umbilical stalk.



Figure 1. Appearance of the umbilicus without signs of inflammation.

Computed tomography urography (CTU) was done, revealing an infra-umbilical sinus tract originating at the umbilicus and extending inferiorly. Crucially, the tract was found to be attached to the dome of the urinary bladder via a distinct fibrous band but not communicating, confirming the diagnosis of a urachal sinus. (**Figure 2**). Laboratory investigations, including a complete blood count and C-reactive protein, were within normal limits. A mid-stream urine culture was sterile, ruling out a concomitant urinary tract infection. Because no discharge was seen at presentation, sample and culture of the purulent umbilical discharge were not done.

Based on the symptomatic nature of this remnant, a definitive surgical excision was planned. Under general anaesthesia and endotracheal intubation, a transurethral urinary catheter was first inserted. A 7 cm midline infra-umbilical skin incision was done through the subcutaneous tissues using electrocautery until the external oblique aponeurosis was identified. The fascia was opened 1 cm lateral to the midline to facilitate entry into the pre-peritoneal space. A thickened, inflammatory sinus tract was identified extending from the posterior aspect of the

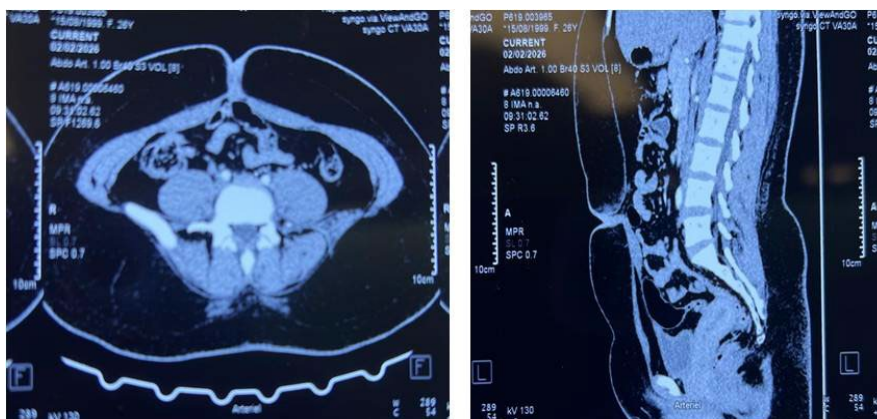


Figure 2. CT axial and sagittal views of the abdomen showing the urachal sinus and fibrous band.

umbilicus towards the bladder. To accurately delimit the junction of the urachal remnant with the bladder, the urinary catheter was used to retrograde-fill the bladder with 250 mL of normal saline. This maneuver successfully demarcated the bladder dome. The fibrous band was transected at its junction with the bladder dome without entering the bladder and securely ligated with 2/0 polyglactin (Vicryl) sutures (**Figure 3**). The tract was then dissected cephalad toward the umbilicus and excised in its entirety. A leak test was done to ensure that there was no urine leakage from the bladder. Umbilicoplasty was not done. The post-operative period was uneventful and the patient was discharged on day 3 post-surgery. Her urinary catheter was removed on post-operative day 7. She was seen at 2 weeks, 1 month, and 3 months after surgery and had no discharge, pains or other surgical site complications. Histopathology showed features of a urachal sinus with no malignancy.

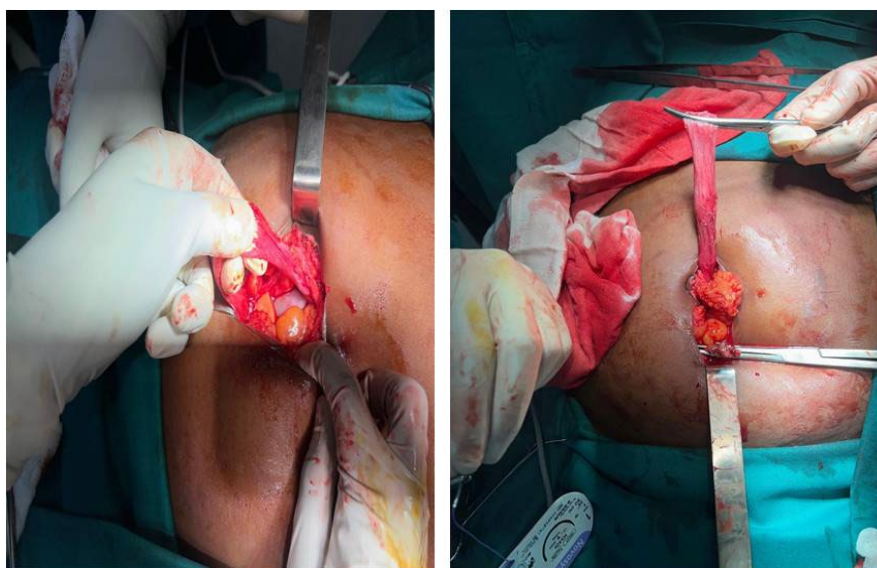


Figure 3. Intraoperative finding of a thick sinus tract. Ligation and section at the bladder dome.

3. Discussion

The urachus embryologically lies pre-peritoneally in the center of a pyramid-shaped space known as the space of Retzius and extends from the bladder's anterior dome to the umbilicus. It normally obliterates spontaneously in-utero or up to 6 months after birth to form the medial umbilical ligament. Failure of obliteration can cause persistence in adult life.

Urachal abnormalities are categorized as follows: 1) patent urachus (50%) in which there is complete communication between the bladder and umbilicus; 2) umbilical-urachal sinus (15%) in which the urachus obliterates at the level of the bladder, leaving a fibrous band, but remains open at the umbilicus, leading to a continuously draining sinus; 3) urachal cyst (30%) where there is no communication of the cyst with the bladder or umbilicus. However, the fluid-filled cyst can drain through the umbilicus or into the bladder intermittently; 4) vesicourachal diverticulum (3% - 5%) where the urachus obliterates almost completely, except at the bladder apex, forming a diverticulum of varying size.

Unlike pediatric cases, which often present with a fully patent urachus (urinary drainage), adults more commonly present with a urachal sinus (48% of symptomatic remnants) or a urachal cyst. As seen in our patient, these typically remain quiescent until a secondary infection triggers episodic umbilical discharge and peri-umbilical pain. An inverted umbilicus as seen here harbors germs, increasing the risk of such infections. There might also be a palpable mass. Also, our patient had diagnostic dilemma since birth as she had previous umbilical symptoms that were misdiagnosed and eventually mistreated. Adult presentation accounts for 1 case/150,000 with a male-to-female ratio of 3:1 [1]. This makes it a rare presentation and even rarer in females, which makes diagnosis difficult.

While ultrasonography is often the first-line investigation, computed tomography urography is the gold standard for adult diagnosis [3]. The use of computed tomography urography (CTU) was pivotal in this case in identifying the infraumbilical sinus connected to the vesical dome via a fibrous band. This fibrous band is a critical finding, as identification of the fibrous band on CTU allowed for precise preoperative planning [4]. In adults, imaging must not only confirm the sinus but also exclude differentials such as umbilical hernia, omphalitis, or persistent vitelline duct. Most importantly, imaging helps assess for urachal adenocarcinoma, which, while rare, carries a poor prognosis and often arises from the vesical end of a urachal remnant [5].

The standard of care for symptomatic urachal remnants is complete surgical excision, as conservative management is associated with a high recurrence rate [6]. While recent literature [6] [7] highlights the rise of robotic and laparoscopic techniques, traditional open surgery remains highly effective, especially in resource-limited settings or when an infected tract requires tactile feedback for safe dissection. In our patient, the open approach allowed for a precise infra-umbilical midline approach, which allowed for excellent exposure of the pre-peritoneal space and a controlled dissection of the thick sinus tract with minimal blood loss. Stud-

ies comparing the two suggest that while laparoscopy offers shorter hospital stay and improved cosmesis, the open approach provides superior tactile feedback when dissecting through the dense inflammatory tissue often found in infected urachal sinuses [8] [9].

A key technical highlight of our procedure was the retrograde intraoperative distention of the bladder via a transurethral catheter. It clearly defines the junction between the bladder dome and the urachal remnant; it reduces the risk of inadvertent cystotomy during the transection of the fibrous band; it ensures that no macroscopic remnant tissue is left behind, which is vital as incomplete excision is associated with a high rate of recurrence and potential malignant transformation. Other techniques like using the fistula probe have been used to identify the fistula tract [10].

Literature suggests that infected urachal remnants should ideally be managed with a two-staged approach: initial drainage/antibiotics followed by delayed excision [7] [9] [11]. However, in sub-acute cases without systemic sepsis, as evidenced here by the absence of a SIRS, a primary one-stage excision is safe and reduces the hospital stay. Our findings of a thick sinus tract are consistent with chronic inflammatory changes described in similar adult cohorts.

4. Conclusion

Persistent urachal sinus in adults is a rare but important differential diagnosis for chronic umbilical discharge and periumbilical pain. Although often quiescent during childhood, these remnants can present in adult life due to secondary infection. CTU remains the diagnostic modality of choice, providing critical anatomical mapping of the sinus tract and its relation to the bladder dome. This case also demonstrates that open infraumbilical excision is a safe and definitive treatment. Retrograde bladder filling and bladder distension are simple and effective maneuvers to prevent bladder injury and ensure complete resection. Radical surgical excision is mandatory not only to resolve symptoms and prevent recurrence but also to eliminate the long-term risk of malignant transformation into urachal adenocarcinoma.

Ethical Considerations

Verbal and written consent for publication of the case, including images, was obtained from the patient.

Author Contributions

Adrien Valère Yongho Mouchili: Conception, drafting and editing; Maurice Esong Fonji: Conception, drafting and, editing; Frantz Ngalle Epoupa: Work supervision and proofreading.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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