Original Article

# Management of Symptomatic Urachal Cysts in Children

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**Abstract**

**Aim:** We report the results of the surgical treatment of symptomatic urachal cysts. **Materials and Methods:** The medical records of patients who underwent urachal cyst excision between 2012 and 2017 were reviewed retrospectively at our hospital. The age, sex, presenting complaint, method of diagnosis, average cyst diameter, surgical procedure, and postoperative complications of each patient were recorded. **Results:** Twenty-seven patients who had urachal cyst were included in this study; 5 out of 27 patients were treated conservatively and the rest of patients were treated surgically, made up of 16 males (72%) and 6 females (28%). The average age of the patients was 7 years (range: 1–17). The most common reason for referral was abdominal pain in 12 patients (54%), discharge in 6 patients (28%), fever in 2 patients (9%), and an abdominal mass in 2 patients (9%). An ultrasound scan was performed in all patients as an initial imaging study. The average cyst diameter was 1.5 cm (range: 1–6 cm). Laparotomy was performed in 16 patients, with 6 patients undergoing laparoscopic excision. Postoperative wound infection developed in two patients. **Conclusions:** Patients with urachal cysts may be managed conservatively initially. However, patients who do not show any clinical and radiological signs of regression, or those who have large cysts, should undergo surgical excision through laparotomy or a laparoscopic approach.

**Keywords:** *Children, surgical treatment, urachal cyst*

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## Introduction

The urachus serves as a connection between the fetal bladder and allantois. When the bladder descends into the pelvis during fetal life, the urachus is stretched and its lumen is obliterated. The urachus remains as a fibrous band extending from the umbilicus to the urinary bladder as the umbilical ligament. In rare cases, the obliteration process may not be completed and can result in urachal residues. These residues may be classified as a patent urachus, urachal cyst, urachal sinus, diverticula, and atretic urachal residues. Some urachal abnormalities must be resected as they may cause urinary stasis, infection, or urachal carcinoma due to chronic irritation.[1-3]

This is a rare congenital anomaly observed in 1.6% of children below the age of 15 years and in 0.63% of adults.[4] Although this condition is often asymptomatic, urachal residues may cause urinary symptoms that may progress to malignancy later in life.[5] Symptomatic urachal residues are removed by a laparotomy through the umbilicus, although laparoscopic procedures are being utilized.[5-8]

In this report, we share our surgical experience with symptomatic urachal cysts.

## Materials and Methods

A retrospective review of records was performed on patients who underwent a surgical procedure to excise an urachal cyst between 2012 and 2017 in our hospital. The patient's age and sex, reason for referral, method of diagnosis, surgical procedure, and postoperative complications were recorded. Antibiotic treatment was initially started in those patients referred with a

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discharge. Patients who recovered clinically and had no imaging findings after antibiotic treatment were excluded from the study. An ultrasound scan (USS) was performed on all patients as the initial diagnostic method. Computed tomography (CT) was ordered in addition to USS for patients with an unclear diagnosis who had a mass.

Patients who did not recover following antibiotic treatment were referred for either laparotomy or laparoscopic excision. The excised material was sent to the pathology department for histopathologic examination. Results were recorded during follow-up.

## Results

Twenty-seven patients who had urachal cyst were included in this study; 5 out of 27 patients were treated conservatively and the rest of patients were treated surgically, made up of 16 males (72%) and 6 females (28%). The average age of the participants was 7 years (range: 1–17). The most common complaints leading to referral were abdominal pain in 12 patients (54%), discharge in 6 patients (28%), fever in 2 patients (9%), and a palpable abdominal mass in 2 patients (9%) [Figure 1]. A USS was performed on all patients as the primary imaging study. USS resulted in a diagnosis in 20 patients; 2 other patients were diagnosed by CT. The average cyst diameter was 1.5 cm (range: 1–6 cm) on USS. Sixteen patients (72.7%) underwent laparotomy, with laparoscopy performed on six (27.3%). The urachal cyst was scraped from the anterior abdominal wall toward the superior part of the bladder after bladder inflation through a Foley catheter. The removed specimens were sent to the pathology department. Specimens in all cases

**Table 1: Characteristics of the patients with urachal cysts**

| Patient | Age (years) | Sex | Symptom | Diagnosis | Treatment | Complication |
|---|---|---|---|---|---|---|
| 1 | 13 | Male | Abdominal pain | Uss | Laparatomy | |
| 2 | 17 | Male | Mass | Uss + Ct | Laparatomy | |
| 3 | 9 | Male | Discharge | Uss | Laparatomy | Discharge |
| 4 | 14 | Female | Discharge | Uss | Laparatomy | |
| 5 | 10 | Female | Abdominal pain | Uss | Laparoscopy | |
| 6 | 14 | Male | Discharge | Uss | Laparatomy | |
| 7 | 6 | Male | Mass | Uss + Ct | Laparoscopy | |
| 8 | 6 | Male | Abdominal pain | Uss | Laparatomy | |
| 9 | 16 | Male | Abdominal pain | Uss | Laparatomy | |
| 10 | 5 | Female | Fever | Uss | Laparatomy | Discharge |
| 11 | 5 | Male | Abdominal pain | Uss | Laparoscopy | |
| 12 | 2 | Male | Discharge | Uss | Laparatomy | |
| 13 | 3 | Male | Abdominal pain | Uss | Laparatomy | |
| 14 | 1 | Female | Discharge | Uss | Laparatomy | |
| 15 | 1 | Male | Fever | Uss | Laparatomy | |
| 16 | 7 | Female | Abdominal pain | Uss | Laparoscopy | |
| 17 | 11 | Male | Abdominal pain | Uss | Laparatomy | |
| 18 | 6 | Male | Abdominal pain | Uss | Laparatomy | |
| 19 | 5 | Male | Abdominal pain | Uss | Laparatomy | |
| 20 | 4 | Female | Abdominal pain | Uss | Laparoscopy | |
| 21 | 8 | Male | Abdominal pain | Uss | Laparatomy | |
| 22 | 4 | Male | Discharge | Uss | Laparoscopy | |

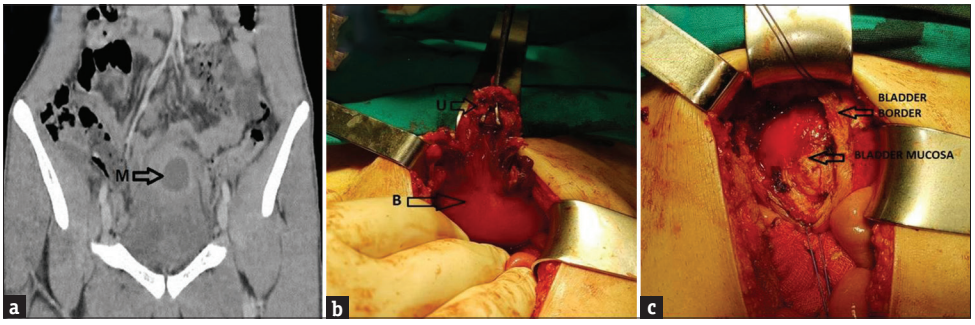


**Figure 1:** (a) CT image of urachus, (b) intraoperative image of urachus, and (c) image after excision

were confirmed as urachal cysts on histopathological analysis. Wound infection developed in two patients postoperatively [Table 1]. These patients recovered following appropriate antibiotic therapy. No other complications were noted during follow-up. Patients were followed up for an average of 36 months (12–72), and clinical and radiological pathology were not detected on follow-up.

## Discussion

Urachal cysts are the commonest urachal residues and often lead to a pathological connection between the bladder and cyst.[9] Urachal abnormalities are more commonly detected in male patients.[10] In this study, males made up of 72% of the patients, in line with the literature. Urachal cysts may be diagnosed incidentally when excluding other causes for current symptoms and clinical findings. The urachal cyst originates from the degeneration and desquamation of the epithelium. It resides between the urachus and the bladder and may serve as a suitable medium for bacterial infection. The infection can cause pain or acute abdomen.[11-16] Additional complications include intestinal adhesions and in rare cases can include necrotizing fasciitis, stones, intracystic bleeding, intestinal fistulas, intestinal obstruction and urinary tract infections, Greiter's disease, and malignancy in children.[17-19]

Urachal cysts can present with varying symptoms in different age groups. According to Sato *et al*., the most common symptom was umbilical granulation in infants and abdominal pain in older children.[20] It has been reported rarely that cancer may develop in advanced ages.[21-26] In our study, two infants presented with discharge and fever. The most common presenting complaint in older children was abdominal pain in 60% (12 patients), discharge in 25% (5 patients), fever in 5% (1 patient), and a palpable mass in 10% (2 patients). CT or cystography can confirm the diagnosis. USS, CT, voiding cystourethrogram, and fistulography may also be used to confirm a clinical diagnosis. USS is recommended as the initial imaging study to evaluate the urachus and urachal abnormalities. USS evaluation of the urachus is operator-dependent and relies on experience and knowledge of the anatomy of urachal residues.[12,27-29] The accuracy of USS for urachal abnormality detection is reported between 61.1% and 91.3%.[30,31] Yiee *et al*.[27] suggested that physical examination is sufficient to diagnose urachal abnormalities; however, they recommended USS as an initial confirmatory diagnostic test for suspected cases and reported that CT may be used when the diagnosis is unclear. In the current study, we confirmed the diagnosis by USS in 20 patients who were initially diagnosed by physical examination, and diagnosis was confirmed with CT in 2 patients. The conventional surgical approach to urachal cysts is through a semicircular umbilical incision or lower midline incision, although laparoscopic surgery is beginning to gain popularity.[9]

In a study by Chiarenza *et al*.,[9] 16 patients underwent urachal cyst surgery. They performed a laparotomy on eight patients and used a laparoscopic approach on eight others. No postoperative complications were observed in their cohort. They suggested that a laparoscopic approach might be preferred due to its less invasive nature and better cosmetic results.

We performed a laparotomy in 16 patients (73%) and used a laparoscopic approach in 6 others (27%). A postoperative wound site infection developed in two patients who had a laparotomy. We did not experience any postoperative complication in patients who had laparoscopic surgical excision. Although laparoscopy is a costly procedure, we believe that better cosmetic results and a less invasive approach are important. McCollum *et al*.[30] reported a complication rate of 8% (wound-site infection or bladder leakage), whereas Cilento *et al*.[32] reported complications in 7% of patients, with wound infection being the commonest. In our study, wound infection developed in two patients. Both of these patients had undergone a laparotomy; luckily, both recovered following antibiotic therapy. The complication rates were similar to those observed in the literature. We believe that such complications may be prevented by an increase in the rate of laparoscopic approaches. Many different treatment approaches have been suggested for urachal abnormalities. Although surgery is traditionally performed, Naiditch *et al*.[33] suggested that urachal residues identified incidentally should be managed conservatively without surgery regardless of the urachus type. However, surgical excision is recommended as an infection or malignancy may arise secondary to urachal abnormalities in many cases.[5] Nogueras-Ocaña M *et al*.[10] achieved a resolution of the abnormalities in 13 patients (61.5% of their cohort), which included 4 asymptomatic and 9 symptomatic patients. Two patients who were treatment-resistant were required to undergo surgical excision. An additional two patients were monitored because the cysts had only shrunk in size. In another study, 5 out of 11 patients all below the age of 1 year were treated conservatively with 6 treatment-resistant patients requiring surgery.[26] In our patients, a decrease in cyst size was observed in three patients, and spontaneous resolution detected in only two patients. The aforementioned patients whose symptoms resolved were excluded from our study. Since patients with urachal cysts may show cyst regression through a conservative approach, unnecessary surgical

procedures should be avoided. Therefore, we advised conservative therapy as the initial treatment according to our experience. Metwalli *et al*.[34] detected significant lymphoid hyperplasia as well as intestinal-type epithelial foci and transitional epithelium on the histopathological examination of a patient with an urachal cyst following a partial cystectomy for hematuria and dysuria. All histopathological examination results in this study were consistent with an urachal cyst pathology.

## Conclusions

Patients who have nonsymptomatic small urachal cysts may be managed conservatively initially; however, patients with large cysts do not achieve any clinical or radiological resolution; therefore, those patients should undergo excision by laparotomy or laparoscopy. Laparoscopic approaches may reduce or prevent complications.

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### Conflicts of interest

There are no conflicts of interest.

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