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## Laparoscopic treatment of an infected urachal cyst and diverticulum in a young adult: Presentation of a case and review of the literature

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## ABSTRACT

**INTRODUCTION:** A urachal remnant is a rare anomaly in adults, with a heterogeneous presentation. We report a case of an infected urachal cyst associated with a urachal diverticulum.

**PRESENTATION OF CASE:** We report the case of a 16-year-old male who presented to our hospital with lower abdominal pain without any other signs of general infection. A physical examination revealed umbilical erythema with associated tenderness. All laboratory tests were normal. An ultrasound scan revealed an urachal cyst near the umbilicus and a second cyst near the bladder dome. We decided on a staged treatment with antibiotic administration followed by surgical excision of the urachus during laparoscopy. The patient was discharged on day 10 without complications. Pathology revealed chronic inflammatory tissue without signs of malignancy.

**DISCUSSION:** Urachus is a fibrous remnant of the allantois that progressively obliterates after birth, forming the median umbilical ligament. Incomplete regression of the urachal lumen results in several anomalies. These anomalies require treatment when discovered because of an increased risk of infection and neoplastic differentiation. A urachal cyst is the most common type of anomaly, and infection is the usual mode of presentation. Surgical intervention with complete excision of the urachus is the treatment of choice. A staged approach with antibiotic administration followed by surgery is recommended if signs of infection are present.

**CONCLUSION:** Urachal anomalies in adulthood are rare, with a nonspecific presentation. However, identifying a urachal anomaly is important because of the increased risk for infection and neoplastic differentiation. The laparoscopic approach is safe and patients recover rapidly.

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## 1. Introduction

The urachus is a fibrous remnant of the allantois, a canal that drains the urinary bladder of the foetus and runs within the umbilical cord. The fibrous remnant lies in the space of Retzius, between the transverse fascia anteriorly and the peritoneum posteriorly.

Urachal remnant anomalies are uncommon in adulthood and present with a variety of clinical manifestations, making diagnosis difficult. The most common presentation is an infected urachal cyst. Surgical removal of urachal remnants is indicated to prevent recurrent infection, which occurs in 30% [1] of cases, and because there is a risk of adenocarcinoma in an unresected urachal remnant [2]. A staged procedure with antibiotic treatment for the acute infection, drainage of the abscess, and subsequent surgical removal of the urachal remnants is the treatment of choice [3]. A laparoscopic

approach is as safe and effective a procedure as an open approach, with the advantages of minimal invasiveness [4].

We present the case of a 16-year-old patient who presented at our community hospital with abdominal pain, and in whom we discovered a urachal cyst associated with a urachal diverticulum that we treated with a staged procedure.

We want also to review the literature concerning the clinical presentation, the histopathological characteristics and the importance of the correct treatment of this uncommon occurrence, often misdiagnosed in adulthood.

Our work has been reported in line with the SCARE criteria [5].

## 2. Presentation of case

A 16-year-old Caucasian male patient, in good condition, without drug history, no smoking, was admitted to our community hospital, referred by family physician, with low abdominal pain that had worsened over 72 h without any other urological or digestive symptoms and without any signs of general infection. An abdominal examination revealed umbilical erythema with asso-

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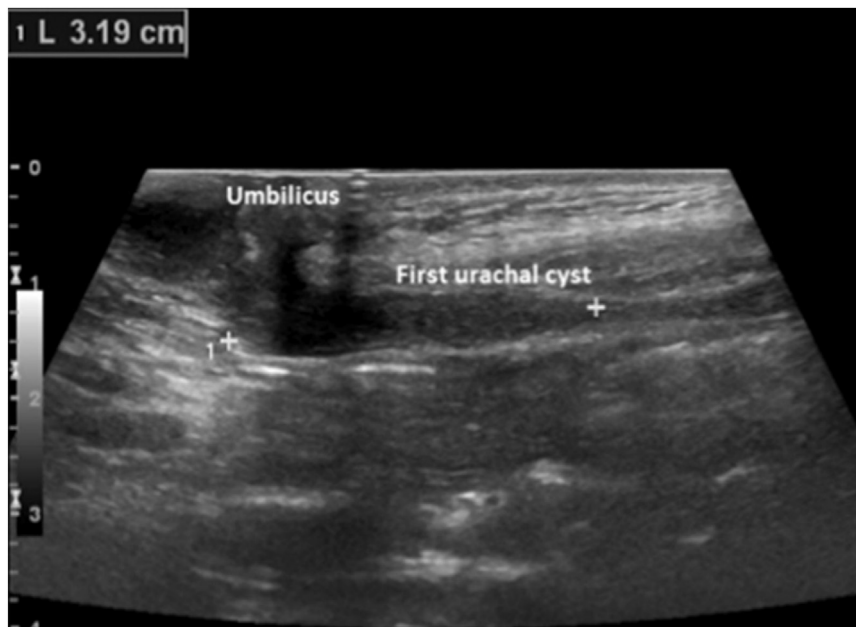


Fig. 1. Abdominal US showing the urachal cyst near the umbilicus.

ciated tenderness and a painful area without any secretions. All laboratory tests were normal.

An abdominal ultrasound was performed to exclude the presence of an umbilical abscess and revealed the presence of an urachal cyst near the umbilicus (Fig. 1), and a second cyst near the bladder dome, without apparent communication with the bladder (Fig. 2).

We decided on a staged procedure to treat the local peri-umbilical infection and after a cycle of antibiotic treatment with co-amoxicillin for 7 days, we excised the urachal remnant using a laparoscopic approach, with patient in supine position, using 3 trocars. An expert surgeon specialised in visceral surgery performed the intervention.

Under general anesthesia the patient was placed in supine position and a Foley catheter was inserted. A prophylactic dose of Cefuroxime was administered before incision. The peritoneal

cavity was accessed using the Hasson open technique in the left lumbar region with a 10 mm port. Two 5 mm working ports were inserted under direct vision in the left hypochondriac and iliac region. A 30° laparoscopic camera was used. After identification of the median and lateral umbilical ligament the dissection of the median umbilical ligament began below the urachal cyst with a laparoscopic hook. When we arrived with the dissection to the bladder we found that the cyst near the bladder dome was actually a urachal diverticulum (Fig. 3), with communication to the bladder, so we resected the bladder dome (Fig. 4), and the bladder defect was closed laparoscopically using 3-0 vicryl. When dissection was completed without rupture of the urachal cyst and diverticulum, the specimen was removed en bloc via the 10 mm port in a closed sac.



Fig. 2. Abdominal US showing a second cyst near the bladder dome, without apparent communication with the bladder.

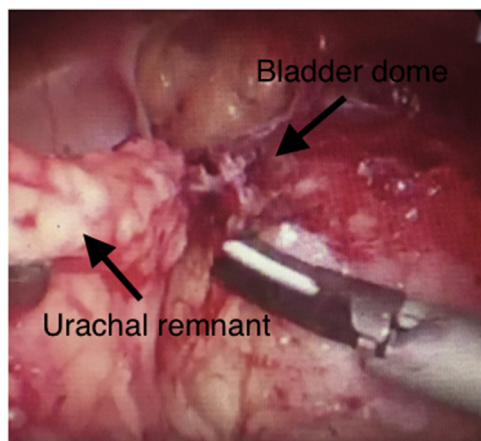


Fig. 3. Laparoscopic image of the urachal diverticulum.

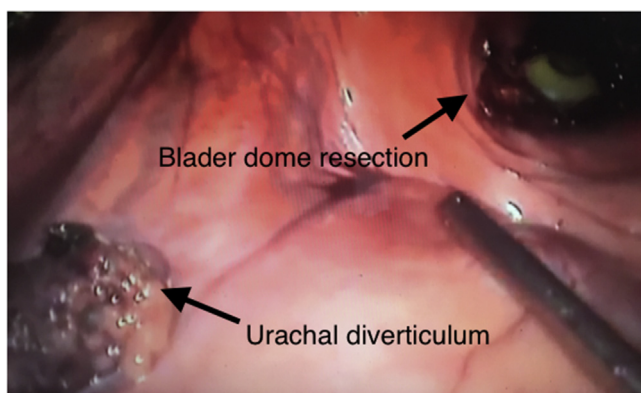


Fig. 4. Bladder defect after resection of the urachal diverticulum.

A urinary catheter was left in place during the postoperative period and removed after a normal cystogram.

The patient was discharged on day 10 without complications. Pathology revealed chronic inflammatory tissue without any signs of malignancy. In the urachal cyst and diverticulum a transitional epithelium was identified.

### 3. Discussion

The urachus is a fibrous remnant of the allantois that progressively deteriorates after birth. The descent of the bladder into the foetal pelvis during gestation causes the urachal canal to form, which progressively obliterates a fibrous tract called urachus or median umbilical ligament in young adults. This ligament stretches from the umbilicus to the bladder dome.

The incidence of a urachal remnant is 1:300,000 in infants and 1:5000 in adults. This lesion typically affects young adults 20–40 years of age, with a male-female ratio of 2:1 [6].

Incomplete obliteration of the urachal canal results in various types of anomalies, including a urachal sinus, with the urachus patent only at the umbilical side; a patent urachus, with persistent communication between the bladder and the umbilicus; a urachal diverticulum, with the urachus patent only at the bladder dome; or a urachal cyst, with the urachus patent between the umbilicus and bladder dome, without communication.

A urachal cyst is the most common type of anomaly, and infection is the most common presentation in adults with a specific range of abdominal symptoms, which can mimic an acute abdomen, making the differential diagnosis difficult [7].

Imaging studies include ultrasound (US), computed tomography and/or magnetic resonance, with US constituting the most common and least expensive diagnostic study, with limitations related to the radiologist's experience and the patient's habitus [8]. In our case, the patient's body conformation and the expertise of the radiologist were sufficient to make a correct diagnosis by abdominal US.

Surgical excision is the treatment of choice for urachal remnants to avoid a recurrent cyst infection. Incomplete resection can lead to recurrent infection rates of up to 30%. Radical excision is important because there is a risk for malignant degeneration of the urachal remnant. Urachal carcinoma is a rare but aggressive cancer, with only 151 cases reported by the National Cancer Institute [9,10]. It is estimated that urachal carcinoma represented less than 1% of bladder cancer [11]. A risk factor for a malignant transformation of an urachal remnant is the presence of gastro-intestinal or metaplastic epithelium in the remnant since approximately 95% of urachal cancers are of the epithelial subtype [12]. Otherwise urachal remnant no containing epithelium have a very little risk for future malignant transformation. Unfortunately it is not possible to predict the presence of epithelium in the urachal remnant based on clinical features [13].

Therefore, complete excision of a urachal remnant is important, and the laparoscopic approach represents the safest and most radical approach [1].

If an infection is found at the diagnosis, a staged procedure with antibiotic treatment followed by surgery is the treatment of choice [3].

### 4. Conclusion

Urachal remnants are a rare condition in adulthood, the correct diagnosis of which is fundamental to the correct treatment. Radical excision of urachal remnants using a laparoscopic approach is a safe and effective alternative to open surgery, to avoid recurrent infection and the risk of malignant transformation. The staged approach with antibiotic treatment followed by surgical excision is the treatment of choice.

### Conflicts of interest

No financial and personal conflict of interest are present for all authors.

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### Ethical approval

Ethical approval at the publication of this case report has been exempted by our Institution (Ospedale Regionale di Bellinzona).

### Consent

We have taken the patient's consent to publish the case report. He accepts the publications of this case report.

### Author contribution

Writing the paper: S. Passoni.  
Contributors: M. Marengo, A. Guerra.

### Registration of Research Studies

None.

**Guarantor**

Dr. Stefano Passoni.

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