

Treatment of Urachal Anomalies: a Minimally Invasive Surgery Technique

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ABSTRACT

Background: Urachal disease is uncommon. The surgical treatment consists of the resection of the urachus throughout its entire length. Our objective is to demonstrate the use of minimally invasive surgery to treat this disease.

Methods: Six patients were studied and diagnosed. The technique used three 10-mm ports on the right hemi abdomen, through which the dissection of the urachus was performed from the umbilical extreme to the bladder. We evaluated the perioperative records to assess morbidity and outcome.

Results: Most patients suffered from episodes of umbilical discharge. The diagnosis was made mainly through clinical history and confirmed during the laparoscopic procedure. The urachus was resected throughout its entire length, and we did not perform a segmentary bladder resection in any patient. The average operative time was 66 minutes (range, 42 to 123), and no operative complications were associated with the technique.

Discussion: Minimally invasive surgery is a safe and effective procedure that allows the dissection of the urachus through its entire length, providing optimal postoperative results.

Key Words: Urachus, Urachal anomalies, Laparoscopy.

INTRODUCTION

Pathology of the urachus is infrequent. An incidence near 1 in 5000¹ has been reported, but we must take it into account when evaluating a patient with an umbilical discharge.

The urachus is a vestigial fibrous cord derived from involution of the allantois, located in the lax conjunctive tissue between the "fascia transversalis" and the peritoneum, and its end crosses the bladder wall.²

In adults, urachal disease presents as nonspecific abdominal discomfort, such as abdominal sensitivity, meteorism, or periumbilical pain. If a cyst is formed and remains uninfected, an early diagnosis is rarely performed.

Some authors have described a classical triad for urachal pathology characterized by umbilical discharge, abdominal pain, and urinary symptoms.³ Despite the diversity in the clinical presentation of this pathology, diagnosis is often performed during surgical endoscopy exploration.

Management must be surgical. The most accepted approach is resection of the urachus through all its length. Some authors³ consider the treatment must include the complete resection of the trajectory including a segmentary bladder resection while taking into account the potential malignization.⁴⁻⁶

Single cases have been reported detailing a minimally invasive surgery approach to urachal disease,⁷⁻⁹ and more recently Cadeddu et al¹⁰ evaluated a series of 4 cases treated efficiently with this method.

The objective of this study was to describe an effective approach to patients with urachal disease, characterizing the type of disease and demonstrating the use of minimally invasive surgery in its treatment.

METHODS

Between June 2001 and October 2002, 6 female patients with a mean age of 21 years (range, 15 to 37) were studied and diagnosed. The evaluation included a complete clinical history and preoperative laboratory workup, abdominal wall ultrasound, cystogram, and fistulography.

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Technique

The materials and equipment used were:

- Laparoscopic equipment (camera, Xenon light source, automatic auto-regulating insufflator, 21-inch monitor, laparoscope 30°).
- Fiberoptic
- 10-mm trocars³
- Laparoscopic instruments (graspers, dissector, Metzenbaum scissors, clip carrying forceps).

Under general anesthesia, the patient is placed in the Trendelenburg position, with 30° elevation of the left hip and flank. The surgeon and the first assistant are positioned with one placed on the patient’s right side and the monitor on the left side, in front of them. The first 10-mm port is placed using the Hasson technique,¹¹ on the right hemi abdomen, at the umbilicus and the lateral border of the rectus muscle. The pneumoperitoneum will be performed through this trocar. The next ports are placed under laparoscopic vision, on the epigastrium (port 2) and the line joining the umbilical cicatrix with the right antero-superior iliacus spina, and always doing so along the lateral border of the rectus, avoiding the epigastric arteries (port 3) (**Figure 1**).

The optic is introduced through port 2, and the surgeon’s forceps (dissector, grasper, or Metzenbaum scissors) through ports 1 and 3. Then the bladder is filled with 350 mL to 400 mL of physiologic solution dyed with 5 mL of methylene blue, to help identify the bladder during the

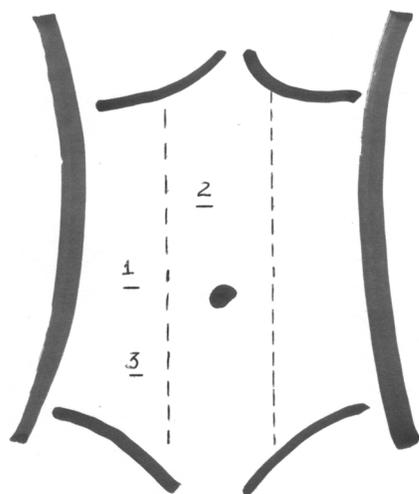


Figure 1. Laparoscopic port placement for treatment of urachal anomalies.

procedure and the dissection of the urachus when its vesical ending is permeable. Once the urachus has been identified (**Figure 2**), the parietal peritoneum is opened and the dissection throughout its entire length is performed, along with section and placement of clips in the vesical and umbilical extremes. The piece is removed through port 3 and sent for histologic confirmation.

The procedures were performed at the Laparoscopic Surgery Unit of the Surgery Department B at the Hospital Universitario de Caracas.

RESULTS

Of the group, 5 patients reported episodes of umbilical discharge and occasional periumbilical pain; one had no symptoms of urachal anomaly, and the diagnosis was made during a surgical intervention for appendicitis.

The preoperative laboratory tests were normal, the ultrasonographic study was positive in one case, where a subaponeurotic hypoechoic image was evidenced on the midline, and the cystogram shows no permeability on the vesical ending in any case. Demographic and perioperative data are shown in **Table 1**.

Our findings were classified according Hammond et al¹² and Bauer and Retik¹³ (**Table 2**).

The urachus was resected throughout its entire track. It was not necessary to perform a segmentary bladder resection. In one case, a right indirect inguinal hernia mesh repair was made using the transperitoneal laparoscopic technique.

No intraoperative complications were associated with the

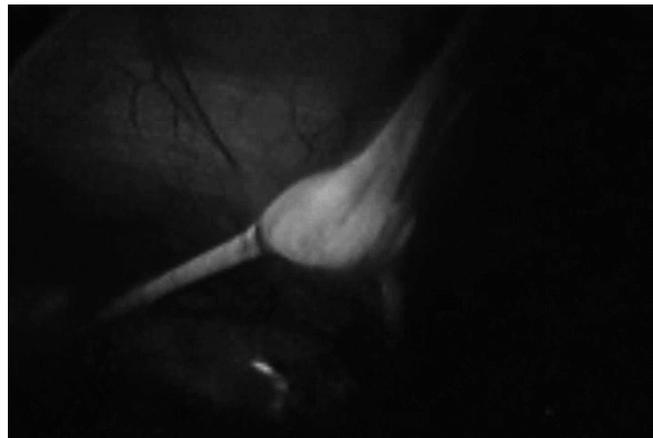


Figure 2. Laparoscopic view of urachal cyst anomaly joining to both umbilical ligaments.

Table 1.
Demographics and Perioperative Data

Demographic	Mean (range)
Age (yr)	21 (15 to 37)
Men-to-women	0:6
Operative time (min)	66 (42 to 123)
Hospital stay (hours)	16 (8 to 24)

technique. Among the postoperative complications, 2 cases of cystitis were reported in relation to the catheterization of the bladder during the procedure; both were treated medically with a satisfactory evolution.

Currently, patients do not experience recurring symptoms, and they have a mean follow-up period of 6 months (1 to 14 months).

DISCUSSION

Anomalies of the urachus are not frequent, and we must take them into account when evaluating patients with an umbilical discharge. The most frequent anomaly in adulthood is the urachal cyst.¹⁰

Most urachal anomalies are discovered by the patient when an umbilical discharge is noticed, as Sterling and Goldsmith describe.¹⁴

The preoperative techniques used in the evaluation of these patients are abdominal ultrasound, fistulography and cystogram;¹⁻¹⁰ however, in our series only 1 case was diagnosed with ultrasound. The other studies were inconclusive. We consider that the diagnosis of this pathology is mainly clinical, and it is confirmed during the laparoscopic procedure. In another series¹⁰ it was reported that abdominal sonography or computed tomography was used when an infection was suspected; however, we do not use computed tomography because of its cost.

“Acquired disease” refers to those cases in which the urachus has closed itself normally at the time of birth, and it is characterized by having a partial reopening of the channel.

Treatment of urachus anomalies requires removing the urachus throughout its entire length including each medial umbilical ligament as well as the associated peritoneum. Traditional surgical treatment of urachus anomalies involves a midline infraumbilical incision. Making a segmentary bladder resection is controversial.¹⁰ In our series, we did not perform segmentary bladder resection because no evidence existed of a communication between the bladder and the urachus.

Perioperative complications were not reported in relation to the minimally invasive surgery technique for resection of the urachus, which agrees with reports of other authors.⁷⁻⁹ The postoperative complication observed in our series had to do with the repair of the inguinal hernia and injury of the epigastric vein that caused a hemoperitoneum, which required a laparoscopic reintervention.

Although beyond the scope of our study, the reincorporation of patients into their daily activities seems to be sooner than expected, and without a doubt, the cosmetic result is better because the usual vertical infraumbilical incision that measures several centimeters was replaced by three 10-mm horizontal wounds.

Another benefit of the laparoscopic approach is the fact that abdominal exploration can be undertaken, which helps in the detection of any pathology, and that is how one case in our series was diagnosed during a laparoscopic appendectomy. No patient in our study has had recurring symptoms. The laparoscopic approach to urachal anomalies constitutes a safe and reliable technique.

Table 2.
Distribution Findings of Urachal Anomalies

Type	Hammond	n	Bauer and Retik	n
I	Cord from the bladder apex to the umbilicus	2	Opening of the bladder ending	0
II	Cord from the bladder apex toward umbilical ligament	0	Opening of the umbilical ending	5
III	Cord that joins both umbilical arteries	3	Permeable throughout the entire track	0
IV	Urachus <2 cm, not well defined	1	Opening in the middle with both endings obliterated	1

CONCLUSION

The diagnosis of acquired anomalies of the urachus is fundamentally clinical, and it is confirmed during the laparoscopic procedure. The minimally invasive surgery technique for the treatment of urachus anomalies is safe and efficient, giving optimal postoperative results.

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