Robot-Assisted Laparoscopic Excision of Symptomatic Retrovesical Cysts in Boys and Young Adults

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Abbreviations and Acronyms

3D = 3-dimensional
EBL = estimated blood loss
LUTS = lower urinary tract symptoms
MD = müllerian duct
MRI = magnetic resonance imaging
PU = prostatic utricle
RALE = robot-assisted laparoscopic excision
RV = retrovesical
SV = seminal vesicle
UDT = undescended testicle
VCUG = voiding cystourethrography
VUR = vesicoureteral reflux

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Purpose: We review our surgical experience with the management of retrovesical cystic anomalies using robot-assisted laparoscopic techniques.
Materials and Methods: We retrospectively reviewed the presentation, diagnosis and treatment of 6 patients 28 months to 22 years old with retrovesical cystic anomalies who underwent robot-assisted laparoscopic excision at our hospital between January 2006 and November 2010.
Results: Presenting signs and symptoms included urinary retention, lower urinary tract symptoms, abdominal pain and repeated epididymitis. Associated anomalies consisted of hypospadias, vesicoureteral reflux, renal agenesis, 5alpha-reductase deficiency, premature adrenarche and cryptorchidism. Cystic anomalies ranged from 3 to 6 cm long. The final diagnoses were prostatic utricular cyst, müllerian duct cyst and seminal vesicle cyst. Ectopic insertion of vas into the cyst was found in 4 cases, requiring ligation of the affected vas in 3. Mean ± SD operative time including cystoscopy was 198 ± 23.8 minutes, and estimated blood loss ranged from 5 to 10 ml. Mean ± SD hospital stay was 1.33 ± 0.52 days. All patients had resumed their regular activities within 2 weeks postoperatively. De novo contralateral epididymitis developed 2 months postoperatively in 1 patient. Otherwise, there was no recurrence of cystic mass or presenting signs or symptoms during followup of 3 to 56 months.
Conclusions: In the management of retrovesical cystic anomalies robot-assisted laparoscopic excision affords a natural extension of conventional laparoscopy with the additional advantages of 3-dimensional vision and ease of instrument control.

Key Words: laparoscopy, müllerian ducts, robotics, seminal vesicles, urogenital abnormalities

In males retrovesical cysts arising from müllerian duct remnants or the seminal vesicles are uncommon. Dilatation of the müllerian duct remnants can result in an enlarged prostatic utricle or a müllerian duct cyst. Seminal vesicle cysts arise from anomalous development of the distal mesonephric duct. Müllerian duct cyst is known to be present in 4% of newborns and 1% of adults.[1] Seminal vesicle cyst was reported in 0.005% of 10,919 autopsies.[2] However, the prevalence of symptomatic cysts is not well known.

Clinically and on radiographic evaluation the various types of RV cysts often are difficult to differentiate from each other. Patients with RV cysts may present with symptoms, although most are asymptomatic. RV cysts are often managed surgically in cases that are symptomatic, which can be challenging due

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to the rarity of this disorder, the anatomical inaccessibility and the close proximity to the ejaculatory ducts, pelvic nerves, rectum, vas deferens and ureters. Drainage and transurethral fulguration of RV cysts have been attempted. However, they are usually associated with a high failure and recurrence rate.[3] Currently open excision through various approaches (transtrigonal, posterior sagittal) provides a more effective method of treatment. Unfortunately because of the inaccessibility of these cysts, the open technique has significant associated morbidity, including bladder, urethral and rectal injuries.

The development of laparoscopic techniques provides a feasible alternative to open surgical excision of RV cysts, with decreased morbidity resulting in decreased postoperative pain, shorter hospital stay and reduced convalescence.[4–8] However, laparoscopic excision of RV cysts through a transperitoneal approach is challenging. The tight confines of the RV space and the close proximity of surrounding structures, such as the rectum, bladder, SV and ureters, require precise dissection. With the benefits of improved 3D imaging and greater dexterity, robotic assistance might facilitate this procedure. The current literature contains sporadic case reports on the use of RALE for RV cysts.[9–14] We evaluated our cumulative experience with RALE for the management of this disorder and reviewed the published literature.

MATERIALS AND METHODS

With approval from our institutional human research committee, we retrospectively reviewed the records of 6 patients 28 months to 22 years old with RV cysts who underwent RALE by a single surgeon (HTN) between January 2006 and February 2010. We used the da Vinci® Si™ Robotic Surgical System. Presenting conditions included urinary retention, LUTS, abdominal pain and repeated epididymitis (table 1). Associated anomalies consisted of hypospadias, VUR, renal agenesis, 5alpha-reductase deficiency, premature adrenarche and cryptorchidism. One patient (5) had a history of transrectal drainage for RV cyst several years before. Two patients (1 and 6) had a history of treatment for penoscrotal hypospadias, UDTs and VUR.

RV cyst was diagnosed by various imaging modalities, including pelvic ultrasound, pelvic MRI, VCUG and cystoscopy. Cyst length ranged from 3 to 6 cm. The decision for surgical intervention was made based on the presence of symptoms and cyst size. Blood loss was estimated by subtraction of fluids used in surgical irrigation from volume in suction reservoir by considering the volume of cystic fluid in case of rupture during surgery.

In this procedure the patient is placed in the dorsal lithotomy position, and the bladder and stomach are decompressed with tube drainage. Cystoscopy is performed at the start of the procedure to place a catheter into the RV cyst (if possible) or the urethra to aid in identification. A Veress needle is introduced through an infraumbilical incision, and the abdomen is insufflated with CO_2 to 15 mm Hg. The Veress needle is replaced with a 12 mm trocar, through which a 10 mm 30-degree lens is inserted. The patient is then placed in the Trendelenburg position to move the bowel out of the pelvis. Two 8 mm trocars are placed lateral to the rectus muscles bilaterally (in the mid clavicular line approximately 1 cm below the camera port) under direct visualization. An additional 5 mm assistant port is used. The robotic surgical system is then positioned between the legs of the patient, and the ports are secured to the robotic system.

Table 1. *Baseline characteristics*

Pt No.—Age	Presentation	Associated Disease	Treatment History	Cyst Configuration on Imaging
1—29 mos	Repeated epididymitis	Perineal hypospadias, bifid scrotum, bilat VUR, bilat UDTs	Staged hypospadias repairs, scrotoplasty, bilat orchiopexy	3 × 3 cm prostatic utricular cyst on ultrasound; reflux of urine into cyst, rt SV and rt vas on VCUG
2—13 yrs, 9 mos	Urgency, frequency, hesitancy	None	None	3 cm round retrovesical cyst with no communication with vas, SV or ureter, suggesting müllerian duct cyst on MRI
3—17 yrs, 9 mos	Penile pain, urinary retention	Rt renal agenesis, lt compensatory hypertrophy	None	4 × 3 cm ovoid retrovesical cyst on midline and slightly on rt side; dilated tortuous rt vas/SV; dilated cyst behind rt SV on MRI
4—17 yrs, 7 mos	Low abdominal pain	Rt renal agenesis	Appendectomy	6 × 5 cm large pelvic cyst located on midline and slightly on lt side
5—17 yrs, 2 mos	Penile pain, urinary retention, epididymitis	Lt renal agenesis	Transrectal drainage of cyst several yrs prior	4 cm ovoid cyst originating from lt seminal vesicle with intermittent signal intensity on MRI, located posterior to bladder
6—22 yrs, 6 mos	Acute epididymitis	Lt renal agenesis, rt VUR, bilat UDTs, penoscrotal hypospadias, premature adrenarche	Hypospadias repair, bilat orchiopexy, rt ureteral reimplantation	4 cm round retrovesical cyst extending upward, communicating with 5 by 3 cm cystic mass on MRI