

## Oncology

# Recognition and Management of Ectopic Ureterocele During Robotic Assisted Laparoscopic Radical Prostatectomy

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## ABSTRACT

Ectopic ureter and ureterocele are rare congenital anomalies. As such, are seldom encountered incidentally during urologic surgery. We present a case illustrating an unforeseen encounter of an ectopic ureter with an associated ureterocele during a robotic assisted laparoscopic prostatectomy (RALP) and the surgical technique used to adapt to the anatomical variation.

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## Introduction

Radical prostatectomy is a widely used treatment modality for localized prostate cancer. Contrary to most other genitourinary cancers, preoperative cross-sectional imaging is not uniformly indicated prior to extirpation. The European Association of Urology guidelines recommend staging with imaging only in patients with high risk or intermediate risk cancer with predominant Gleason 4 pattern.<sup>1</sup> As a result, ureteral anatomic variants may not be detected during the preoperative workup. We present a case of ureteral duplication with an ectopic upper pole moiety and associated ureterocele that was encountered unexpectedly during RALP.

## Case presentation

A 54-year-old male was referred for elevated PSA after 3 previous negative prostate biopsies, all more than four years ago. The patient's PSA on referral was 12.24 ng/mL. His past medical history included Meniere's disease, epilepsy, conjunctivitis, cataract, and a hiatal hernia. He had undergone surgeries for cataracts, hiatal hernia and esophageal dilation. The patient's father was diagnosed with prostate cancer at the age of 55 and underwent radiation

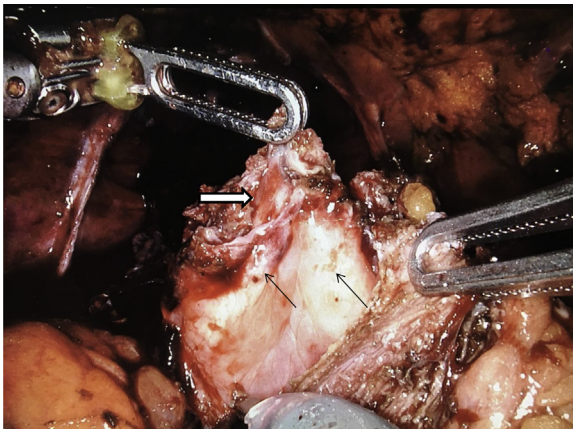
therapy. On physical exam, his prostate was 30 g, smooth and without nodules. A TRUS-guided saturation biopsy revealed Gleason 3 + 4 prostate cancer in 3 of 36 cores. After discussion regarding possible treatment options, the patient elected to undergo RALP with pelvic lymphadenectomy.

A transperitoneal anterior approach using the *da Vinci Xi* robot (Intuitive Surgical Inc., Sunnyvale, CA) was performed. Dissection of the bladder, incision of the endopelvic fasciae and ligation of the dorsal venous complex were uneventful. As the anterior bladder neck was incised, a cystic structure was encountered on the urothelium overlying the posterior bladder neck. More proximally on the trigonal ridge, ureteral orifices were identified bilaterally (Fig. 1). We recognized the cystic structure as an ureterocele overlying an ectopic left upper pole ureteral orifice. We inspected for a duplicate system on the right but only found a single ureteral orifice. The ureterocele was incised and opened into a patulous left upper pole moiety orifice. A 6Fr open ended catheter was placed through the urethra and a 0.038 guidewire (Cook Medical, Bloomington, IN) was passed through the catheter into the ectopic ureter. A 6Fr multilength ureteral stent (Cook Medical, Bloomington, IN) was deployed over the wire (Fig. 2), with the distal coil forming within the bladder. We paid special attention to preserve a posterior bladder flap distal to the ectopic ureteral orifice for the vesicourethral reconstruction. The bladder neck was closed from the lateral edges to a suitable size for the vesicourethral reconstruction. The anastomosis was completed in a running fashion with the posterior sutures placed adjacent to the upper pole ureteral orifice. A 22Fr urethral catheter was left in place.

**Abbreviations:** RALP, Robotic assisted laparoscopic prostatectomy; PSA, Prostate specific antigen; TRUS, Trans-rectal ultrasound; CT, Computed tomography.

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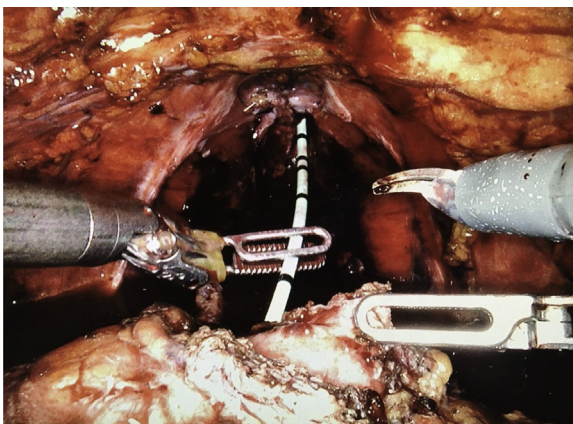
**Figure 1.** Ectopic left ureterocele was incised, revealing a patulous ectopic ureteral orifice (open arrow), with two additional ureteral orifices located more proximally on the trigonal ridge (solid arrows).

Postoperatively, the patient had an uneventful recovery and was discharged home on postoperative day 2. His drain was removed. CT scan 6 weeks postoperatively confirmed the duplicated system on the left and no pelvic fluid collection (Fig. 3). In retrospective review of the patient's TRUS images on biopsy, the ureterocele was apparent.

At three months postoperatively, the patient was having urinary incontinence requiring one pad per day. Cystoscopy and ureteral stent removal was performed in the office. Final pathology downgraded to Gleason 3 + 3 (pT2cN0M0) with negative surgical margins.

## Discussion

An ectopic ureter is defined as one that does not insert into the bladder trigone and an ureterocele is a cystic dilation of the distal ureter located within the bladder. The ectopic ureter in a duplex system is invariably the upper pole ureter, as it buds later from the mesonephric duct and is incorporated into the urogenital sinus at a later time. Males with ectopic ureters do not suffer incontinence as the point of insertion is above the external sphincter. Clinical presentation instead is associated with infection or pelvic pain. Ectopic ureters occur in about 1/1900 live births and present 2 to 12 times more often in females than in males.<sup>2</sup> As such, ectopic ureters



**Figure 2.** 6Fr multilength ureteral stent was deployed over a standard 0.038 guidewire without fluoro guidance.



**Figure 3.** Postoperative CT scan showing duplicated collecting system with ureteral stent coil in the upper pole moiety.

are very rarely found in asymptomatic, elderly men undergoing radical prostatectomy.

Due to the lack of staging CT scan prior to surgery for low to intermediate risk cancer, rare congenital ureteral anomalies are unforeseen at the time of surgery.<sup>3,4</sup> Serious surgical complications have been reported due to non-recognition of these entities.<sup>4</sup> The management of the ectopic ureter sometimes requires complex reconstructive surgery, especially if the point of insertion is below the bladder neck.<sup>2</sup> Even with timely intraoperative recognition, previous authors have needed to undock the robot to perform retrograde pyelography and ureteral stenting to confirm the diagnosis.<sup>3</sup> The challenge of the intraoperative management of the ectopic ureter during robotic prostatectomy is thus two-fold: recognition of the anatomic variant as well as reconstruction of the vesicourethral anastomosis without compromising the ectopic ureteral orifice. However, in select situations as illustrated by the current example, successful reconstruction without robotic undocking can be accomplished.

The current case scenario is also the first to our knowledge in which an ureterocele was encountered during RALP. These cystic structures can be picked up on TRUS images. If not recognized preoperatively, however, ureteroceles can easily be mistaken for the median lobe of the prostate. Intimate knowledge of the embryological principles governing ectopic ureters and familiarity with this anatomic variant are essential in its recognition and prevention of complications. In addition, our experience with ureteral stent placement without fluoroscopic guidance<sup>5</sup> enabled us to perform the procedure without undocking the robot.

The vesicourethral reconstruction needed to be modified according to the position of the ectopic ureter. If the ureter inserts below the level of the bladder neck or into the seminal vesicle, the ectopic ureter can be transected and reimplemented into the posterior bladder.<sup>2</sup> Ureteral stenting has been reported by all authors, but could potentially be omitted if the ureteral orifice is patulous and obstruction not suspected.

## Conclusion

Ectopic ureter and ureterocele are congenital anomalies rarely encountered during RALP. The surgeon needs to be familiar with these anatomic variations and be able to adapt the surgical

technique to complete the vesicourethral anastomosis without compromising the ectopic ureteral drainage.

### Consent

Informed consent for the publication of this case was obtained.

### Conflict of interest

No author has any declaration of conflict of interest.

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