Management of an enlarged median lobe with ureteral orifices at the margin of bladder neck during robotic-assisted laparoscopic prostatectomy

Jamil Rehman, MD,[1], Bilal Chughtai, MD,[2] Khurshid Guru, MD,[3]
Ridwan Shabsigh, MD,[4] David B. Samadi, MD[5]

[1]Department of Urology, SUNY-Stony Brook University Health Sciences Center, School of Medicine, Stony Brook, New York, USA

[2]Division of Urology, Albany Medical Center, New York, USA

[3]Department of Urologic Oncology, Roswell Park Cancer Institute, Buffalo, New York, USA

[4]Department of Urology, Columbia University/College of Physicians and Surgeons, Columbia Presbyterian Medical Center, New York, New York, USA

[5]Department of Urology, Mount Sinai School of Medicine and Medical Center, New York, New York, USA

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Objective: *To present our technique for the management of an enlarged median lobe when the ureteral orifices are close to the bladder neck during robotic-assisted radical prostatectomy.*

Materials and methods: *From January 2005 to January 2007, we performed over 600 robotic assisted radical prostatectomies. We had 63 patients (10%) with enlarged medium lobes. Of these patients, two (5.7%) had their ureteral orifices in close proximity to the bladder neck. An additional patient, without a median lobe, had his orifices very close to the bladder neck. To aid in the management of their median lobes, all three patients had bilateral placement of ureteral catheters manually by the daVinci robot. We present our technique of robotic-assisted catheter insertion during robotic prostatectomy to protect the ureteral orifice from damage, precluding the use of a cystoscope.*

Results: *All three patients, underwent successful robotic-assisted radical prostatectomy (RALP) aided by intraoperative placement of either a double J ureteral catheters or open ended ureteral catheters that were removed after completion of the anastamosis. All three had normal cystograms before Foley catheter removal. All three patients were continent with follow up PSAs < 0.1. The presence of a median lobe slightly increased the operative time required for bladder neck dissection or anastomosis (including reconstruction). There was no difference in complications such as urine leaks and bladder neck contractures. Continence after RALP was not significantly different in men with large median lobes.*

Conclusion: *Management of ureteral orifices that are too close to the bladder neck with or without large medium lobes can be successfully performed with the uses of ureteral catheters placed robotically with the da Vinci robot. The presence of a median lobe does not alter outcomes in patients who undergo robot-assisted laparoscopic prostatectomy.*

Key Words: prostate cancer, da Vinci robot, median lobe, robotic prostatectomy

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Address correspondence to Dr. Jamil Rehman, Stony Brook Health Sciences Center, Department of Urology, School of Medicine, SUNY-Stony Brook, HSC L-9, Room 040, Stony Brook, NY 11794-8093 USA

Introduction

In the United States, approximately 77000 radical prostatectomies are performed yearly for the treatment of prostate cancer. As prostate cancer is being diagnosed earlier and as life expectancy is on the rise,

there has been a greater role for radical prostatectomy as primary therapy for localized prostate cancer. To date, radical prostatectomy remains the gold standard for localized prostate cancer. However, radical surgery is invasive and its side effects profile makes it a less palatable option for the majority of patients and many seek alternative options. With more minimally invasive techniques, such as robotic-assisted radical prostatectomy (RARP), more patients are opting for prostatectomy. In 2006, 31500 cases were predicted to be performed with the robotic system, which would add up to about 35% of all radical prostatectomy procedures[1] and in 2008 more than 50% would be done robotically.

Robotic prostatectomy using the da Vinci surgical system (Intuitive Surgical, Sunnyvale, CA, USA) incorporates the benefits of minimally invasive surgery with three-dimensional magnified visualization and precise control of the operative field via instrumentation with seven degrees of freedom and two degrees of axial rotation. Robotic-assisted laparoscopic prostatectomy (RALP) provides a shorter hospital stay, less blood loss and less perioperative morbidity than traditional open radical prostatectomy (RP). Continence and potency rates far exceed those of traditional open RP, as it enhances dissection of the neurovascular bundles (NVB) and meticulous suturing of the urethrovesical anastamosis.[2,3]

As the number of robotic prostatectomies increases, so does the number of challenges that confront experienced robotic surgeons. These challenges include obesity, patients with narrow or deep pelvises, large prostates and large median lobes. Another anatomical variant that presents a challenge is ureteral orifices that are near or at the bladder neck.

A large median lobe in robotic-assisted radical prostatectomy presents the operative surgeon with several challenges. There is the potential for ureteral injury during the bladder neck resection and there is the risk of obstruction during urethrovesical anastomosis. In an attempt to remove the complete median lobe, a wide excision of the trigone results in a large bladder defect. This presents the surgeon with another challenge of leaving the ureteral orifices too close to the edge. This would need special precautions during the reconstruction, as the resulting bladder defect is larger, requiring more reconstruction, which further jeopardizes the orifices. Finally, having the orifices too close to the bladder neck can lead to local trauma during the resection, leading to postoperative edema, causing obstruction of the orifice. Surgeon's fear of the ureteral orifices may lead to an increase in positive margins at the base of the prostate and posteriorly.

In an attempt to avoid the challenge of the median lobe, extra care can be used to avoid the orifices during the anastomotic suturing, but this is not always enough to avoid injury. Many urologists will do either a preoperative ultrasound or cystoscopy and if a large median lobe is found, they will counsel patients against robotic surgery. Intraoperative administration of indigo carmine or methylene blue may also be useful in the identification of the orifices and avoidance injuring them.[4] The optics of the robotic camera can be affected by either of these dyes, impairing vision during the procedure. Other techniques used to aid in avoiding the orifices include; extra traction on the Foley balloon, use of the thirty degree lens and increasing the magnification.

Injury to a ureteral orifice can present in several ways; decreased urine output, increased urine through the drain, flank pain or an elevated serum creatinine, from urine absorbtion or partial outflow obstruction from transient edema at the bladder neck. If the creatinine remains elevated an ultrasound should be performed to rule out complete ureteral obstruction.

We report our experiences handling a large median lobe during RARP and the resulted ureteral orifices that are close to the anastomosis.

Methods

Patient selection

From January 2005 to January 2007, we performed over 600 robotic-assisted radical prostatectomies. Forty-two patients (10%) had large medium lobes that were first seen intraoperatively. Of these patients, two (5.7%) had ureteral orifices in close proximity to the bladder neck. An additional patient, had his ureteral orifices at close proximity to the bladder neck, but lacked a median lobe. We do not routinely cystoscope the patient before the robotic prostatectomy to look for the presence of a median lobe.

Surgical technique

All three patients underwent a robotic-assisted radical prostatectomy with the same technique using the 3-arm and later 4-arm daVinci robotic system (Intuitive Surgical, Sunnyvale, CA, USA). Once the prostate and bladder was defatted, the Foley catheter imprint was seen being deviated laterally by the presence of the large median lobe. The Foley catheter was slowly manipulated by the assistant to identify the bladder neck. The bladder neck was then incised with the monopolar hook. A 1 cm incision was made in the anterior bladder neck at 12 o'clock, and the catheter was exposed in the midline. After the anterior

bladder neck was incised and the detrusor divided, the assistant grasped the Foley catheter, giving it firm anterior traction. This exposed the posterior bladder neck. Once the bladder neck was entered and the median lobe identified, the trigone was inspected. The median lobe was held with the fourth arm of the robot or Figure of eight suture placed in the median lobe to retract median lobe upwards while dissecting from bladder neck. As the orifice were noted to be close to the bladder neck, extreme care was used to continue the posterior dissection toward Denonvillier's fascia and separate the fascia from the seminal vesicles, without damaging the bladder or orifices.

Ureteric catheter placement

Once the specimen had been dissected free and placed in an Endo Catch sac (US Surgical, Norwalk, CT, USA), we preceded to place bilateral ureteral catheters to help in the management of the urethrovesical anastomosis (note: we use the 0 degree scope through out the whole procedure). The assistant removed the Foley catheter and placed a 0.35-inch Bentson tip guide wire (Cook Urological, Spencer, IN, USA) through the meatus, into the urethra. Using robotic needle drivers, the surgeon grasped the wire, placed it into the ureteral orifice and gently pushed it up until resistance was met. One patient without a median lobe only needed temporary catheters to help in the anastomosis. In this case, a 5 French open ended catheter (Cook Urological, Spencer, IN, USA) was placed over the guide wire until resistance was felt from the kidney. Positive urine from the catheter suggested adequate placement. The catheter was left hanging out of the urethra. A second ureteral catheter was placed similarly in the contralateral orifice. The surgeon then proceeded with the anastomosis and removed the catheters from the penis before the final Foley was placed.

The remaining two patients had large median lobes and therefore required more permanent catheterization. After a guide wire was inserted through the urethra and inserted robotically into the orifice, a double J stent (Cook Urological, Spencer, IN, USA) was placed through the urethra, over the guide wire, gently without resistance. After each JJ stent was placed, the surgeon proceeded with the anastomosis.

In all three cases, the anastomosis was performed in our standard fashion using a double armed 3-0 monofilament, one dyed and one undyed. The anastomosis began at the three o'clock position, outside-in on the bladder, and inside-out on the urethra. The two sutures were tied at the three o'clock position. The remaining anterior defect was sutured with a 3-0 monofilament, running suture, until it was water tight and the final 20 French Foley was placed. Irrigation of the catheter demonstrated no appreciable leak at up to 60 cc of irrigation.

All patients had a KUB in the recovery room to assure correct placement of the catheters.

Follow up

Before the Foley catheters were removed, on postoperative day 7, a cystogram was performed. This was done with 300 cc of 30% contrast, under gravity drainage or until the patient needed to void. The Foley was gently pulled back into the urethra to look for extravasation. If there was none, the Foley was removed and the stents were taken out with a cystoscope and a grasping forceps making sure not to disrupt the anastomosis. If extravasation was seen the Foley and the stents remained in situ for 1 more week and the cystogram was repeated.

Continence status was assessed either via office follow ups or phone conversations as well as questionnaire. We collect and analyze the data using International Index of Erectile Function (IIEF), Sexual Health Inventory for Men (SHIM), Expanded Prostate Index Composite (EPIC) questionnaire at 0, 1, 3 ,6, 9, 12 months, and the Medical Outcomes Study 36-Item Short-Form General Health Survey (SF-36) questionnaire at 0, 1 ,3, 6, 9, 12 months. Patients were considered continent from the date at which no pads were necessary. Patients were excluded from continence analysis if they had had less than 3 months of follow up after surgery.

Results

The average ages of our patients were 67 years of age. All three patients had an average PSA of 5.9 and had localized prostate cancer with total Gleason grades ranging from 6-7. The average sizes of the two prostates with medium lobes were 77 grams and the third prostate was 42 grams (estimated on pathological specimen), Table 1.

The first patient did not have a median lobe, but his anatomy was such that the ureteral orifices were 1 mm from bladder neck. Open ended catheters were placed to protect the ureters during the urethravesical anastomosis. These were removed after completion of the suturing. The next two patients had large median lobes and the posterior dissection left the patients with a large bladder neck defect with the orifices too close to the bladder neck. Therefore we placed JJ stents. Stents were needed to help protect both the orifices and the ureters from the anastomotic sutures. A second indication for JJ stent was to protect the orifices from postoperative edema secondary to the

TABLE 1.

	Patient #1	**Patient #2**	**Patient #3**
Age	66	72	71
PSA pre-op	6.3	5.9	5.5
PSA f/u	< 0.1 one year	< 0.1 one year	< 0.1 one month
Median lobe	No	Yes	Yes
Prostate size	42	75	79
Gleason score	4 + 3	3 + 3	3 + 4
Catheters	Bilateral ureteral catheters (open ended)	Bilateral JJ stents	Bilateral JJ stents
Bladder neck reconstruction	None	Anterior (running)	Anterior (running)

posterior dissection. The presence of edema, risks postoperative obstruction that could be relieved by JJ stent placement.

All three patients had negative cystograms on postoperative day number 7 and had their Foleys removed. The two patients with large median lobes had the JJ stents removed at the same time of Foley catheter removal via a flexible cystoscope and grasping forceps. The patient also had CT urogram 6 weeks after the cystogram. This was performed gently with care not to disrupt the urethravesical anastomosis.

Biochemical recurrence

All three patients were alive with undetectable PSAs (defined as PSA ≤ 0.1) during an average follow up of 8 months (range 1–12 months).

Continence

Two patients, after 1 year of follow up, were continent, defined as not requiring pads. Each patient did however complain of mild stress incontinence. The third patient was only followed for 1 month and his continence could not be assessed.

Discussion

As both the advances in robotic surgery progress and the risk of cancer specific survival following radical prostatectomy continues to be lower than for conservative treatment or radiation therapy,[5] more patients will be electing robotic-assisted radical prostatectomy. With this increase in patient numbers, more and more challenging cases are being performed by the robotic surgeons. These include patients with obesity, median lobes, extensive prior pelvic surgery and large prostates. Indeed, El-Hakim et al published a series of 30 patients with prostates larger than 75 grams (average 116 grams) and found only a small increase in blood loss and OR time.[6]

One of the more common urological procedures is the perioperative placement of ureteral catheters. This can be done either cystoscopically to protect the ureter during pelvic surgery or transvesically to protect the ureteral orifices during open bladder surgery. With the recent advances in laparoscopy and robotics, reconstructive bladder surgery for diseases such as bladder diverticulum and localized invasive bladder cancer, can now be managed laparoscopically. Initial laparoscopic bladder surgery, as described by Mcdougall et al, required cystoscopic placement of bilateral double pigtail ureteral stents as the initial step in the planned laparoscopic procedure.[7] More recently, large laparoscopic diverticulectomies still have there catheters placed cystoscopically as the initial step.[8,9] Even though tactile sensation is lost in robotic surgery, the seven degrees of freedom provided by the daVinci robot, allows for safe and easy placement of ureteral catheters. As such, this is the first series on the management of an enlarged median lobe during a robotic-assisted radical prostatectomy[10,11] that obviates the need for cystoscopy. □

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