JOURNAL OF ENDOUROLOGY
Volume 23, Number 12, December 2009
© Mary Ann Liebert, Inc.
Pp. 1975–1977
DOI: 10.1089/end.2009.0133

Double-Pigtail Stenting of the Ureters: Technique for Securing the Ureteral Orifices During Robot-Assisted Radical Prostatectomy for Large Median Lobes

Youssef El Douaihy, M.D.,[1] Gerald Y. Tan, M.D.,[1,2] Philip J. Dorsey, M.D., M.P.H.,[1]
Jay K. Jhaveri, M.D.,[1] and Ashutosh K. Tewari, M.D., M.Ch.[1]

Abstract

Patients with large median prostate lobes undergoing robot-assisted radical prostatectomy are at potential risk of ureteric orifice injury, during posterior bladder neck transection and vesicourethral anastomosis reconstruction. We describe our technique of *in situ* robot-assisted ureteral stenting with double-pigtail stents for accurate observation and preservation of the ureteral orifices. We have performed this maneuver in over 30 patients in our cohort of over 1500 patients undergoing robot-assisted radical prostatectomy to date—none of these patients developed urinary leak or bladder neck contracture, and had uneventful cystoscopic removal of stents at 6 weeks after surgery.

Problem

Patients with large median prostate lobes undergoing robot-assisted radical prostatectomy present unique technical challenges to their surgeons.[1,2] Chief among these is the risk of ureteral orifice injury, which could occur during posterior bladder neck transection and vesicourethral anastomosis reconstruction because of extended trigonal excision for ensuring complete median lobe clearance. Failure to clearly identify and preserve the ureteral orifices intraoperatively may result in advertent injury, requiring tedious secondary procedures to redress the clinical sequelae of iatrogenic upper tract obstruction. Double-pigtail ureteral stent insertion during robot-assisted radical prostatectomy for accurate observation and preservation of the ureteral orifices has recently been described. Rehman and colleagues[3] reported their early multicenter experience with this operative strategy in three patients, citing the improved dexterity of surgical manipulation with robotic instruments to expedite safe and swift ureteral intubation. Katz et al[4] also described their experience with a similar technique in two patients, in which the 0.038″ floppy-tip Teflon guidewire was introduced through a 14-gauge angiocatheter passed through the abdominal wall via an incision over the pubic symphysis. We describe our approach of robot-assisted ureteral intubation in over 30 patients to date.

Technique

Anterior bladder neck dissection begins with accurate observation of the prostatovesical junction. We routinely employ both robotic forceps to gently press down on the anterolateral prostate surfaces, with caudal traction of the Foley catheter by the assistant to optimally highlight the contours of the prostatovesical junction.[5] After anterior bladder neck transection, the median lobe may obscure the ureteral orifices during posterior bladder neck dissection (Fig. 1). Anterior traction is applied to the median lobe using the robotic forceps. Occasionally, we employ an 0-Vicryl suture on a GS-21 needle placed through the median lobe for improving anterior traction by the assistant. Intravenous furosemide and indigo carmine are then administered for accurate identification of both ureteral orifices, and posterior bladder neck transection is completed under optical magnification, and radical prostatectomy proceeds in the standard fashion. Postprostatectomy, we reconstruct the bladder neck anteriorly and posteriorly.[6] After preserving maximal functional urethral stump length, we commence with reconstruction of the posterior Denonvilliers' musculofascial plate. To avoid distal ureteral injury, we perform *in situ* ureteral intubation with 6F double-pigtail ureteral stents (Sof-Flex® Stent; Cook Medical, Bloomington, IN) at this point before constructing the anastomosis with running sutures.

[1]LeFrak Institute of Robotic Surgery & Prostate Cancer Institute, James Buchanan Brady Foundation Department of Urology, Weill Medical College of Cornell University, New York Presbyterian Hospital, New York, New York.
[2]Department of Urology, Tan Tock Seng Hospital, Singapore.

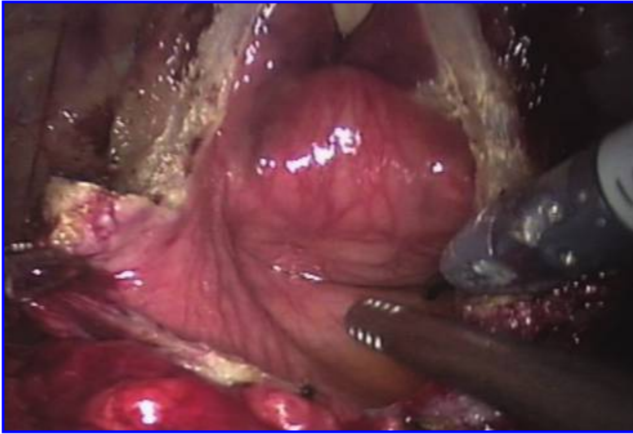

FIG. 1. Large median lobe observed after anterior bladder neck dissection.

The soft-tipped guidewire is introduced through the patent lumen of the suction trocar. The introducer tip is then grasped using both left and right robotic forceps and gently passed through the ureteral orifice along the axis of the distal ureter (Fig. 2A). Care is taken not to cause inadvertent ureteral perforation at this point by observing for signs of buckling of the guidewire. The radio-opaque 6F double-pigtail Sof-Flex Stent is then passed over the guidewire in a retrograde fashion using a modified Seldinger technique (Fig. 2B). The guidewire is then removed after correct positioning of the stent, and the procedure repeated on the contralateral side (Fig. 2C). We then complete the vesicourethral anastomosis with continuous running 2-0 Monocryl sutures (Fig. 2D). Postoperatively, upright abdominal roentograms are performed to confirm accurate stent position. We cystoscopically remove the stents 6 weeks after surgery to allow adequate time for resolution of edema and optimal healing at the anastomosis before instrumentation. While ureteral stent placement has been previously reported to cause irritative symptoms of dysuria, urgency, and frequency, none of the patients in our series have complained of this, and the stents could certainly be removed anytime earlier after catheter removal if such complaints occurred. Also, we have not found ureteral stent placement to be a contraindication for urinary diversion either via a conventional Foley urethral catheter, or via our suprapubic drainage device.[7] In our opinion, cystoscopic placement of the ureteral stents before commencement of robotic surgery, while technically possible, may be difficult owing to significant intravesical median lobe protrusion obscuring observation of the ureteral orifices.

Conclusion

In patients with large median lobes undergoing robot-assisted radical prostatectomy, the proximity of the ureteral orifices to the remnant bladder neck endangers these structures during anastomosis construction, especially if they are poorly observed. In our experience of 1600 robot-assisted radical prostatectomies, we have employed this simple technique in over 30 cases, representing the largest series with this approach to date. No patient developed signs of upper tract obstruction, bladder neck contracture, or anastomotic leak mandating further clinical work-up, and all had their stents

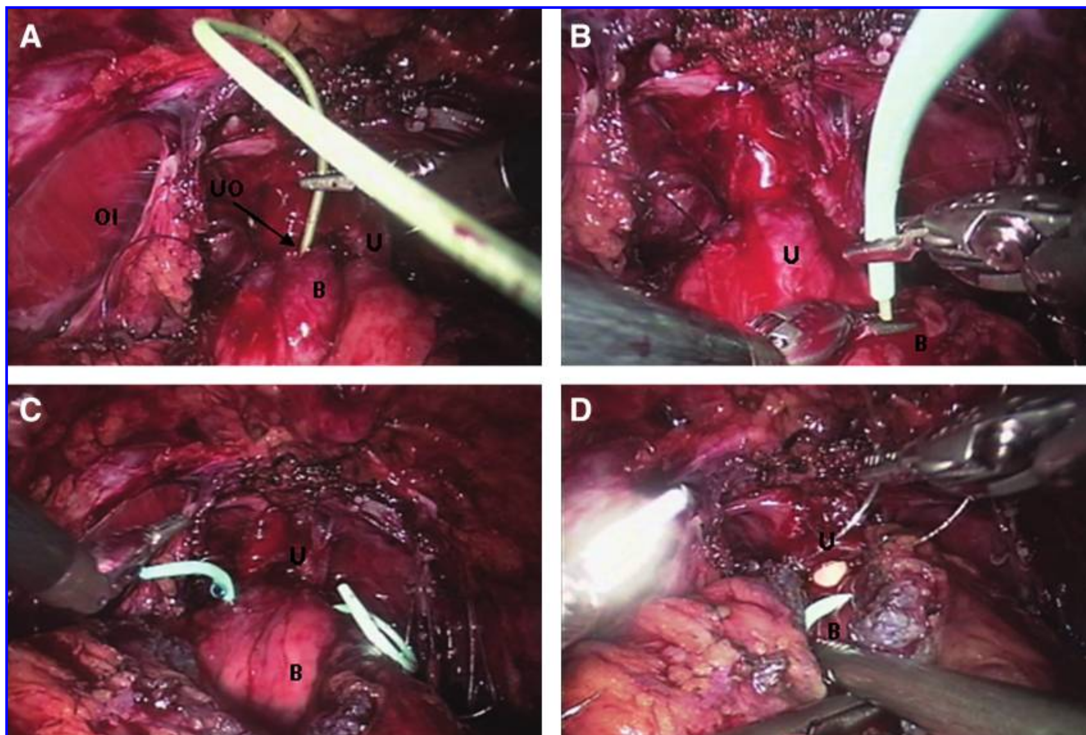

FIG. 2. (**A**) Robotic manipulation of soft-tipped guidewire into ureteral orifice. (**B**) Radio-opaque 6F double-pigtail stent railroaded over the introducer. (**C**) Bilateral Double-J stents in place just before the beginning of the anastomosis. (**D**) Construction of vesicourethral anastomosis with running continuous suture—the stents serve as visible landmarks for avoiding iatrogenic ureteral orifice injury. OI = obturator internus; U = urethra; B = bladder; UO = urethral orifice.

removed uneventfully at 6 weeks after surgery. The added steps of *in situ* robot-assisted bilateral ureteral stenting take less than 10 minutes to perform and serve as valuable landmarks during anastomosis construction. We hope that other robotic surgeons will also find this simple technique a useful addition to their surgical repertoire for dealing with patients with large median lobes.

Disclosure Statement

Dr. Gerald Tan receives financial support from the Ferdinand C. Valentine Fellowship in Urologic Research, New York Academy of Medicine; the John Steyn Traveling Fellowship in Urology from the Royal College of Surgeons of Edinburgh; and the Medical Research Fellowship, National Medical Research Council (Singapore).

Dr. Ashutosh Tewari is the principal investigator on research grants from Intuitive Surgical, Inc. (Sunnyvale, CA), the Prostate Cancer Foundation and the National Institute of Bioimaging and Bioengineering (R01 EB009388-01); he is also the endowed Ronald P. Lynch Professor of Urologic Oncology and Director of the LeFrak Institute of Robotic Surgery, Weill Cornell Medical College, New York, NY.

References

1. Sarle R, Tewari A, Hemal AK, Menon M. Robotic-assisted anatomic radical prostatectomy: Technical difficulties due to a large median lobe. Urol Int 2005;74:92–94.
2. Meeks JJ, Zhao L, Greco KA, Macejko A, Nadler RB. Impact of prostate median lobe anatomy on robotic-assisted laparoscopic prostatectomy. Urology 2009;73:323–327.
3. Rehman J, Chughtai B, Guru K, Shabsigh R, Samadi DB. Management of an enlarged median lobe with ureteral orifices at the margin of bladder neck during robotic-assisted laparoscopic prostatectomy. Can J Urol 2009;16:4490–4494.
4. Katz MH, Eng MK, Deklaj T, Zorn KC. Technique for ureteral stent placement during robot-assisted radical prostatectomy: Safety measure during vesicourethral anastomosis when ureteral orifices are too close for comfort. J Endourol 2009;23:827–829.
5. Tewari AK, Rao SR. Anatomical foundations and surgical maneuvers for precise identification of the prostatovesical junction during robotic radical prostatectomy. BJU Int 2006;98:833–837.
6. Tewari A, Jhaveri J, Rao S, et al. Total reconstruction of the vesico-urethral junction. BJU Int 2008;101:871–877.
7. Tewari A, Rao S, Mandhani A. Catheter-less robotic radical prostatectomy using a custom-made synchronous anastomotic splint and vesical urinary diversion device: report of the initial series and perioperative outcomes. BJU Int 2008; 102:1000–1004.

Address correspondence to:
Ashutosh K. Tewari, M.D., M.Ch.
James Buchanan Brady Foundation Department of Urology
Weill Medical College, Cornell University
525 East 68th Street, Starr 900
New York, NY 10065

E-mail: ashtewarimd@gmail.com