Case Report

Cystolithotomy during robotic radical prostatectomy: Single-stage procedure for concomitant bladder stones

Gerald Y. Tan, Prasanna Sooriakumaran, David L. Peters, Abhishek Srivastava, Ashutosh Tewari

Department of Urology, Weill Cornell Medical College, York Avenue, New York, USA

ABSTRACT

Asymptomatic concomitant vesical calculi are an occasional finding on routine radiologic staging and evaluation of patients with early prostate cancer. We report the first case of single-stage robotic cystolithotomy for multiple bladder stones in a 64-year-old man undergoing robotic-assisted radical prostatectomy, and discuss the approaches available for ensuring complete stone clearance in this unique setting. We show that concomitant bladder stone extraction during robotic-assisted radical prostatectomy is feasible and does not add significantly to operative time. This technique avoids the need to undergo additional general anesthetic procedures with potential complications such as bleeding, urethral stricture formation, and bladder perforation, prior to the prostatectomy.

Key words: Cystolithotomy, radical prostatectomy, robotic

INTRODUCTION

Bladder calculi in older men are commonly associated with prostatomegaly causing chronic bladder outlet obstruction. In most cases, these stones are removed endoscopically with transurethral disintegration employing mechanical, ultrasonic, or electrohydraulic lithotripsy, Swiss Lithoclast, and holmium: YAG laser.[1] For patients with multiple or large stones, open cystolithotomy is the preferred approach. Alternative approaches including combination percutaneous and transurethral cystolithotripsy, and percutaneous cystolithotomy have also recently been reported.[2] These procedures invariably require anesthesia and hospitalization, and occasionally result in bladder perforation or postoperative urethral strictures.

For correspondence: Dr. Ashutosh Tewari, Department of Urology, Prostate Cancer Institute, James Buchanan Brady Foundation, 525 East 68th Street, Starr 900, New York 100 65, USA.
E-mail: ashtewarimd@gmail.com

Access this article online	
Quick Response Code:	Website: www.indianjurol.com
	DOI: 10.4103/0970-1591.94968

Robotic-assisted radical prostatectomy (RARP) using the da Vinci® System (Intuitive Surgical, Inc, Sunnyvale, CA) has become increasingly popular as primary therapy for early prostate cancer, accounting for over 70% of all radical prostatectomies performed in the United States in 2008.[3] In these patients, concomitant vesical stones are not uncommon. Single-stage retrieval of vesical calculi may be easily performed robotically upon opening the bladder neck. With seven degrees of freedom afforded by the patented Endowrist® robotic instruments, stone manipulation and handling is greatly facilitated with minimal trauma to the bladder mucosa, minimizing the risk of postoperative hematuria and clot retention that is associated with prolonged cystolithotripsy or cystolitholapaxy in the setting of large or multiple stones. We describe here our experience of single-stage cystolithotomy during RARP.

CASE REPORT

We present a case of a 64-year-old male with Gleason 3+4 prostate cancer with concomitant multiple asymptomatic bladder stones diagnosed on preoperative endorectal magnetic resonance imaging of the prostate, the largest measuring 16 mm. Our technique of athermal nerve-sparing robotic prostatectomy with anatomic restoration of the vesicourethral junction has been previously described. We employ a six-port transabdominal approach using the da Vinci® Surgical System (Intuitive Surgical Inc, Sunnyvale, CA). After the bladder was dissected off the pelvis, the contours of the vesicoprostatic junction were

visualized and bladder neck transection was commenced anteriorly. Given the prominent median lobe of the prostate encountered [Figure 1a], posterior bladder neck transection was completed after visual identification of both ureteral orifices with the aid of intravenous indigo carmine. The vasa deferentia were ligated and divided between clips, and both seminal vesicles dissected from their pedicles.

The right-sided Endowrist Hot shear™ scissors on the right robotic arm was then exchanged for a robotic ProGrasp™ forceps. Holding open the bladder neck with the left-sided Maryland forceps, the ProGrasp™ forceps were used to manually retrieve the bladder stones one at a time [Figure 1b]. Each stone was deposited into an EndoCatch™ Gold laparoscopic entrapment sac (Covidien Inc., Mansfield, MA) introduced through the right-sided assistant port. Sixteen stones were retrieved in total [Figure 1c]. The bladder was then inspected for residual stones using both graspers to manipulate the transected bladder neck, and bladder irrigation with normal saline performed repeatedly to ensure complete stone clearance [Figure 1d]. Total console time for complete stone clearance was 6 minutes. Thereafter, robotic prostatectomy and vesicourethral anastomosis was completed in our usual fashion,[4] and the specimen with bilateral lymph nodes removed with the entrapped stones in the same Endocatch™ Gold sac. Final pathologic assessment confirmed Gleason 3+4 adenocarcinoma of the prostate, weighing 61g.

The patient was discharged home on the first postoperative day, and his Foley urethral catheter removed on the seventh postoperative day. The patient reported passage of two tiny stone fragments after catheter removal, with significantly improved urinary stream. Flexible cystoscopy at 6 weeks follow-up showed no evidence of residual stones in the bladder, with the patient using one pad a day for continence.

DISCUSSION

Vesical calculi are seen in 25–30% of patients with bladder outlet obstruction, and in the setting of retained or infected urine arises from supernaturation and nucleation around a nidus.[1] Bladder stone composition varies geographically, being predominantly of calcium oxalate origin in the United States, while uric acid or urate stones predominate in Europe.[2] In patients with large, hard, or multiple stones with prostatic hyperplasia, single-setting transurethral cystolithotripsy or cystolitholapaxy with resection of prostate, albeit desirable, has been reported to be technically challenging and associated with morbidities that included significant hematuria, urethral stone impaction, sepsis, and incomplete stone clearance with need for repeated or staged procedures.[5] For these patients, open cystolithotomy remains the most expeditious approach for swift and complete stone eradication.

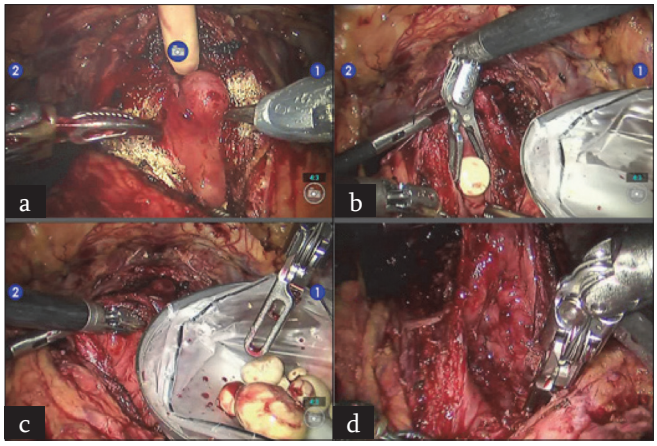

Figure 1: (a) Prominent median lobe of prostate noted on bladder neck transection during robotic-assisted radical prostatectomy. (b) Bladder stone retrieval using Endowrist ProGrasp™ forceps while bladder neck held open with Endowrist Maryland forceps. (c) Multiple stones retrieved and placed in EndoCatch™ Gold entrapment sac. (d) The bladder inspected for residual calculi – the mucosa appears trabeculated and inflamed from chronic outlet obstruction

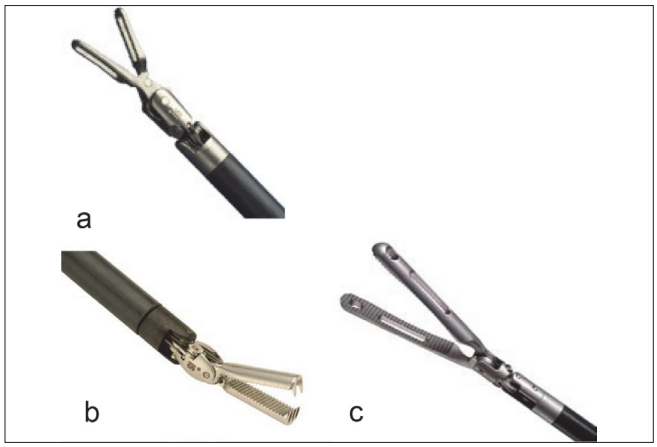

Figure 2: Different types of Endowrist™ grasping forceps available from Intuitive Surgical, Inc., for use during robotic cystolithotomy. (a) ProGrasp™ forceps. (b) Cobra forceps with serrated inner jaws. (c) Extended length Graptor™ (grasping retractor) forceps. (Courtesy of Intuitive Surgical Inc., Sunnyvale, CA.)

We were able to achieve complete stone clearance using the ProGrasp™ forceps [Figure 2a], which are best suited for smooth flat or rounded stones, while smaller stones with jagged and irregular surfaces may be handled using the serrated inner jaws of the Endowrist Cobra forceps (Intuitive Surgical Inc., Sunnyvale, CA) [Figure 2b]. For larger stones, the Graptor™ forceps afforded extended length for securing the stone between its jaws [Figure 2c]. Although not required in our case, bladder neck incision may be easily extended to facilitate retrieval of very large bladder stones, followed by racquet handle closure prior to vesicourethral anastomosis construction. A separate laparoscopic entrapment sac may be required for these sizable stones. In patients with stones in bladder diverticuli, concomitant robotic diverticulectomy should be performed to ameliorate the possibility of recurrent stone formation due to urinary stasis.

Ensuring complete stone clearance may be difficult in a capacious chronically distended bladder. We employed direct vision of the bladder interior while holding the neck wide open with both forceps, followed by saline irrigation until bladder distension. This can indeed be challenging especially with the patient in the Trendelenburg position where the stones will tend to gravitate toward the bladder dome; however, dissection of vasa deferentia and seminal vesicles permits the bladder neck to be manipulated in various directions, making it easier to access the bladder dome and other hidden regions for subsequent stone retrieval and laparoscopic inspection. On-table passage of a flexible cystoscope under robotic guidance into the bladder followed by saline distension or passage of a basket/grasper for direct stone removal was an alternative approach we had considered for ensuring stone clearance, but is ergonomically challenging given the sizable footprint of the robotic platform and arms.

CONCLUSION

In summary, single-stage cystolithotomy during robotic radical prostatectomy is easy to perform given the augmented dexterity and repertoire of the available robotic grasping instruments, causes minimal morbidity, and obviates the need for prior transurethral cystolithotripsy or cystolitholapaxy that could potentially result in urethral stricture formation and compromise of continence return.

REFERENCES

1. Papatsoris AG, Varkarakis I, Dellis A, Deliveliotis C. Bladder lithiasis: from open surgery to lithotripsy. Urol Res 2006;34:163-7.
2. Lam PO, Te CC, Wong C, Kropp BP. Percutaneous cystolithotomy of large urinary diversion calculi using a combination of laparoscopic and endourologic techniques. J Endourol 2007;21:155-7.
3. Su L. Role of robotics in modern urologic practice. Curr Opin Urol 2009;19:63-4.
4. Tewari A, Jhaveri J, Rao S, Yadav R, Bartsch G, Te A, *et al*. Total reconstruction of the vesicourethral junction. BJU Int 2008;101:871-7.
5. Richter S, Ringel A, Sluzker D. Combined cystolithotomy and transurethral resection of prostate: best management of infravesical obstruction and massive or multiple bladder stones. Urology 2002;59:688-91.

How to cite this article: Tan GY, Sooriakumaran P, Peters DL, Srivastava A, Tewari A. Cystolithotomy during robotic radical prostatectomy: Single-stage procedure for concomitant bladder stones. Indian J Urol 2012;28:99-101.

Source of Support: Nil, **Conflict of Interest:** None declared.