Multiple bladder diverticula treated with robotic approach-assisted with cystoscopy

Diego Antonio Preciado-Estrella, Pascual Cortés-Raygoza, Jorge Gustavo Morales-Montor, Carlos Pacheco-Gahbler

Department of Urology, General Hospital Dr. Manuel Gea Gonzalez, Mexico City, Mexico

INTRODUCTION

Bladder diverticula, unique or multiple, is a relatively frequent condition associated with several complications ranging from urinary tract infections to urinary retention with detriment of the lower urinary tract. Genetic disorders such as Ehlers Danlos or Williams Beuren syndrome have been associated with BD. When there are multiple or very large bladder diverticula they affect normal storage and emptying of the bladder, significantly deteriorating the quality of life because of recurrent urinary tract infections or voiding dysfunction. 90% of BD occur in adults with a male to female ratio of 9:1. Acquired BD, also known as secondary, are most commonly diagnosed in the setting of neurogenic vesicourethral dysfunction or bladder outlet obstruction. Acquired BD use to be multiple, associated with trabeculated bladder and prostatic enlargement in more than 70% of all cases.

We present the case of a 56-year-old male with low urinary tract symptoms that are complicated by urinary retention. During the diagnostic protocol, multiple bladder diverticula are documented and surgical treatment is proposed through robot assisted laparoscopic diverticulectomy and cystoscopy. This approach let us resolve completely all of the diverticula with excellent postoperative results.

CASE REPORT

A previously healthy 56-year-old male patient with no

Access this article online

Website: www.urologyannals.com
DOI: 10.4103/UA.UA_108_17

How to cite this article: Preciado-Estrella DA, Cortés-Raygoza P, Morales-Montor JG, Pacheco-Gahbler C. Multiple bladder diverticula treated with robotic approach-assisted with cystoscopy. Urol Ann 2018;10:114-7.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com
history of chronic diseases presented with acute urinary retention. He was treated with transurethral catheter with a nonsuccessful attempt of catheter retirement. He was initially studied with bladder and prostate ultrasound showing bladder diverticula; forward we obtained a contrasted tomography evidencing 4 big diverticula in posterolateral walls [Figure 1], which are better appreciated in 3D reconstruction [Figure 2]. With this evidence, we decided to treat them surgically.

About surgical preparation, prophylactic parenteral third-generation cephalosporin antibiotics, and compression stockings were installed before the procedure. After general endotracheal anesthesia induction, the patient is positioned in the supine/lithotomy position and padded at all pressure points, with arms placed at patient’s sides and legs separated in semi-flexion (conventional lithotomy position). The operating table was maintained in a significant Trendelenburg position for the duration of the procedure.

During initial cystoscopy 4 retrotrigonal diverticula were identified, registering, position into the bladder, neck size, and relation with urethral meatus, which were identified and left side cannulated with urethral stent due to nearness with one of the diverticula [Figure 3].

Pneumoperitoneum was archived with veress needle inserted at the conventional periumbilical position, and then replaced by a 12 mm lap-port introducing the scope for abdominal inspection. Four additional trocars were placed under direct vision: three 8 mm da Vinci© (Intuitive Surgical System) ports and an extra 12 mm regular port assistant. Pneumoperitoneum was established to 12–15 mmHg.

Using a 0° scope, the abdominal cavity is inspected with no evidence of adhesions. After docking the robot, extraperitoneal space is created in the parietal peritoneum. After entering Retzius space, BD are identified with cystoscopy assistance, dissecting their borders with arms 1 and 2, whereas the 3rd arm retracts bladder dome. Synchronic cystoscopy is performed in real time until both lenses meet [Figure 4].

Three bladder diverticula are obtained largest of them with 3.5 cm diameter, and the other two with 1.5 and 1 cm each [Figure 5]. The remaining one was enough small to be closed with a simple suture point.

Hydrodistention bladder test is performed with a transurethral catheter with no evidence of a fluid leak. Robotic arms are undocked with laparoscopic trocars retired closing the ports.

The patient is discharged 2 days after surgery, and the catheter is removed 4 weeks later performing a previous cystography without evidence of new diverticula. Three
months after surgery, his micturition is normal without new urinary tract infection (UTI) [Figure 6].

**DISCUSSION**

Bladder diverticula are important causes of lower urinary tract symptoms including bleeding, irritative voiding symptoms, and persistent or recurrent UTI. They usually occur in the context of some type of bladder outlet obstruction. When diverticulum is found superolateral to the ureteral meatus outside the trigone is known as “Hutch” diverticulum, which was first described in paraplegic patients thus is associated with bladder neurological diseases.

Celebi et al.\(^5\) evaluated the effect of BD on bladder function using an animal model with rabbits testing the urodynamic profile and functional results of animals that
Preciado-Estrella, et al.: Preciado-Estrella, Multiple bladder diverticula

were inducted with BD. They found that BD effectively causes dysfunctional micturition with involuntary contractions, decreased storage capacity, and affects bladder compliance.

Surgical treatment is indicated in cases where urinary retention is as important that leads to absolute retention and severe symptoms as well as those diverticula susceptible to stone or tumor formation and perforation.

Surgical repair has been described with multiple techniques including open, endoscopic, or laparoscopic repairs. Orandi[6] described in 1977 the endoscopic technique in which the neck and the mucosa of the diverticulum are flashing which causes their subsequent involution. This technique has been used successfully in small to moderate-sized diverticula but carries the risk of potential perforation.

The open and laparoscopic approach conventionally implies a great surgical challenge due to the technical difficulties caused by the anatomy of the pelvis. Previously, Sivarajan et al.[7] used transabdominal robotic approaches to treat urethral diverticula which, as in our case, involve anatomical difficulties, highlighting the use of the robot, providing better exposure, facilitating dissection, and making it more precise while favoring the surgeon’s vision and comfort with all the advantages of minimal invasion.

CONCLUSION AND LEARNING POINTS

The repair of BD by robot-assisted techniques is feasible, reproducible and with good results.

The use of the robotic technology is preferred in cases where the size or position of the BD involves an important technical difficulty with all the advantages of minimal invasive surgery.

Simultaneous cystoscopy provides technical safety, especially when the lesions are located near the ureteral meatus or the bladder anatomy is distorted.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Wein AJ, Kavoussi LR, Partin AW, Peters CA, Novick AC, Abouassaly R. Campbell-Walsh, Urology. 11th ed. Philadelphia, PA: Elsevier; 2015. p. 2140-51.
2. Idrees MT, Alexander RE, Kum JB, Cheng L. The spectrum of histopathologic findings in vesical diverticulum: Implications for pathogenesis and staging. Hum Pathol 2013;44:1223-32.
3. Blacklock AR, Geddes JR, Shaw RE. The treatment of large bladder diverticula. Br J Urol 1983;55:17-20.
4. Wesselhoeft CW, Perlmutter AD, Berg S, Unger I, Gherardi GJ, Harrison JH, et al. Pathogenesis and surgical treatment of diverticulum of the urinary bladder. Surg Gynecol Obstet 1963;116:719-25.
5. Celebi S, Kuzdan Ö, Özaydın S, Başdaş C, Özaydın İ, Yazıcı M, et al. The effect of bladder diverticula on bladder function: An experimental study in rabbits. J Pediatr Surg 2016;51:1538-42.
6. Orandi A. Transurethral fulguration of bladder diverticulum: New procedure. Urology 1977;10:30-2.
7. Sivarajan G, Glickman I, Faber K, Kim M, Fromer D, Munver R. Transabdominal Robot-assisted laparoscopic urethral diverticulectomy of a complex anterior horseshoe diverticulum of the proximal urethra. J Endourol Case Rep 2015;11:33-5.