Laparoscopic resection of symptomatic bladder diverticulum

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ABSTRACT

Bladder diverticula are herniations of the mucosa through the muscular bladder wall. Traditionally, symptomatic bladder diverticula are resected by means of conventional open surgery. However, the development of minimally invasive surgical techniques has made this operation possible using endourologic, laparoscopic or robotic procedures.

The case of a 28-year-old female patient diagnosed with left perimeatal bladder diverticulum and managed with laparoscopic diverticulectomy with excellent functional as well as cosmetic results is presented.

To the best of the authors’ knowledge this is the first case of laparoscopic diverticulectomy reported in Mexico.

Key words: bladder diverticulum, laparoscopic diverticulectomy, Mexico.

RESUMEN

Los divertículos vesicales son herniaciones de la mucosa a través de la pared muscular de la vejiga. De manera tradicional, los divertículos vesicales sintomáticos se resecan con procedimientos quirúrgicos convencionales a cielo abierto. Sin embargo, el desarrollo de las técnicas quirúrgicas de mínima invasión posibilita la práctica de esta operación mediante procedimientos endourologicos, laparoscópicos o robóticos.

Se presenta el caso de una paciente femenina de 28 años de edad con diagnóstico de divertículo vesical perimeatal izquierdo, sometida a diverticulectomía mediante laparoscopia con excelentes resultados, funcionales y cosméticos.

Hasta donde tienen noticia los autores, éste es el primer caso de diverticulectomía laparoscópica informado en México.

Palabras clave: divertículo vesical, diverticulectomía laparoscópica, México.
INTRODUCTION

Bladder diverticula are herniations of the mucosa through the muscular wall of the urinary bladder. Depending on their size and location, they can cause ureteral obstruction, urinary flow obstruction (incomplete bladder voiding), recurrent infection or vesicoureteral reflux. Bladder diverticula are usually found lateral or superior to the ureteral openings since they are the weakest tissular areas of the bladder wall.1

Traditionally, symptomatic bladder diverticula have been resected by means of conventional open surgery. However, the development of laparoscopic, endourologic and robotic techniques has brought about their use in treating different pathologies, including bladder diverticula. Laparoscopic diverticulectomy can be performed trans- or extraperitoneally.2-4 The authors describe their initial experience in performing laparoscopic transperitoneal diverticulectomy. This is the first such report in Mexico.

CLINICAL CASE

The patient is a 28-year-old woman with a history of dysuria, urinary frequency and straining of long progression, recurrent urinary tract infection and 2 episodes of acute (left) pyelonephritis meriting hospitalization. Urinalysis showed leukocyturia and urine cultures were positive for different gram-negative bacteria over a period of several years.

Patient had undergone previous studies including cystography that had diagnosed bladder diverticulum but stated that those studies had been lost. Urethrocystoscopy was then ordered which revealed a left-side bladder diverticulum where the ureteral meatus and intramural portion of the left ureter formed part of the inner surface of the diverticulum. This was filled with pus and sediment. There were no apparent calculi or other lesions within the diverticulum. Double-J catheter was put in place resulting in exit of cloudy urine from the left kidney (Image 1).

After a 4-week wait for antibiotic treatment to be fully effective, laparoscopic diverticulectomy was performed. The patient was placed in the modified lithotomy position and given balanced general anesthesia. Laparoscopic approach consisted of four 5 mm ports at the umbilical location, the suprapubic midline, the right iliac fossa and the left iliac fossa. Simultaneous flexible cystoscopy was done, visualizing the diverticulum through bladder transillumination with the flexible cystoscope placed in the bladder interior. Diverticulum was exposed with a peritoneal incision. After circumferential dissection of the diverticular neck was carried out, diverticulectomy was completed by sectioning the neck around the flexible cystoscope (Image 2). Bladder opening was sutured at two planes with 3-0 vicryl. Antireflux mechanism was created by tunneling the terminal portion of the ureter. Hermetic bladder closure was verified by hydro pneumatic test, placing drain under direct vision. Resected diverticulum was removed and sent to the laboratory for anatomopathological study. The surgical area was checked by cystoscope after the procedure (Image 3) and 18 F Foley catheter was put in place, completing the operation. Total time in surgery was 145 minutes, with no incidents or accidents and a minimum of bleeding (<100 ml). Patient was released 48 hours later, after prior drain removal. Foley catheter was removed 7 days later. Control urethrocystoscopy and double-J catheter removal were carried out at 9 weeks, corroborating cicatrization zone. Cosmetic results were excellent. Follow-up care was carried out during
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Image 2. Flexible cystoscope can be seen entering the abdominal cavity from the bladder once the diverticulum was resected. Diverticular neck resection.

4 months with persistently negative urine cultures and complete post-urinary voiding demonstrated through ultrasonography.

**DISCUSSION**

Clinically significant bladder diverticulum is rare. The majority of diverticula are secondary to urinary flow obstruction. Medical treatment criteria are not well-defined. Surgical treatment is clearly indicated in patients that present with persistent urinary symptomatology, recurrent infection, bladder calculi, urethral obstruction or malignancy within the diverticulum.⁵

Current surgical techniques include conventional open surgery (intravesical, extravesical and combined), endoscopic surgery (fulguration or resection of the diverticular neck), laparoscopic surgery that can be transperitoneal⁸ or extraperitoneal³ and, more recently, robot-assisted laparoscopy that adds 3-dimensional visualization and articulated tweezers enabling movement at all angles.⁹

The most frequent diverticular site is the area anterolateral to the ureteral opening and the proximity to this opening often makes reimplantation necessary.⁹ In 1992 Parra et al were the first to report laparoscopic transperitoneal bladder diverticulectomy but they stated that the proximity of the diverticulum to the ureter was a contraindication for the laparoscopic approach.⁸ However, as minimally invasive surgical techniques have progressed, this consideration is no longer an impediment to safely carrying out laparoscopic ureteral reimplant.⁸,⁹

In the present case, the variables of time in surgery, amount of bleeding and postoperative recuperation time were all within the parameters cited in the literature reviewed and functional and cosmetic results were also good.

Traditional open surgery is safe and provides good results, but the laparoscopic approach in selected patients presenting with the same pathology can provide even better cosmetic results and a quicker return to normal activities for the patient. However, its higher cost and greater necessity of technological and human resources make the laparoscopic approach to bladder diverticulum treatment an indication in only very select cases.

It can be concluded that the laparoscopic approach to bladder diverticulum treatment is feasible and safe providing results comparable to those of conventional surgery. However, this approach demands adequate technological equipment and a well-trained surgical team with the laparoscopic skills necessary to achieve access, dissection and suturing. There are published prospective studies on a reduced number of patients that evaluate the actual benefits of this technique.¹⁰

Image 3. Cystoscopic revision after completion of laparoscopic diverticulectomy.
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BIBLIOGRAPHY