


Intravesical mini-laparoscopic repair of vesicovaginal fistulas

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Abstract Vesicovaginal fistulas (VVF) constitute the most common type of genitourinary fistulas. In developed countries, VVF are almost always iatrogenic and frequently a secondary result of gynecological surgery. Some minimally invasive techniques have been introduced to decrease the morbidity related to standard open procedures for the treatment of VVF. One such procedure is the intravesical mini-laparoscopic approach. The aim of this study was to present our initial clinical experience using this technique for transvesical VVF repair. In 2013 and 2014, we carried out mini-laparoscopic repair of VVF in two women who did not respond to conservative treatment with a Foley catheter. The procedure was performed transvesically with a 3-mm instrument and a 5-mm, 30° scope. The fistulous tract was dissected and partially excised. The bladder and vaginal wall defects were closed in two layers with two separated continuous barbed, resorbable 3-0 sutures (V-Loc 90 Absorbable Wound Closure Device; Covidien, Norwalk, CT, USA). The median operative time for the two patients was approximately 100 min, and the blood loss was not clinically significant. The patients were released from the hospital 24 h after surgery. A Foley catheter was left in place for 14 days. Imaging examinations performed 6 weeks postoperatively revealed no VVF. In patients with simple fistulas, this technique provides a min-

imally invasive, easily reproducible approach with few associated complications. Nevertheless, further experience and observations are necessary.

Keywords Vesicovaginal fistula · Minimally invasive surgery · Mini-laparoscopy

Introduction

Vesicovaginal fistulas (VVF) constitute the most common type of genitourinary fistulas. In developed countries, VVF are almost always iatrogenic and frequently a secondary result of gynecological surgery. In underdeveloped countries, obstetric treatment is the primary cause of VVF [1]. The incidence of VVF in developed countries such as Great Britain is 1 in 788 hysterectomies [2].

Laparoscopic surgery has undergone exponential development during the last 2 decades because of its intraoperative and postoperative advantages over conventional surgery. It is now applied in many surgical procedures. One of the described applications of laparoscopic surgery in recent years is the treatment of VVF by means of minimally invasive surgery [3, 4].

Fistulas can be treated by a vaginal or abdominal approach depending on their location. For supratrigonal fistulas in a posterior position with difficult vaginal approach, one of the most used techniques is that described by O'Connor [5], in which the fistula is addressed transvesically, carrying out anterior cystotomy to reach the posterior aspect for complete resection. The purpose of this study was to describe our initial experience with VVF repair by means of an intravesical mini-laparoscopic approach in two patients.

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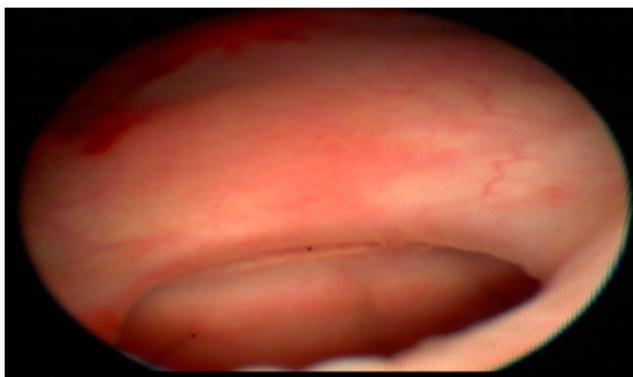


Fig. 1 Supratrigonal fistula on the dorsal vesical side

Clinical cases

A 45-year-old woman presented to our center in March 2013 for evaluation of urine leakage. She had undergone a laparoscopic hysterectomy for treatment of a uterine myoma in January 2013. Preliminary tests showed vaginal discharge of urine, and subsequent explorations showed a 3-cm supratrigonal fistula on the dorsal vesical side (Fig. 1).

Another woman, aged 72 years, presented to our center in January 2014 for evaluation of continual involuntary leaking of vaginal urine. The patient had undergone an abdominal laparotomic hysterectomy in October 2013 for treatment of pelvic endometriosis. Examination revealed a supratrigonal fistula. As the first therapeutic measure, permanent bladder catheterization was performed in both patients. Surgical treatment was performed after persistent demonstration of the VVF for 4 weeks. Informed consent was obtained from both patients before surgery.

Laparoscopic treatment was initially considered in both cases because of the location of the VVF. The same surgical technique was carried out for both patients. The patients were

placed in the lithotomy position, and ureteral catheterization was performed. By means of cystoscopic visualization, two silk 0 sutures were introduced with a straight needle through the abdominal wall and into the interior of the bladder (Fig. 2). The needle was then extracted to the exterior through the urethra. The sutures were cut and tied together and then immediately reintroduced into the interior of the bladder.

Upon exerting exterior pressure on both sutures at the suprapubic level, the bladder remained immobile and fixed to the abdominal wall. After this procedure had been carried out, we introduced one 5-mm trocar for viewing and three 3-mm trocars for mini-laparoscopy (Karl Storz, Tuttlingen, Germany). A rigid 30° scope (Karl Storz) was introduced for an intravesical view. All instruments that were introduced through the trocars were 3 mm in diameter (scissors, clamps, needle holders, and bipolar coagulation forceps) (Karl Storz).

The mini-laparoscopic intravesical view was sufficient for recognition of the fistulous orifices and identification of the anatomical structures. The vesical mucosa was separated from the vaginal mucosa by means of dissection with scissors through the fistulous orifice (Fig. 3). In both patients, the mucosal vesical ring and affected vaginal area were cut out with scissors to create fresh surgical edges. The vaginal and vesical orifices were closed with two separated continuous barbed, resorbable 3-0 sutures (V-Loc 90 Absorbable Wound Closure Device; Covidien, Norwalk, CT, USA) (Figs. 4, 5, and 6).

The integrity of the bladder was checked by filling it with 300 ml of saline solution. The mean operative time for the two patients was approximately 100 min, and the blood loss was insignificant. The ureteral catheters were removed before finalizing the intervention, and a size 18-0 vesical Foley catheter was used for 2 weeks. Prophylactic antibiotics were used for 3 days. The patients were released from the hospital 24 h after surgery.

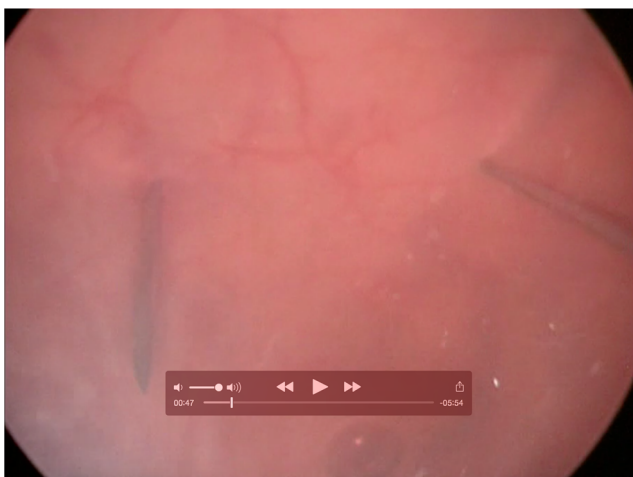


Fig. 2 Cystoscopic view from the bladder neck

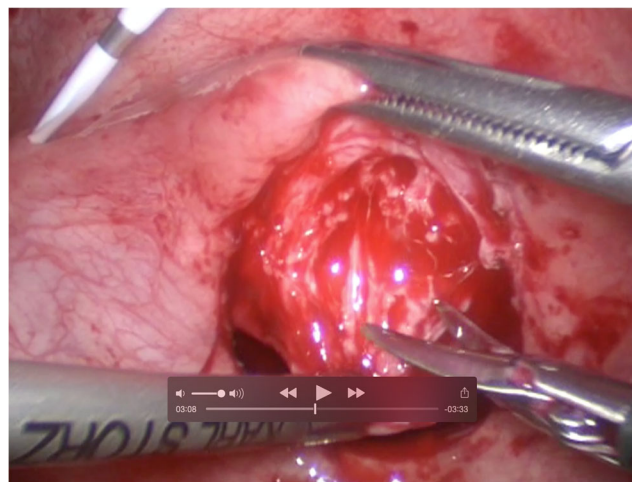


Fig. 3 Dissection of the bladder mucosa

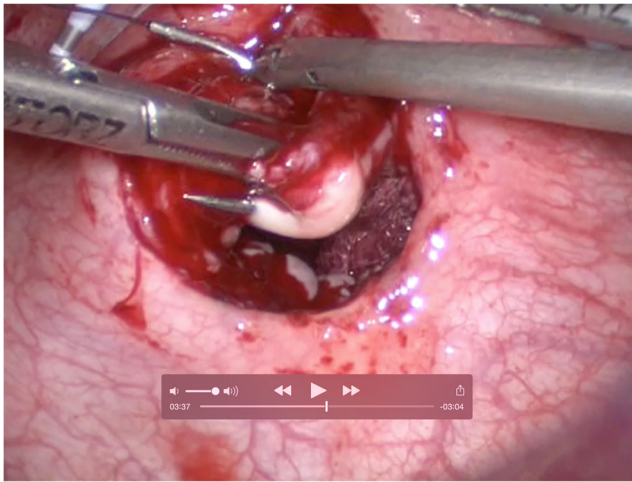


Fig. 4 Suturing of the bladder mucosa

Imaging examinations 6 weeks postoperatively revealed no VVF. The patients were asymptomatic at the time of this writing.

Discussion

Although some series report success between 5 and 25 % with permanent bladder catheterization in small VVF [6], in our cases, the urine vaginal leakage was present at the end of the 4-week period of bladder catheterization. We agree with the general opinion that the use of bladder catheter is useless in macroscopic fistulas.

No absolute consensus has yet been reached regarding the best approach for treating VVF. The vaginal approach is much less aggressive with less complications and a much faster recovery but requires proper training and familiarity in vaginal surgery. Supratrigonal fistulas are more challenging, but with an experienced vaginal surgeon, they can be repaired without



Fig. 5 Suturing of the vagina

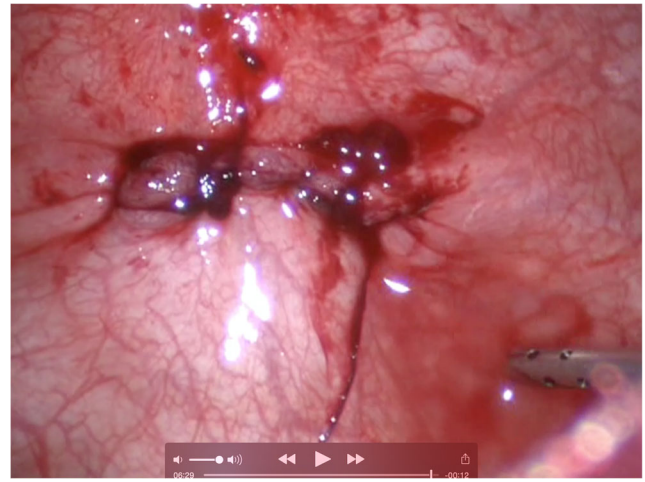


Fig. 6 Suturing of the bladder mucosa

any particular difficulty. There are some series with good results in transvaginal VVF repair [7].

The abdominal route allows the realization of other associated procedures (cystoplasty, ureteral reimplantation, etc.); it also provides access to high-location VVF in the cases of difficult vaginal approach (narrow vaginas, post irradiation, etc.). Nonetheless, some authors believe that the best approach for VVF is that which the surgeon best knows how to perform [1].

In recent years, laparoscopy has been frequently performed in place of laparotomy for treatment of VVF, and comparable results have been obtained [4, 8]. Almost all laparoscopic techniques are performed in an attempt to imitate the classic technique described by O'Connor [8]. Some authors have carried out minimally invasive transvesical approaches through only one aperture [9].

Our approach involves a minor skin incision, minor vesical trauma, and the ability to triangulate the working instruments. Following the directive of the most commonly used techniques for the treatment of VVF, adequate exposure of the damaged tissues and their previous exeresis before repair facilitates adequate scarring of the tissues.

And, advantage of the abdominal approach is the use of pedicle omental flaps to cover the defect between the bladder and the vagina, as it is described in most of the classic series [8]. Some more recent authors have describe the interposition of a fleece-bound sealing system (Thachosil[®], Takeda Pharmaceuticals, Zurich, Switzerland) between the two lines of suture when repairing a recurrent VVF [10]. In contrast, some other authors describe high success rates in the treatment of VVF with laparoscopic approach without using any interposition flap [11].

In the present cases, the two orifices of the fistula were sutured separately with resorbable continuous barbed sutures (V-Loc); we were thus able to simplify the technique and reduce the time of surgery while avoiding implementation of intravesical knots.

One of the major problems when suturing the layers of the repaired VVF are the lines of suture of the vagina and the bladder and perhaps, the inflammation produced by the knots when tying the suture, is one of the most important factors in the relapse of the defect [12]. Some authors have described an intracorporeal suturing for the bladder and transvaginal suturing of the resultant vaginal defect without the observation of any recurrences within their series of extravesical repairs of VVF [11]. The suture employed in our patients does not have any knot, as it is integrated in the tissue; therefore, this could reduce the posterior inflammation of the tissues. However, we still need more cases over time to verify this affirmation.

This approach may not be the most adequate in patients with complicated or recurring fistulas or when another surgical treatment may be required to repair the fistula. However, in patients with simple fistulas, this minimally invasive approach is easily reproducible and associated with few complications.

Because of the limited number of patients treated, a larger number of cases are needed to establish the effectiveness of this technique in the long term.

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Authors' contributions A Lluca: Technique development, Manuscript writing

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D Piquer: Manuscript editing

M Guijarro: Data management

A Cañete: Data analysis

J Escrig: Data analysis

Conflict of interest The authors report no conflicts of interest.

A Lluca: declares that he has no conflict of interest

JL Herraiz: declares that he has no conflict of interest

M Rodrigo: declares that he has no conflict of interest

Y Mazzouzi: declares that she has no conflict of interest

D Piquer: declares that she has no conflict of interest

M Guijarro: declares that she has no conflict of interest

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J Escrig: declares that he has no conflict of interest

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards

Informed consent Informed consent was obtained from all individual participants included in the study.

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