Case Report

Same problem, different approaches: transvesical and extravesical laparoscopic vesicovaginal fistula repair—case report

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Abstract: Vesicovaginal fistulas (VVaFs) are relatively uncommon in developed countries but with devastating consequences for the women suffering them. Conservative management has a low response rate. The surgical repair is a technically demanding procedure. Transvaginal, open transabdominal or laparoscopic (pure or robot-assisted) approaches have been described with similar post-operative results. We report two real-life cases of VVaF after surgery of benign gynaecological conditions, both presenting with continuous urinary incontinence and repaired with laparoscopic surgery. The first case had a simple tract above the trigone and was managed with an extravesical approach. The second is a complex case with multiple fistulous tracts that required a transabdominal-transvesical approach (modified O'Connor technique). Both patients have their fistula closed and are continent after surgery with a mean follow-up of 9 months. Given the lack on evidence for the selection of the best approach, it is important to report the outcomes with the different surgical techniques in both simple and complex fistulae. A pre-operative exhaustive study of the location and number of fistulous tracts is essential, as well as selecting the technique which best allows tissue dissection and tension-free suture to get a successful closure. Therefore, knowledge of several procedures and approaches is mandatory when dealing with this disorder.

Keywords: Vesicovaginal fistula (VVaF); laparoscopic surgical procedure; transvesical repair; extravesical repair; case report

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Introduction

Vesicovaginal fistula (VVaF) is an abnormal connection between the vagina and the bladder that conditions a constant flow of urine into the vagina. Following the recent International Continence Society (ICS) report on the terminology for female pelvic floor fistulas, it affects both the anterior vaginal wall and the posterior bladder wall with or without involvement of the ureteric orifices (1).

The management of VVaFs can be conservative or surgical. Surgical repair of VVaF has been the gold standard over the years. Both a vaginal and a transabdominal approach can be performed with good cure rates (around 90%) (2). Furthermore, since its description in 1994 by Nezhat *et al.* (3), the laparoscopic approach is increasingly common in fistula repair, having demonstrated together with the robotic assisted approach, very high cure rates (over 95%) with excellent cosmetic results according to a recent systematic review (4). There are two main techniques in the laparoscopic or robot-assisted repair of VVaFs. On the one hand, we have the adaptation of the classic O'Connor

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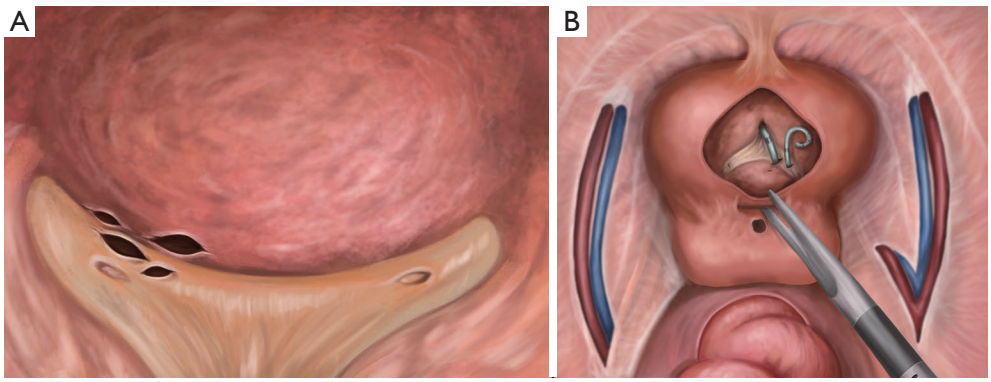

Figure 1 Complex VVaF. (A) Illustration showing the multiple orifices present at bladder level and the proximity to right ureteral meatus during the cystoscopy; (B) illustration of the laparoscopic view after bladder opening exposing the double-J stent exiting the right ureteral meatus and a straight stent exiting the urethra and entering the fistulous tract nearest to the meatus. VVaF, vesicovaginal fistula.

transabdominal-transvesical technique during which a broad cystotomy is performed to identify the fistulous tract, that is surrounded and resected. On the other hand, we have the extravesical technique, which was first described in 1998 by von Theobald (5) and a few months later by Miklos (6) as a site-specific repair with laparoscopic dissection of the vesicovaginal space until the fistulous tract is identified. Both techniques have in common the closure of the remaining defects in the bladder and in the vagina with a two- or three-layer closure and the interposition of fatty tissue (perirectal fat or an omentum flap) in case the surgeon estimates it necessary. Once the fistula is closed, most authors recommend checking the integrity of the suture line filling the bladder with 100–400 mL of dyed saline. Postoperative care includes proper bladder drainage through urethral catheterization for 10–21 days and good fluid intake to avoid clot formation and catheter blockade.

We present two cases of patients who underwent laparoscopic VVaF repair by the same surgeon but using two different approaches due to the characteristics of each fistula. The cases are reported in accordance with the CARE reporting checklist (available at https://dx.doi.org/10.21037/tau-21-373) (7). In both cases, the patients were placed in low lithotomy position and prepared in the standard sterile fashion.

Case presentation

Case 1

Case 1 is a 45-year-old nulliparous woman who had undergone a vaginal hysterectomy because of leiomyomata with development of VVaF and a failed attempt of vaginal repair at another center. The patient complaint of recurrent vaginal urine leakage and continuous incontinence.

Cystoscopy evidenced a right complex supratrigonal fistula with multiple tracts close to the right ureteral meatus (*Figure 1A*). Bilateral ascending pyelography ruled out ureteral involvement. An MRI was performed showing a fistulous tract between the vaginal dome and the central portion of the posterior bladder wall.

One year after the first unsuccessful surgery, we planned a laparoscopic repair of this multi-tract VVaF. First, a cystoscopy was performed with catheterization of both ureters with double-J ureteral stents and the main fistulous tract with a ureteral catheter. Then, we proceeded to laparoscopic access with 4 trocars: the first 10 mm trocar was placed below the umbilicus through a mini-laparotomy incision and, after creation of the pneumoperitoneum, the remaining trocars were inserted under direct vision at the left iliac fossa (5 mm), right paraumbilical area (5 mm) and right iliac fossa (10 mm).

A wide vertical cystotomy was performed to visualize both the ureteral orifices and the fistulous tracts (*Figure 1B*). Cystotomy was extended to reach and surround the fistulous tracts, and the surgical dissection plane between the vagina and the bladder was developed by up to 2 cm. Then, the vaginal opening was sutured in one plane with 2/0 barbed suture and the cystotomy was closed in one plane with 3/0 barbed suture. A 20 Ch bladder catheter and a 14 Ch suprapubic catheter were placed. We checked the integrity of the suture by infusing 250 cc of saline with povidone. Final step was omental flap harvesting and suturing to the

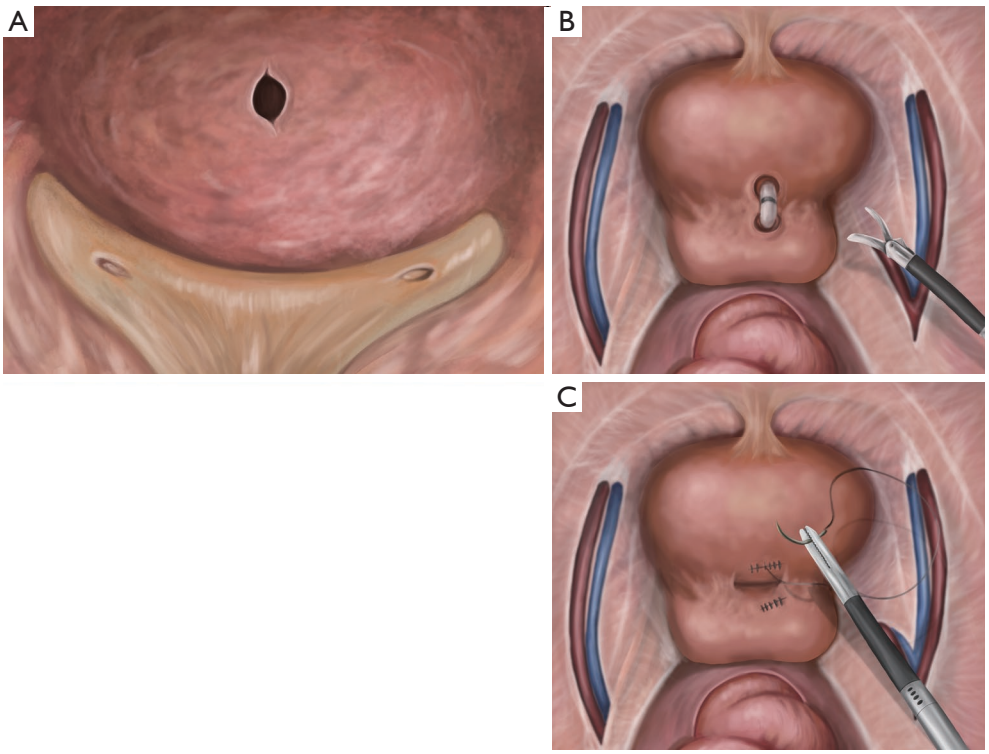

Figure 2 Simple VVaF. (A) Illustration showing in a cystoscopic view the unique fistulous tract present at the supero-posterior bladder wall in connection with the vaginal dome; (B) illustration of the laparoscopic extravesical view presenting the communication between bladder and vagina after exposure of the vesico-vaginal space and the identification of the straight stent; (C) illustration of the laparoscopic extravesical view during the closure of both vesical and vaginal defects independently before the interposition of the omental flap. VVaF, vesicovaginal fistula.

vagina to avoid direct contact of both suture lines. The patient was discharged in postoperative day 4.

A cystography was performed after 7 days before removal of the suprapubic catheter, and again in postoperative day 21 before extraction of the urinary catheter to rule out urine leakage. Six weeks after the intervention, the ureteral stents were also withdrawn and 2 weeks later we performed and abdominal ultrasound to check that the upper urinary tract was undamaged. At 1-year follow-up, the patient remains with the fistula closed and continent.

Case 2

Case 2 is a 43-year-old patient, G1P1, referred from the Gynecology department due to continuous urinary incontinence after abdominal hysterectomy attributable to leiomyomata. Physical examination revealed a fistulous orifice in the vaginal vault of approximately 1 cm. Cystoscopy revealed the presence of a simple VVaF of 1 cm in diameter located in the midline 2 cm above both ureteral meatus (*Figure 2A*). CT scan verified the presence of the fistulous tract between the bladder and the upper part of the anterior vaginal wall, and the indemnity of the upper urinary tract was confirmed.

Given the height of the fistula and the presence of a unique tract, an extravesical approach was planned. Again, the surgery began with cystoscopic evaluation and catheterization of the fistulous tract. Laparoscopy trocars were placed exactly as in Case 1. Bowel adhesions due to previous hysterectomy were released and dissection of the vesicovaginal space was developed until we reached the ureteral catheter inserted through the VVaF (*Figure 2B*). The fistulous tract was dissected around 2 cm to enable tension-free closure. Vaginal and bladder closures were performed independently in one layer with 2/0 and 3/0 barbed sutures, respectively (*Figure 2C*). A 20 Ch bladder

catheter was inserted, and we performed a leak test with 240 cc of povidone-dyed saline. Final step was omental flap interposition. The patient was discharged 3 days after surgery.

In postoperative day 14, a cystography was performed to rule out VVaF persistence, and the catheter was removed. At 6 months follow-up, the patient remains with her fistula closed and continent without genitourinary complaints.

The study was performed according to the Helsinki Declaration (as revised in 2013) and approved by the Research Ethics Committee of the Complejo Hospitalario Universitario de Canarias (Tenerife, Spain). Written informed consent was obtained from both subjects for publication of this case report. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

In low-resourced countries, obstetric VVaFs represent a major public health problem with devastating social and physical consequences. They are mainly secondary to prolonged obstructed labour, and it is estimated than 3 million women are affected worldwide with about 30,000–130,000 new cases developing annually only in Africa (8). On the other hand, in well-resourced countries, VVaFs are relatively uncommon, and more than 90% of cases are secondary to surgery or radiotherapy (RT) (9). One in every 788 hysterectomies will suffer a VVaF as a postoperative complication according to United Kingdom data (10), with a higher incidence after total abdominal hysterectomy for cervical cancer (1 fistula in 100 cases).

Conservative management for VVaF patients has a modest response rate (estimated 11–15%) and consists of indwelling catheterization usually associated to drug treatment (antimuscarinics and/or antibiotics). It is reserved for small fistulas without risk factors such as RT, malignancy, or ischemia on the underlying tissues (2). Patients with persistent urine leakage despite bladder catheterization will get very unlikely spontaneous closure and can be spared of long catheterization periods; however, if a VVaF is diagnosed within the first 6 weeks, bladder catheterization up to 12 weeks from the causative agent is recommended (2). Some authors consider cystoscopic fulguration, laser ablation or the use of fibrine sealant for millimetric VVaFs as conservative treatment, with good results in those under 4 mm (4).

Although the surgical treatment is considered the gold standard, the evidence to support the different approaches is scarce, and guidelines do not clearly state which technique should be used in each specific scenario (11). In the "*EAU guidelines on management of non-neurogenic female lower urinary tract symptoms (LUTS)*", the only reference found is that "*repair by the abdominal route is indicated when high fistulae are fixed at the vaginal vault and are inaccessible via a vaginal approach*" (11). Indeed, the vaginal route is the preferred method in most series dealing with VVaF after treatment of gynaecological benign conditions (4). Given this lack on evidence for the selection of the best approach, it is important to report the outcomes with the different techniques in both simple and complex fistulae, as it is done here.

Laparoscopic repair of VVaF allows good exposure, precise dissection and suture, tissue interposition, and all this with the advantages of minimally invasive surgery (minimizing bleeding, postoperative pain, and skin incisions). Furthermore, its success rate is comparable to the vaginal and open transabdominal routes (4).

During the transition to the laparoscopic approach, the first aim was to reproduce the O'Connor transabdominal-transvesical technique, but the extravesical procedure has also shown good results with a success rate of 98% (12). In our opinion, the choice will depend on several factors: (I) the proximity of the fistula's orifice to the ureteral meatus, (II) the number of fistulous tracts, (III) the location of the fistula, (IV) surgeon's preference and/or experience.

However, other important technical aspects have to be achieved for an efficacious VVaF repair: good visualization, adequate dissection to allow tension-free suture, watertight closure (and testing), and adequate postoperative bladder drainage (13). Introducing a tampon (5), end-to-end anastomosis sizer (6) or, in our experience, an Oschner abdominal malleable retractor, may help to orientate the dissection. It is mandatory to resect all fibrous tissue for correct wound healing and increase the success rate (5,8).

It is worth highlighting that the pre-surgical studies are of paramount importance to choose the most successful approach for fistula closure. From our standpoint, it is also imperative to know how to perform different correction surgeries when treating VVaF and to carefully select the best procedure for each specific case since the first attempt is the one with the best chance of success (8).

The limitations of this article are inherent to the nature of case reports: the lack of a bigger sample to show the real success rate of each technique, the absence of a comparative

group, and the retrospective type of case review. However, and in comparison with other manuscripts as highlighted by Bodner-Adler *et al.* (4), we clearly state the location and number of fistulae, we extensively describe the procedure undergone supplemented with images, and provide information about the mid-term outcomes.

In conclusion, laparoscopic management of VVaF is an excellent option in experienced hands and can be adapted to each specific case. Simple VVaFs can be managed through an extravesical approach performing a site-specific repair, while complex VVaFs are probably best managed through a transvesical (modified O'Connor) approach.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was performed according to the Helsinki Declaration (as revised in 2013) and approved by the Research Ethics Committee of the Complejo Hospitalario Universitario de Canarias (Tenerife, Spain). Written informed was obtained from both subjects for publication of this case report. A copy of the written consent is available for review by the editorial office of this journal.

References

1. Goh J, Romanzi L, Elneil S, et al. An International Continence Society (ICS) report on the terminology for female pelvic floor fistulas. Neurourol Urodyn 2020;39:2040-71.
2. De Ridder D, Browning A, Mourad S, et al. Fistula. In: Abrams P, Cardozo L, Wagg A, et al. editors. Incontinence. 6th ed. Bristol: International Continence Society, 2017:2143-202.
3. Nezhat CH, Nezhat F, Nezhat C, et al. Laparoscopic repair of a vesicovaginal fistula: a case report. Obstet Gynecol 1994;83:899-901.
4. Bodner-Adler B, Hanzal E, Pablik E, et al. Management of vesicovaginal fistulas (VVFs) in women following benign gynaecologic surgery: a systematic review and meta-analysis. PLoS One 2017;12:e0171554.
5. von Theobald P, Hamel P, Febbraro W. Laparoscopic repair of a vesicovaginal fistula using an omental J flap. Br J Obstet Gynaecol 1998;105:1216-8.
6. Miklos JR, Sobolewski C, Lucente V. Laparoscopic management of recurrent vesicovaginal fistula. Int Urogynecol J Pelvic Floor Dysfunct 1999;10:116-7.
7. Riley DS, Barber MS, Kienle GS, et al. CARE guidelines for case reports: explanation and elaboration document. J Clin Epidemiol 2017;89:218-35.
8. Wall LL. Obstetric vesicovaginal fistula as an international public-health problem. Lancet 2006;368:1201-9.
9. Hillary CJ, Osman NI, Hilton P, et al. The aetiology, treatment, and outcome of urogenital fistulae managed in well- and low-resourced countries: a systematic review. Eur Urol 2016;70:478-92.
10. Cromwell D, Hilton P. Retrospective cohort study on patterns of care and outcomes of surgical treatment for lower urinary-genital tract fistula among English National Health Service hospitals between 2000 and 2009. BJU Int 2013;111:E257-62.
11. Harding CK, Lapitan MC, Arlandis S, et al. EAU guidelines on management of non-neurogenic female lower urinary tract symptoms (LUTS). Arnhem: European Association of Urology, 2021.

12. Miklos JR, Moore RD. Laparoscopic extravesical vesicovaginal fistula repair: our technique and 15-year experience. Int Urogynecol J 2015;26:441-6.
13. Couvelaire R. Reflections on a personal statistics of 136 vesicovaginal fistulas. J Urol Medicale Chir 1953;59:150-60.

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