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Case Report

Laparoscopic Vesicovaginal Fistula Repair: 2 Cases From Chaophrayayommarat Hospital

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Abstract

Background: Vesicovaginal fistula (VVF) is a distressing complication most commonly resulting from gynecologic surgeries, particularly abdominal hysterectomy. Laparoscopic repair offers a minimally invasive alternative to open surgery, providing favorable outcomes and quicker recovery.

Case Presentation: This report presented 2 cases of posthysterectomy VVF managed at a provincial hospital. The first case was a 39-year-old woman who developed persistent urinary leakage one month after abdominal hysterectomy. Imaging revealed a 3-mm fistula near the left ureteric orifice, and cystoscopy showed a 1 cm defect. The second case was a 45-year-old woman who presented with leakage 16 months posthysterectomy and intraoperative bladder repair. Imaging and cystoscopy confirmed a 6-mm midline fistula. Both patients underwent laparoscopic transabdominal VVF repair using the O'Conor technique. Key surgical steps included cystotomy, layered closure with nonoverlapping sutures, and omental interposition. Ureteral stenting was used to prevent injury, and Foley catheters were left for 2 weeks postoperatively. Both surgeries were completed successfully without major complications. Operative times were approximately 4 hours. Blood loss was minimal. Patients were discharged within 3-5 days, and followed-up at 1, 3, and 6 months which confirmed complete continence and improved quality of life.

Conclusions: Laparoscopic VVF repair is a feasible technique to minimize postoperative pain and length of hospital stay, as well as enhance access to quality of care and reduce the burden of referral to tertiary centers.

Keywords: Vesicovaginal fistula, Laparoscopic surgery, Complications, Gynecologic surgery, Urinary incontinence

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Introduction

Vesicovaginal fistula (VVF) is an abnormal connection between the bladder and the vagina that results in continuous urinary incontinence. It significantly impacts psychological well-being and social participation among affected women. Surgical repair is the primary treatment method, yet patients in provincial hospitals are often referred to tertiary centers in Bangkok due to the lack of experienced surgeons, increasing financial and logistical burdens on patients and families.

Historically, VVF repair began with pioneering efforts by J. Marion Sims in the 19th century using open surgery, which became the standard.[1] However, the advent of minimally invasive surgery (MIS) in the late 20th century introduced laparoscopic techniques to urology and gynecology.[2] With high costs and limited availability of robotic systems in provincial hospitals, laparoscopic repair has emerged as a viable and effective alternative.[2, 3]

Compared to open surgery, laparoscopic repair offers numerous benefits, including smaller incisions, reduced pain, shorter hospital stays, and improved cosmetic outcomes. Vaginal approaches, while scar-free externally, may be technically challenging in cases with high or large fistulas.[4] Laparoscopy enhances visualization, facilitates precise dissection, and adheres to key principles such as adequate tissue mobilization, tension-free multilayer closure, and interposition of well-vascularized tissue like omentum. First reported in 1994, laparoscopic VVF repair has shown comparable success to open methods with fewer complications and faster recovery.[4, 5]

Comparing outcomes between laparoscopic and traditional open repair of VVF reveals several important considerations: reduced postoperative complications: laparoscopic repair is associated with significantly less intraoperative blood loss, lower postoperative pain, and reduced need for analgesics compared to open surgery.[4] The smaller incisions result in a lower risk of surgical wound infection and incisional hernia.

Shorter hospital stay: due to its minimally invasive nature, laparoscopic VVF repair typically leads to a significantly shorter hospitalization period (2-4 days) compared to open surgery (7-10 days), facilitating faster return to normal daily activities.[4]

Comparable success rates: several studies have demonstrated that laparoscopic VVF repair achieves success rates — defined by fistula closure and restored continence — comparable to open transabdominal approaches.[4, 5] While the learning curve for laparoscopic repair may be steeper, experienced surgeons can achieve excellent outcomes.

Improved visualization: the magnified view provided by laparoscopy enables precise dissection and repair, which is particularly beneficial in complex fistulas or in cases requiring adhesiolysis due to prior surgeries.[6]

Cosmetic advantages: the smaller incisions used in laparoscopy result in less noticeable scarring compared to the large abdominal incision required in open surgery.[6]

Laparoscopic repair of VVF is a technically demanding procedure that has been predominantly reported from academic hospitals in major cities such as Bangkok. This is because VVF is a relatively rare condition, and the surgical management requires advanced laparoscopic expertise that is typically concentrated in high-volume teaching hospitals. Consequently, there are very few reports of laparoscopic VVF repair being performed in provincial hospitals.

Therefore, performing laparoscopic VVF repair in a provincial hospital, even with a limited number of cases, represents a worthy achievement. It has demonstrated that such complex reconstructive urological surgery can be successfully carried out outside renowned academic centers, reflecting both the capability of the surgical team and the growing potential of regional hospitals in providing advanced minimally invasive care.

Case Presentation

Case 1: a 39-year-old woman without comorbidity presented with continuous vaginal urine leakage one month after abdominal hysterectomy for myoma uteri. A computed tomography (CT) imaging revealed a 3-mm VVF near the left ureteric orifice, but cystoscopy identified a 1 cm fistula (Figure 1A).

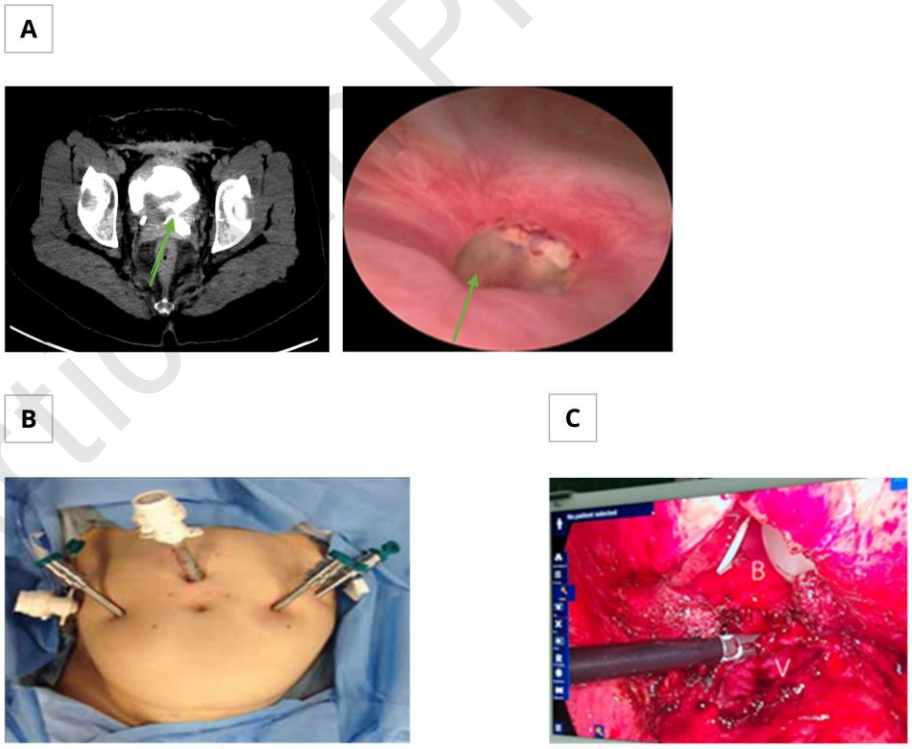
After counseling, she opted for laparoscopic repair. The surgery was performed 3 months after clinical presentation of fistula. The patient received a vaginal cleansing before entering the operating theatre and also prophylactic antibiotics, which were ceftriaxone 2 g and metronidazole 500 mg intravenously. After properly scrubbed and prepped, cystoscopy was performed to retain ureteral stents, small plastic stent in the VVF,

and Foley catheter with 10 mL balloon. Hasson technique was implemented for port placement (Figure 1B).

Surgery included lysis of abdominal adhesion to expose bladder and vaginal vault. Sponge stick was used to put inside vaginal canal to identify vaginal vault. Cystotomy just above the vaginal vault was performed using Metzenbaum scissors to reveal VVF. Cold cut dissection of bladder wall from vagina was done with minimal coagulation to preserve blood supply of the bladder (Figure 1C).

After proper plane was accomplished, separate layered closures were done using 3-0 polyglactin round needle, with nonoverlapping sutures between bladder and vaginal defect. Omental interposition was also performed and fixed between bladder and vagina using the same suture material. Tube drain was placed near repair site to monitor leakage. The procedure lasted 4 hours with 200 mL blood loss. She recovered well with minimal pain and was discharged on postoperative day 3 with a Foley catheter in place for 2 weeks. Cystography showed no leakage, so the urethral catheter was then removed. Follow-up at 1, 3, and 6 months confirmed complete continence and satisfactory recovery. The patient reported much-improved quality of life and could resume sexual activity with her husband.

Figure 1. Patient 1



A, Computed tomographic and cystoscopic view of a 1 cm vesicovaginal fistula (arrow).

B, Laparoscopic port placement for laparoscopic vesicovaginal fistula repair (top, head; bottom, feet).

C, Laparoscopic view showing plane of dissection between bladder and vagina (B, bladder; V, vagina).

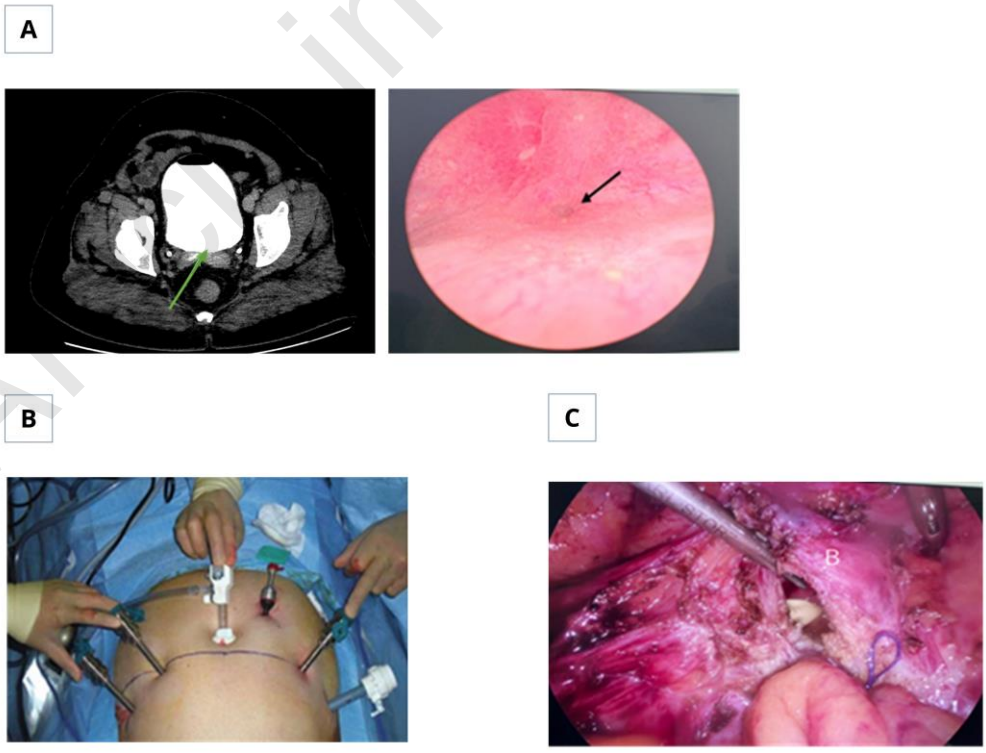
Case 2: a 45-year-old healthy woman developed continuous leakage 16 months after total abdominal hysterectomy with left oophorectomy, during which bladder repair was performed. CT showed a 4-mm midline posterior bladder fistula, and cystoscopy confirmed a 6-mm VVF (Figure 2A).

After counseling, she chose laparoscopic repair. The patient received a vaginal cleansing before entering the operating theatre and also prophylactic antibiotics, which were ceftriaxone 2 g and metronidazole 500 mg intravenously. After properly scrubbed and prepped, cystoscopy was performed to retain ureteral stents, small plastic stent in the VVF, and Foley catheter with 10 mL balloon. Hasson technique was implemented for port placement (Figure 2B).

Dense adhesions were encountered due to previous intraoperative bladder repair. The bladder and vaginal wall were dissected separately using sponge stick to identify vaginal vault and closed in layers. A round needle 3-0 polyglactin was used for bladder and vaginal closure. Omentum was interposed at the fistula repair site (Figure 2C).

The operation lasted 4 hours and 15 minutes with 20 mL blood loss. Postoperatively the patient recovered uneventfully with mild pain and was discharged on day 5 with a Foley catheter for 2 weeks. Cystography 2 weeks postoperative showed no leakage, so the urethral catheter was then removed. A 6-month follow-up confirmed resolution of symptoms and improved quality of life.

Figure 2. Patient 2



A, Computed tomographic and cystoscopic view of 6 mm vesicovaginal fistula (arrow)

B, Laparoscopic port placement for laparoscopic vesicovaginal fistula repair (top, head; bottom, feet).

C, Interposition of omentum between vagina and bladder (B, bladder).

Discussion

The choice for VVF repair is crucial for an excellent outcome, depending on the fistula's size, location, and whether the patient has undergone prior radiation therapy. Details are as follow.

The transvaginal approach is generally an excellent choice of approach particularly for smaller, lower-lying, nonradiated, and recurrent fistulas. This method, which is exemplified by techniques like the Latzko repair, is considered minimally invasive, offering the patient a shorter operative time and a faster recovery compared to the transabdominal approach. It avoids an abdominal incision. However, the technique has its limitations since it provides limited visualization for high-lying or complex fistulas, can be technically challenging with a very small vagina, and may sometimes be associated with vaginal shortening.

The transabdominal approach, performed as an open surgery or, more commonly today, using laparoscopic or robotic techniques, is reserved for more complex, high-lying, or recurrent fistulas. The chief advantage is the excellent visualization of the lesion, making it possible to address complex issues like ureteral involvement through easier ureteral stenting and repair. Furthermore, this approach allows interposition of well-vascularized tissue, such as the omentum, to significantly increase success rate. Even so, even the minimally invasive laparoscopic/robotic versions typically require a longer operative time and multiple ports, while traditional open surgery results in a much longer recovery time.

A sophisticated variant of the transabdominal method is the laparoscopic/robotic repair with limited cystotomy, which is adapted from the conventional O'Conor technique. This technique involves making a small, controlled incision (cystotomy) directly on the bladder dome to access and close the fistula from the bladder side. Its main benefit is the reported high success rate (approaching 100% in initial series) due to the ability to place precise sutures and effectively interpose the omentum. It is praised for minimizing the overall bladder dissection. The primary drawbacks are that it is technically demanding, requiring advanced skills, and it involves entering the peritoneal cavity.

An even newer, highly minimally invasive development is the single-port transvesical repair. This method involves inserting all necessary instruments through a single small incision made directly into the bladder wall. Patients benefit from minimal pain, maximum cosmetic appeal, and potentially the fastest recovery among the abdominal routes. It also offers direct visual access to the fistula from the bladder. However, this is a very new technique with limited long-term data, requires specialized surgical equipment, and presents a steep learning curve due to restricted instrument movement.[7-9]

In this study's case series, the transabdominal approach with omental interposition flap was chosen, because in both cases the fistulas were located above the trigone near the bladder dome, in which the transvaginal route might be difficult to repair. Moreover, tissue interposition can reinforce wound healing and prevent recurrence of fistula. This study has demonstrated that laparoscopic transabdominal VVF repair can be safely and effectively performed in provincial hospitals. Both patients experienced complete symptom resolution without significant complications. These outcomes aligned with existing literature reporting success rates and reduced postoperative morbidity comparable to open surgery.[4-6]

In both cases, VVF developed post-hysterectomy, reflecting global data identifying gynecologic surgeries as a leading cause, particularly abdominal hysterectomy.[7] Imaging and cystoscopy played crucial roles in diagnosis and surgical planning, and ureteral stenting helped prevent iatrogenic injury.[8]

This study's technique followed recognized principles: adequate tissue mobilization, tension-free multilayer closure, and omental interposition. Low blood loss, moderate operating time, and brief hospitalization reflect the advantages of laparoscopy in minimizing pain and enhancing recovery.[9]

There are notable differences between tertiary academic centers and provincial hospitals in Thailand in terms of surgical resources and case exposure. Academic hospitals are typically equipped with advanced technology, a larger number of operating rooms, and a greater variety of surgical instruments and energy devices that facilitate complex laparoscopic procedures. Moreover, there are surgeons with extensive experience and subspecialty training, supported by well-structured multidisciplinary teams and readily available anesthetic and nursing staff specialized in minimally invasive surgery.

In contrast, provincial hospitals usually have very limited resources and fewer opportunities to perform complex reconstructive cases such as VVF repair. The lower-case volume significantly affects the learning curve and experience of surgeons in such specialized procedures. Therefore, successful laparoscopic VVF repair in a provincial setting underscores both the surgical skill and adaptability of the team, and it signifies the growing capability of regional hospitals to manage complex urological conditions with minimally invasive techniques.

Conclusions

With limited resources and experiences in a provincial hospital, laparoscopic VVF repair is feasible. It remains another surgical technique to minimize postoperative pain and length of hospital stay, as well as enhance access to quality of care and reduce the burden of referral to tertiary centers. However, more cases are required to further confirm its effectiveness and safety in provincial hospital setting.

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