Original Article

Feasibility for Transvaginal Closure Supratrigonal Vesicovaginal Fistula

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Background: Vesicovaginal fistula (VVF) after a gynecologic procedure is often located at the supratrigonal area. This location is difficult to approach via the vagina because of the depth and exposure.

Objective: To demonstrate the outcome of transvaginal closure supratrigonal VVF.

Materials and Methods: The authors retrospectively reviewed non-radiated VVF that was repaired transvaginally between 2015 and 2017. A cure was defined as no clinical urinary incontinence and vaginal discharge.

Results: Eleven cases were performed transvaginal closure fistula. The average fistula diameter was 5.1 mm. The peritoneal flap and labial fat were used for tissue interposition in five and three cases respectively. Six cases were cured at mean follow-up of 6.8 (1 to 24) months. Five cases recurred and four of them were performed transvaginal closure. The four cases of recurrence were cured at mean follow-up of 7.0 (3 to 10) months. Two cases used peritoneal flap and others used labial fat for tissue interposition. One had recurrence using one pad per day and did not want to repair. The average operative time for 15 repairs was 82.1 (45 to 120) minute. For all 15 repairs, mean length of stay was 4.3 (2 to 11) days and mean catheter time was 19.1 (10 to 54) days.

Conclusion: Supratrigonal VVF could be successfully repaired with transvaginal approach. Overall success rate in first attempt was 54.5%.

Keywords: VVF, Vesicovaginal fistula, Transvaginal repair, Success rate

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Vesicovaginal fistulas (VVFs) are one of the most distressing complication after a gynecological procedure[1]. It is a cause of abnormal urinary incontinence. Supratrigonal VVF results from a variety of causes. Ninety percent of the cases are caused by trauma to the bladder during surgery[2] and 75% of these fistula are caused by hysterectomy[3]. Recent meta-analysis by Gilmour et al suggested that iatrogenic bladder injury occurred in 10.4 per 1,000 cases[4]. The location of the fistula is at the supratrigonal area, which relate to the gynecological procedure. It is difficult to reach via the vaginal approach. VVFs are found commonly in cases with complication, difficult surgery, fibrosis, or infection. Post-operative fistulas are usually an early complication, appearing approximately ten days after hysterectomy[5]. Nowadays, there are many surgical techniques for repairing the fistula such as transabdominal techniques, transvesical techniques, or transvaginal techniques. However, there are no absolutely best technique. A systematic review demonstrated that all technique had comparable outcome but they included all locations of VVFs and all races[6]. Transvaginal approach minimizes the operative complications, the hospital stay, the blood loss, and the pain following the procedure and still achieves good success rates when compared with the abdominal approach[1]. For Asian women, the vagina is usually smaller than in other races and transvaginal repair has some limitation. The present study would like to demonstrate the feasibility of transvaginal repair that had the better outcome.

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Table 1. Demographic data, indication for hysterectomy, detail of fistula, surgical technics for each patient

Name	Age (year)	BMI (kg/m^2)	Indication for hysterectomy	Previous VVF repair	Fistula size (mm)	Number of fistula(s)	Recurrent VVF	2nd repair	Interposition	Blood loss (ml)
No.1	51	22.4	Myoma uteri	None	2	2	No	None	Peritoneal/ preperitoneal flap	20
No.2	47	22.3	Myoma uteri	None	8	1	No	None	Peritoneal/ preperitoneal flap	100
No.3	37	20.8	Placenta previa	None	1	1	No	None	Peritoneal/ preperitoneal flap	50
No.4	40	24.5	Myoma uteri	None	5	1	Yes	Yes	Local tissue interposition	20
No.5	47	32.9	Myoma uteri	None	6	1	Yes	No	Local tissue interposition	20
No.6	47	31.5	Myoma uteri	None	5	1	Yes	Yes	Martius flap	100
No.7	53	31.8	Myoma uteri	Abdominal	10	1	Yes	Yes	Autologous fascia lata tissue interposition	400
No.8	53	29	Myoma uteri	None	8	1	Yes	Yes	Peritoneal/ preperitoneal flap	50
No.9	47	23.6	Myoma uteri	Abdominal	4	1	No	None	Martius flap	100
No.10	49	24.8	Myoma uteri	None	5	1	No	None	Martius flap	200
No.11	57	24.7	Myoma uteri	Abdominal	2	1	No	None	Peritoneal/ preperitoneal flap	50

BMI=body mass index; VVF=vesicovaginal fistula

Materials and Methods

The authors retrospectively reviewed the medical record of 11 patients diagnosed with supratrigonal VVF and received transvaginal closure between 2015 and 2017. Institutional Review Board (IRB) was sent and approached from Siriraj IRB (SIRB) on July 19, 2018. The cure was defined as no urinary leakage from vagina or vaginal discharge. The interval of diagnosis to the final surgical correction ranged from hysterectomy to fistula repair. None of the patient received pelvic radiation. A detailed medical history was recorded focusing on the cause of the fistula and previous attempts to repair. Vaginal assessment was done to inspect and palpate the vaginal opening of the fistula. Any local genital infection was treated before surgery. Cystoscopy was done to establish the supratrigonal location of the fistula and assess its proximity to the ureteric orifices. Eleven patients developed VVF after hysterectomy, two cases from laparoscopic hysterectomy and nine cases from abdominal hysterectomy. The diagnoses of the eleven patients were one with placenta previa and ten with myoma uteri. Two cases had intraoperative bladder injury. Three cases had previous transabdominal VVF closure, and three cases had VVF closed by ureteric orifice. Cystogram was performed in three of eleven patients (Table 1).

Surgical techniques

The patient was on exaggerated dorsal lithotomy with the caution for hip dislocation, sciatic nerve entrapment, and hypotension when both legs were lowered. For the next step, the ring retractor was used to make a good exposure. Cystoscopy was performed, then the guide wire was inserted from the bladder to the vagina or vice versa. The Foley catheter, size 8 to 12 Fr, was railroaded over the guide wire from the vagina to the bladder to pull the fistula downward during the dissection. The vaginal wall was carefully dissected in full thickness fashion without further bladder injury. The vaginal flap was created from both anterior walls and cuffs of the vagina. All of these steps are shown in (Figure 1, 2). The bladder site was closed in a watertight fashion without a fistula tract excision. Tissue interposition was used to cover the suture line by first choosing the local tissue such as the peritoneum. For using the preperitoneal flap, the procedure was same as above. The anterior vaginal wall was opened, the seromuscular and bladder was repaired and imbricated. Next, the pubocervical fascia was closed and the peritoneal flap was pulled down from above for tissue interposition. Lastly, the vaginal epithelial was closed. If the local tissue was inappropriate, the labial fat would be considered. After the tissue interposition was properly placed, vaginal

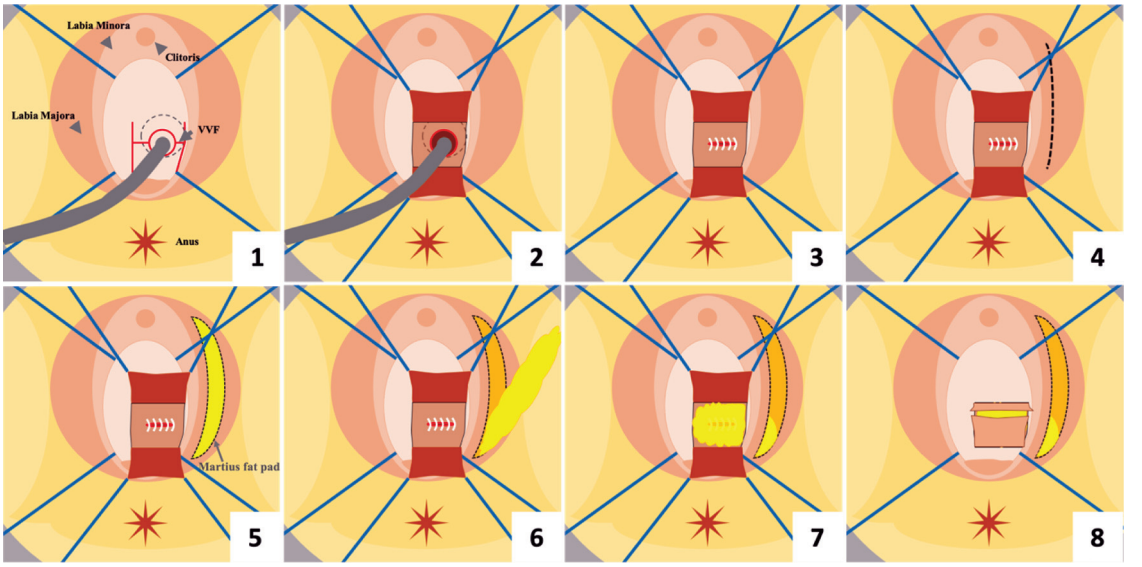

Figure 1. The picture shows the step of closure the fistula. 1) Pulled the fistula down. 2) Created vaginal wall flap both anterior wall and cuff. 3) Closed the fistula of bladder site. 4) Made incision at left labia. 5) Harvesting labial fat. 6) Created labial fat flap by preserving posterior pedicle. 7) Patched labial fat flap after tunnel was created. 8) Vaginal wall flap was closed covering the labial fat flap.

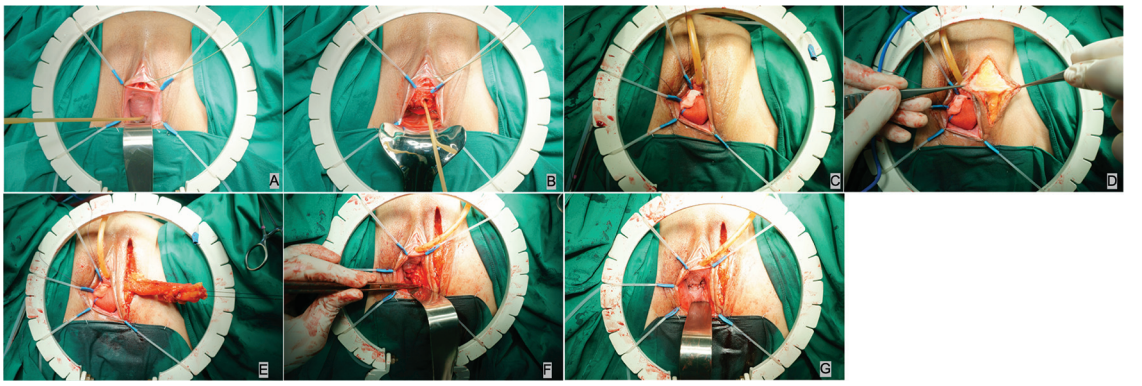

Figure 2. A) The fistula was pulled down. B) Vaginal wall flap was created. C, D) Closure fistula at bladder site and prepare skin for harvesting labial fat. E) Labial fat flap was harvested and preserved the pedical. F) Tunnel was created and patched the fistula with labial fat. G) Closed fistula at vaginal wall.

wall flap was closed to cover all vaginal defect in overlapping technique. Urethral catheter No.18 was kept for about two to four weeks. Cystogram or VCUG might be required in some cases.

Results

Eleven patients with supratrigonal VVF were treated with the transvaginal technique. Average age at repair was 48 years. Average fistula diameter was 5.1 mm. Time from hysterectomy to repair was 5.3 months. Average body mass index (BMI) 26.21 (20.8 to 31.8) kg per m^2. Mean number of children were 1.2. Three cases recurred after the trans-abdominal repair. The episiotomy rate was 27%. Six of eleven cases were cured at mean follow-up of 6.8 (1 to 24) months. Success rate for first attempt was 54.5%. All those cases used tissue interposition technique, including five cases with peritoneal or preperitoneal fat that had one recurrence, two cases with local tissue that had two recurrences, three cases with labial fat that had one recurrence, and one case with autologous fascia lata that had one recurrence. Five cases recurred and four of them were performed transvaginal closure. One had recurrence using one pad per day and did not want to

repair. Four cases were cured at mean follow-up 7.0 (3 to 10) months after repair. Two cases used peritoneal flap and others used labial fat for tissue interposition. For all 15 repairs, mean length of stay was 4.3 (2 to 11) days and mean catheter time was 19.1 (10 to 54) days. Average operative time was 82.1 (45 to 120) minutes. Average estimated blood loss was 100.9 ml. In the present study, seven patients had children, three of them had vaginal delivery and two of them had cesarean section, one patient had first born via vaginal delivery and the second via cesarean section and there was missing data for one patient. There was no post-operative complication or blood transfusion. The 15 repairs were successful.

Discussion

Supratrigonal VVF is one of the most gynecologic complication and disturb quality of life of the patient. The first description of a repair of VVFs was made in the last century when Sims reported a successful operation. Since then, numerous techniques for VVF repair have been reported using the vaginal or suprapubic approach. Although, there are several techniques for repairing the fistula, there is no consensus on which technique is the best for repairing VVF.

From the largest series of transvaginal VVF repair, Eliber et al demonstrated outcome of transvaginal closure VVF after initial repair with a peritoneal, Martius and labial flap was 96%, 97%, and 33%, respectively. There were no intraoperative complications[7]. In systematic review, 96.4% patients were treated surgically. Overall, the transvaginal approach was performed in most patients (39%), followed by a transabdominal or transvesical route (36%), a laparoscopic or robotic approach (15%) and a combined transabdominal-transvaginal approach in 3% of cases. Success rate in surgical cases was 97.98% and 91.63% in patients with prolonged catheter drainage followed by surgery[6].

The asian population have some limitation on body habit. Small introitus and poor relaxation of pelvic fascia were considered as a hinder for urologist to choose transvaginal approach. Supratrigonal VVF was always located at vaginal cuff, which made it difficult to successfully perform a transvaginal repair. However, no study compared the vaginal and introital size among races. Many studies of perineal lacerations after vaginal delivery could be found to explain that the vagina and introitus of Asian woman might be smaller than other races[8,9]. Nevertheless, there are no study in the Asian population for the result of these transvaginal repaired supratrigonal VVF technics and there are no randomized studies comparing abdominal and vaginal approaches. The relative advantages of transvaginal approach compared with abdominal approach include shorter hospital stay, less blood loss, and shorter operative time. The relative disadvantages of transvaginal approach include lack of familiarity of vaginal anatomy, the potential for vaginal shortening, and difficulty in exposing high or retracted fistulae.

The present study demonstrated the feasibility for transvaginal repair of supratrigonal VVF. All patients in the present study had developed supratrigonal VVF after hysterectomy, which was iatrogenic fistula. Therefore, the surrounding tissue was viable and proper for repairing the fistula. The concepts of using healthy tissue, tension free closures, and reinforcing the closures in high-risk situations will ensure success nearly most of the time. All patients used tissue interposition during repair of the fistula. Although five cases had recurrence, four of the five cases used tissue interposition technique again and were successfully repaired. The present study found that success rate of the first transvaginal repair was 54.5%, which was lower than the study from Eilber et al success rate of 97.7%. We focused on supratrigonal VVF that was too high to transvaginally repair, too narrow to properly expose in Asian woman, and there were a few patients with supratrigonal VVF after hysterectomy in the present center. Importantly, this technique required an experience surgeon to achieve good outcomes.

Conclusion

VVF is a distressing urological condition and require skilled surgical attention[10]. The present study suggests the transvaginal repair for supratrigonal VVF even though the location site is hard to approach via trans-vagina. These techniques have an excellent outcome, minimized length of stay, and low blood loss.

What is already known on this topic?

The treatment for supratrigonal VVF are dependent on the surgeon skill. The abdominal approach is easy to access for the location and similar for urologist.

What this study adds?

The transvaginal approach for repairing supratrigonal VVF had an excellent outcome, low complication, low transfusion rate, and decrease in length of stay in hospital even though the site is hard to approach with these technics.

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