

Original Research Article

Iatrogenic vesicovaginal fistula repair-experience at Prince Hussein Urology and Organ Transplant Center

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ABSTRACT

Background: Despite the advances in technology in urology practice, and the surgical approach in dealing with iatrogenic vesicovaginal fistula repair, the most important is to achieve continent rate with minimum morbidity.

Methods: From January 2006 to December 2017, the medical records and operative notes of 52 female (mean age 37 year) who had undergone transabdominal transvesical operative repair of their vesicovaginal fistula (VVF) at this institution were reviewed retrospectively. CT urography and diagnostic cystourethroscopy were the modalities of diagnostic tools. Trans-abdominal, transvesical repair with omental flap interposition were performed within 4-6 months in all cases. Patients were evaluated at two to three weeks initially, then at three months interval and later annually.

Results: In present study, the most common presentation of VVF was urine leakage through vagina. In two third of the patients the etiology was due to hysterectomy procedure, regarding the location of the fistula, 94.2% of the fistulas located high in the posterior wall of the urinary bladder (supratrigonal), with the mean size of 2.2cm (range 5-25mm). 49 patients had single fistula (94.2%). The mean operative time was 110 minutes (range 60-130 minutes) and the mean post-operative urethral catheterization was 21 days (range 17-24 days). Almost all patients were continent after a mean of five months.

Conclusions: Iatrogenic VVF is one of the distressing complications of gynecological procedure; delayed transabdominal transvesical approach with omental flap interposition is associated with excellent and durable results with minor morbidity. Standardization of the technique is a key success in the outcome of the repair.

Keywords: Hysterectomy, IATROGENIC, Omental flap, Transvesical, Supratrigonal, Vesicovaginal fistula

INTRODUCTION

VVF is an abnormal communication between the urinary bladder and vagina, which can lead to continuous urine discharge from the vagina resulting in sexual and psychological disorders in affected patients.¹

The etiology of VVF is varied worldwide, with obstructed prolonged labour being the most common cause accounting for more than 90% of VVF cases in

developing countries. Iatrogenic bladder injury during pelvic surgery, most commonly hysterectomy, accounts for more than two thirds of cases in well developed countries.²

The pathogenesis of VVF is not fully understood. It is suggested that intraoperative iatrogenic bladder injury following pelvic surgery, especially hysterectomy, is the initial step that leads to pelvic urine collection which drains through suture lines into the vagina. There is

another mechanism that results in VVF: the presence of necrosis that resulted from improper suture placements between vagina and posterior urinary bladder wall.³

Both conservative and surgical treatments are being used. For small fistula less than 10 mm, a trial of urethral catheter drainage for four weeks may lead to spontaneous fistula closure.⁴ In the case of conservative management failure, surgical management is needed, with a transvaginal or transabdominal approach being the most practiced procedures.^{5,6}

In this study, author evaluated the outcome of delayed transabdominal transvesical VVF repair with interposition omental flap done at the institution.

METHODS

This was a retrospective study where author reviewed the medical records and operative notes of 52 females that underwent transabdominal transvesical operative repair of their vesicovaginal fistulae at the institution from January 2006 to December 2017.

Patients with iatrogenic VVF after gynecological or obstetrical procedures were included in this study, while patients with post radiation fistulae, malignant fistulae, history of previous repair, and incomplete files were excluded.

All patients had presented to the urology outpatient clinic complaining of urine leaking through the vagina following a gynecological or obstetrical procedure. At initial evaluation, all patients were assessed by detailed history and physical examination. In some cases, a high creatinine level of vaginal discharge was used to confirm the urinary leakage, while in others, methylene blue tests were used in which diluted methylene blue was instilled into the urinary bladder through a Foleys catheter and a tampon inserted into the vagina. Bluish staining of the tampon confirmed the diagnosis.

Renal ultrasonography and computed tomography urography (CTU) were used to demonstrate any urogenital abnormalities such as the presence of hydronephrosis, ureterovaginal fistula and pelvic collections. At the time of surgery, all patients underwent cystourethroscopy and vaginal examination under general anesthesia. The size, number, exact location of fistula tract, relation of the fistula to the ureteric orifices and the trigone, and cystoscopic estimations of the bladder capacity were documented preoperatively.

While analyzing of patients' medical records, the duration of presence of VVF, etiology, site, size, number of openings, duration of surgery, and duration of urethral catheter and suprapubic cystostomy drainage were recorded. Fistulae were classified into high and low according to their relation to the trigone of the urinary bladder. According to their size, the fistulae were

classified into three categories: small (less than 5mm), intermediate (from 5mm to 25mm), and large (more than 25mm).

Trans-abdominal, transvesical repairs with omental flap interposition were performed within 4-6 months in all cases (delayed approach). Regarding the procedure description, a midline infra-umbilical incision under general anesthesia in supine position was done, and the urinary bladder was accessed by a mean of extraperitoneal dissection of retro-pubic space, and then followed by long longitudinal cystostomy incision between two vicryl stay sutures. Identification of the site of the fistula was done with proper exposure of the intravesical area. Four holding sutures were done over the edges of the fistula using vicryl 4.0 sutures to hold the fistula. The fistulous tract was then completely excised down to the vagina and through the anterior wall of the vagina using blade size 11 (Figure 1).



Figure 1: Holding edge sutures and excision of the VVF.



Figure 2: Excision of the VVF and undermining of the urinary bladder wall.

Undermining of the wall of the urinary bladder was performed in all cases to facilitate closure (Figure 2). The anterior vaginal wall defect was closed using vicryl 2.0 continuous suturing with the suture material lifted at the distal edge to fix the omental flap (Figure 3). At this stage, author opened a small window in the peritoneum, created a tunnel behind the urinary bladder into the intra-

peritoneal space, prepared a well vascularized flap of omentum with adequate length, delivered the flap posterior to the urinary bladder through the creative tunnel covering the suture line (Figure 4), then fixed it to the previously lifted suture material just distal to the distal part of the suture line. A tension free, watertight closure of urinary bladder wall defect was done using Vicryl 2.0 in a continuous manner crossing the vaginal suture line. The urinary bladder was drained by both urethral catheter and cystostomy with closure of the wall of the urinary bladder in two layers with perivesical drain.

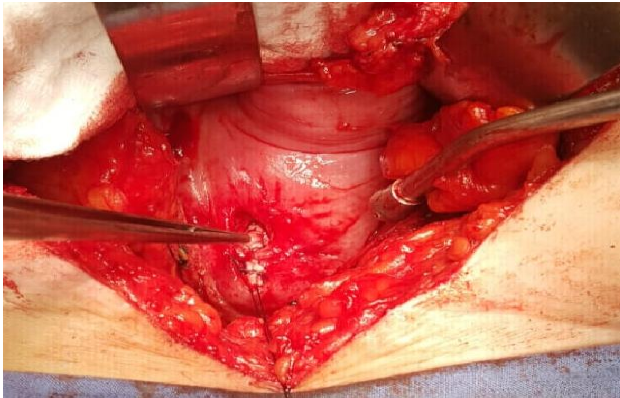


Figure 3: Suture lifted at the distal end of the vaginal wall defect.



Figure 4: Omental flap transposition.

All patients received antibiotics (second generation cephalosporin and metronidazole) during hospitalization; anticholinergics were given to all patients starting one day after surgery and stopping one day before the catheter removal.

Patients were discharged after a mean hospitalization of five days. The cystostomy catheter was removed after 14 days, and the urethral catheter was removed without cystogram after a mean of 21 days. Patients were seen at the outpatient clinic 2 weeks post operation, then 4 weeks later, then at three-month intervals for the first year, and then annually after that. The operation was considered successful in those patients who reported being continent.

We got approval from the institution ethical committee for publication. Most of the data was presented in the form of tabulated descriptive statistics. The frequency was generated from the categorical data and the range of the original data. The frequency distributions and the summary statistics were calculated to describe the sample characteristics. SPSS software version 24 was used for this purpose.

RESULTS

Fifty-two female patients with iatrogenic VVF were included in this study, with the mean (SD, range) age of the patients being 37 (9, 22-57) years. According to etiology, 38 patients (73.1%) had elective hysterectomies, 13 patients had emergency cesarean hysterectomies (25%), and one patient presented after obstructed normal vaginal delivery (1.9%).

The vast majority of fistulae were high in location, intermediate in size, and a single tract opening being the most common configuration (Table 1).

Table 1: characteristics of the repaired fistulae according to the location, size, and multiplicity of the fistula opening.

Variable	Total / n (%)
Fistula location	
High	49 /52 (94.2%)
Low	3 / (52) (5.8%)
Multiplicity	
Single	49/52(94.2%)
Multiple	3/52 (5.8%)
Size	
Small	2/52 (3.8%)
Intermediate	46/52 (88.4%)
Large	4/52 (7.6%)
Mean size	2.2 cm

The mean (SD, range) duration of the VVF until treatment was 130 (32, 120-180) days. And the mean (SD, range) operative time was 110 (30,100-160) minutes. Blood loss was insignificant, with only two patients requiring blood transfusions (two units or less). Ureteric reimplantation was not required in any case of repair, however one patient required intra-operative ureteric catheterization due to the location of the ureteric orifice close to the bladder suture line.

According to the post-operative complications, one patient developed mild pulmonary embolism that was treated by anticoagulation, two patients had surgical site infections that were managed by drainage, dressing and delayed closure, and two patients developed paralytic ileus that was managed conservatively. No post-operative mortality occurred, and the mean (SD, range) hospital length stay was 5 (3, 4-10) days.

Urethral catheters were removed after a mean (SD, range) of 21 (3.9, 17 - 24) days, while the cystostomy catheters were removed after a mean (SD, range) of 14 (2.6, 10-17) days. All patients were dry after a mean (SD, range) of 14 (2.8, 7-21) days of suprapubic and per urethral catheter drainage.

The patients were followed up regularly in the outpatient department at two weeks post-operatively, then after one month, and then at 3-month intervals for the first-year post repair. All patients were continent after a mean (SD, range) of 5 (5.7,8) months, with two patients developing stress urinary incontinence after labor. No recurrences were seen during the first five years post operation. Four patients were lost from regular follow up after the first year, and six patients after the second year. The remaining of the patients were compliant with the regular follow up visits.

DISCUSSION

In this study, gynecological hysterectomy was the most common cause of iatrogenic VVF, with more than 98% due to iatrogenic causes, while obstructed labour resulted in less than 2%, which is quite similar to data published from developed countries, despite being a developing country, this is mainly due to recent advance in obstetrics and maternal care in the last three decades.⁷ On the other hand, in a retrospective study published by Wadie et al, iatrogenic VVF accounted for two thirds of the cases, with 40% due to abdominal hysterectomy and one fourth due to complicated vaginal delivery.⁸ In another retrospective study that analyzed the etiology of VVF in Saudi population published by Osman et al, they showed that the mean age of patients was 41 years and that obstetric procedures were found to be the leading cause of VVF, only 22% were due to abdominal hysterectomies.⁹

A systemic review and meta-analysis study done by Bodner-Adler et al, they reviewed 282 full text articles. According to them, VVF was treated surgically in the vast majority of patients (96.6%), with transvaginal route being the most common procedure followed by transabdominal transvesical route. The majority of surgically treated fistulae were simple (60%), with complex fistulae forming 36%.¹⁰ In this study, the vast majority of treated fistula were simple (92.2%), with complex fistulae forming 7.8%.

Early (immediate) versus delayed repair is still a controversial issue, with no consensus about the timing of the procedure being considered immediate or delayed. Waaldijk defined early repair as any fistula treated in less than 12 weeks from its creation, with a successful repair approaching (95 %).¹¹ In published studies where all delayed repairs were the choice, the fistula closure rate ranged from (88-94%) while in studies where the repairs were done early, the fistula closure rate ranged from (86-100%).¹²⁻¹⁵ so the timing of repair should be

individualized according to the treating surgeon and patient factors.¹⁶ In this study, all repairs were done late (delayed repair) four to six months after the etiologic procedure to allow time for inflammation to subside. The successful closure of fistulae was about (100%).

According to the route of repair, the two most common procedures are transvaginal and transabdominal, transvaginal being the preferred approach by the gynecologist because of their familiarity with this approach, the less morbidity, and the comparable outcomes to transabdominal repair. The main disadvantages of transvaginal repair include unfamiliarity of urologists with this technique, May resulted in vagina shortening as in Latzko technique, and if uretric reimplantation is needed, it won't be feasible. The two most common procedures are Latzko technique and the layered closure. The abdominal route, either extravesical or intravesical, is usually used for complex fistulae as it is useful in cases where ureteral reimplantation is required or when a small bladder is remained that needs augmentation cystoplasty. In comparison with transvaginal repair, it is associated with a longer hospital stay, more blood loss, and more morbidity.^{17,18,5} In a retrospective study published by Eilbers et al, 207 patients underwent transvaginal VVF repair with interposition flap for complex fistulae. The success rates for labial, peritoneal, and Martius flap were 33%, 96%, and 97% respectively.¹⁹ Evans et al, found transabdominal transvesical repair with interposition flap to be associated with 100% success rate, while without interposition flap to be associated with a 63% success rate.²⁰ Most of the published articles defined successful repair as closure of fistula with no vaginal urine leakage. This should be called anatomical closure instead of cure, because many successful anatomical repair results in sexual, psychological, and genitourinary organ dysfunction.¹⁰

In all transabdominal transvesical repairs at this institution, author used interposition omental flaps regardless of the size of the fistula or its complexity. The use of interposition flaps for all fistula repair is controversial. Li et al in his article did not note increase in fistula repair failure when interposition flaps were not used, and 76% of repair fistulae was successfully closed.²¹ In contrast, a retrospective study published by Ockrim JL et al reviewed forty one cases with VVF and UVF (ureterovaginal fistula), and a total of 47 repairs (23 transvaginal; 24 transabdominal) were done on 37 patients at a tertiary center in United Kingdom. All fistulae were complex fistulae. They noticed a higher failure rate when interposition flaps were not used for the trans-abdominal repair of complex fistula.²² Postoperative complications were common and included: stress urinary incontinence, over active bladder, urgency, pain, infection, dyspareunia, and failure of repair.²³ The limitations in this study included: being a single center study, lack of functional assessment of repair, and unfamiliarity with transvaginal approach.

CONCLUSION

Most iatrogenic vesicovaginal fistula resulted from bladder injury during gynaecological or obstetrical procedures. Intraoperative recognition and repair of bladder injury will decrease the incidence of VVF formation. Delayed transabdominal transvesical approach with omental flap interposition is associated with excellent and durable results with minor morbidity. Standardization of the technique is a key success in the outcome of the repair.

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REFERENCES

- Sharma S, Rizvi SJ, Bethur SS, Bansal J, Qadr SJ, Modi P. Laparoscopic repair of urogenital fistulae: A single center experience. *J Minim Access Surg.* 2014;10(4):180-4.
- Tancer ML. Observations on prevention and management of Vesicovaginal fistula after total hysterectomy. *Surg Gynecol Obstet.* 1992;175:501-6.
- Garthwaite M, Harris N. Vesicovaginal fistulae. *IJU.* 2010 Apr;26(2):253.
- Zimmern PE, Hadley HR, Staskin D, Genitourinary fistula: vaginal approach for repair Vesicovaginal fistula. *Clin Obstet Gynaecol.* 1985;12(12):403-13.
- Angioli R, Penalver M, Muzii L, Mendez L, Mirhashemi R, Bellati F, et al. Guidelines of how to manage Vesicovaginal fistula. *Crit Rev Oncol/Hematol J.* 2003;48(3):295-304.
- Armenakas NA, Pareek G, Frachia JA. Iatrogenic bladder perforations: long-term follow-up of 65 patients. *J Am Coll Surg.* 2004;198:78-82.
- Haferkamp A, Wagener N, Buse S, Reitz A, Pfitzenmaier J, Hallscheidt P, et al. Vesicovaginal fistulas. *Urology A.* 2005;44:270-6
- Wadie BS, Kamal MM. Repair of Vesicovaginal fistula: Single-centre experience and analysis of outcome predictors. *Arab J Urol.* 2011;9(2):135-8.
- Osman SA, Al-Badr AH, Malabarey OT, Dawood AM, AlMosaieed BN, Rizk DEE. Causes and management of urogenital fistulas. A retrospective cohort study from a tertiary referral center in Saudi Arabia. *Saudi Med J.* 2018;39(4):373-8.
- Bodner-Adler B, Hanzal E, Pablik E, Koelbl H, Bodner K. Management of vesicovaginal fistulas (VFFs) in women following benign gynaecologic surgery: A systematic review and meta-analysis. *PloS one.* 2017 Feb 22;12(2):e0171554.
- Waalwijk K. The immediate surgical management of fresh obstetric fistulas with catheter and/or early closure. *Inter J Gynecol Obst.* 1994 Apr;45(1):11-6.
- Wein AJ, Malloy TR, Carpiniello VL, Greenberg SH, Murphy JJ. Repair of Vesicovaginal fistula by a suprapubic transvesical approach. *Surg Gynecol Obstet.* 1980;150:57-60.
- Keettel WC, Laube DW. Vaginal repair of vesicovaginal and urethrovaginal fistulas. In: Buchsbaum HJ, Schmidt JD, editors. *Gynecologic and Obstetric urology.* 2nd ed. Vol. 1982. WB Saunders Co: Philadelphia; 1982:318-326.
- Persky L, Herman G, Guerrier K. Nondelay in vesicovaginal fistula repair. *Urol.* 1979;13:273-5.
- Cruikshank SH. Early closure of posthysterectomy vesicovaginal fistulas. *South Med J.* 1988;81:1525-8.
- Sori DA, Azale AW, Gameda DH. Characteristics and repair outcome of patients with Vesicovaginal fistula managed in Jimma University teaching Hospital, Ethiopia. *BMC Urol.* 2016;16:41.
- Ghoniem GM, Warda HA. The management of genitourinary fistula in the third millennium. *Arab J Urol.* 2014;12:97-105.
- Rovner ES. Urinary tract fistula. In: Campbell-Walsh Urology, Wein J, Kavoussi LR, Novick AC, Partin AW, and Peters CA, Eds. 9th ed. Saunders, Philadelphia, Pa, USA. 2007:2323-2340.
- Eilber KS1, Kavalier E, Rodríguez LV, Rosenblum N, Raz S. Ten-year experience with transvaginal vesicovaginal fistula repair using tissue interposition. *J Urol.* 2003 Mar;169(3):1033-6.
- Evans DH, Madjar S, Politano VA, Bejany DE, Lynne CM, Gousse AE. Interposition flaps in transabdominal vesicovaginal fistula repairs: are they really necessary?. *Urology.* 2001 Apr 1;57(4):670-4.
- Li AY, Papin JE, Suskind AM, Cameron AP, Clemens JQ, Stoffe JT. Abdominal Approach for Vesicovaginal Fistulas: Outcomes and Risk Factors for Failure. *Int Arch Urol Com.* 2017;3(3):29.
- Ockrim JL, Greenwell TJ, Foley CL, Wood DN, Shah PJ. A tertiary experience of vesico-vaginal and urethro-vaginal fistula repair: factors predicting success. *BJU Int.* 2009;103:1122-6.
- Mellano EM, Tarney CM. Management of genitourinary fistula. *Curr Opin Obstet Gynecol.* 2014;26(5):415-23.

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