

Transvaginal Repair of Vesicovaginal Fistula: The Standard of Care: Ten Years Experience

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Abstract

Background: Vesicovaginal fistula (VVF) is a debilitating condition leaving the effected female incontinent of urine. There has been a shift in the etiology of VVF in developing nations where hysterectomy is becoming a leading cause of VVF.

Objective: To share our experience of transvaginal repair of VVF using a modified Latzko technique and evaluate various factors for a successful repair.

Study type, settings & duration: This retrospective study was carried out at the Department of Urology and Kidney Transplantation, Fauji Foundation Hospital, Rawalpindi from March 2010, to August 2020.

Methodology: Data were collected from patients who underwent transvaginal repair of VVF by a modified Latzko technique. Data consisting of multiple variables was analyzed using SPSS version 21. For qualitative data, percentages and frequencies were given and for quantitative data mean±SD were used. A comparison of two quantitative variables was done by using an independent t-test. For categorical variables, the chi-Square test was used. The *p* value ≤0.05 was taken as statistically significant.

Results: A record of 144 patients was analyzed. Multivariate analysis revealed a statistically significant relationship between etiology (*p*-value 0.000), location (*p*-value 0.002) and size of VVF (*p*-value 0.000) and a successful repair, while number (*p*-value = 0.71) and VVF with a previous history of repair (*p*-value = 0.83) were insignificant factors. Success was observed in 98.6% while recurrence occurred in 1.4%.

Conclusion: Transvaginal repair of Vesicovaginal fistula using a modified Latzko technique can be carried out in all vesicovaginal fistulae whether primary or recurrent irrespective of its aetiology, size, site and number. It has a high success rate and minimal complications.

Key words: Vesicovaginal fistula, hysterectomy, obstructed labour, urinary incontinence, transvaginal repair.

Introduction

Vesicovaginal fistula (VVF) is an abnormal communication between the urinary bladder and vagina with resultant unremitting urinary leakage from the vagina.¹ The condition is

commonly seen as one of the most disturbing complications after hysterectomy, caesarean section and childbirth.²

The presence of VVF has been known to prehistoric Egyptian healers, with the example of VVF present in mummies before 2000 years BC.³ It is estimated that at least three million women in sub-Saharan countries have unrepaired VVF and that 30,000 to 130,000 new cases develop each year in Africa alone.⁴ In the countries of the third world the true prevalence of VVF is not known and these patients usually present late, as most of these patients live in isolation and silence.⁵

About two to three decades ago in developing countries like Pakistan, the majority of cases of VVF were the outcome of childbirth injury.^{6,7} However, due to the improvement of obstetric services, the etiology of VVF has changed in our country in the recent past. Currently, most cases of VVF seen in rural and remote areas are of

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Received: 27 May 2021, Accepted: 22 May 2023,

Published: 24 July 2023

Authors Contribution

KF conceptualized the project. IA & SAM did the data collection. AM & IZK did the literature search and performed statistical analysis. Drafting, revision & writing of manuscript were done by AM, RN & IA.

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obstetrical origin and those reporting from urban areas are iatrogenic.⁸ The principal causes of VVF in developed countries are gynaecological surgeries, radiotherapy and pelvic malignancies.⁹ Hysterectomy is the most common cause of iatrogenic VVF and in such cases, the fistula is frequently found at the dome of the urinary bladder at the level of the vaginal cuff.¹⁰ In contrast to the post-surgical fistula which is usually the result of more direct and localized trauma to otherwise healthy tissues, the obstetric fistula is the result of a field injury caused by ischemia to a wide area that may lead to greater tissue loss, thus producing a large fistula.¹¹

Different techniques of VVF repair including transvaginal, transabdominal, transvesicoscopic, laparoscopic and robotic have been described in the literature, but transabdominal and transvaginal repairs are the most commonly performed procedures in developing countries with variable success rates. Time and route of repair have been debated in the literature. It is surmised that simple, small and low-lying fistulas can be managed by transvaginal repair whereas large, complex and high fistulas should be managed by transabdominal repair with or without tissue interposition.¹² However, with increasing experience, most large, complex and high fistulas are being successfully treated by transvaginal repair. It is minimally invasive and is associated with little blood loss, shorter hospital stay and early resumption of routine activity.¹³ During the last ten years we have been performing transvaginal repair of all cases of VVF reporting to our centre. Irrespective of the size, multiplicity and level of the fistulae all cases are repaired transvaginally. In the present study, we share our experience in managing all vesicovaginal fistulae by our modification of the Letzko technique.

Methodology

This retrospective study was carried out in the Department of Urology and kidney transplantation, Fauji Foundation Hospital, Rawalpindi. Data of patients with VVF who underwent transvaginal repair using a modified Letzko technique from March 2010 to August 2020, was included in the study. The sample size was calculated through Raosoft, with a margin of error of 5%, a confidence interval of 90%, a population size of 20,000, an anticipated population proportion of 84.1%, and was found to be 144.⁹ A record of 144 patients was collected and analyzed. Patients with urethrovaginal fistula, vesicovaginal fistula and concomitant ureterovaginal fistula were excluded from the study. The fistula were labeled trigonal if

they are located at the trigone of the urinary bladder, supratrigonal if they were located above the interureteric bar on urethrocytoscopy. Primary fistula was defined with no prior history of repair of the fistula and the secondary fistula was with a previous attempt at repair. Patients' data was recorded regarding the etiology, size, location and the number of fistulae, hospital stay and complications. Data were analyzed using SPSS version 21. The repair was considered successful if the patient remained continent of urine at 3 month's follow-up. A complication was considered if the patient became incontinent of urine during follow-up or if the patient developed any post-operative hematuria. For qualitative data, percentage and frequencies were calculated and for quantitative data mean±SD were used. A comparison of two quantitative variables was done by using an independent T-test. For categorical variables, the chi-Square test was used. The p value ≤ 0.05 was taken as statistically significant.

All the patients were evaluated schematically by a detailed history and a complete physical examination. Urine routine examination, urine culture and sensitivity, serum creatinine and an ultrasound KUB (kidney, ureter and bladder). A methylene blue dye test was performed on all patients in the ward. An examination under anesthesia, vaginoscopy, cystoscopy and a retrograde ureteropyelography was done to assess the fistula site, size, number and proximity to ureteric orifices. The fistula repair was delayed for 12 weeks after the index surgery to give enough time for tissue inflammation to settle in case of benign etiology. For fistulas of malignant etiology repair is delayed for 12 months after chemoradiotherapy. All vesicovaginal fistulae were repaired by a Letzko technique described below.



Figure 1: Patient position.

- 1. Exaggerated lithotomy with head end tilted 30 degree down.**
- 2. Patient's buttocks projecting from the end of the table.**

Patients were administered general anesthesia and placed in an exaggerated lithotomy position with buttocks positioned beyond the edge of the table and the head end of the table tilted down to 30 degrees to facilitate access to the fistulas (Figure-1). A vaginal speculum examination was done to assess the location, size, and number of fistulae. Vaginal mobility and the extent of fibrosis was also noted. Urethrocytostomy was then carried out to assess the site, size, number of fistulae, proximity to the ureteric orifices and bladder capacity. A close-ended 6Fr ureteric catheter was then passed into the ureteric orifice on each side and bilateral retrograde ureteropyelogram obtained under fluoroscope to confirm the ureteric integrity.

was passed on one or both sides to avoid iatrogenic ureteric injury during the repair. Multiple fistulas less than 1 cm apart were merged and repaired as a single fistula (Figure-2) and those more than 1 cm apart were repaired separately. A Harvard weighted vaginal speculum was placed. Fistulous tract was then probed and dilated by an appropriate size of urethral dilator and a 16Fr Foley catheter passed through the tract and 10 cc distilled water instilled in the balloon and gentle traction was applied on the catheter so that the fistula would get close to the operator and easily accessible. Adrenaline (1:1,000) 50% diluted with normal saline was then injected around the fistula to keep the operative field clear during surgery.

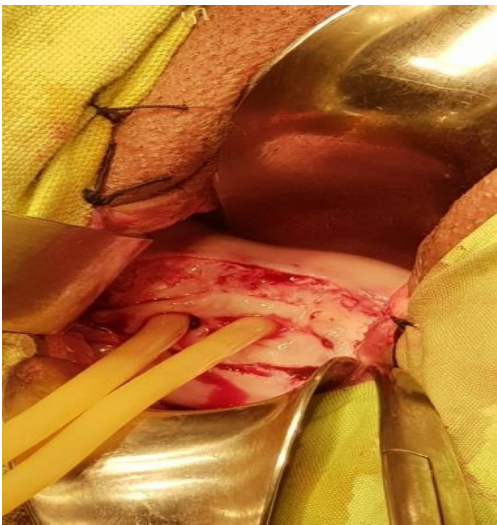


Figure 2: Twin fistulae, vaginal flaps raised.

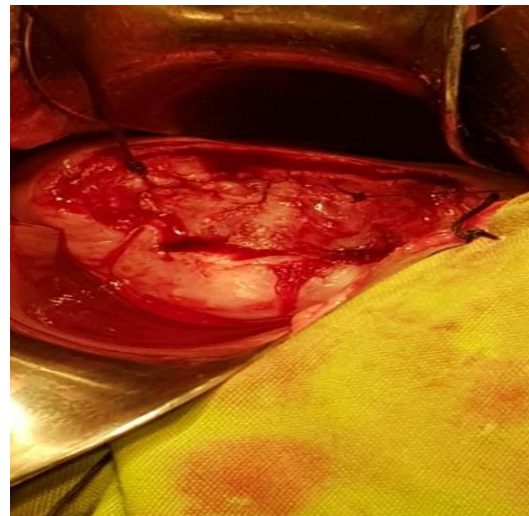


Figure 4: Vesical layer repaired.

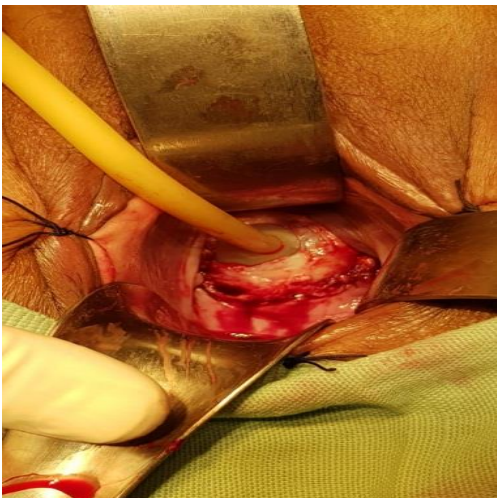


Figure 3: Fistulous tract excised circumferentially.

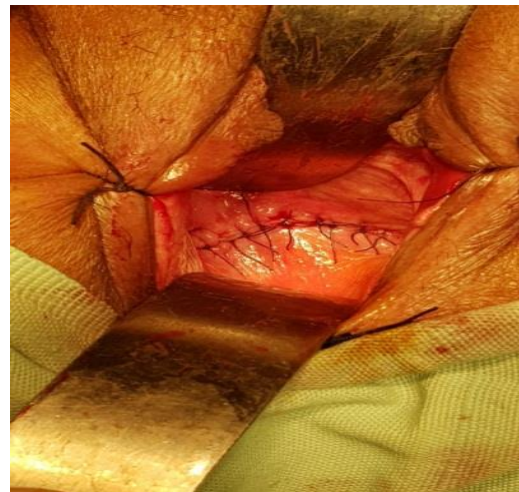


Figure 5: Vaginal layer repaired.

If urethrocytostomy revealed a fistula close to the ureteric orifice, a ureteric catheter size 5 Fr

An elliptical incision was then made around the fistula with No 11 surgical blade and the vaginal

layer was dissected by a combination of sharp and blunt dissection for 1cm all around the fistula leaving the bladder layer intact. The fistula tract surrounded by bladder layer was excised circumferentially (Figure-3). Stay sutures were taken at either side of the bladder layer and the Foley catheter was removed. Watertight repair of the bladder was done in two layers using 3/0 vicryl continuous suture. (Figure-4) In cases of all benign fistulas vaginal repair was then carried out with interrupted vicryl 3/0 suture without any tissue interposition (Figure-5). In cases of malignant pelvic fat interposition was done after a posterior colpotomy. Firm vaginal packing was done. A Foley catheter 20 Fr was passed

transurethrally to provide uninterrupted bladder drainage for 2 weeks. No suprapubic catheter was passed in any case. Vaginal packs were removed on the second postoperative day in the ward. Patients were discharged on 3rd to 5th postoperative day and called for follow-up on 14th postoperative day when the Foley catheter was removed. Patients were then followed up at 1 month and then at 3 months and evaluated clinically for any urinary leakage.

The ethical approval was obtained from ethical review committee of Fauji Foundation Hospital, Rawalpindi vide reference no. 449/RC/FFH/RWP.

Table 1: Vesicovaginal fistula: etiology, type, number, location and complication.

VVF	Etiology			Type		Number			Location			Size (cm)			Complications			
	Abdominal	Vaginal	C section	Obstructed labour	Primary	Secondary	Single	Double	Three	Supra trigonal	Bladder dome	Trigonal	<1	1-2	2-3	3-4	Hematuria	Failed repair
N=144	134	4	4	2	138	6	120	20	4	134	6	4	77	43	18	6	6	2
%	93	2.7	2.7	1.3	95.4	4.6	81.9	31.8	2.8	93	4.1	2.8	53.5	29.9	12.5	4.1	4.2	1.4

Table 2: Analysis of variables affecting transvaginal repair of vesicovaginal fistula.

Variable	Successful repair	Failed repair	Hematuria	Chi-square	p value
Etiology				35.21	0.000
	Hysterectomy	133	1	6	
	C section	4	0	0	
	Obstructed Labor	3	1	0	
Type				.368	0.83
	Primary	136	2	6	
	Secondary	6	0	0	
Number				2.10	0.71
	Single	120	2	4	
	Double	20	0	2	
	Three	4	0	0	
Location				17.16	0.002
	Supra trigonal	134	1	6	
	Trigonal	4	1	0	
	Bladder dome	6	0	0	
Size				50.89	0.000
	< 1cm	77	0	2	
	1-2cm	46	1	4	
	2-3cm	18	0	0	
	3-4cm	3	1	0	

Results

A record of 144 patients with VVF was included in the study. The patient's age ranged from 29 to 68 (mean 48.5) years. Of these, 134 (93%) were due to iatrogenic injury during transabdominal hysterectomies (for uterine fibroid and gynecological malignancies), 4 (2.7%) for transvaginal hysterectomies, 4 (2.7%) were post-Cesarean section and 2 (1.3%) was due to obstructed labor. A total of 138 (95.9%) fistulas were primary fistulas with no prior history of repair whereas 6 (4.1%) were recurrent fistulas with a previous history of repair. Time to present after fistula formation was quite variable 2 to 960 (mean 481) weeks. Of the total 118 (81.9%) were single fistulas, 20 (13.8%) were double fistulas and 4 (2.7%) were 3 in number. Fistula size ranged from 1 to 4 (mean 2.5) cm. The 140 (97.2%) were supra-regional in location and only 4 (2.7%) were trigonal. The time of intervention ranged from 12 to 56 (mean 34) weeks. The duration of hospital stay ranged from 3 to 5 (mean 4) days. In 136 (94.4%) cases no postoperative complications were observed. Hematuria was observed in 6 (4.2%) which was successfully managed conservatively. Recurrence was observed in 2 (1.4%) patients, Table-1. Location (p -value = 0.002), etiology (p -value = 0.000) and size (p -value = 0.000) of VVF were found to be significant factors affecting the outcome, Table-2.

Discussion

Vesicovaginal fistula is the most common acquired fistula of the urinary tract which leaves the affected women with persistent leakage of urine through the vagina causing odour, discomfort, recurring infections and serious social and psychological problems. Affected patients are prohibited by their families to cook food and sharing utensils. This may lead to depression, marital breakdown and becoming an outcast from family and society. It is estimated that some 70-90% of women with this condition in Pakistan and India are abandoned or divorced.¹¹

Hysterectomy is the most common cause of VVF in developed nations hence attention became focused on the overuse of hysterectomy and it was emphasized that too many unnecessary hysterectomies were being performed. This important issue is still debated in scientific as well as lay publications. During the past two decades, alternatives to hysterectomy have emerged to prevent VVF formation. Treatment options for benign uterine diseases now include novel medical

and surgical therapies. Despite the intensive argument, the rate of hysterectomy continues to rise with only a small decline happening in the last few years.¹⁴ In developing countries, the situation is even worse where these surgeries are performed by inappropriately trained surgeons.¹⁵

In the present study, 95.8% of VVF cases were due to an iatrogenic injury during a hysterectomy and only 4.2% of cases were due to obstetric injury. Similar results have been reported by Ashraf et al., where 88.2% of their patients had VVF due to iatrogenic injury whereas 11.7% had an obstetric injury.¹⁶ Similar etiology has been reported in studies from Thailand and Singapore.^{17,18} Whereas Hillary et al. in their systemic review reported that 83.2% of VVF were iatrogenic following gynecological procedures.¹ Similar results have been reported in India.^{19,20} There is significant variability in the etiology of VVF in Pakistan as reported by different studies. This difference may be due to regional variability in the socioeconomic status, level of education and availability of healthcare facilities. Generally, fistulas with an obstetrical etiology are considered more likely to recur,²¹ we also found a statistically significant association as out of two failed repairs in our series one patient had an obstetrical fistula.

The location of VVF is an important factor affecting the outcome of the repair. It is reported that fistulas located at the trigone are more likely to recur as compared to those located superior to the trigone.¹¹ Since these fistulas are mostly obstetrical and form because of excessive tissue ischemia and necrosis due to obstructed labor. We also found a significant association between fistula location and recurrence as in one out of two failed repairs in our study, the fistula was located at trigone.

In the present study, the duration between VVF formation and presentation was extremely variable. It ranged from 0.5 to 240 (mean 120.5) months. One of our patients belonging to a remote area of Azad Kashmir presented 240 months after fistula formation due to obstructed labor. Javed et al in their retrospective analysis of 1003 patients reported a mean duration of 58.14±302.7 months.²² This extreme delay in treatment may be due to low literacy, poor socioeconomic status, embarrassment, self-neglect and psychological factors in these patients.

Poor surgical success has been associated with recurrent VVF in some series as reported by Jadav RR et al and Javaid A et al, while others did not find such an association.^{13,22} We did not find any association in our series as we had 6 cases with a previous history of repair and all these cases were successfully managed by Transvaginal repair.

In the present study, 6 patients had self-limiting hematuria. Khan also reported hematuria postoperatively in some of their patients after VVF repair.²³ None of our patients developed clot retention as described by Sheikh et al in one of their patients after the transvaginal repair of VVF.²⁴

In the present study, we used a transvaginal approach to repair the vesicovaginal fistula and the success of repair was 98%. In another study conducted in India, the transvaginal route using a Foleys catheter has high success and less morbidity.⁹ Therefore, we recommend that the transvaginal route should be preferred over an abdominal route for vaginally accessible VVF both of obstetric and gynecological origin. Ansquer et al²⁵ reported a 100% success rate while Stamatakos et al reported a 91% success rate after transvaginal repair of VVF in women following benign gynecologic surgery.²⁶

Recurrence was observed in two cases in our series. One case was due to obstructed labor resulting in a single, large 4cm trigonal fistula and the second case was post hysterectomy single 2cm supranational fistula that presented with urinary leakage on the 17th and 19th postoperative day respectively. Both cases were initially managed conservatively and a subsequent successful transvaginal repair was done after 3 months. For obstetric fistula, delaying repair is appropriate so that necrotic tissues slough out and inflammation subsides.²

In our institution, we manage all vesicovaginal fistulae transvaginally by the modified Letzko technique. We propose that all vesicovaginal fistulas except those with ureteric involvement can be successfully managed by a transvaginal repair with minimal morbidity and fewer complications.

The transvaginal repair can be carried out in all vesicovaginal fistulae whether primary or recurrent irrespective of its etiology, size, site, and number and in seasoned hands it has a high success rate and minimal complications.

Conflict of interest: None declared.

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