

Management of Genitourinary Fistulas Following Benign Gynecological and Obstetric Procedures: A Single Surgeon Experience

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ABSTRACT **Background:** Genitourinary fistula results in lot of anxiety in the suffering females. Scant literature regarding the comprehensive management of genitourinary fistula i.e. VVF and UVF is available. **Objective:** The aim of the study was to review a single surgeon experience in dealing with these complex situations. **Material and Methods:** We conducted a retrospective, institutional review board approved chart review of patients who underwent genitourinary fistula repair from Jan 2014 till Dec 2019. Of all the fistulas VVF accounted for 18 and UVF for 12 cases. Pre-operative diagnosis in these patients was based predominantly on the history, local examination and cystoscopy. Of the 18 VVF 12 were managed laparoscopically and 6 by open O'Connor's repair. Of the 12 UVF, 8 were managed laparoscopically and 4 by open ureteric reimplants. All were followed up for three months post operatively. **Results:** A total of 30 patients were treated since 2014 till December 2019. Average age for the VVF was 54.72 ± 10.9 years and that for UVF repair was 59.9 ± 7.6 years. Hysterectomies for benign diseases accounted for 66.66% of VVF and 91.6% of UVF. Of the VVF patients one required a ureteric reimplantation, remaining were managed with O'Connors' repair. We had one failure which was successfully repaired after 6 weeks. None of our patients with UVF repairs had a failure at three months follow-up. **Conclusion:** Genitourinary fistulas are a debilitating problem in females but a comprehensive approach regarding diagnosis and treatment can cure these patients.

KEYWORDS: Genitourinary fistula, hysterectomy, laparoscopy

INTRODUCTION

Genitourinary fistula refers to an abnormal communication between the genital and the urinary tracts resulting in continuous incontinence or cyclical hematuria. The condition leads to a lot of anxiety and morbidity in the afflicted women. Vesicovaginal fistula (VVF) is the most common type of genitourinary fistula that occurs following gynecological procedures (reported incidence: 0.8/1000 procedures).^[1] In developing countries, obstructed labor accounts for 97% of VVFs.^[2]

The reported incidence of ureteral injuries following gynecological procedures ranges between 0.5%–14%.^[3] In developed countries, laparoscopic or laparoscopic-assisted hysterectomies account for the majority of ureteric injuries (depending on the

experience of the laparoscopic surgeon). However, in developing countries, gynecological procedures still account for the majority of ureteric injuries.^[3] These injuries usually result from an inadvertent cut, nick, ties, or injudicious use of thermal energy during open or laparoscopic procedures in and around the ureter, especially at the distal ureter (close to the cervix) where it crosses the uterine vessels and the urinary bladder in case of adherent uterus (either due to inflammatory disease or previous surgery). Previous studies have identified various risk factors for ureteric/bladder injury; these include endometriosis, obesity, pelvic inflammatory

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disease, history of radiation therapy, and pelvic malignancy. However, on many occasions, technically easy cases may also lead to formation of genitourinary fistula; Symonds.E.S., attributed these cases to technical or iatrogenic factors.^[4] Therefore, good knowledge of pelvic anatomy is essential to minimize iatrogenic injuries.

Several options for the management of such fistulas have been discussed in the literature; these include conservative treatment, open surgery, cysto-fulguration, endourology, and laparoscopy/robotic surgery.^[5-10] The decision-making is guided by the patient characteristics, etiology, and the experience of the treating surgeon.

There is a plethora of literature pertaining to the management of individual types of genitourinary fistula, i.e., VVF and ureterovaginal fistula (UVF); however, very few studies have investigated the overall management of both types of genitourinary fistulas in a single study. In this study, we analyzed the occurrence of genitourinary fistulas following obstetric and gynecological pelvic surgeries in a resource-constrained setting. In particular, we examined the patient characteristics, surgical approaches, and the outcomes. The aim of the study was to review a single surgeon experience in dealing with these complex cases and providing the best outcomes in patients with genitourinary fistulas.

MATERIALS AND METHODS

We conducted a retrospective, Institutional Ethics Committee approved chart review of all patients who underwent repair of genitourinary fistula following iatrogenic injury at our units between January 2015 and December 2019. A total of 30 patients were included in this study; of these, 18 patients had VVF while 12 patients had UVF.

Preoperative diagnosis was based predominantly on the history of continuous incontinence post gynecological procedure. Radiological investigations included basic ultrasound in all the patients and intravenous urography (IVU)/computed tomography (CT) urography to rule out any concomitant ureteric fistula. This was followed by local examination to assess any vaginal defect and cystoscopic evaluation of the VVF, wherein in the characteristics of fistula were noted, especially size (mm), site (supra or infratrigonal), and its relationship (proximity) to the ureteric orifice. These factors facilitated in planning surgery.

Patients with suspected UVF also underwent cystoscopy and a retrograde study (using 5 fr ureteric catheter) was performed under anesthesia in addition to IVU/CT urography. The objective was to assess the bladder capacity and determine the exact site of the ureteral injury. An

ultrasound guided percutaneous nephrostomy (PCN) was placed in all these patients on the affected side. In case of the collapsed system, the PCN was placed under fluoro guidance after delineating the pelvicalyceal system following injection of intravenous contrast. PCN was removed on the first postoperative day following an uneventful definitive repair of the UVF.

In addition to the routine work up (biochemical and preanesthetic checkup) for surgery, all patients received betadine vaginal washes and tablet metronidazole 400 mg twice a day 48 h prior to surgery. For patients with post obstetrical VVF, a waiting period of 3 months was mandatory whereas a period of 4–6 weeks was provided for patients with posthysterectomy VVF (laparoscopic or open). For UVF, a waiting period of 4–6 weeks was observed prior to the definitive repair.

Of the 18 VVFs, six were repaired by standard open O'Connor's repair and the remaining 11 were repaired using transperitoneal laparoscopic technique as reported by us in 2010 (mini O'Connorcystotomy).^[10] One patient with complex VVF required left ureteric reimplantation in addition to VVF repair. Regarding the UVF, 4 cases were repaired using open technique; of these 3 patients underwent simple ureteric reimplantation (modified Lich Gregoir technique) while one patient required a Boari flap for a tension free anastomosis. The remaining 8 patients with UVF underwent transperitoneal laparoscopic ureteric reimplantation (modified Lich Gregoir technique) using 4-0 vicryl (26 mm 3/4th circle needle). All UVF patients had DJ stent in place which was removed after 3 weeks.

All patients with VVF were discharged on the third postoperative day after the removal of the vaginal pack and first dressing and were prescribed an

Table 1: Demographic and clinical characteristics of patients with vesicovaginal fistula (n=18)

Parameter	Value
Age (years)	54.72±10.9
Body mass index (kg/m ²)	23.5±1.9
Size (cm)	2.02±1.5
Site	
Supratrigonal	17
Trigonal	1
Start of incontinence (postoperation day)	8.9±2.4
Average time to repair (postoperative weeks)	14.11±4.5
Etiology	
Posthysterectomy	12
Post-LSCS	5
Re do VVF	1

LSCS: Lower segment cesarean section, VVF: Vesicovaginal fistula

anti-cholinergic (tablet darifenacin 7.5 mg). First follow-up of patients after repair of VVF was after 2 weeks of suture removal followed by per urethral catheter removal and voiding trial after clamping of the suprapubic catheter (SPC). This was followed by removal of the SPC.

Patients who had undergone UVF repair were followed up on the 3rd week for removal of the DJ stent. These patients were serially followed up with routine urine examination and ultrasound KUB region on monthly basis for three consecutive months, followed by an IVU at the end of 3 months' post-DJ removal.

RESULTS

The demographic and clinical characteristics of patients with VVF are summarized in Table 1. Of the total 18 patients with VVF, 6 patients underwent open repair through the standard O'Connors' approach and one patient required ureteric reimplantation in view of the fistula location which was juxta left ureteric orifice. As we graduated to the laparoscopic approach, all fistulas since 2017 are repaired by transperitoneal laparoscopic mini O'Connor's approach. In all, 11 fistulas were repaired laparoscopically. Irrespective of the technique used (i.e., open or laparoscopy), all patients had a SPC 20 fr two way along with a perurethral catheter 18 fr two way so as to facilitate unhindered drainage of urine. In addition, all patients had a drain *in situ* which was removed on 3rd–4th postoperative day once the drainage was ≤ 50 mL. The open and laparoscopy groups were comparable with respect to blood loss (mean: 82.54 ± 12.7 vs. 72.84 ± 14.7 mL, respectively), changes in pre- and post-operative creatinine levels, and drain output (data not shown). None of the patients in either groups required blood transfusion. However, patients in the laparoscopy group showed early initiation of orals, lesser days to ambulation, and less requirement of analgesia (data not shown). Moreover, the scar was less conspicuous in the laparoscopy group.

Twelve patients with UVF required ureteric reimplantation. Of these, 3 patients underwent open retroperitoneal and 8 patients underwent transperitoneal laparoscopic reimplantation (direct anastomosis^[3] and modified Lich-Gregoir technique^[5]) using three ports. One patient required open Boari flap with DJ stenting. Of all these reimplants, psoas hitch was done in 9 patients and direct reimplantation without tension was feasible in 2 patients. One patient required a Boari flap repair. The demographic, clinical, and surgical characteristics of patients with UVF are summarized in Table 2. The open and laparoscopy groups were comparable with respect to blood

Table 2: Demographic, clinical and surgical details of patients with ureterovaginal fistula (n=12)

Parameter	Value
Age (years)	59.9±7.6
Body mass index (kg/m ²)	25.5±2.7
Side involved (left:right)	9:3
Level of injury	
Juxta vesical	9
Lower SI joint	2
Mid SI joint	1
Start of incontinence (postoperation day)	6.9±2.4
Average time to repair (postoperative weeks)	14.05±9.1
Etiology	
Posthysterectomy	11
Post-LSCS	1
Mean hospital stay (days)	4.5±2.1

LSCS: Lower segment cesarean section, SI: Sacroiliac

loss (90.54 ± 12.5 vs. 79.84 ± 16.7 mL, respectively), change in pre- and post-operative creatinine levels, or drain output (data not shown). None of the patients in either groups required blood transfusion. However, patients in the laparoscopy group showed early initiation of orals, lesser days to ambulation, and less requirement of analgesia (data not shown). Moreover, at 3 months, there was hardly any noticeable scar in the laparoscopy group. We had a 100% success rate in the treatment of UVF with either technique, i.e., open or laparoscopy. These patients were followed up for 3 months post-DJ stent removal and underwent monthly ultrasonography and urine routine examination. IVU was performed at the end of 3 months to assess any obstruction in the implanted ureter.

Regarding the complications, 2 patients who underwent open VVF repair developed wound infection at the incision site. Swab test was positive for *Staphylococcus aureus* and this patient responded to culture sensitive oral antibiotics and dressings. One patient who underwent ureteric reimplantation developed postoperative fever. Her urine culture was positive for *E. coli* and she responded to culture sensitive antibiotic and prolonged PCN drainage.

None of the patients undergoing laparoscopic surgery required conversion to open procedure. One laparoscopic VVF repair developed failure on 6th week; redo laparoscopic repair was successfully performed after 6 weeks of diagnosis.

DISCUSSION

Genitourinary fistula (VVF or UVF) is a debilitating condition for women. The first documented record of VVF following obstructed labor dates back to 1550 BC.^[11] Hysterectomy is the commonest cause

of VVF; transvaginal approach accounts for 0.2 per 1000 hysterectomies, followed by transabdominal (1:1000), and laparoscopic procedures (2.2:1000). The supratrighonal area is the most common site of VVF.^[12] Similar findings were observed in our study wherein 17 out of the 18 VVF (94.44%) were located in the supra trigonal close to the level of vaginal cuff. In our study, 17 out of 18 VVF occurred following surgical intervention. Hysterectomies accounted for 12 of the 18 VVF (66.66%). Of these 12 cases, 9 occurred after laparoscopic hysterectomy and 3 after open hysterectomy. The higher incidence of VVF following laparoscopic hysterectomy (75%) in our cohort may be attributable to the initial learning curve for laparoscopy, as laparoscopic approach has recently been started at the gynecology department of our institute. History of previous surgery is one of the risk factors for genitourinary fistula following the laparoscopy approach. Of the 9 patients who developed VVF, 8 patients had a history of previous lower segment cesarean section (LSCS) (mean LSCS: 2.1 ± 1). We believe that postoperative adhesions at the level of vault along with inadvertent use of energy source can be one of the reasons for the increased incidence of VVF following laparoscopic hysterectomy.

Different methods for the treatment of VVF have been described in the literature starting from fulguration, use of glue and prolonged catheterization for small fistulae, open repair, and laparoscopic and robotic surgery. There is no general consensus with respect to the best approach as the main aim of treatment is to render the female continent and sexually active again. Therefore, the approach will depend on the confidence of the surgeon and the available facilities. Time to repair from the history of fistula was variable depending on the etiology and presentation though different people follow different approaches.^[13] This we believe is because the best approach to repair is the first attempt which is associated with success rates of up to 97%.^[14] The success rate in our study was 94.44% (17/18) in the first attempt and 100% after the redo for one patient. For patients who developed the fistula following LSCS, we waited for 12 weeks to repair; for patients who developed fistula following hysterectomy, we waited for at least 6 weeks for the inflammation to subside. All patients underwent transabdominal repair. Initially we were doing open repair; however, the last 11 patients underwent laparoscopic repair with one failure which was subsequently successfully repaired laparoscopically after 4 weeks.

Of the 30 patients with genitourinary fistulas, 12 patients (40%) had UVF. The incidence of UVF is

variable with laparoscopic hysterectomy accounting for maximum cases. In one study, the incidence was 13.9 per 1000 after laparoscopic as compared to 0.4 per 1000 after total abdominal hysterectomy and 0.2 per 1000 after vaginal hysterectomy; that following LSCS was 0.9 per 1000.^[15,16] In one study, hysterectomies accounted for 54% of iatrogenic ureteric injuries. In our series, the high incidence of UVF is attributed to the learning curve for our gynecological surgeons as 11 of the 12 cases (91.6%) occurred following hysterectomy; of these, 10 (90%) occurred following laparoscopic hysterectomy. The most common site of injury was the lower ureter where it crosses close to the cervix and left side ureters accounted for 75% of the cases; this is consistent with the published literature.^[17,18] Of the 12 patients with UVF, 3 patients underwent open repair and 8 underwent transperitoneal laparoscopic approach with DJ stenting. Non refluxing modified Lich-Gregoir technique was the technique of choice; however, in cases where a tunnel could not be created a direct reimplantation was performed with no adverse sequelae. Non refluxing reimplantation, i.e., simple end-to-side anastomosis is an accepted method in adults and is not associated with any long-term problems.^[19] We experienced no failures following ureteric reimplantation as we had made a conscious effort to spatulate and anastomose without tension. In case of any tension, psoas hitch was done. In our series, 10 out of 12 patients required a psoas hitch so as to attain a tension-free anastomosis. These patients were followed up to 3 months postoperatively with IVU at 3 months to ensure unobstructed drainage. Our results of repair are consistent with previous studies that documented 100% success rates in dealing with such fistulas.^[3]

Previous reports have described endoscopic management of UVF with placement of DJ stent/Memokath™ 051 stent (PNN A/S, Hornbaek, Denmark) with varying success rates (59.4%); however, we did not follow the same approach owing to the late presentation of patients (usually beyond 2 weeks of injury); therefore, we resorted to a definitive staged repair, i.e., PCN followed by open or laparoscopic reimplantation.^[20,21]

The single-center scope of the study, the small sample size of patients, and the effect of potential selection bias on our results are the main limitations of our study. We could not statistically compare the outcomes between the laparoscopic and open surgery subgroups of patients with VVF and UVF due to inadequate statistical power. However, our study provides meaningful insights for the management of genitourinary fistulas in a typical resource-constrained setting.

CONCLUSION

Genitourinary fistula is a debilitating condition in women. A comprehensive approach towards diagnosis and treatment can cure these patients. The management approach can be tailored according to the experience and expertise of the treating surgeon so as to achieve the best results. The laparoscopic approach is associated with minimal morbidity.

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Conflicts of interest

There are no conflicts of interest.

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