Urethrovaginal fistula repair with or without concurrent fascial sling placement: A retrospective review

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Abstract

Introduction: We sought to review outcomes of urethrovaginal fistula (UVF) repair, with or without concurrent fascial sling placement.

Methods: All patients diagnosed with UVF at our center from 1988–2017 were included in this study. Patient charts were reviewed from a prospectively kept fistula database, and patient characteristics and surgical outcomes were described. Descriptive statistics were applied to compare complication rates between patients with or without fascial sling placement at the time of UVF repair.

Results: A total of 41 cases of UVF were identified, all of which underwent surgical repair. Median age at diagnosis was 49 years (interquartile range [IQR] 35–62). All patients had undergone pelvic surgery. UVF etiology was secondary to stress urinary incontinence (SUI) surgery in 17 patients (41%) and urethral diverticulum repair in seven patients (17%). The most common presenting symptom was continuous incontinence in 19 patients (46%). Nineteen patients had a fascial sling placed at the time of surgery (46%), with no significant difference in complication rates (26% vs. 23%, p=0.79). Two patients had Clavien-Dindo grade I complications (5%) and one had a grade III complication (2%). Four patients had long-term complications (10%), including urinary retention, chronic pain, and urethral stricture. Two patients had UVF recurrence (5%). Median followup after surgery was 21 months (IQR 4–72).

Conclusions: UVF should be suspected in patients with continuous incontinence following a surgical procedure. Most UVF surgical repairs are successful and can be done with concurrent placement of a fascial sling.

Introduction

Urethrovaginal fistula (UVF) is an abnormal connection between the urethra and vagina. It is a rare complication in the developed world and is most often due to iatrogenic injury from pelvic surgery. Less common etiologies include urethral instrumentation, trauma, radiation, and complications from labor.[1,2] UVF has also been reported as a rare complication of anti-incontinence sling procedures, including tension-free transvaginal tape (TVT) and transobturator tape placement,[3] likely secondary to tension necrosis of the urethra.[4-6]

Continuous incontinence associated with UVF may mask associated stress urinary incontinence (SUI). Simultaneous surgical correction of incontinence at the time of UVF repair to avoid a secondary surgical intervention is controversial,[7,8] however, small cohort studies have reported concomitant incontinence procedures with success.[9,10] Literature on long-term assessment and postoperative outcomes of UVF repair with or without fascial sling placement is lacking, largely due to low case volumes. In this study, we review our experience with UVF repairs, with a large proportion of simultaneous fascial sling placements.

Methods

Data collection and analysis

Research ethics board approval was obtained from our institution prior to initiation of this study (REB #330-2019). Forty-one patients diagnosed with UVF at our center from 1988–2017 were identified and reviewed using a prospectively maintained urogenital fistula database. No patients with UVF were excluded from this study. Preoperatively, all patients were evaluated with history, physical examination, vaginal speculum exam, and cystoscopy with urethroscopy. Diagnosis of UVF was made using urethroscopy or urethrogram to identify evidence of an abnormal connection between the urethra and vagina**.** Select patients had computed tomography (CT) scan and magnetic resonance imaging (MRI) to gain further information on diagnosis. Surgical management of UVF is described in the section below, with 19 patients having concurrent placement of a pubovaginal sling (PVS) with autologous rectus sheath. Postsurgical followup was designated at one month, three months, and then

arranged on a patient-by-patient basis. Prospective data collection included patient baseline characteristics, fistula etiology, presenting symptoms, fistula size, surgical intervention, intraoperative complications, hospital length of stay, fistula recurrence, postoperative and one-year complications, and long-term followup, where available.

Results are presented to show differences between patients who had fascial slings and those who did not. Continuous, non-normally distributed data were presented as medians, with interquartile ranges (IQR). Complication rate was defined as a total of postoperative complications, long-term complications, and UVF recurrence. Descriptive statistics were used to compare the complication rates of patients who had a fascial sling placed at the time of UVF repair to those who did not. Descriptive statistics were also used to determine differences between patients who had a complication and those who did not. Continuous data were analyzed using the Wilcoxon rank-sum test and categorical data were analyzed using the Chi-squared test and the Fisher exact test when expected cell counts were <5. All data analysis was performed using SAS University (SAS Institute Inc.), with a p-value <0.05 considered a statistically significant difference.

Surgical technique

All UVFs were repaired by a single surgeon at a tertiary care institution. Surgical repair was done using a transvaginal approach, and 9/41 (22%) women required a Martius flap. Mono-filament absorbable suture 3-0 or 4-0 was used for multilayer closure. Concomitant anti-incontinence procedures with PVS placements using autologous rectus sheath were offered to patients with bothersome SUI and done in 19/41 (46%) patients, where SUI was diagnosed with a combination of history, physical examination, and urodynamics. One patient had a labial flap urethral reconstruction, and one patient with a continent diversion had a concomitant bladder neck closure. Postoperatively, patients had either placement of a suprapubic tube (SPT) with urethral Foley catheter, or urethral Foley catheter alone. All patients gave informed consent for surgical treatment.

Results

We identified 41 cases of UVF, all of whom underwent surgical repair. The median age at diagnosis was 49 years (IQR 35–62). We identified 16/41 (39%) patients as smokers. Two patients had a diagnosis of malignancy, one patient had undergone pelvic radiation, one patient had diabetes, and one patient was on chronic steroids. All patients had undergone prior pelvic surgery, with 21/41 patients (51%) having had some form of surgery to treat SUI, 10/41 (24%) patients having had a hysterectomy, and 8/41 (20%) patients having had a urethral diverticulum repair (Table 1). SUI surgery included mid-urethral slings, PVS, Burch colposuspension, anterior repair, and needle suspension.

The most common presenting symptom was continuous incontinence, seen in 19/41 patients (46%). Other presenting symptoms included SUI, urgency, recurrent urinary tract infections (UTIs), difficult urethral catheterization, and difficulty voiding. The etiology of UVF was secondary to SUI surgery in 17/41 patients (41%) (nine of whom had vis-

Table 1. Patient characteristics

	Patient cohort n=41	Fascial sling placement n=19 (46%)	No sling placement n=22 (54%)
	n (%)	n (%)	n (%)
Age (years), median (IQR)	49 (35–62)	49 (40–62)	44.5 (31–62)
Medical history			
Smoker	16 (39)	10 (53)	6 (27)
Malignancy	7 (17)	3 (16)	4 (18)
Pelvic radiation	2 (5)	1 (5)	1 (5)
Diabetes mellitus	1 (2)	1 (5)	0
Chronic steroid use	1 (2)	1 (5)	0
Presenting symptom leading to investigations			
Continuous incontinence	19 (46)	6 (32)	13 (59)
SUI	18 (44)	10 (53)	8 (36)
Urgency	7 (17)	3 (16)	4 (18)
Recurrent UTI	3 (7)	0	3 (14)
Difficult catheterization	3 (7)	1 (5)	2 (9)
Difficulty voiding	1 (2)	1 (5)	0
Etiology of fistula			
SUI surgery	17 (41)	10 (53)	7 (32)
Visible mesh erosion	9 (22)	4 (21)	5 (23)
Urethral diverticulum repair	7 (17)	6 (32)	1 (5)
Forceps delivery	6 (15)	2 (11)	4 (18)
Vaginal surgery	4 (10)	0	4 (18)
Catheterization	2 (5)	0	2 (9)
Cystectomy	2 (5)	0	2 (9)
C-section	1 (2)	0	1 (5)
Radiation	1 (2)	0	1 (5)
Unknown	1 (2)	1 (5)	0
Time to presentation (months), median (IQR)	12 (4–40)	14 (5–48)	11.5 (4–30)
Size of fistula (mm), median (IQR)	5 (3–10)	4 (3–10)	8 (4–10)
Concomitant fistula			
Vesicovaginal fistula	2 (5)	0	2 (9)
Ureter-vaginal fistula	1 (2)	0	1 (5)
Length of stay (days), median (IQR)	3 (2–7)	2 (1–4)	5 (3–8)
Followup (months), median (IQR)	21 (4–72)	21 (4–56)	26 (4–76)

IQR: interquartile range; SUI: stress urinary incontinence; UTI: urinary tract infection.

ible mesh erosion), and urethral diverticulum repair in 7/41 patients (17%). Two patients had concomitant vesicovaginal fistulae (VVF), and one patient had concomitant VVF and uretero-vaginal fistula. Twelve of 41 patients (29%) had a failed surgical repair before referral to our center. The median duration of time from fistula diagnosis to presentation at our center was 12 months (IQR 4–40). Nineteen of 41 patients (46%) had a PVS placement at the time of surgery. Differences in the baseline characteristics of patients who had PVS placement vs. those who did not can be seen in Table 1. The median followup after surgery was 21 months (IQR 4–72). The median duration of hospital stay was three days (IQR 2–7).

Intraoperative complications were rare, with one patient requiring a blood transfusion. Two patients had Clavien-Dindo grade I complications (5%) and one patient had a grade III complication (2%). The patient with a grade III complication required re-insertion of her SPT under general anesthesia after postoperative displacement and failed reinsertion at the bed side. By one year, 6/41 (15%) patients had complications, which included urinary retention, chronic pain, urethral stricture, and UVF recurrence (Table 2). Both cases of urinary retention resolved without intervention within three months. UVF recurrence occurred in 2/41 (5%) patients. One patient, whose UVF occurred after cystectomy with neobladder creation for urothelial cancer, had a short-term recurrence with continuous incontinence and was managed surgically with creation of a continent catheterizable stoma and bladder neck closure. The second patient with UVF recurrence had a complicated course with a history of multiple labial surgeries for labial cysts and urethral-cutaneous fistula. She had a small UVF recurrence after transvaginal repair with Martius flap with minimal symptoms. Lower urinary tract symptoms were common postoperatively, with 11/41 (27%) patients with urgency incontinence, 10/41 (24%) patients with SUI, 8/41 (20%) patients with urgency, and 4/41 (10%) patients with frequency.

Patients who had PVS placement were no more likely to have a postoperative complication (26% vs. 24%, p=0.79). Two patients had fistula recurrence, neither of which had had PVS placement. No significant difference was found in postoperative complication rates between patients who had had prior repairs and those undergoing a primary repair (25% vs. 21% p=1.0), nor were there any differences found in fistula size, whether or not the patient had had prior SUI surgery or had visible mesh erosion or was a smoker (Table 3). Patients who had PVS placement had a 10.5% rate of postoperative SUI (2/19) vs. a rate of 31.8% of postoperative SUI in patients who did not have slings (7/22).

Of the 22 patients who did not have concomitant fascial sling placement, one went on to have a facial sling placed two years after surgery. This patient originally presented with fistula secondary to mesh erosion and underwent fistula repair with mesh removal. At presentation, this patient had mild SUI and chose to forgo concomitant sling placement.

Table 2. Complications following surgical management of UVF

	Total cohort n=41	Fascial sling placement n=19 (46%)	No sling placement n=22 (54%)
Postoperative complications			
Clavien-Dindo grade			
I: Hypertension requiring medical treatment; superficial labial wound breakdown – self-resolving	2	2	0
IIIb: Suprapubic tube placement in OR	1	1	0
Total	**3**	**3**	**0**
Long-term complications			
Urinary retention	2	2	0
Chronic pain	1	0	1
Urethral stricture	1	0	1
Fistula recurrence	2	0	2
Total	**6**	**2**	**4**

OR: operating room.

Discussion

In this series, 98% of UVFs were secondary to iatrogenic causes, in keeping with the limited literature on UVF in the developed world. UVF as a complication of anti-incontinence synthetic sling placement has been reported,[11-14] and in our cohort, we found 41% of UVFs were secondary to prior SUI surgery, 53% of which were due specifically to mesh erosion. While the overall risk is low, patients undergoing anti-incontinence sling procedures should be counselled on the risk of developing UVF. Avoiding UVF as a complication from urethral surgery includes mitigating risk factors for fistula formation where possible. In general, risk factors for genitourinary fistula include scarring from prior surgery, poor tissue healing, radiation, infection, inexperience of the surgeon, or poor surgical technique.[12,15] We found a

Table 3. Comparison of patients with complications post-UVF repair vs. those without

Variable	Complication n=9 n, (%)	No complication n=32 n, (%)	p
Fascial sling placement at time of surgery	5 (56)	14 (44)	0.71
Previous surgical repair	3 (33)	9 (28)	1.0
Size of fistula >5 mm	3 (33)	14 (44)	0.71
Prior SUI surgery	4 (44)	17 (53)	0.72
Visible mesh erosion	1 (11)	8 (25)	0.73
Smoker	3 (33)	13 (41)	1.0

SUI: stress urinary incontinence; UVF: urethrovaginal fistula.

high proportion of women with UVFs to be smokers (39%), known to be associated with poor tissue healing, and all patients had had some form of prior pelvic surgery. Almost 30% percent of our cohort had a failed surgical repair of UVF prior to referral to our center. Of note, these patients did not have a higher complication rate postoperatively than those patients undergoing primary UVF repair.

Symptoms of UVF include incontinence, urgency, UTIs, and difficulty with catheterization. We found the most common presenting symptom to be continuous urinary incontinence, often associated with proximal urethral fistula or bladder neck fistula. We recommend that patients with continuous incontinence following pelvic surgery be evaluated for UVF with history, physical examination, speculum examination, cystoscopy, and urethroscopy.

The mainstay of UVF treatment is primary closure, with or without Martius flap, with a success rate of 82–95% in small cohort studies.[7,16-18] This is comparable to our findings of success in 95% of patients, some of whom had prior failed surgical repairs at lower-volume centers. Surgical repair of urethral fistulas can be challenging, often due to a lack of local viable tissue.[19] We found a 93% success rate in repair using the transvaginal approach in 39/41 patients, with multilayer closure with or without Martius flap interposition as needed. Transvaginal repair is preferred, as it is associated with lower analgesic use, shorter hospital length of stay, and lower costs.[20] For more complicated cases at the bladder neck, combined transvaginal-transabdominal approach may be required.

SUI is common after UVF repair, masked preoperatively by continuous incontinence, or as a function of sling removal, and is seen in as many as many as 50% of patients.[21] Whether or not SUI can be treated at the time of UVF repair is controversial, with small cohort studies showing success.[9,10] In our series, 19/41 (46%) patients had a fascial sling placed at the time of surgery, without recurrence of fistula or need for sling removal. We found no significant difference in postoperative complication rates between those who had sling placement and those who did not. Mesh sling placements at the time of UVF repair are not recommended due to the risk of mesh erosion.

Short-term complications of UVF repair found in this study included postoperative hypertension, exterior wound break down, and SPT misplacement. Long-term complications included UVF recurrence, UTI, chronic pain, and urethral stricture. A total of 8/41 patients (20%) had complications, with only two patients experiencing a fistula recurrence (5%). Complication rates found in the literature range from 7–75%, with a recurrence rate of 10–33%.[7,8,21,22]

The main limitation of our study is that our data are from a single-surgeon, single-institution cohort. The interpretation of our data is limited due to the rarity of UVF and by the small sample size, resulting in low statistical power.

Conclusions

Although UVF is rare, it should be suspected in patients with continuous incontinence, especially following a surgical procedure. In this large series, most UVF transvaginal surgical repairs are successful and can be done with concurrent placement of a fascial sling, if necessary. Secondary surgical repairs are also successful and can be repaired in the same manner as primary UVF.

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