Original Article

Surgical Management of Genitourinary Fistula

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Abstract

Objective: To determine the commonest cause of genitourinary fistulae and evaluate the experience of the surgical management. The study was carried out at the Urology Department, Jinnah Postgraduate Medical Centre (JPMC), Karachi.

Methods: Twenty two patients were operated including 14 of Vesicovaginal Fistula (VVF), and 8 of Ureterovaginal Fistula (UVF). In one patient of VVF fistula was extending up to proximal urethra. Out of 14 VVF cases, 9 patients underwent transvaginal repairs, 1 extraperitoneal transvesical repair and 1 transperitoneal repair. Three urinary diversions including 1 Mitrofanoff and 2 ileal conduits were also made. Ureteroneocystostomy was done in cases of UVF with adjuvant procedures in 3 cases including Psoas Hitch in 1 and Boari's flap in 2 patients.

Results: The mean age was 35 (range 21-50) years. VVF due to obstetric causes was seen in 71.4% patients while 28.6% developed VVF secondary to gynaecological procedures. Majority of (91%) VVF were repaired successfully in the first attempt in patients subjected to the procedure (78.6% cases of VVF). There was only one recurrence in transvaginal repair, which was successfully treated with extraperitoneal transvesical approach in second attempt, thus augmenting the success rate to 100%. However 3 (21.4%) cases of VVF required urinary diversion as there was complete loss of sphincter mechanism in one case, in which fistula was extending up to the urethra, and in two cases of complex VVF with complete loss of posterior bladder wall surrounded by extensive scarring. All cases of UVF were successfully treated with ureteroneocystostomy alone or with adjuvant procedure in 37.5% cases.

Conclusion: Uncomplicated VVF can be successful repaired transvaginally by refreshing the fistulous edges without excising it. Transabdominal route should be reserved for complicated VVF. Ureteroneocystostomy with antireflux mechanism with or without adjuvant procedure is the treatment of choice for UVF resulting from complete transaction or ligation of ureter (JPMA 55:280;2005).

Introduction

Genitourinary fistula (GUF) is an abnormal communication between genital tract and urinary system. GUF is a common problem in our setup. It includes mainly vesicovaginal fistula and ureterovaginal fistula, while other types of fistulae are relatively less common. In developing countries, GUF with its persistent odor and unimpeded leakage of urine is one of the most distressing complications that occur in women.[1] This causes serious social and psychological problems, which leads to social cut-off and even divorce in some cases. In our social culture, these females undergo further psychological trauma when they are unable to perform their religious duties. Today, VVF secondary to obstetric causes is a rare consequence in the developed world (5-8%)[2,3], while in contrast it is still the commonest cause (84-97%) in developing countries including Pakistan.[4-6] Poor socioeconomic class suffers the most. Most of our population, (70-80%) lives in villages.[7] Lack of proper antenatal care, neglected prolonged labour in the hands of untrained persons especially "Dais" is the major cause of vesicovaginal fistula (VVF).[8] On the other hand iatrogenic injuries during emergency obstetric surgery and gynaecological procedures are the major causes of ureterovaginal fistula. Various methods of surgical repair are adopted to deal with this problem with different indications and success rates. Depending upon the experience of surgeons, considerable difference of opinions exists regarding the method of repair and timing of repair after injury.[2,9] Overall, up to 90-92% of the patients are reported to be cured.[2] Vesicovaginal fistula is most commonly repaired transvaginally as most of the gynaecologists find this approach more convenient.[1] Transabdominal route is adopted mostly by urologists[10,11] particularly in cases where the fistula is higher up in vault of vagina or size of fistula is too large to be repaired transvaginally. Scar of previous surgery and severe vaginal stenosis also makes it difficult to repair the fistula transvaginally.[12] In general up to 80% fistulae are repaired transvaginally.[13]

Urinary diversion with ileal conduit formation or Mitrofanoff is resorted to patients in whom the sphincter mechanism is destroyed. Various flaps can also be made to close the defect.[4]

Ureterovaginal fistula is stented if partially occluded. If there is complete obstruction, it is managed with ureteroneocystostomy with or without adjuvant procedures like Psoas hitch or Boari's Flap.

The objective of our study is to highlight the commonest cause of genitourinary fistula in our population, to find methods to reduce this complication and evaluate our surgical experience for its management.

Patients and Method

Patients admitted in urology ward of JPMC for surgical management of genitourinary fistulae between January 2002 and June 2003 were analyzed prospectively. Twenty-two patients were managed during this period, including 8 having ureterovaginal fistula and 14 vesicovaginal fistula of whom one had both VVF and urethrovaginal fistula.

All the patients were initially admitted for thorough evaluation by detailed history, physical examination and laboratory investigations including intravenous urogram (IVU). Definite procedures were planned after cystoscopic examination and cystoretrograde studies where required. The site of fistula, size of fistula, sphincter mechanism, surrounding fibrosis, previous attempts to repair and extent of vaginal stenosis was carefully evaluated. In cases of uretrovaginal fistula, the type of obstruction whether complete or partial, the distance of the fistula from uretrovaginal junction and capacity of bladder was noted.

Operative Procedure

General anaesthesia was given in all cases. In cases of VVF, transvaginal route was adopted in 9 out of 14 cases and in 2 cases (including one second attempt), extraperitoneal transvesical route was selected, while 1 case was approached transperitoneally. Transperitoneal approach was also used in 3 cases of diversion. Extended lithotomy position was made for transvaginal approach. Stay sutures were applied in those cases where fistula was higher up and exposure was relatively inadequate, while in other cases, small Foleys catheter was placed in fistula vaginally and exposure was improved by slight traction of Foleys catheter after inflating the balloon. Diluted adrenaline 1:10000 was injected submucosally to raise the vaginal epithelium and decrease the intraoperative oozing of blood. Circumferential incision was given. Vaginal flap was raised all around. Defect in the bladder was repaired with full thickness interrupted sutures with Vicryl 3/0 or 4/0. Tension free second layer and even 3rd layer where tissue allowed, was applied with interrupted sutures in the same direction. Vaginal mucosa was approximated loosely. A pack was placed in vagina for 24 hours. An indwelling Foleys catheter was placed for 14-21 days and fixed with thigh.

In patients operated through transabdominal route, incision was given away from previously operated sites. In one patient having damaged bladder neck and sphincter, Mitrofanoff procedure was done after closing bladder neck and making a continent diversion by using appendix along with its blood supply.

In two cases, ileal conduit was made because of large defects involving the entire posterior bladder wall including trigone as a result of obstetric injuries followed by failed attempts of repair twice in some peripheral hospital. Fifteen-centimeter long segment, fifteen centimeter proximal to ileocaecal junction was used and both ureters were anastomosed at proximal end separately and distal end of ileal segment was brought out in the right iliac fossa. Ureteric stents were placed in both ureters separately for 10 days.

Eight cases of ureterovaginal fistula were treated by ureteroneocyctostomy making antireflux mechanism with submucosal tunnel. In three cases, adjuvant procedures were done due to short length of ureter. This included Psoas hitch procedure in one case, and Boari's flap in two cases. All cases were approached transperitoneally. A 6 Fr. long feeding tube was used as ureteric stent and brought out through bladder from supra pubic region. It was removed on 10-12 postoperative day after getting a stentogram.

Results

The mean age of 22 patients was 35 $\pm$ 15 years. Majority of (71.4%) patients developed VVF because of obstetric cause and 28.6% secondary to gynaecological procedures (Figure).

Figure. Causes of fistula formation

~~Obs. Obstetric complication / procedure, Gyn. Gynaecological procedure, VVF. Vesicovaginal fistula; UVF: Ureterovaginal fistula~~

Of UVF cases, 37.5% were due to obstetric causes and 62.5% due to gynaecological procedures. Time between development of VVF and its repair ranged from 7 months to 26 years and for UVF 12 days to 6 years. The patient operated 26 years after development of fistula belonged to a very remote area of interior Sindh. Sixty four percent patients were operated for vesicovaginal fistula and 36% for ureterovaginal fistula.

Table 1. Patients' diagnosis, treatment and results.

Sr #	Age	Site	Size (cm)	Cause	Previous repair	Time since fistula	Diagnosis	Operative procedure	Results
1.	30	3cm from L UVJ		Obs	Nil	4 month	L UVF	UNC	Good
2.	40	Base	2	Gyn	2	1 year	VVF	Trans Vag	Good
3.	45	8 cm from L UVJ		Gyn	Nil	5 months	L UVF	Boari's Flap	Good
4.	25	Neck+Ureth	2.5	Obs	1	1.5 year	Ureth VF	Mitrofanoff	Good
5.	50	Base	2	Obs	Nil	1year	VVF	Trans Vag	Good
6.	35	Trigone	3	Obs	Nil	7 months	VVF	Trans Vag	Good
7.	50	Base	1.5	Obs	Nil	26 years	VVF	Trans Vag	Good
8.	43	1.5cm from L UVJ		Gyn	Nil	12 days	L UVF	Boari's Flap	Good
9.	30	4cm from LUVJ		Obs	Nil	6 years	L UVF	UNC	Good
10.	32	3 cm from LUVJ		Gyn	Nil	3 months	L UVF	Psoa Hitch	Good
11.	35	Base	4	Obs	Nil	9 years	VVF	Trans Vag	Good
12.	53	Base	1	Gyn	Nil	15 months	VVF	Trans Vag	Good
13.	42	Base	1	Gyn	Nil	8 months	VVF	Trans Vag*	Failed
14.	30	Trigone	6 Fr	Obs	Nil	7 months	VVF	Trans Vag	Good
15.	35	Trig +Base	>6	Obs	2	9 years	VVF	Ileal conduit	Good
16.	42	Base	2.5	Gyn	1	8 months	VVF	Trans Ves	Good
17.	40	Trig +Base	5	Obs	1	1 years	VVF	Ileal conduit	Good
18.	35	Base	5	Obs	Nil	8 month	VVF	Trans periton	Good
19.	37	Trigone	2	Obs	1	1year	VVF	Trans Vag	Good
20.	35	3 cm from L UVJ		Gyn	Nil	4 month	L UVF	UNC	Good
21.	30	4 cm from R UVJ		Obs	Nil	5 month	R UVF	UNC	Good
22.	42	2.5cm from L UVJ		Gyn	Nil	7 month	L UVF	UNC	Good

* This was repaired successfully by extraperitoneal transvesical repair in 2nd attempt.

VVF: Vesicovaginal fistula; UVF: Ureterovaginal fistula; Ureth VF: Urethrovaginal fistula; UNC: Ureteroneocystostomy; Obs: Obstetric; Gyn: Gynaecological; UVJ: Ureterovesical junction; Trans Vag: Transvaginal; Trans Ves: Transvesical; Trans Periton: Transperitoneal

Repair of VVF was attempted in 78.6% cases and in 21.4% patients urinary diversion was planned. Of the 11 cases subjected to repair, 9 (82%) were attempted transvaginally and 2 (18%) transabdominally. Fistula was repaired successfully in all these cases except in one case of transvaginal route, in which there was recurrence. This was managed successfully in 2nd attempt through extraperitoneal transvesical route.

Six patients presented after previous failed attempts of VVF repair. The success rate in cases of VVF repair was 91% after 1st attempt in 11 cases, which was augmented to 100% with successful second attempt in one case. In three cases of diversion, one continent and two incontinent diversions were made successfully. No other significant post operative complication was noted.

In one patient with ileal conduit, previous failed attempts of repair had made the fistula large enough with extensive fibrosis so that it was not possible to repair the defect even after bisecting the bladder.

Table 2. Break up record of vesicovaginal fistula.

	No. of patients	Recurrence after 1st attempt	Recurrence after 2nd attempt
Transvaginal	9	1*	Nil
Transvesical (extraperitoneal)	1	Nil	____
Transperitoneal	1	Nil	____
Ileal conduit	2	Nil	____
Mitrofanoff	1	Nil	____

* Extraperitoneal transvesical repair was done in 2 nd attempt in recurrent case .

Eight cases of ureterovaginal fistula were treated. Out of them, seven patients had injury of left ureter while in 1 case right ureter was damaged. Successful ureteroneocystostomy with antireflux mechanism was done in 62.5% cases while in 37.5% cases adjuvant procedures

like Psoas hitch (1 case) or Boari's flap (2 case) were used. All the patients were managed successfully. One patient received blood transfusion at time of surgery. There was no mortality in the present series.

Table 3. Break up record of ureterovaginal fistula.

	UNC* without adjuvant procedure	UNC* with Psoas Hitch procedure	UNC* with Boari's Flap
No. of patients	5	1	2
Recurrence	Nil	Nil	Nil
Success Rate	100%	100%	100%

* UNC: Ureteroneocystostomy

Discussion

In developed countries, genitourinary fistula is rarely seen as complication of pregnancy while in developing countries, prolonged obstructed labour is still a common cause of genitourinary fistula.[9] This is mainly due to good antenatal care in developed countries and reduction in length of second stage of labour causing eradication of obstetric genitourinary fistula.[14] Situation in our country is different, as 80% of our patients with GUF belonged to rural areas and 20% to poor socioeconomic class of urban population, where traditional birth attendants had attempted vaginal deliveries initially and then they were taken to either nearby doctors or hospitals after delay of 20-50 hours.

In obstructed labour, bladder base, urethra and anterior vaginal wall are compressed against symphysis pubis by the head of impacted foetus leading to pressure necrosis and later fistula formation in cases of VVF.[4,15] Attempt to stop intraoperative bleeding in ruptured uterus, myomectomy, hysterectomy and emergency caesarean sections are major causes of ureteral injuries leading to fistula formation.[1] As we noted in our series, it is more common on left side, the probable reason is inadequate exposure of left adenexa during application of clamps while standing on right side of the patient. Rare causes of urinary fistula may be malignant tumor, postradiotherapy and neglected foreign bodies.[16,17] But no such cause was noted in our series.

Surgical repair of genitourinary fistulae was started a century ago but since then, controversy remains on the time of repair and route of repair. In this study, VVF was repaired 7 months to 26 years after injury and UVF after 12 days to 6 years. We believe that repair must be done at least 4-6 weeks after injury so that inflammation has subsided. In our study VVF repair rate was 78.6% while diversion rate was 21.4%, with a success rate of repair being 91% after 1st attempt and 100% after 2nd attempt, which is comparable to 90% success rate after 1st attempt and 95% after 2nd attempt by Pushpa Sirichand[1], 100% results in 6 cases of Ramzan Chaudhary[10] and 88.8% successful transvesical repair of Abdul Mannan.[12] Our high success rate is due to better patient selection for repair, as we did not attempt repair in those cases where either whole of the posterior bladder wall was involved or sphincter mechanism was destroyed due to involvement of urethra. One case of severe vaginal stenosis along with large vaginal fistula surrounded by extensive scar tissue was also not attempted for repair. However, in case of UVF early intervention is required in order to avoid obstructive nephropathy. We tried for retrograde stenting in all cases of UVF as soon as patients presented to us. Careful planning after proper evaluation is also very essential especially in complicated fistulae. In cases of VVF route of repair mostly depends upon surgeon's choice. Gynecologists mostly use the vaginal approach.[18,19] Genitourinary surgeons prefer suprapubic approach especially in complicated fistulae. Comparing the two procedures morbidity in transvaginal procedure is far less than transabdominal approach.

In our study, transvaginal approach was used in uncomplicated VVF, as all uncomplicated cases including fistulae near vault of vagina can be repaired adequately through vaginal route if the patient is placed in the correct position. Transabdominal approach should only be reserved for complicated VVF, like ureteric involvement in VVF, extensive scarring, severe vaginal stenosis, multiple fistulae, multiple failed previous attempts, bladder neck destruction and large defects which cannot be repaired transvaginally.[20] However the size, number of fistulae and history of previous operative repairs does not necessarily obviate the vaginal route. Good exposure can also be obtained by making a generous episiotomy[19], applying stay sutures or using small Foleys catheter for traction.

Regarding surgical technique of repair of VVF, there are set rules including adequate exposure, wide mobilization of vaginal flap, tension free closure and adequate postoperative bladder drainage.

There are still controversies regarding excision of fistulous track. Sims technique involves excision of fistulous track however Lawson opposes the excision.[17] He favours refreshing fistulous track edges in order to avoid too much removal of normal tissue. In our experience, we have exercised the Lawson's technique and achieved excellent results.

Soft tissue interposition like omentum[22], gracilis muscle[23], Martius pedicle graft of fibrofatty tissue[24] and bladder mucosa[25] may also be used in cases of complicated fistula. In our series no such procedure was required as a proper surgical technique provided good results.

While operating UVF transperitoneally, incision should be away from previous scar in order to avoid adhesions. We used oblique lower abdominal incision (Gibson's incision) in most cases.

The study concluded that GUF is still a very troublesome complication of Obstetric and gynaecological procedure in developing countries. Almost all the uncomplicated cases of VVF can be repaired transvaginally and only complicated cases should be managed transabdominally. Most of the ureterovaginal fistulae can be successfully managed by ureteroneocystostomy without any adjuvant procedure. In all the cases, proper evaluation of the patient to decide the type of procedure and route of repair is essential. Good postoperative care and continuous uninterrupted bladder drainage are key steps in successful management of GUF.

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