

Urethroplasty for Traumatic Urethral Stricture Sudanese Experience

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Abstract

The treatment of traumatic urethral stricture is one of the most challenging situations for the urologist and a very troublesome condition for the patient and has one main aim - to allow the patient to void with a satisfactory stream and control. Every case is to be judged individually to select best options of available modalities. In this article we review.

Forty six patients 45 of them were males. The majority age is from 20-34 years, 73.9% are Soldiers, 56.5% had urethral injury as a result of road traffic accidents, fracture of pelvis was seen in 39.1% patients and all had blind or long posterior urethral strictures in dynamic retrograde urethrogram ($p > .001$), 45.6% were previously manipulated, 94.1% patients of those need another interventions after reconstruction. The success rate of optical urethrotomy and perineal urethroplasty without previous manipulation was 83.3% and 93.75% respectively.

Keywords: Acetabular Bone; Hip Revision Surgery; Radiographic; Porous Metal

Introduction

Urethral stricture is the result of scar tissue development after either traumatic or inflammatory injury of the urethra. The earliest records of medicine are much concerned with the management of urethral strictures by means of catheters and sounds. In ancient India Susruta described the use of a reed catheter lubricated with ghee. In Greece, Socrates was known to joke about the gleet of others, and poor Epicurus committed Suicide when he could no longer dilate his own stricture. In Rome in the first century, Celsus described the operation of external urethrotomy for a calculus impacted behind a stricture, and urethrotomy became part of the canon of classical medicine preserved by the Arabs only to be re-discovered in the Renaissance, when Ambroise Pare (1510-1590) devised an instrument for scraping 'carnosities' from the urethra. Silver catheters armed with a concealed lancet were in use in 1795, and in 1817 Civiale of Paris devised a practical internal urethrotome, improved by Maisonneuve in 1848 to screw on to a filiform guide [1].

Although not a life threatening condition, the treatment of urethral stricture is one of the most challenging situations for the urologist and a very troublesome condition for the patient. The

treatment of this condition has one main aim - to allow the patient to void with a satisfactory stream and control. This can be achieved by creating a urethra with an adequate caliber either by dilatation (regular bouginage) or endoscopic incision of the stricture or preferably by one of the many urethroplasty techniques developed for this purpose [2,3].

Since the number of urethral strictures is much greater than the number of urologists performing this type of surgery, most urologists still manage their stricture patients with repeated dilatation or urethrotomy, which are less curative methods.

The word bougie is of some interest: Bujyah was the name of the Algerian town from which came the best wax for candles [1]. The incidence of urethral injury in men with pelvic fracture varies widely. The results of 2 extensive reviews have shown that the incidence of posterior urethral injury varied from 1.6% to 25% (mean 9.9%) [7,8] the incidence of posterior urethral injuries in pelvic fractures in another series had been estimated to be 5-10% [9]. This variation is due to the differences in age group and the type of pelvic fracture in different series and due to the prospective and retrospective nature of different series [9].

Materials and Methods

General objective

To find out the outcome of urethroplasty in patients presenting with traumatic urethral stricture.

Specific objectives

- To assess the benefit of surgical reconstruction as the main mode of treatment of urethral strictures resulting from trauma.
- To evaluate the outcome of patients who had urethroplasty for traumatic urethral stricture without previous manipulation and those managed by other modalities (visualized internal urethrotomy or dilatation) as a previous manipulation before urethroplasty.

Study area

Omdurman Military Hospital – Urology Department.

Study design

This is prospective study that who investigated the patients of urethral stricture caused by trauma presented to the Hospital from October 2011 to January 2013.

Study population

Included all patients with traumatic urethral stricture managed in Omdurman Military Hospital during the above period after accepting the provided informed consent.

A special patient data sheet was designed for data collection.

Data was collected prospectively from all patients who presented to Omdurman Military Hospital and already managed for traumatic urethral stricture in the area of events.

Variable used includes type of management on the time of first presentation, mode of injury, symptoms on presentation from the history and signs on physical examination.

All 46 patients underwent either ascending urethrogram alone or ascending and antegrade cystourethrogram to identify the type of the urethral injury (complete-partial, long-short) to provide the best modalities (delayed one stage prenieal urethroplasty or visualized internal urethrotomy).

The patient was positioned in lithotomy position, vertical prenieal incision, and sharp dissection to identify the site of disruption, the site was assessed under anasthia using (antegrade) supra-

bupic and (retrograde) urethral dilators, tension free end to end anastomosis using 4-0 Vacryl interrupted sutures.

Suprapubic catheter removed after 1 week and the folly's catheter removed after 3 weeks.

Most of them followed clinically, laboratory (blood urea, serum creatinine...) and radiological within a period of three months.

Inclusion criteria

- All patients who presented with history of urethral injury treated in Omdurman Military Hospital during the above period.
- Acceptance of the informed consent

Exclusion criteria

- Bladder outlet obstruction.
- Non traumatic urethral stricture.

Ethical considerations

Preoperative consent was obtained from study patients.

Results

Forty six patients with traumatic posterior urethral stricture were included in this study. Most patients were in good health before the injury except three patients with prostatic enlargement, all patients were available for follow up for a period of three months. Forty five (97.8%) were males and 1(2.2%) was female. Ages of the patients ranged from 8 to 80 years. The peak incidence of traumatic posterior urethral stricture was from 20-39 years of age (Figure 1). Thirty Four (73.9%) were Soldiers while 12 (26.1%) were Civilians (Figure 2). Twenty six patients (56.5%) had urethral injury as a result of road traffic accidents, 1(2.2%) due to fall from height, 12 (26.1%) because of gunshot injury and 7 (15.2%) due to iatrogenic injury (Figure 3). Thirty five (76.1%) patients presented with suprapubic cystostomy, 31 (67.4%) had history of retention of urine, 19 (41.3%) urethral bleeding, 13 (28.3%) haematuria and 10 (21.7%) with weak stream following injury (Figure 4). Fracture of pelvis was seen in 18 (39.1%) patients and all had blind or long posterior urethral strictures in dynamic retrograde urethrogram due to road traffic accident ($p > .001$). The duration of urethral injury ranged from 2 months to 24 months with majority (91.2%) having the problem of urethral injury for 4 months to 10 months. Twelve patients (26.1%) had history of urethral dilatation, 6 (13%) had optical urethrotomy, 2 (4.3%) catheterization and 1 (2.2%) had history of diversion as previous manipulation 4 to 10 months before presenting to the department (Table 2). Dynamic retrograde urethrogram was performed for all patients and showed 11

(23.9%) short stricture, 20 (43.5%) long stricture, 1 (2.2%) partial rupture and 14 (30.4%) with complete rupture. Urethroplasty were performed in 34 (73.9%) and optical urethrotomy in 12 (26.1%). Post operative 7 (15.2%) patients presented with lower urinary tract infection in a form of burning urination documented by culture and 11 (23.9%) with stricture, all were previously manipulated. Within a period of three months all patients were followed up using ascending urethrogram, first month, and normal study was found in 23 (50%) patients, second month normal study was found in 25 (54.3%) patients, third month normal study was found in 29 (63%) patients (Figure 5,6). Also urine frequency and stream followed for a period of three months (Table 3-4). Of the complete rupture patients 10 (71.4%) were due to road traffic accident, 3 (21.4%) due to Gunshot and 1 (7.1%) due to iatrogenic injury ($p > .002$). Sixteen (94.1%) patients of those previously manipulated needed more interventions after reconstruction which was also significant ($p > .004$) either redo urethroplasty or visualized internal urethrotomy.

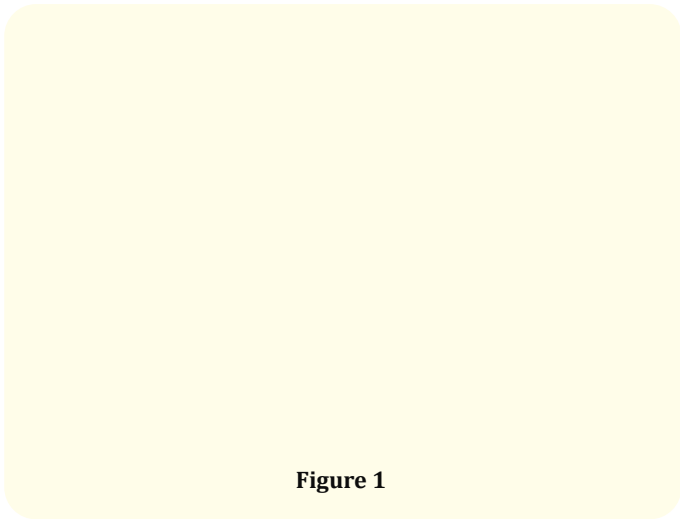


Figure 1

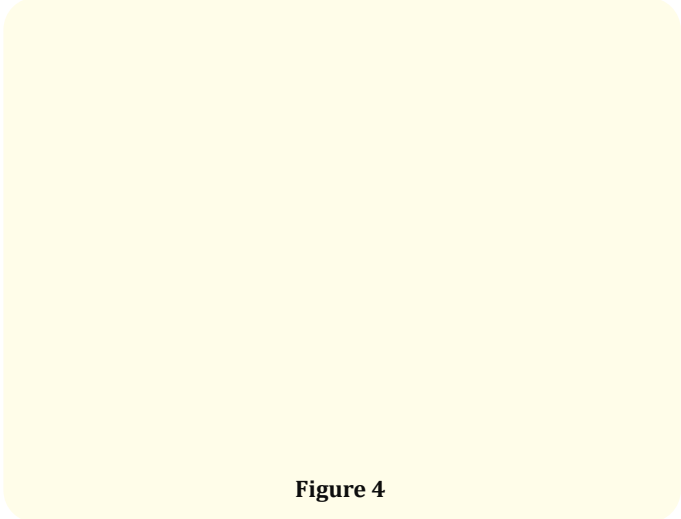


Figure 4

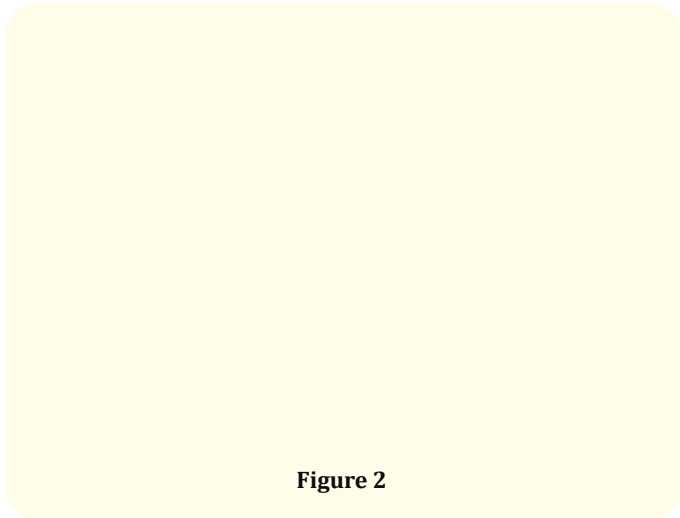


Figure 2

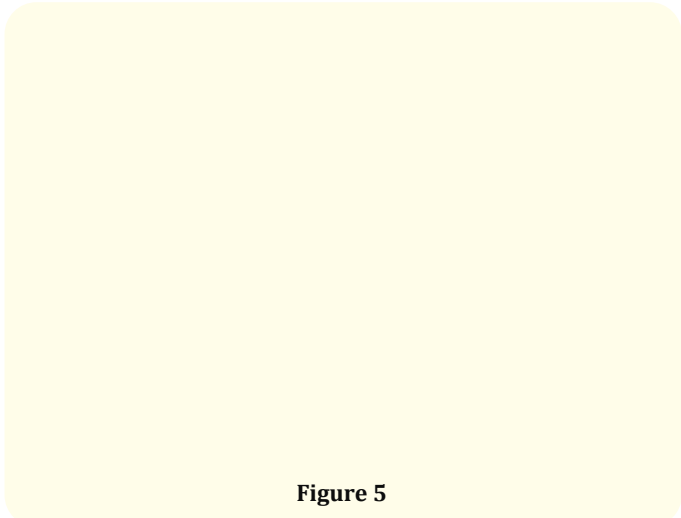


Figure 5

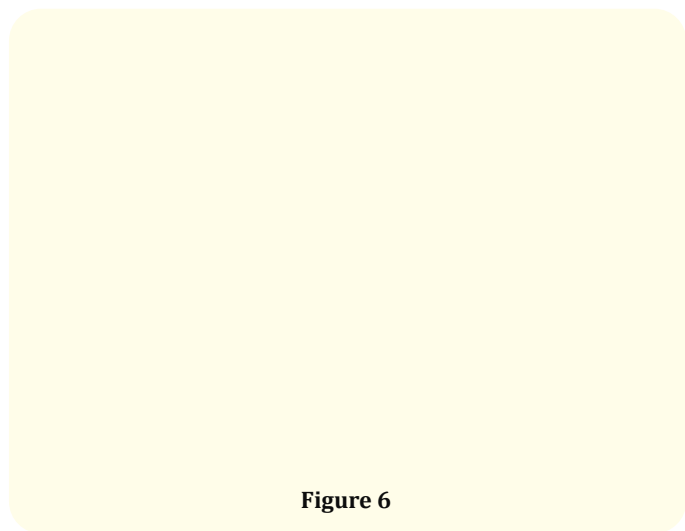


Figure 6

Catheter	Frequency	Percent
Urethral	6	13.0
Suprapubic	32	69.6
Urethral+suprapubic	3	6.5
Total	41	89.1
NO	5	10.9
Total	46	100.0

Table 1: Type of catheterization already on presentation to the unit (%).

	Frequency	Percent
Catheterization	2	4.3
Dilatation	8	17.4
Viu	2	4.3
Divertion	1	2.2
Dilatation+viu	3	6.5
Urethroplasty	1	2.2
Dilatation+viu+urethroplasty	1	2.2
Total	18	39.1
NO	28	60.9
Total	46	100.0

Table 2: Type of previous manipulations which was performed outside the unit (%).

Frequency	Frequency	Percent	
NO	First month	37	80.4
	Second month	40	87
	Third month	42	91.3
YES	First month	9	19.6
	Second month	6	13
	Third month	4	8.7
Total		46	100

Table 3: Urine frequency during the three months follows up period (%).

Stream	Frequency	Percent	
Normal	First month	25	54.3
	Second month	32	69.6
	Third month	40	87
Weak	First month	15	32.6
	Second month	12	26.1
	Third month	4	8.7
Frocking	First month	5	10.9
	Second month	2	4.3
	Third month	2	4.3
Spraying	First month	1	2.2
	Second month	No	No
	Third month	No	No
Total	46	100	

Table 4: Urine stream during the three months follows up period (%).

Discussion

Posterior urethral disruption is one of the more challenging injuries to manage following pelvic trauma. Therefore significant controversy continues regarding the best approach to these cases. Morey A.F, *et al.* [33] admit that the initial evaluation of urethral injury is very difficult in most of the cases because of pain and comorbidity. But patients who were unable to void, with hematuria, have blood at the urethral meatus, perineal hematoma or extravasations of urine with or without a high-riding prostate on digital rectal examination with pelvic fracture must indicate a urethral disruption [33]. Most of the patients in this study were suspected or diagnosed as urethral disruption before presented to this unit and some of them evaluated by the same guidelines.

Webstar G.D., *et al.* [34]. In doubtful cases, retrograde urethrogram with gentle pressure using water soluble contrast will show urethral continuity with extravasations in case of partial urethral tear (2.2%) where as extravasations of contrast without urethral continuity is the feature of complete urethral disruption (30.4%) and long stricture (43.5%). The extent of bladder elevation will give the idea of extent of urethral disruption or the volume of pelvic hematoma [34]. In all patients ascending urethrogram were performed for them and most of them antegrade cystourethrogram were performed to identify the extent of disruption. Colapinto and McCallum classification not used.

Glass R.E., *et al.* [35] Management of urethral injury and its complication has evolved in the last decade. Suprapubic cystostomy alone is the best initial management. It is an effective temporary technique of urinary diversion that does not interfere with the management of associated life threatening conditions. Suprapubic cystostomy is safe, simple may be performed quickly under local anesthesia even in haemodynamically unstable patient in emergency situation within limited setup [35]. In the study majority of urethral injuries (73.2%) were managed by Suprapubic cystostomy either initially or after previous manipulation (Table 2).

Follis H.W., *et al.* [36]. Primary urethral realignment using either railroad method, interlocking sound or endoscopic technique may be tried immediately or several days later after stabilization of associated injuries [36]. Guille F.C., *et al.* [37]. There may be chance of creation of false passage, introduction of infection, severe bleeding due to dislodgement of clot, pudendal nerve injury, difficulty in assessment of vitality of injured urethral ends [37]. So for those hazards and the lack of facility this modality of management not performed in the study.

Delayed reconstruction is advocated 2 to 6 months after initial suprapubic cystostomy. By this time the inflammation subsides and the scar matures [38]. In the study all patients with pelvic fracture or a gunshot the reconstruction delayed tells the healing was complete and wound infection subsides. The major advantage of this modality, it can be done under controlled conditions when the patient has recovered from major associated injuries [39]. But the main drawback of it is that the patient has to accept either incomplete or in most cases complete obliteration of urethra and also has to carry and care suprapubic catheter for longer period of time [40].

Heyns C.F., *et al.* [41]. Delayed endoscopic management of thin diaphragmatous stricture or those with a narrow lumen is easier with insignificant morbidity. However, endoscopic maneuvers for complete urethral obliteration remain controversial. As much as

61% of impassable strictures could be managed endoscopically. The immediate success rate may vary from 54% to 100% in different series. But the long-term recurrence rate of available series are not encouraging (62% to 89%) [41]. In this study 12 (26.1%) with either short or partial disruption managed by optical urethrotomy with success rate for those not previously manipulated 83.3%.

Rosette J.J., *et al.* [42] Delayed open urethral reconstruction may be done in single session or in two sessions. The most common two-stage repairs have been described by Johanson, Somervil., *et al.* Schreiter and Noll. Two stage urethroplasty currently reserved in case of severe urethral damage, extensive urethral stricture or often after failed 1- stage repairs. The interval between two stages would allow for healing of the usually infected and damaged tissue before final reconstruction of the urethra [42]. The different route of approach in single stage urethroplasty includes perineal, transpubic or combined perineal and suprabic with or without free graft [43]. The success rate of delayed one stage urethroplasty through perineal approach in experienced hand is highly encouraging. It is more than 95%18. Much superior result (97%) was claimed in other study also [44]. In this study delayed one stage urethroplasty through perineal approach performed with success rate (93.75%) for those not previously manipulated.

Antigrade cystourethrogram may fail to outline the prostatic urethra because of bladder neck spasm. The narrow area of urethral stricture region is difficult to image accurately. So pelvic Magnetic Resonance Imaging though very expensive but is excellent in this regard for precise evaluation of distance and direction of disrupted prostatomembranous urethra [44]. Thus it was costly in this study retrograde urethrogram and antegrade cystourethrogram performed in all cases.

The result of different modalities of managements in post traumatic urethral disruption published in different journal from 1968 to 1990 was analyzed in a review study [45]. Thirty seven percent of our patients did not need any intervention after urethroplasty. Recurrent urethral stricture was seen in 23.9% (n – 11) cases managed by visualized internal urethrotomy + intermittent sound dilations. In this study success rate of optical urethrotomy and perineal urethroplasty without previous manipulation was 83.3% and 93.75% respectively which was statistically significant. The overall result in our study is good and no patient needed re-operation.

Considering the current available literature it could be inferred that the outcome of management of post-traumatic urethral disruption in relation to potency and continence depends upon the result of initial injury to the neurovascular bundle supplying the corporal bodies and injury to the sphincter (internal, or both external

and internal) rather than operative technique; provided it is done in good centre by expert hand [36]. In the study all patients were continent postoperatively with intact internal urethral sphincter.

Conclusion

Road traffic accident associated with pelvic fracture always almost result in urethral injury and always either long stricture or complete disruption.

The best options of management were deferent from case to case and it depends on the finding in the ascending, time of presentation and available facilities.

Suprapubic cystostomy alone is the best initial management followed by delayed anastomotic perineal urethroplasty which was an effective and safes approach.

Recurrent strictures are uncommon and most can be effectively managed with direct visualized internal urethrotomy or redo urethroplasty.

The best early result could be obtained by delayed one stage urethroplasty through perineal approach as seen in the present study.

Recommendations

- To observe patient with pelvic fracture this is most likely to have some degree of urethral injury.
- Trauma to the urethra with urine retention or clinical symptoms of disruption should be managed initially by fixation of a suprapubic cystostomy, attempts at urethral catheterization should be avoided.
- To use the Colapinto and McCallum classification for evaluation of every case of urethral injury through combine retrograde urethrogram and Antigrade cystourethrogram.
- Urethroplasty for traumatic urethral injury should follow as the main mode of treatment, following management of other urgent injuries.
- Primary urethral realignment should be done only in selective group of patients.
- Long term follow up study should be planed for more accurate outcome.

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