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An Audit of Management of Male Urethral Stricture and its Outcome: A Retrospective Review

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Abstract

Background: Urethral stricture leads to obstructive voiding dysfunction. We report an audit of surgical management of urethral stricture in adult males.

Methods: The records of all patients diagnosed with urethral stricture from December 2017 to March 2019 at B. P. Koirala Institute of Health Sciences, Nepal were retrieved. Preoperative, surgical, and postoperative follows-up data were evaluated. The American Urological Association International Prostatic Symptom Score (AUA-IPSS) and Uroflowmetry (voided volume and peak urinary flow rate (Qmax)) were used to assess the outcome of the surgery.

Results: Among 50 patients, the majority (46%) belonged to 40 - 59 years. Twenty-five patients (78.1%) with traumatic anterior urethral stricture underwent excision and primary end to end anastomotic (EPA) urethroplasty; seven patients (21.9%) with pelvic fracture urethral injury (PFUI) underwent progressive perineal urethroplasty (PPU) with EPA; eight patients with inflammatory urethral stricture underwent Kulkarni urethroplasty; four patients with iatrogenic urethral stricture underwent EPA; six patients with idiopathic urethral stricture underwent Barbagli dorsal onlay urethroplasty. All patients had preoperative voided volume < 150ml, Qmax < 15ml/s. Thirty patients had complete obliteration; the remaining patients had severe storage and voiding symptoms (AUA-IPSS ≥ 20) before surgery. Except for two patients who underwent redo surgery, outcome of urethroplasty was successful in terms of storage and voiding symptoms (AUA-IPSS < 7) and uroflometry findings (voided volume > 150ml and Qmax >15ml/s).

Conclusion: Urethreal stricture was most common in the age group of 40 - 59 years and traumatic stricture was the most common cause.

Keywords: Anastomosis; Iatrogenic; Male; Traumatic; Urethral Stricture.

Declarations

Ethics approval and consent to participate: Ethical approval was obtained from Institutional review committee (IRC), BPKIHS, Dharan, Nepal (IRC/1791/020).

Consent for publication: Not applicable.

Availability of data and materials: The data supporting the findings of this article are available from the corresponding author on reasonable request.

Competing interest: None

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Urethral stricture is a relatively common urological problem in males resulting from fibrosis in the surrounding corpus spongiosum. Urethral stricture leads to obstructive voiding dysfunction with potentially serious consequences for the entire urinary tract [1]. The most common etiology of urethral stricture is idiopathic followed by iatrogenic and traumatic (pelvic and perineal trauma) [2]. The surgical procedures for urethral strictures include urethral dilatation, direct vision internal urethrotomy, excision of stricture and primary end-to-end anastomosis (EPA), graft or local flap, and staged reconstruction [3]. Urethroplasty is the definitive procedure for urethral stricture disease and the type of urethroplasty depends on the etiology, location, and length of the stricture [1]. We aimed to perform an audit of patients diagnosed with urethral stricture and admitted to the tertiary care center, B. P. Koirala Institute of Health Sciences (BPKIHS).

METHODS

This retrospective audit was conducted on patients with urethral stricture admitted to the Urology Division, Department of Surgery at BPKIHS, Dharan, Nepal from December 2017 to March 2019 after clearance from the Institutional Review Committee (IRC/1791/020) of BPKIHS.

After obtaining approval from the hospital authority to review the patient's medical record, the patients diagnosed with urethral stricture during the study period were identified from the electronic registry. The paper files of all the patients were retrieved and reviewed. Patients < 18 years and those with urethrocutaneous and rectourethral fistula or malignant urethral stricture were not reviewed.

According to the etiology, the urethral strictures were divided into four types: traumatic, inflammatory, iatrogenic, and idiopathic [1]. Preoperative assessment of the site of urethral stricture was performed with retrograde urethrography (RGU) and micturating urethrography (MCU). Urethrocystoscopy was done in all cases to assess if the obliteration of the urethra was complete.

The American Urological Association International Prostatic Symptom Score (AUA-IPSS) was used to assess the storage and voiding symptoms [4]. Patients were questioned about seven symptoms: intermittency, poor flow, straining, frequency, urgency, nocturia, and sensation of incomplete voiding. Each symptom carried 5 points; the total maximum possible score was 35 which was classified as mild (score 0 to 7), moderate (score 8 to 19), and severe (score 20 to 35). Postoperative AUA-IPSS score of less than 7 was recorded as a success [5]. Uroflowmeter was used to record voided volume and peak urinary flow rate (Qmax). Postoperative voided volume of more than 150 ml and Qmax more than 15 ml/s was recorded as success [6].

Data related to preoperative parameters, surgical procedure and postoperative follow-up were recorded using a pre-designed proforma. Data were entered into Microsoft Excel 2010. Statistical analysis was performed with Statistical Package for Social Sciences version 17.0 (SPSS Inc. Chicago, Illinois, USA). Results were expressed as frequency and percentage for categorical data and mean ± SD for continuous data.

RESULTS

The data of all 50 patients meeting the inclusion criteria were analyzed. Patients in the age group of 40 to 59 years were the most commonly affected by urethral stricture (23 patients, 46%) **(Table 1)**. Out of the 32 cases of traumatic stricture, 25 remained in the bulbar region (anterior) while the remaining seven, which were associated with pelvic fractures, occurred at the bulbomembranous junction. All eight inflammatory strictures were panurethral. Out of the remaining 10 strictures (idiopathic and iatrogenic), seven were bulbar and three penile. Twenty-six traumatic strictures and all four iatrogenic strictures had complete obliteration during urethrocystoscopy.

Twenty-five patients (78.1%) with traumatic anterior urethral stricture underwent excision and EPA urethroplasty **(Fig. 1)**; seven patients (21.9%) with pelvic fracture urethral injury (PFUI) underwent progressive perineal urethroplasty (PPU) with EPA; eight patients with inflammatory urethral stricture underwent Kulkarni urethroplasty **(Fig. 2)**; four patients with iatrogenic urethral stricture underwent EPA; six patients with idiopathic urethral stricture underwent Barbagli Dorsal onlay urethroplasty **(Fig. 3)**.

All patients had received broad-spectrum antibiotics preoperatively one hour before the induction of general anesthesia and continued postoperatively. Patients had been discharged with per-urethral catheter in situ and on oral antibiotics. All patients had been advised to report for any wound-related complications.

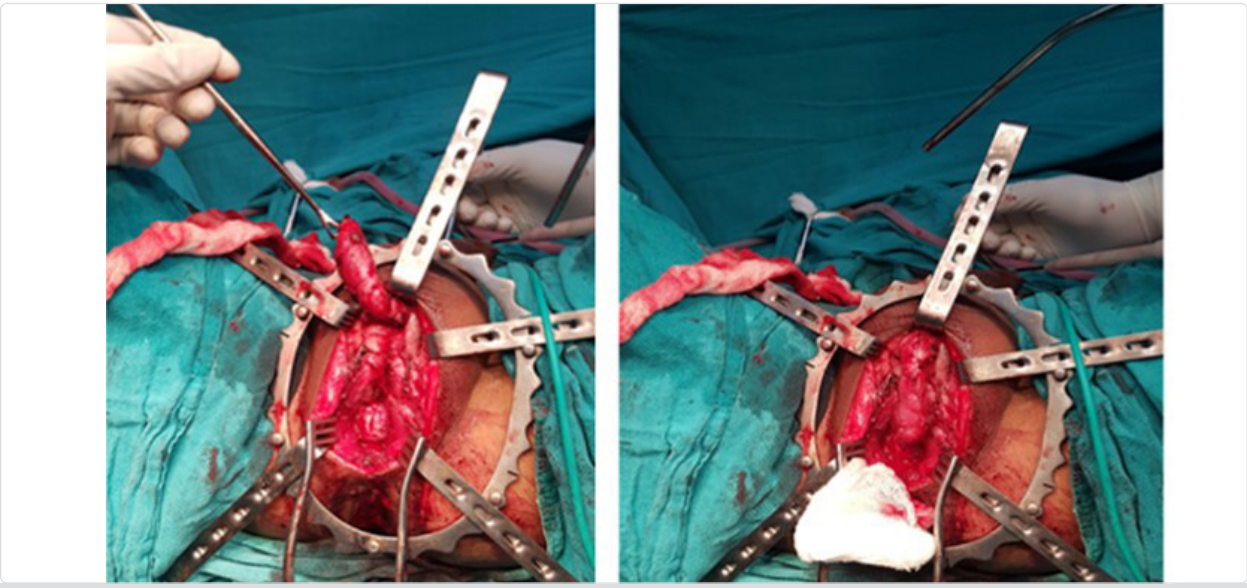

Figure 1: Excision and primary anastomosis

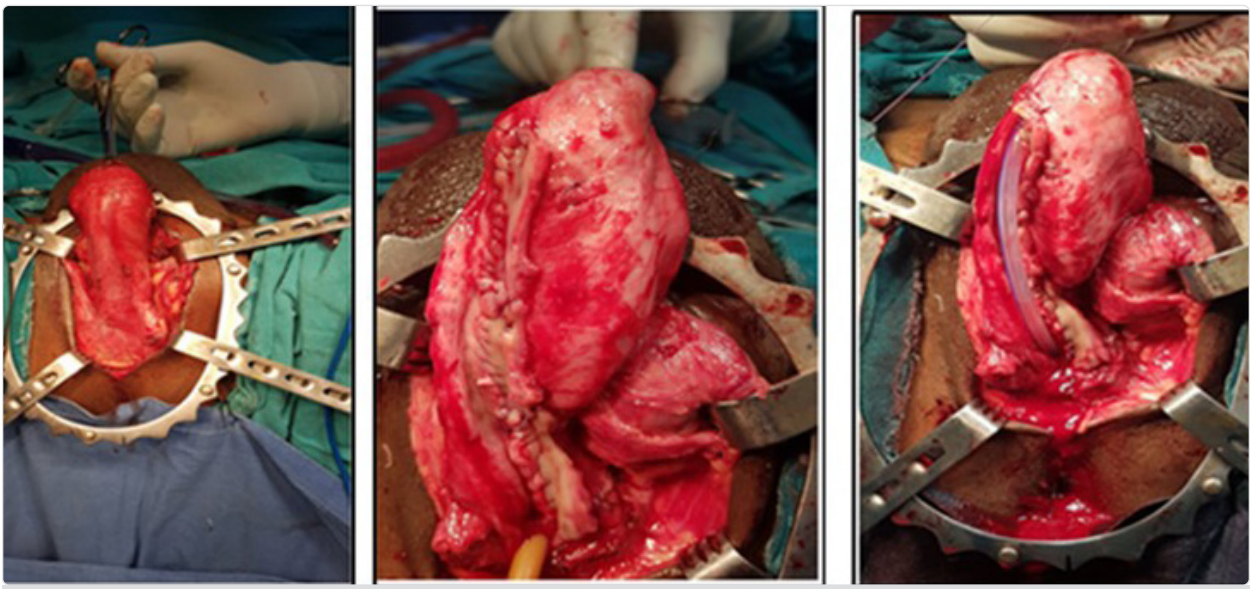

Figure 2: Kulkarni Urethroplasty

The postoperative pericatheter RGU was done at four weeks in all patients and then the per-urethral catheter (PUC) was removed in all patients without any extravasation. After the successful void trial, the suprapubic catheter (SPC) was removed one week after PUC removal. Except for the 30 patients who could not void due to complete obstruction, all the other patients were assessed for voided volume and Qmax **(Table 2)** and AUA-IPSS **(Table 3)** before surgery. These tests were performed for all the patients at three months follow up. All patients had preoperative voided volume < 150 ml, Qmax < 15 ml/s and storage and voiding symptoms were severe (AUA-IPSS > 7). Due to short segment stricture and failure to void, redo surgery was done in two cases, one patient with traumatic urethral stricture (PFUI) who underwent PPU and another patient with inflammatory urethral stricture who underwent Kulkarni urethroplasty. In the remaining patients, outcome of urethroplasty was successful in terms of storage and voiding symptoms (AUA-IPSS < 7)

Table 1: Etiology of urethral stricture according to the age group (n = 50). Values are presented as number (%).

Age group (years)	Total Number of cases	Etiology of urethral stricture			
		Traumatic (n = 32)	Inflammatory (n = 8)	Iatrogenic (n = 4)	Idiopathic (n = 6)
20 – 39	18 (36.0)	12 (64.0)	0	0	6 (36.0)
40 – 59	23 (46.0)	14 (60.9)	5 (21.7)	4 (17.4)	0
60 – 79	6 (12.0)	4 (66.7)	2 (33.3)	0	0
80 – 99	3 (6.0)	2 (66.7)	1 (33.3)	0	0

Table 2: Outcome of urethroplasty according to uroflowmetry at three months follow up (n = 48). Values are expressed as mean ± SD.

Type of urethral stricture	Voided volume (ml)	Qmax (ml/s)
Traumatic: anterior stricture (n = 25)	175 ± 5	20 ± 4
Traumatic: PFUI (n = 6)	200 ± 5	18 ± 2
Inflammatory (n = 7)	200 ± 5	20 ± 5
Iatrogenic (n = 4)	250 ± 5	20 ± 2
Idiopathic (n = 6)	180 ± 5	20 ± 2

PFUI: pelvic fracture urethral injury

Table 3: AUA-IPSS before surgery and at three months follow up (n = 48). Values are presented as number (%) or mean ± SD.

Type of urethral stricture	Type of obstruction	Number of patients	AUA-IPSS score and severity	
			Preoperative	Postoperative
Traumatic (n = 31)	Complete	25 (81.3)	0*	6 ± 1
	Incomplete	6 (18.7)	25 ± 5	5 ± 2
Inflammatory (n = 7)	Incomplete	8 (100.0)	28 ± 5	5 ± 1
Iatrogenic (n = 4)	Complete	4 (100.0)	0*	5 ± 2
Idiopathic (n = 6)	Incomplete	6 (100.0)	25 ± 5	5 ± 2

**Patient could not void for assessment due to complete stricture.*

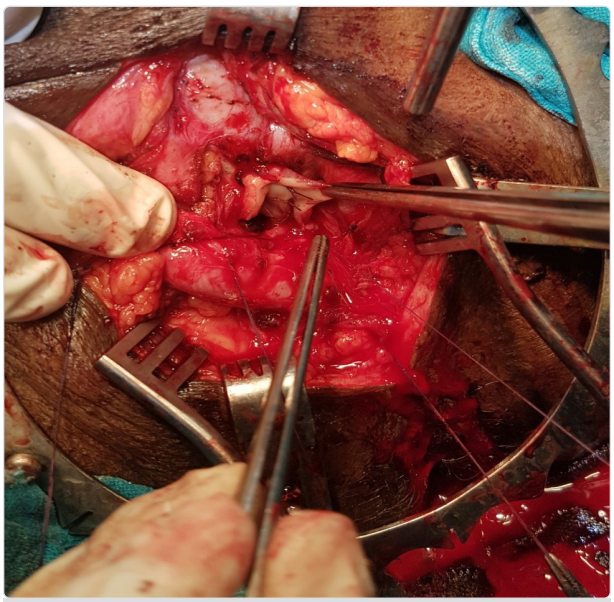

Figure 3: Dorsal onlay buccal mucosal augumented urethroplasty

and uroflometry findings (voided volume > 150 ml and Q max > 15 ml/s).

DISCUSSION

Scar tissue in the urethra with different etiology causes urethral stricture, leading to obstructive voiding dysfunction with potentially serious consequences for the entire urinary tract [7]. The obstruction causes micturition disturbances, impairs the patient's quality of life, and may lead to renal function impairment [8]. Therefore, early diagnosis and management is mandatory for urethral stricture disease.

In our audit, patients in the age group of 40 - 59 years were most commonly affected by urethral stricture disease (23 cases, 46%). The average age of our patients was similar to other reports [9 - 11]. In our patients of 40 - 59 years, the most common cause of urethral stricture was traumatic followed by inflammatory and

iatrogenic which was in contrast to another study where idiopathic was the main cause of stricture in patients younger than 45 years [11].

The EPA urethroplasty is typically employed in bulbar urethral stricture of short segments [12]. In our patients, EPA was done in 36 urethral strictures, and success was observed in all except one patient (97.2%) who had to undergo a redo surgery. This finding was similar to a report by Bagchi et al. where the success rate of this procedure was 92.31% after six months postoperatively [2].

The dorsal onlay technique was popularized by Barbagli et al. in 1998; it involves the dissection of the urethra from the corpora cavernosa and its rotation of 180° [12]. In our report, six patients had undergone dorsal onlay and had 100% success in all cases evaluated at three months follow up. However, the success rate was lower (85% to 89%) in other reports [13, 14].

Our eight patients had undergone the Kulkarni urethroplasty with a success rate of 87.5% as one case had to undergo redo-surgery due to short segment stricture. Panurethral stricture and long segment penile stricture can be managed as single-stage or staged procedures. Kulkarni et al. showed that the success rate of dorsal buccal mucosal graft urethroplasty by one-sided mobilization as 92% and the mean stricture length in their series was 4.2 cm for bulbar urethral stricture and 10 cm for pan urethral stricture [13].

Our report had a small sample size with short follow-ups of three months, so generalizing the finding of a high success rate in our clinical practice is difficult. Proper selection of surgical techniques for different etiology of urethral stricture management with larger sample size and longer follow-up in the future is needed for generalizing the findings.

CONCLUSION

Traumatic stricture was the most common cause of urethral stricture in the 50 patients we encountered during the study period at our institute. The most commonly involved age group was 40 – 59 years. The outcome was successful in 48 patients and two patients had to undergo a redo surgery.

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