

## Outcomes of Anterior Urethral Stricture Management in a Tertiary Care Hospital in Eastern Nepal

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### ABSTRACT

#### Introduction

The standard guidelines for the management of anterior urethral strictures categorizes as transurethral procedures like dilatation and urethrotomy; and open surgical procedures like urethroplasty. This study aims to find the extent and outcome of anterior urethral strictures managed in a tertiary care hospital in eastern Nepal.

#### Methods

It was a hospital-based cross-sectional study. Patients were evaluated preoperatively as per institutional protocol. The procedure was done either in local or spinal or general anesthesia with nasal intubation. At the end of the procedure, a 14 Fr Silicon catheter was inserted per urethra and removed either on the next day, 2 weeks or 4 weeks post operatively depending upon the type of procedure done. Patients were asked to follow up postoperatively at 6 weeks and three months.

#### Results

Thirty-six cases were eligible. The mean age of the patients was  $39.25 \pm 14.02$  years. According to the etiology; 36.1% were iatrogenic, 30.6% traumatic, 25% were balanitis xerotica obliterans or genital lichen sclerosus (BXO/LS) associated and 8.3% were infective respectively. Similarly, 61.1% of strictures were bulbar in location, 22.2% panurethral, 11.1% penile and 5.6% meatal. The mean length of the stricture was  $4.26 \pm 4.22$  cm (range 1-14 cm). Similarly, Visual internal urethrotomy (VIU) was done in 47.2%, augmentation urethroplasty in 44.4% meatoplasty in 5.6% and anastomotic urethroplasty in 2.8% respectively. Complications occurred in 11.1% of cases.

#### Conclusion

Visual internal urethrotomy was the commonly performed procedure for the urethral stricture. Meatal stenosis was the most common complication.

#### Keywords

Catheters; urethral stricture

## INTRODUCTION

Anatomically, male urethra consists of two parts: the posterior urethra which includes prostatic and membranous urethra; and the anterior urethra which includes bulbar and penile urethra.<sup>1</sup> Anterior urethral stricture is narrowing of urethral lumen resulting from the fibrosis of the epithelium and corpus spongiosum. It is a common urological condition (prevalence of 229-627 per 100,000 males) with various etiologies: external trauma, iatrogenic and lichen sclerosus (LS).<sup>2</sup> It badly affects the patient's quality of life (voiding symptoms, recurrent infections and hematuria leading to frequent hospital visits and disturbance in daily life activities) as well as overall health status (renal failure).<sup>3</sup>

Different options exist for managing urethral strictures. They are broadly classified into two categories: transurethral procedures and open surgical procedures. The former includes dilation and urethrotomy, and the latter is urethroplasty. The transurethral procedures can be performed as an outpatient department (OPD) procedure with minimal morbidity but limited by low success rate.<sup>4,5</sup>

In contrast, the urethroplasty is technically more demanding with excellent success rate.<sup>6,7</sup> The urethroplasty consists of excisional anastomotic urethroplasty (EPA) and augmentation urethroplasty with a free graft (skin, oral mucosa, rectal mucosa or urinary bladder mucosa) or a flap (prepuce or dartos) is used in onlay or inlay fashion dorsally or ventrally depending upon the case.<sup>8</sup>

In Nepal, there is no documented incidence of urethral stricture but with rising incidence of road traffic accidents and urethral instrumentation, the incidence is increasing. In Birat Medical College-Teaching Hospital, we receive about three cases of urethral stricture a month which are managed according to the extent of injury. This study aims to find the extent and outcome of anterior urethral strictures managed here.

## METHODS

A hospital-based cross-sectional study was conducted in the Urology Department of Birat Medical College – Teaching Hospital, Morang, Nepal from December 2021 to November 2022. The study was approved by the Institutional Review Committee (Ref: IRC-PA-180/2078-79).

We included all patients with anterior urethral stricture presenting in the department who consented for the study and were managed here over the study period. Thirty eight patients were eligible. We excluded the patients with active urinary tract infection and patients on anticoagulation therapy.

Patients were evaluated preoperatively as per

institutional protocol. Uroflowmetry, retrograde urethrogram and micturating cystogram were done in all patients and a sterile urine culture report was mandatory before the intervention. Patients received prophylactic antibiotic Inj. Ceftriaxone 50mg/kg and Inj. Amikacin 15 mg/kg. The procedure was done either in local or spinal or general anesthesia with nasal intubation. Semirigid ureteroscopy using a 6.5/7 Fr ureteroscope from Karl Storz was done in all patients. If a semirigid ureteroscope was not negotiable, a 6 Fr, 70 cm ureteric catheter or even 0.035" guidewire negotiation was done before the procedure. For the augmentation urethroplasty, an oral mucosal graft (buccal and or lingual) was used and the donor site was either closed with 3-0 chromic catgut or left open after the hemostasis depending upon the extent of the defect. For the reconstructive procedure, 4-0 polyglactin was used.

At the completion of the procedure, a 14 Fr Silicon catheter was inserted per urethra and removed either on the next day, 2 weeks or 4 weeks post operatively depending upon the type of procedure done. Patients received intravenous antibiotics during the hospital stay and oral antibiotics (Cefixime 200 mg PO BD) until the catheter was removed along with other supportive medications (analgesics and proton pump inhibitor). After the per urethral catheter removal and initial void, uroflowmetry was done and documented. For those patients who had a suprapubic catheter, it was removed 1 week after the per urethral catheter removal and successful urethral voiding. Patients were asked to follow up postoperatively at 6 weeks and three months.

Patients' demography, stricture location, stricture length, etiology, operating time, hospital stay and complications were recorded.

Statistical analysis was performed using SPSS Statistics version 27 (IBM, Armonk, NY). Continuous and ordinal variables were expressed as mean  $\pm$  standard deviation and nominal/categorical variables were expressed as frequency and percentage.

## RESULTS

Thirty-eight patients were included in the study, two patients lost to follow-up and were excluded. The mean age of the patients was 39.25 $\pm$ 14.02 years. According to the etiology, 36.1% (13 cases) were iatrogenic, 30.6% (11 cases) traumatic, 25% (9 cases) were balanitis xerotica obliterans or genital lichen sclerosus (BXO/LS) associated and 8.3% (3 cases) infective respectively. Similarly, 61.1% (22 cases) of strictures were bulbar in location (25% proximal, 25% mid and 11.1% distal), 22.2% panurethral (8 cases), 11.1% penile (4 cases) and 5.6% meatal (2 cases).

The mean length of the stricture was 4.26 $\pm$ 4.22 cm (ranging from 1-14 cm) and the maximum

Table 1. Management of anterior urethral stricture

Characteristics	Number (%)
<b>Etiology</b>	
Iatrogenic	13 (36.1)
Traumatic	11 (30.6)
BXO/LS associated	9 (25)
Infective	3 (8.3)
<b>Location</b>	
Bulbar	22 (61.1)
Panurethral	8 (22.2)
Penile	4 (11.1)
Meatal	2 (5.6)
<b>Urinary flow rate (ml/s)</b>	
Pre-operative	7.80±1.30
Post-operative	20.41±2.10
<b>Management</b>	
Visual internal urethrotomy	17 (47.2)
Augmentation urethroplasty	16 (44.4)
Meatoplasty	2 (5.6)
Anastomotic urethroplasty	1 (2.8)
<b>Complications</b>	
Meatal stenosis	2 (5.6)
Coronal fistula	1 (2.8)
Stricture recurrence	1 (2.8)
<b>Management of complications</b>	
Dorsal meatotomy	1 (2.8)
Suprapubic catheter	1 (2.8)

preoperative flow rate was 7.80±1.30 ml/s. Similarly, VIU was done in 17 cases (47.2%), augmentation urethroplasty in 16 cases (44.4%) meatoplasty in 2 cases (5.6%) and anastomotic urethroplasty in 1 case (2.8%) respectively. The maximum postoperative urinary flow rate was 20.41±2.10 ml/s after catheter removal.

Complications occurred in 4 cases (11.1%) and all complications occurred in panurethral stricture cases who had undergone augmentation urethroplasty using buccal mucosal grafts. Two cases (5.55%) developed meatal stenosis which was managed by dorsal meatotomy. One case developed a coronal fistula, but he did not want further treatment as he was voiding satisfactorily through the fistula. Similarly, one case developed stricture recurrence at the bulbomembranous junction, and is currently on suprapubic catheter (SPC).

## DISCUSSION

Urethral stricture is a common condition with an incidence of about 0.6% in populations at risk.<sup>2</sup> There is no documented incidence of urethral stricture in Nepal but with the rising incidence of road traffic accidents and urethral instrumentation, the incidence of urethral stricture is increasing. Iatrogenic (36.1%) cause was the most common

etiology followed by trauma (30.6%) and BXO/LS (25%) in this study. This is slightly different from a study in China where 51.67% of cases were traumatic, 34.49% were iatrogenic and only 4.22% were lichen sclerosus associated.<sup>9</sup> Another study conducted in the United States of America, reported the cause of stricture as iatrogenic (32%), traumatic (14%) and inflammatory (20%).<sup>10</sup> While a European study reported 21% cases of iatrogenic and 14% cases of traumatic origin.<sup>11</sup> These variations can be due to difference in geographical location and patient profile. The bulbar was the most common stricture location in our study (61.1%) which is similar to the study of Fenton et al. where the bulbar location of the stricture was most common (52%).<sup>10</sup>

Visual internal urethrotomy is the most commonly performed surgery for urethral stricture worldwide because of the minimum invasive transurethral approach, limited resource requirements and low morbidity. Fuehner et al. reported the popularity of VIU to be 66%-97% among the practicing urologists in America and Europe.<sup>12</sup> The success rate of VIU ranges from 60%-70% at one year in a highly selected case with stricture length < 2cm.<sup>13,14</sup> In our study, 47.2% of cases were treated by VIU and no patient had stricture recurrence at 3 month follow-up. The high success rate of VIU in this study can be due to highly selected cases (soft bulbar stricture < 2cm) and the shorter duration of the follow-up. We had only two cases who underwent meatoplasty and a single case of anastomotic urethroplasty so we can not make any comparison in this regard.

Different grafts have been used in the urethral reconstruction. They include genital skin, extragenital skin, oral mucosa, and bladder or colonic mucosa. The oral mucosa meets ideal graft characteristics for urethra reconstruction and can be considered as gold standard for urethral augmentation.<sup>15,16</sup> Similarly, there are various way to the onlay augmentation including a ventral, dorsal, or lateral approach. However, there is no consensus on the benefits of one over the other till the date.<sup>16,17</sup> In the current study, 44.4% (16 cases) underwent augmentation urethroplasty in the dorsal onlay approach using a buccal mucosal graft in a single stage procedure. Out of these 16 cases, 4 cases (25%) developed complications indicating a success rate of 75% for the augmentation urethroplasty. The success rate for augmentation anterior urethroplasty using free graft has been reported in the range of 73%-90%.<sup>18</sup> Kulkarni et al. demonstrated a 92% success rate in 24 patients of single-stage augmentation urethroplasty using oral mucosa graft.<sup>19</sup> Similarly, in another study by Aldaqadossi et al. with 25 cases of augmentation urethroplasty using oral mucosa in dorsal onlay fashion, the success rate was reported to be 88%.<sup>20</sup> Our institute is not a high-volume center for the urethral reconstruction with a full reconstructive armamentarium available and all the

procedure was performed by a single urologist can be reasons for the inferiority of our success rate in augmentation urethroplasty.

The overall complications in this study were 11.1% and all occurred in patients with long segment strictures requiring augmentation urethroplasty resulting in a 25% (4 of 16 cases) failure rate of the procedure. Two of them were treated by dorsal meatotomy, one refused for treatment and one patient is waiting for further treatment. We considered a failure of the clinical outcome when any postoperative intervention was needed. Others have reported a failure rate of the procedure in the 8%- 12% range. The reason for these parallels our success rate.

The limitations of this study include small sample size of 38 patients, a narrow time frame and a lack of control group. It is also a hospital-based cross-sectional study, limiting its generalizability to the overall population of the patients with urethral strictures in Nepal. This study only includes patients who received treatment, so it may not be applicable to those who have not yet received treatment or have chosen not to receive it.

## CONCLUSION

Iatrogenic and traumatic etiologies were common for the anterior urethral stricture. Visual internal urethrotomy was the commonly performed procedure for the urethral stricture. Meatal stenosis was the commonest encountered complication.

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## CONFLICT OF INTEREST

The author(s) declare that they do not have any conflicts of interest with respect to the research, authorship, and/or publication of this article.

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