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Case Series

Surgery Section

"Detubularised Non Augmented Urethroplasty"- A Promising Option for Pananterior Urethral Stricture: A Case Series

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ABSTRACT

Pananterior urethral stricture involving the penile and bulbar urethra is a challenging urological condition in the Indian population. In India, Balanitis Xerotica Obliterans (BXO) or Lichen Sclerosus (LS) is the most common cause of pananterior urethral stricture. Various surgical techniques have been described in the literature for present condition, with varied outcomes. However, there is still a need for a simple and effective procedure to address this problem. Hereby, the authors present a case series that included five male patients with BXO and pananterior urethral stricture who underwent Detubularised Non Augmented (DNA) urethroplasty between January 2022 and December 2022. The median age of the patients was 45 years, with a mean stricture length of 13 cm. The median follow-up period was 11 months. During the procedure, a scroto-perineal incision was made, and the anterior urethra was ventrally cut open from the meatus to the junction of the stricturous and normal urethra. A right-sided Tunica Vaginalis (TV) flap was raised (left is left), and the cut-open anterior urethra was wrapped with the TV flap, creating a "controlled fistula" at the proximal end of the detubularised urethra. The average operative time was 1.5 hours. The success of the procedure was determined by a postoperative peak flow rate of 12 mL/sec or more, with no further need for urethral dilatation or direct vision internal urethrotomy. The procedure was successful in 4 out of 5 cases (80%). One patient developed a narrowed urethra during follow-up and required serial catheter upgradation for urethral dilatation. In conclusion, DNA urethroplasty was found to be a simple and effective treatment option for the notorious pananterior urethral stricture associated with BXO.

Keywords: Balanitis xerotica obliterans, Lichen sclerosus, Scroto-perineal, Tunica vaginalis

INTRODUCTION

Urethral stricture is a common urological condition, with an estimated prevalence in the United Kingdom (UK) of approximately 10/100,000 men in their youth, rising to about 20/100,000 by the age of 55 years, then to 40/100,000 by the age of 65 years, and over 100/100,000 thereafter [1]. The burden of urethral stricture disease in India has not been well-documented, but the incidence of LS-associated strictures is three times higher compared to Western data (21.5% vs. 6.9%) [2]. BXO, which was first described in 1928 by Stuhmer, is the male genital variant of Lichen Sclerosus et Atrophicus (LSA) [3]. In cases of long-standing disease, it can spread from the meatus, involving the mucosa and leading to spongiofibrosis extending as far back as the prostatic urethra. It is the most common cause of pananterior urethral stricture in the Indian population. Various one-stage and two-stage procedures have been described for this condition, with variable clinical outcomes. In present article, authors described a simple and novel technique called DNA urethroplasty for addressing this challenging condition.

CASE SERIES

This is a case series of five male patients with BXO who were evaluated and treated for pananterior urethral stricture disease [Table/Fig-1]. All patients underwent DNA urethroplasty performed by postdoctoral trainees under the supervision of consultants through a scroto-perineal incision. All patients were evaluated preoperatively through clinical history, physical examination, urine culture, uroflowmetry, measurement of Post-Void Residual Urine (PVRU), ascending and Voiding Cystourethrography (VCUG), and urethroscopy using a 6/7.5 Fr ureteroscope. The stricture was considered obliterative if only a 0.035-inch (0.89 mm, 2.67 Fr) guidewire could be inserted during preoperative urethroscopy. The clinical outcome was considered a failure if any instrumentation was required after the surgery. Uroflowmetry was performed at three-month intervals. If the flow of the urinary stream was reduced and the peak flow rate was less than 12 mL/sec, urethrography, PVRU, and urethroscopy were performed.

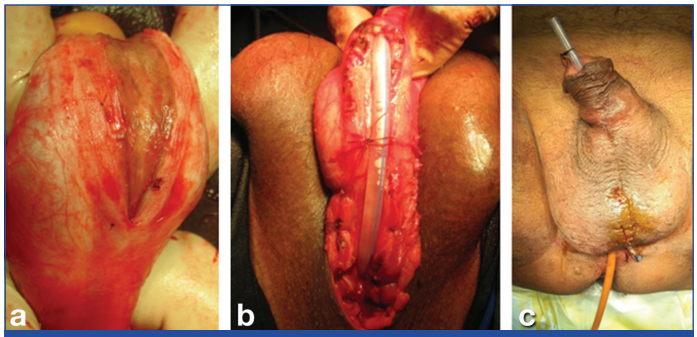
Surgical technique: The patient was placed in the dorsal lithotomy position with adequate padding and no pressure on the calves to avoid peroneal nerve injury. The suprapubic, scrotal, and perineal skin were shaved, disinfected with povidone-iodine, and draped. Preoperatively, urethroscopy was performed using a 6/7.5 Fr semi-rigid ureteroscope, and a 5 Fr ureteral catheter was passed over a 0.035-inch guidewire through the meatus [Table/Fig-2]. A midline scroto-perineal incision was made. The anterior urethra was incised ventrally from the meatus up to the junction of the stricturous and normal-looking proximal urethra over the ureteral catheter

Case	Age/Sex	History of circumcision	Preoperative Qmax (mL/sec)	Stricture length (cm)	Postoperative Qmax (mL/sec)	Closure of proximal fistula	Postoperative complications
1	59 y/Male	Yes	10	15	14	No	Seminal hypovolemia
2	66 y/Male	Yes	9	13	14	Yes	None
3	42 y/Male	Yes	12	10	16	No	Seminal hypovolemia
4	45 y/Male	Yes	11	13	14	No	None
5	35 y/Male	Yes	8	14	13	No	Difficult P.A.D.U.A

[Table/Fig-1]: Summary of the clinical findings of all the five cases.

[Table/Fig-3a]. A 20 Fr latex Foley catheter was inserted through the proximal "controlled fistula" into the bladder. The glandular portion of the narrowed urethra was incised dorsally to increase its caliber. A right-sided TV flap was raised, and the incised anterior urethra was wrapped by the TV flap over a 16 Fr silicone catheter, which was passed through the meatus and kept as a scaffold [Table/Fig-3b,c]. The TV flap was also fixed to the meatus after wrapping the distal detubularised urethra. A sandwich dressing, including the scrotum, was applied to prevent postoperative scrotal oedema.

[Table/Fig-2]: Balanitis Xerotica Obliterans (BXO) involving glans and meatus.

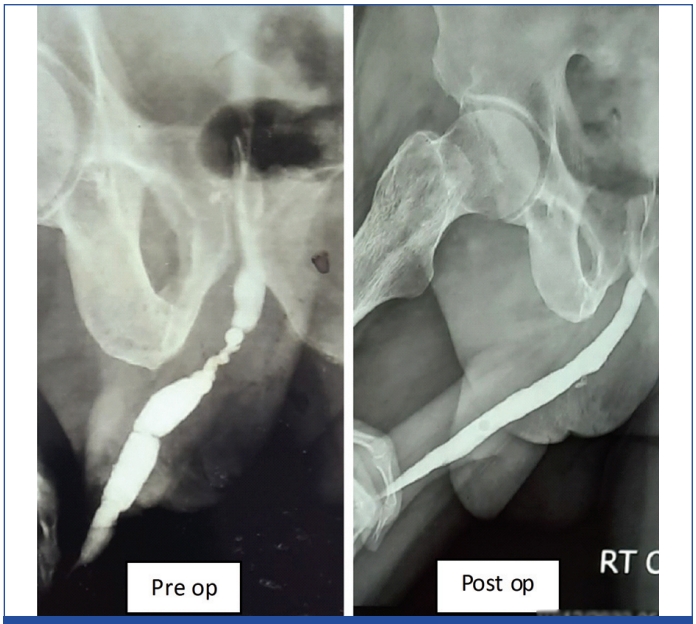


[Table/Fig-3]: (a) Ventral anterior urethrotomy; (b) Distal scaffold silicone catheter; (c) Proximal "controlled fistula" with latex catheter.

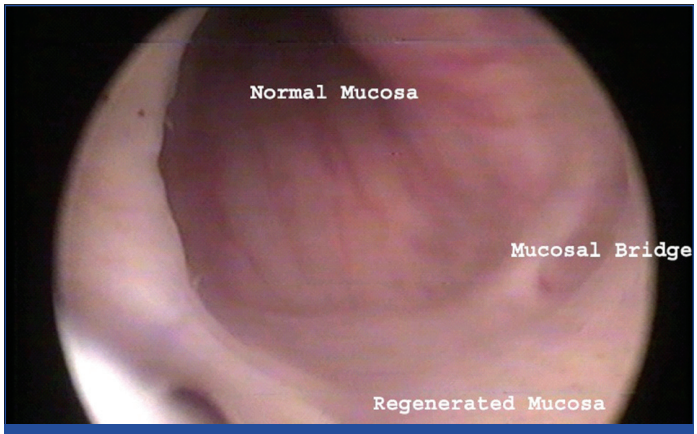
Postoperative care and follow-up: The patient was mobilised on the first postoperative day and discharged seven days after surgery. The catheter from the "controlled fistula" was removed on the 15th postoperative day, and the distal urethral catheter was removed after four weeks. After that, the patient was advised to continue self-Progressive Augmentation by Dilating the Urethra Anterior (PADUA) using 2% Lignocaine gel and 0.03% Tacrolimus ointment. Oral antibiotics were continued until the catheters were removed. VCUG was done after three months postoperatively [Table/Fig-4]. Uroflowmetry was performed at three-month intervals postoperatively for one year and annually thereafter, or sooner if clinically indicated. If the patient developed a decreased flow of urinary stream and uroflowmetry showed a peak flow rate of less than 12 mL/sec, further investigations including urethrography, PVRU, and urethroscopy were performed [Table/Fig-5].

RESULTS

The median age of the patients was 45 years. All of them had a history of circumcision with histopathological evidence of BXO. A suprapubic catheter was placed in all patients, and they were advised to apply 0.03% Tacrolimus ointment into the urethra through the meatus 2 to 3 months before surgery. The mean length of the stricture was 13 cm. None of the patients had undergone



[Table/Fig-4]: Preoperative image showing pananterior urethral stricture while postoperative image showing wide lumen of the anterior ureatha. (Images from left to right)



[Table/Fig-5]: Postoperative urethroscopy.

any previous urethral surgery and had an urethrocutaneous fistula. The success rate of present surgery was 80%. The average operative time was 1.5 hours. Closure of the proximal "controlled fistula" was not required in four patients. The mean postoperative peak flow rate was 14.2 mL/sec. Two patients developed seminal hypovolemia. One patient could not follow the instructions of PADUA after removal of the silicone catheter scaffold. As a result, the calibre of the urethra was found to be narrowed at follow-up and he was put on urethral dilatation by serial catheter upgradation.

DISCUSSION

Panurethral stricture presents a significant challenge for urologists. In cases of BXO, the meatus is commonly the first site of involvement, with a tendency to form superficial adhesions between the meatal lips in milder cases, and dense ivory-white fibrosis in more severe cases. Urethral involvement can occur in 20% of cases [3]. Various surgical techniques have been reported in the literature for this condition, ranging from Johanson's two-stage repair to single-stage buccal mucosal graft repair [4].

Depasquale I et al., observed that 20% of LS patients required surgery for urethral stricture, involving excision of the diseased urethra and replacement with grafts. Although the early results were good, there was an almost 90% recurrence rate of strictures on long-term follow-up [3]. McAninch JW and Morey AF reported on 66 patients who underwent penile circular fasciocutaneous skin flap procedures, with a success rate of 79% at a mean follow-up of 41 months. They found that the most common issue with the fasciocutaneous flap was penile skin necrosis proximal to the flap.

Since most pananterior urethral strictures are secondary to BXO, a genetic disease involving the genital skin, the general consensus is to avoid incorporating diseased skin into the repair [5]. This procedure also requires experience and surgical skill to achieve better outcomes.

Kulkarni SB et al., shared their experience with panurethral stricture repair using a one-stage, one-sided dissection dorsal onlay technique with oral mucosa grafts. The overall success rate was 83.7%, with a success rate of 86.5% for primary urethroplasty and 61.5% in patients with previous failed urethroplasty [6]. However, this technique demands surgical skill to achieve the standard mentioned by the authors.

Panda SN and Subudhi CL demonstrated promising results with a new technique called "sleeve urethroplasty," similar to our "DNA urethroplasty," for long-segment penile urethral strictures, with an almost 100% success rate [7]. Authors extended this technique up to the bulbomembranous junction and also placed a vascularised wrap of TV flap over the detubularised urethra.

The urothelium has a remarkable ability to regenerate, even in the presence of BXO. Cells for tissue engineering of the urethra can be harvested from the abnormal fibrosed urethra itself, as these cells retain genetic stability [8]. Author utilised the same principle in this technique. The incised urethral plate was wrapped by vascularised TV flap over the scaffold catheter to enhance vascularity in the newly regenerated urethral tube. Similarly, Monseur J reported on a technique called 'dorsal' sagittal urethrotomy with spread fixation of the cut margins to under the surface of the tunica albuginea of the corpora cavernosa, without augmentation, to allow for urothelium regeneration [9]. Authors found several advantages to this novel technique. Firstly, the risk of urethrocutaneous fistula is minimal as there is no penile incision or suture line. There is no hypospadias meatus, and the chance of chordee is reduced. Author preserved the bulbospongiosus muscle, urethral neurovascular supply, and perineal body, as well as we used a vascularised TV flap. This results in better healing of the repair, a lower chance of ejaculatory dysfunction and post-micturition dribbling. Additionally, operative time ranged from 1.5 to 2 hours when performed by postdoctoral trainees, and only 45 minutes to 1 hour when performed by a consultant.

CONCLUSION(S)

The DNA urethroplasty is a simple and effective treatment option for the notorious pananterior urethral stricture associated with BXO, and it does not require extensive operative skills. However, larger studies with longer follow-ups are needed to validate results.

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