

Dorsolateral onlay urethroplasty for anterior urethral strictures by a unilateral urethral mobilization approach

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ABSTRACT

Context: For management of long segment anterior urethral stricture, dorsal onlay urethroplasty is currently the most favored single-stage procedure. Conventional dorsal onlay urethroplasty requires circumferential mobilization of the urethra, which might cause ischemia of the urethra in addition to chordee.

Aims: To determine the feasibility and short-term outcomes of applying a dorsolateral free graft to treat anterior urethral stricture by unilateral urethral mobilization through a perineal approach.

Settings and Design: A prospective study from September 2005 to March 2008 in a tertiary care teaching hospital.

Materials and Methods: Seventeen patients with long or multiple strictures of the anterior urethra were treated by a dorsolateral free buccal mucosa graft. The pendulous urethra was accessed by penile eversion through the perineal wound. The urethra was not separated from the corporal bodies on one side and was only mobilized from the midline on the ventral aspect to beyond the midline on the dorsal aspect. The urethra was opened in the dorsal midline over the stricture. The buccal mucosa graft was secured on the ventral tunica of the corporal bodies.

Statistical Analysis Used: Mean and median.

Results: After a follow-up of 12-30 months, one recurrence developed and 1 patient needed an internal urethrotomy.

Conclusions: A unilateral urethral mobilization approach for dorsolateral free graft urethroplasty is feasible for panurethral strictures of any length with good short-term success.

Key words: Onlay patch, stricture urethra, urethroplasty

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INTRODUCTION

The conventional approach for management of long segment anterior urethral stricture is a two-stage Johanson repair along with the use of free grafts if required.^[1-3] One-stage techniques are either dorsal onlay (Barbagli procedure),^[4-7] ventral sagittal urethrotomy with inlay patch (Asopa technique),^[8,9] or dorsal onlay with separate grafting for the distal-most urethra by graft insertion through the meatus. To avoid urethral devascularization due to circumferential dissection of the urethra in the standard dorsal onlay procedure, we adopted the approach of one-sided urethral mobilization to place a dorsolateral graft, its feasibility, and short-term outcomes.

MATERIALS AND METHODS

Between September 2005 and March 2008, a cohort of 20 patients (mean age: 46 years old, range:

33-62 years old) underwent a dorsolateral onlay urethroplasty using buccal mucosa for long anterior urethral strictures. In this study, we included only 17 patients who had a minimum follow-up of 12 months. Lichen sclerosis was present in 8 patients, whereas in the other 9 patients the etiology was inflammatory. Stricture location was bulbar in 1 patient, penile in 8 patients, and the remaining 8 patients had a pananterior urethral stricture. Mean and median stricture lengths were 8.6 and 8.4 cms, respectively. The median time for follow-up was 19.0 months (mean: 19.8 months; range: 12-30 months) [Table 1].

An intra-operative urethroscopy was performed to check the caliber of the narrow urethra and the remaining urethra. We performed the onlay procedure only if the urethra was of at least 6 fr. diameter. Urethroplasty was started by a midline perineal approach, with the patient in a high lithotomy position. The penis was everted through the perineal incision. The urethra was mobilized from the midline on the ventral aspect to beyond the midline on the dorsal aspect [Figure 1a]. Fascia and vascular attachments on the other side of the urethra were left intact. Maximum distal and proximal limits of dissection were meatus and bulbomembranous junction. The urethra was incised open in the midline

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Table 1: Patient parameters and outcomes

Parameter/ patient group according to the site of stricture (number of patients)	Age (years) (mean/ median/ range)	Stricture length (cms) (mean/ median/ range)	Follow- up period (months) (mean/ median/ range)	Pre- operative Qmax (ml/sec.) (mean/ median/ range)	Postoperative Qmax in all patients (ml/sec.) (mean/ median/ range)	Postoperative Qmax in successful patients (ml/sec.) (mean/median/ range)	Success rate ratio (%)	Satisfactory result rate ratio (%)	Other complications ratio (%)
All patients (17)	46.4/ 46.0/ 33-62	8.6/ 8.4/ 3.5-14.0	19.8/ 19.0/ 12-30	6.7/ 6.6/ 3.8-9.5	16.4/ 16.5/ 8-21.2	17.4/ 17/ 15.1-21.2	15/ 17 (88%)	16/ 17 (94%)	3/ 17 (17.6%)
Penile (8)	43.5/ 40.5/ 33-58	6.6/ 6.9/ 4.7-8.4	21/ 19.5/ 14-30	6.8/ 7.0/ 4.2-9.5	16.4/ 17.5/ 8-20.2	17.6/ 18/ 15.4-20.2	7/ 8 (87.5%)	7/ 8 (87.5%)	1/ 8 (WI) (12.5%)
Bulbar (1)	44	3.5	17	8.2	18.4	18.4	1/ 1 (100%)	1/ 1 (100%)	0 (0%)
Panurethral/ penile + bulbar (8)	49.8/ 50.0/ 35-62	11.1/ 11.1/ 8.8-14	19/ 19.5/ 2-26	6.4/ 6.3/ 3.8-8.7	16.1/ 16.3/ 10.2-21.2	17.0/ 16.4/ 15.1-21.2	7/ 8 (87.5%)	8/ 8 (100%)	2/ 8 (MS/WD) (25%)

dorsally [Figure 1b]. Buccal mucosal grafts (from one or both the cheeks) of required length and width were taken. The length of the area to be grafted was measured by the incised length of the urethra. Graft sizing is appropriate by this method; hence, preventing chordee. Proximally, the graft was sutured to the open urethra by a few interrupted sutures at the apex and at the medial urethral margin. Then, one edge of the graft was sutured to the medial urethral margin,

which is in place and fixed to the corpora [Figure 1c]. This was performed by continuous suturing using 4/0 Vicryl until the distal apex. At the distal apex, few interrupted sutures were taken. Quilting sutures were applied to keep the graft opposed to the tunica and to prevent buckling of the graft. A 14 Fr Foleys catheter was kept. The other margin of the graft was sutured to the lateral margin of the urethra and the tunica of corpora [Figure 1d]. These three tissues were

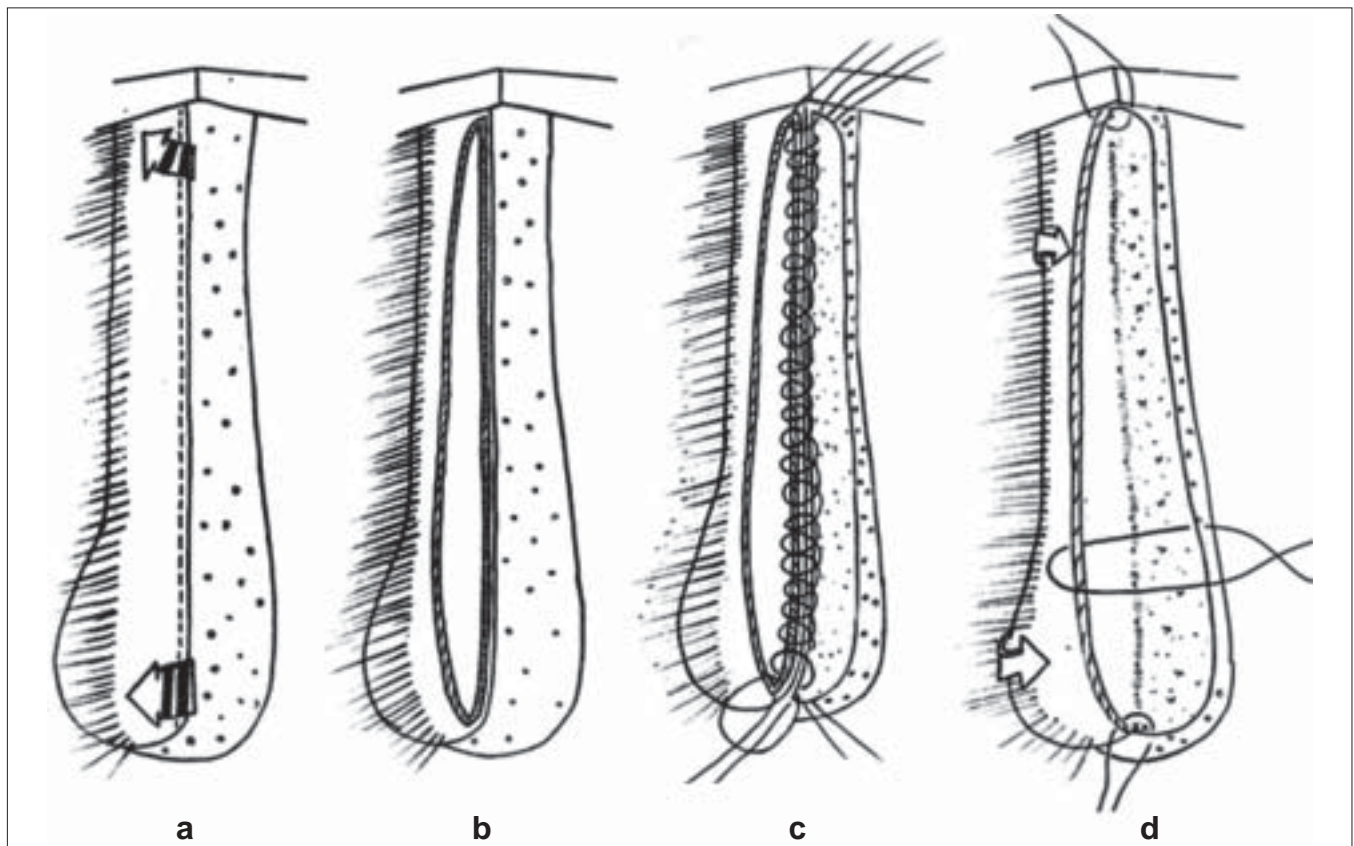


Figure 1: (a) Limited urethral mobilization from midline ventrally to beyond midline dorsally, (b) urethral incision at dorsal midline (12 O'clock), (c) graft sutured to medial (right) urethral margin, and (d) graft sutured to lateral (left) urethral margin

taken together while approximating the lateral edge, thereby anchoring both graft and urethral margin to the coporal tunica. During the entire procedure, care was taken to prevent stretching of the graft, which may result in chordee. A corrugated drain was kept. The bulbospongiosus muscle was approximated in the midline. Subcutaneous tissues and skin were closed with interrupted absorbable sutures.

The results were classified into three outcomes. Success was defined as a maximum flow rate of ≥ 15 ml/sec., sterile urine, normal urethral imaging (retrograde urethrogram), and/or urethroscopy (with a 19 fr. sheath). Failure was defined as the presence of obstructive urinary tract symptoms, $Q_{max} < 15$ ml/sec., stricture diagnosed on retrograde urethrogram/urethroscopy, and the need for any postoperative urethral intervention, including dilatation, internal urethrotomy, or urethroplasty. However, in the failure group, a satisfactory result was considered to be one episode of restricture diagnosed on retrograde urethrogram or urethroscopy that was successfully managed by one internal urethrotomy.

RESULTS

Our short-term success rate with a median follow-up of 19 months (range: 12-30 months) was 88% and a satisfactory result rate was 94%. One of the failure cases who developed a proximal anastomotic stricture had a successful outcome following internal urethrotomy. Another patient developed long segment restricture and required a two-stage urethroplasty. One patient developed meatal stenosis (MS) in the postoperative period for which he required meatal dilatation. Two of these three patients had lichen sclerosis. Two patients had minor complications: Wound infection (WI) and superficial wound dehiscence (WD). None of the patients developed diverticulum on a subsequent urethrogram. Detailed results according to the site of stricture are presented in Table 1.

DISCUSSION

A circumferential dissection of the whole anterior urethra risks the vascularity of the urethra, which may be more important if the meatus is involved with disease and the distal-most urethra is extensively dissected, such as is seen with concomitant lichen sclerosis. The Barbagli procedure with circumferential mobilization of the urethra for dorsal onlay patch has a success rate of 99% and 66% in the short- and long-term, respectively.^[10] However, in long segment anterior urethral strictures, circumferential urethral mobilization may jeopardize the lateral vascularity of the urethra.

Barbagli also described the lateral onlay procedure with results similar to dorsal and ventral onlay for bulbar urethral strictures.^[11] In the pendulous urethra, ventral and lateral onlay grafts have the risk of diverticulum formation.

Asopa's procedure of inlay patch by ventrally incising the urethra is another option for anterior urethral strictures.^[8] It preserves the lateral vascularity of the urethra. However, it has two potential drawbacks. Firstly, a wider graft may be difficult to be placed using this approach and may likely get folded. Secondly, we do not know how the long ventral saggital incision on the scarred urethra will behave in the long-term follow-up. In the short-term follow-up, this procedure has shown good results.^[8,9]

Recently, Singh, *et al.*, have shown the superiority of the Asopa procedure over the Barbagli procedure in terms of success and complications.^[12] This also supports the approach of restricting the mobilization of the urethra from its bed in patch urethroplasties for long segment anterior urethral strictures.

To maintain the urethral vascularity on one side of the urethra while keeping the graft in a dorsolateral onlay fashion, we adopted the policy of limited urethral mobilization, i.e., from ventral midline to beyond dorsal midline. In this procedure, the graft is eccentric toward one side on the ventral tunica of the corpora, shifting the urethral lumen toward that side. We kept the grafts of up to 2.2 cm in width with a maximum length from the proximal bulbar up to the meatus (up to 14 cms). Technically, it is as easy as the Barbagli procedure. It also preserves the one-sided bulbar artery in addition to maintaining the native lateral vascularity at the meatus and the distal urethra.

Furthermore, by using this approach, we did not find postoperative chordee in any case. In this procedure, the urethra is not completely mobilized off the corpora; hence, graft sizing is more appropriate, preventing the chordee. Because both the edges of the graft are anchored to the tunica, there is equal stretch on either edge of the graft and hence, probably, does not result in lateral curvature or torque. It is important to avoid any undue stretching of the graft to avoid chordee.

We cannot comment on postoperative sexual and ejaculatory function as we specifically did not look into this matter by any validated questionnaire because of the illiterate background of most of our patients. Muscle and nerve sparing onlay patch urethroplasty have been suggested for better ejaculatory function and to avoid postvoid dribbling.^[13] Although this technique may be good for the ventral onlay procedure, there is a risk of muscle damage by downward excessive retraction of the bulbospongiosus muscle in proximal strictures. In the standard dorsal onlay procedure, the entire bulbospongiosus muscle is cut and separated from its natural attachment over the bulb. This muscle, which is later re-approximated over the bulb, may lose some of its function, leading to postoperative sexual and ejaculatory dysfunction. By using our approach, at least the one-sided bulbospongiosus muscle remains intact along

with ipsilateral intact vascularity to the urethra. Whether this concept will translate clinically into better sexual and ejaculatory functions is to be seen by further studies. None of our patients reported postvoid dribbling.

Using this approach, our short-term results for these long segment strictures are reasonable.

CONCLUSIONS

For single-stage repair of long segment anterior urethral strictures, dorsal patch urethroplasties are the mainstay of treatment. To avoid the extensive circumferential mobilization of the urethra or unnecessarily incising the scarred urethra ventrally, a dorsolateral patch by one-sided urethral mobilization may be a good alternative for dorsal patch urethroplasty. In our study of a limited number of patients, we found it to be a technically feasible and successful procedure. In a short-term follow-up of 19 months, the results are encouraging. Long-term results of this procedure are yet to be seen.

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