

Dorsolateral Onlay Bmg Urethroplasty in Long Segment Anterior Urethral Stricture – Our Experience

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Abstract

Objectives: To evaluate the result of dorsolateral onlay buccal mucosal graft (BMG) urethroplasty in different type of long segment anterior urethral stricture.

Materials and Methods: In this retrospective study total number of patients was 30 from January 2014 to December 2015.

This study was carried out at NRS Medical College, Kolkata in dept. of Urology in patients who presented with long anterior urethral stricture at OPD. Preoperatively they were assessed by complete history, physical examination, uroflowmetry, retrograde urethrography and voiding cystourethrography and cystoscopy. They were managed by dorsolateral BMG urethroplasty with or without hypospadiac meatus. In follow-up period they were assessed by uroflowmetry 3 monthly for one year and RGU and/or urethroscopy if required. Successful outcome was defined as normal voiding with a maximum of one attempt of VIU after catheter removal.

Results: total no. of cases was 30. Overall success rate 76%.

Conclusions: Dorsolateral onlay buccal mucosa graft urethroplasty is a simple and reproducible surgical technique with good surgical outcome for patients with long segment anterior urethral stricture disease.

Keywords: urethral stricture, buccal mucosal graft, dorsolateral approach, follow up

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I. Introduction

Urethral stricture disease is a relatively common disease in men with different etiologies [11]. There are various treatment modalities for short urethral strictures, including simple dilatation, visual internal urethrotomy, scar excision, and end-to-end anastomosis, while management of long urethral strictures is a technically challenging and complex procedure for urologists. 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 [2-4]. One-stage techniques are either dorsal onlay [4], ventral sagittal urethrotomy with inlay patch [8,9] or dorsal onlay with separate grafting for the distal-most urethra by graft insertion through the meatus [10]. Suprechko first described buccal mucosa could be used as a graft in 1886, it has become the tissue of choice for urethral reconstruction [5]. It is readily available and easily harvested with minimal donor site morbidity. Recently in different study it has been found that one-sided mobilization of the urethra with sparing of central tendon of perineum and dorsal anterior/lateral placement of the BMG in order to preserve the blood supply to the urethra and neuro-vascular integrity of the bulbospongiosus muscle respectively [6,7].

In dorsolateral approach to preserve the urethral vascularity on one side of the urethra, mobilization of urethra is done on one side, i.e., from ventral midline to beyond dorsal midline. In this procedure, the graft is placed on one side on ventral tunica of the corpora cavernosa. It also preserves the one-sided bulbar artery in addition to maintaining the native lateral vascularity at the meatus and the distal urethra. We retrospectively evaluated the results of our experience in one-stage transperineal urethroplasty using dorsolaterally placed buccal mucosal graft and its outcomes in the treatment of long segment anterior urethral strictures.

II. Materials and methods

This retrospective study was carried out in Nilratan Sircar Medical college and Hospital, Kolkata since January 2014 to December 2015. Total number of patients who presented with long segment anterior urethral stricture was 30. Each patient was evaluated by detailed history, physical examination, Uroflowmetry study with post void residual urine, RGU and VCUg, urethroscopy and other routine investigations necessary for surgery. Patients with short segment urethral strictures (length < 2cm), posterior urethral strictures, complete urethral blockage or during assessment strictures not allowing atleast 6 Fr infant feeding tube were excluded from study. Patients with urethral stricture with acute urethritis or complete blockage due to severe inflammatory urethritis, patient presented with urinary retention or obstructive uropathy underwent suprapubic catheter placement atleast 6 weeks before definitive surgery. Of the strictures, 18 strictures were associated with lichen sclerosus (BXO), 4 were idiopathic in origin, 4 weretraumatic, 3were due to catheter induced (reactive) inflammatory and 1 wasinfective in origin. Mean stricture length, asmeasured by preoperative RGU was 9.9 cm (range 3.5to 15 cm). The sites of strictures were panurethral in 18 patients, penile in 6 and bulbar in 8 patients(Table-2).

Table 1 - Etiology of strictures.

Cause of Strictures	Number of Patients
Idiopathic	4
Traumatic	4
Lichen sclerosus (BXO)	18
Catheter induced inflammatory	3
Infective	1
Total	30

Table 2 –Sites of strictures.

Site	Number of Patients
Panurethral	16
Penile	6
Bulbar	8
Total	30

Surgical technique:

General anaesthesia with nasotracheal intubation was given. Patients were placed in the exaggerated dorsal lithotomy position with all pressure points appropriately padded with cotton. Specifically, the legs were padded in Allen stirrups. Operation was done in a 2-team approach. On team engaged in urethral procedure, and other team was for harvesting the buccal mucosa. Midline perineal incision was made,thebulbocavernosus muscle was exposed and divided. Thecorpus spongiosum of the anterior urethra exposed. Then the bulbar urethra was dissected to separate from corporacavernosa on left side, so as to leave the right half attached and preservation of its lateral blood supply.By invaginating the penis, the penile urethrawas similarly dissected up to the coronal sulcus (13).Then the strictured segment of the urethra was identified and divided dorsolaterally.

Simultaneously the other team harvested the buccalmucosal graft from the inner cheek area away from the Stensen’s duct and muco-cutaneous junction. Usually, 6 to 8 cmlong and 2.5 – 3 cm width graft harvested. If the required graft length is morethan 6 cm, then graft from other cheek had taken. Lignocaine (2%) with adrenaline (1:200000) wasinjected into the edges of the desired graft beforeharvesting the graft to get better haemostasis and it also help in dissection. Stay sutures areplaced into the corners and the graft was harvested. Graft donor site was kept open for re-epithelialisation. The graft was then defatted, multiple opening done and tailored to its proper size. The dissected urethra was rotated towards right side to expose the dorsolateral surface of the strictured segment of urethra and opened vertically extending the incision for about1 cm both proximally and distally into the normalurethral lumen. The proximal and distal urethral lumen of the urethra wererecalibrated.Theleft margin of the urethral mucosa was sutured to thegraft using 4-0 polyglactin interrupted stitches. Then graft was sutured,splayed and quilted over the corpora cavernosa using 4-0 vicryl sutures for reinforcementwith good support and minimizing the dead space. A 16F silicone Foley catheter was inserted through theurethra into the urinary bladder. Then the urethra wasrotated back to its original position and the right marginof the urethral mucosa was sutured similarly to theremaining margin of the buccal mucosal graft. At theend of the procedurespongioplasty was done. Separated muscles are apposed and skin closed with 3-0 rapidevicryl suture.

In those cases with external urethral involvement, the dorsal meatotomy incision was given to widen the narrow meatus/fossa navicularis region and draw the graft in through the glans from the distal urethrotomy and place it right up to the tip of the external meatus.

In cases with scarred deformed meatus a ventral midline full thickness incision was made from meatus upto urethra with adequate calibre. Skin margins sutured to mucosal margin with 3 – 0 rapidevicryl to widen urethral meatus.



Fig 1: Glans and meatus involved by BXO

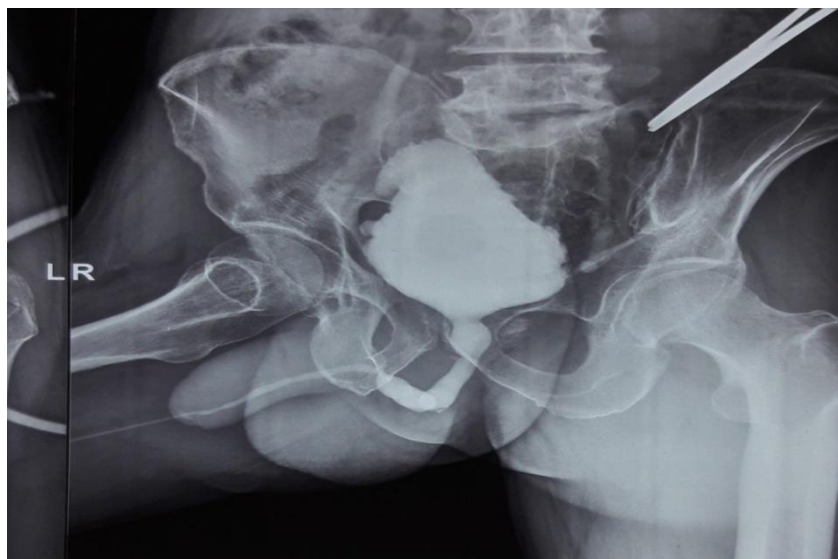


Fig. 2: RGU + VCUG showing long segment anterior urethral stricture

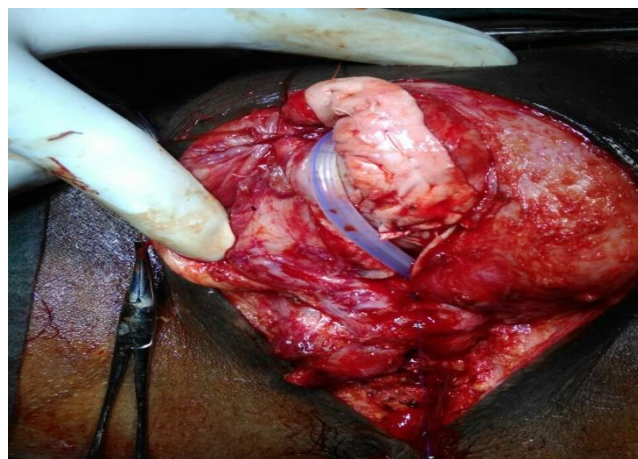


Fig 2 : Dorsolaterally placed buccal mucosal graft

III. Results

A total of 30 patients (mean age 41 years, range 17 to 65 years) underwent BMG urethroplasty between January 2014 to December 2015 in our centre. The etiology of the urethral stricture was idiopathic 4(14%), balanitis xerotica obliterans 18(60%), catheter induced (reactive) inflammatory 3(10%), traumatic including catheter induced trauma, iatrogenic and from injury 4(13%), and sexually transmitted disease 1(3%). The location of stricture was panurethral 16(53%), in penile urethra 6(20%) and in bulbar urethra 8(27%). The mean length of stricture 9 ± 6 cm. Mean operative time was 170 min (range 130 to 210 min) and mean follow-up 18 months (range 12 to 30 months). Mean duration of hospitalization was 7 days (range 5 to 14 days). A total number of 6 patients was with penile urethral stricture with the mean length of 7 ± 1 cm. In this group 4 patients underwent dorsolateral BMG urethroplasty (BMG extending upto meatus) and another 2 patients were dorsolateral BMG urethroplasty with hypospadiac meatus. In this group success rate 83% and one patient developed re-stricture due to blockage of meatus by BXO. One patient of successful group developed proximal anastomotic site re-stenosis which treated by VIU. Now this patient is doing well.

A total number of 8 patients were with bulbar urethral stricture with mean length of 5.15 ± 2 centimeters. All patients underwent dorsolateral BMG urethroplasty with a success rate 87%. One patient developed re-stricture who maintained on suprapubic catheter and later on underwent surgical treatment. One patient of successful group had developed narrowing at proximal anastomotic site and underwent VIU and 1 patient at distal anastomotic site who also underwent VIU. All of these patients are passing urine with good flow. 16 patients were presented with panurethral stricture. Approximate length of stricture was 12 ± 3 centimeters. Nine patients underwent dorsolateral onlay BMG urethroplasty and 7 patients underwent dorsolateral onlay BMG urethroplasty with hypospadiac meatus. Overall success rate in this group was 69%. Out of 16 patients of dorsolateral onlay BMG urethroplasty 10 patients were successful without any further intervention, 1 patient needed VIU in follow-up period and 3 patients did not pass urine more than one month due to failure of surgery and extension of disease. Two patients had developed stricture after 3 months of surgery.

Three patients (10%) developed wound infection, managed successfully with wound dressing and change in antibiotics as per wound swab culture sensitivity test. No patient developed urethra-cutaneous fistula, diverticulum, sacculum formation, erectile dysfunction, urinary incontinence, lower extremity injury (compartment syndrome or common peroneal nerve paralysis) secondary to prolonged operative positioning. Two patients had developed mild chordee in follow-up period in panurethral stricture.

Minor buccal discomfort like trismus occurred in 2 patients (17.09%) after surgery but all of them became symptom-free during their follow-up period. One patient had developed parotitis which resolved after conservative management.

Two patients needed blood transfusion in post-operative period.

Table 3: List of failure cases

Sl. No.	Age	Location	Length	Etiology	Cause of failure
1	45	Penile	6 cm	BXO	Meatal stenosis
2	32	Pan urethral	13	BXO	Proximal anastomotic site stricture.
3	34	Pan urethral	14	BXO	Multiple ring like narrowing involving whole urethra.
4	40	Pan urethral	15 cm	Catheter inflammatory	Due to disease extension
5	50	Pan urethral	14	BXO	Meatal stricture due disease persistence
6	36	Bulbar	5.5	BXO	Narrowing of proximal and distal anastomotic site
7	36	Pan urethral	12	BXO	Restructure involving whole urethra

IV. Discussion

Urethral stricture disease has various etiologies. In western countries post traumatic and post instrumentation are common causes of stricture but in our country post inflammatory particularly balanitis xerotica obliterans is the most common cause of stricture and in our study 60 percent of stricture were due to BXO and most of them were long segment and panurethral. Catheter induced inflammatory stricture is another important cause of long segment stricture. Regarding distribution of urethral stricture most was located in penobulbar urethra starting from meatus. In our study more than fifty percent (53%) stricture are panurethral because the stricture was due to BXO. Average length of stricture 9 ± 6 cm due to most stricture in this study was due to pan urethral involvement which are comparable to other study.

Substitution urethroplasty with BMG is most commonly performed technique particularly for long segment anterior urethral stricture and become standard of care. Whether to place the graft ventrally, dorsally or

dorsolaterally has comparable results. In dorsal onlay approach graft placed on a well vascularised corporal body which prevent protrusion of graft. In dorsolateral onlay approach urethra is mobilized in one side, which maintain vascularity of urethra. In our study total 30 patients underwent dorsolateral onlay BMG urethroplasty with overall success rate of 76%. Mean follow up was 12 months to 30 months. Follow up in post-operative period was done by History taking, Physical examination, AUA symptoms score, Uroflowmetry 3 monthly for one year thereafter 6 monthly. RGU and/or cystoscopy was advised if Q_{max} was less than 15 ml/min. Overall success rate was 76% whereas in other international study it was more than 85%. Kulkarni et al. published a series of 24 patient in 2009 where they had used the technique of one sided mobilization of urethra with a success rate of more than 90%. Studies by Barbagli or Kulkarni on dorsal onlay urethroplasty have shown success rate are more than 90%. Most common complications in this study is wound infection. No other major complications occurred in this study. In our study overall success rate was 76% for dorsolateral onlay BMG urethroplasty but in dorsal onlay urethroplasty success rate is more than 90%. This is may be due to most of the stricture are more than 10 cm in length.

V. Conclusion

Dorsolateral BMG urethroplasty is a safe and reproducible technique but it is a less successful technique for long segment anterior urethral stricture compared to more conventional dorsal onlay BMG urethroplasty.

Table 4: List of total number of cases

	Age	Location of stricture	Length	Etiology	Pre-op Q_{max}	Post- op Q_{max}	
						At 3 month	At 6 month
1	52	Pan urethral	8 cm	Catheter induced inflammatory	5 ml/sec	17 ml/sec	15 ml/sec
2	21	Bulbur	4 cm	Traumatic	8 ml/sec	23 ml/sec	17 ml/sec
3	45	Penile	6 cm	BXO	3 ml/sec	15 ml/sec	failed
4	53	Bulbur	5 cm	BXO	8 ml/sec	29 ml/sec	26 ml/sec
5	16	Bulbur	3.5	trumatic	7 ml/src	19 ml/sec	16 ml/sec
6	50	Pan urethral	9	BXO	4 ml/sec	25 ml/sec	19 ml/sec
7	48	Penile urethral	7	idiopathic	5 ml/sec	23 ml/sec	20 ml/sec
8	32	Pan urethral	13	BXO	3 ml/sec	14 ml/sec	6 ml/sec failed
9	42	Bulbur	7	Traumatic	2 ml/sec	27 ml/sec	19 ml/sec
10	38	Bulbur	4	Idiopathic	5 ml/sec	36 ml/sec	26 ml/sec
11	36	Bulbur	5.5	BXO	4 ml/sec	24 ml/sec	failed
12	45	Pan urethral	14	BXO	3 ml/sec	26 ml/sec	21 ml/sc
13	46/m	penile	7	BXO	2 ml/sec	18 ml/sec	16 ml/sec
14	34	Pan urethral	14	BXO	3 ml/sec	15 ml/sec	8 ml/sec failed
15	53	penile	6	Idiopathic	5 ml/sec	19 ml/sec	17 ml/sec
16	50	Pan urethral	13	BXO	0 ml/sec	22 ml/sec	19 ml/sec
17	58	Panurethral	12	BXO	nil	24 ml/sec	22 ml/sec
18	30	Bulbur	4 cm	Chr. urethritis	6 ml/sec	20 ml/sec	19 ml/sec
19	25	Penile	6 cm	BXO	9 ml/sec	22 ml/sec	21 ml/sec
20	40	Panurethral	15 cm	Catheter inflammatory	nil	5 ml/sec	On catheter Failed
21	49	Panurethral	12	idiopathic	2 ml/sec	16 ml/sec	15 ml/sec
22	48	Panurethral	13	Idiopathic	7 ml/sec	18 ml/sec	16 ml/sec
23	17	Panurethral	15	BXO	2 ml/sec	17 ml/sec	15 ml/se
24	50	Pan urethral	14	BXO	6 ml/sec	failed	failed
25	30	Pan urethral	13.5	BXO	3 ml/sec	28 ml/sec	24 ml/sec
26	36	Pan urethral	12	BXO	3 ml/sec	10 ml/sec	Failed
27	20	Penile urethral	8	BXO	8 ml/sec	25 ml/sec	21 ml/sec
28	50	Pan urethral	9 cm	BXO	5 ml/sec	26 ml/sec	18 ml/sec
29	65	Bulbur	5 cm	Traumatic	4 ml/sec	24 ml/sec	18 ml/sec
30	35	Panurethral	14	BXO	3 ml/sec	27 ml/sec	18 ml/sec

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