

Dorsal Onlay Buccal Mucosal Graft Urethroplasty for Long Segment Anterior Urethral Stricture



Medical Science

KEYWORDS : Urethral stricture, Urethroplasty, Buccal mucosa, BMG Urethroplasty

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ABSTRACT

Objective: To present our experience with buccal mucosa urethroplasty for reconstruction of long segment anterior urethral strictures by dorsal onlay technique.

Patients and methods: Between January 2011 and February 2014, 56 patients with long anterior urethral strictures were managed by dorsal onlay BMG urethroplasty. Follow up included uroflowmetry with an ultrasonographic estimate of residual volume at 3 months, 1 year and yearly thereafter or at onset of obstructive voiding symptoms. Retrograde urethrogram (RGU) was done at 6 months. Cystoscopy was done in selected patients. Successful outcome was defined as normal voiding after catheter removal and no need for subsequent instrumentation.

Results: Mean age of the patients was 47.2 years. The mean AUA symptom score was 23.2. The mean preoperative maximum flow rate was 7.2 ml/sec with mean residual volume 89.2ml. The mean stricture length was 8.9cm and mean urethral lumen diameter 8.6 Fr. The mean operative time was 133 mins. Mean follow up period was 25 months. Three patients developed recurrent strictures of which two patients underwent VIU and one underwent redo BMG urethroplasty. The success rate was 94.64%. The mean post operative maximum flow rate was 27.5 ml/sec with mean residual volume of 24.7 ml.

Conclusion: Dorsal buccal mucosal graft urethroplasty provides excellent results for long anterior urethral stricture.

Introduction:

Urethral reconstruction remains a challenge in modern surgical practice. The treatment of urethral stricture varies according to location, length, depth and density of the stricture. Anterior urethral strictures which are not amenable to end to end anastomosis, require substitution urethroplasty(1). This can be achieved by using penile skin flaps or free grafts of full thickness skin, bladder or buccal mucosa (BMG). BMG is the ideal substitute for urethra for the following factors: ease of accessibility, resistance to infection, compatibility with a wet environment, a thick epithelium and a thin lamina propria, allowing easy inosculation(2). Though Humby had described the use of buccal mucosa for urethral substitution in 1941, it has become popular only after 1990(3). We present a retrospective analysis of our experience with the use of buccal mucosa for the repair of long segment anterior urethral strictures by dorsal onlay technique.

Patients and methods:

Between January 2011 and February 2014, 56 patients who underwent urethroplasty for long anterior urethral stricture were taken for the study. Each patient was evaluated with detailed case history physical examination, uroflowmetry with residual urine measurement, urine culture and imaging study with retrograde urethrogram (RGU) and voiding cystourethrogram (VCUG). Sonourethrogram was done in selected patients.

Inclusion criteria: Pan urethral strictures

Bulbar urethral stricture >3cm

Exclusion criteria: H/o previous urethral surgeries

Perioperative antibiotics started based on urine culture & sensitivity or empirically started on third generation cephalosporins with metronidazole. Pre-operative local application of 10% wokadine was advised regularly for all patients (24 hours before surgery). A two team approach was used; with the patient under general anaesthesia and nasotracheal intubation. Midline perineal/lambdoid incision was used commonly. Circumcoronal incision was used in 3 patients.

The graft was placed dorsally and anastomosed to the urethra with 4-0 vicryl. For meatal reconstruction, the distal most BMG was fixed to the dorsally cut margins of the meatus. 14/16 Fr Foley catheter was used. Complete hemostasis ensured, corrugator drain kept and compression dressing applied for all patients.

Post operative mobility was restricted for 2 days. Drain was removed after 24 hours. Liquid diet was started after 24 hours. Catheter was removed after 2-3 weeks. Patient was discharged after 10-14 days. Follow up included uroflowmetry with an ultrasonographic estimate of residual volume at 3 months, 1 year and yearly thereafter or at onset of obstructive voiding symptoms. Routine intra urethral steroid cream was advised for BXO patients. Retrograde urethrogram (RGU) was done at 3 months. Cystoscopy was done in selected patients. Successful outcome was defined as normal voiding after catheter removal and no need for subsequent instrumentation.

Results:

A total of 56 patients underwent dorsal onlay BMG urethroplasty between January 2011 and February 2014. The mean age of the patients was 47.2 years. The most common cause was Lichen sclerosis(BXO) (Table 1). The commonest site of stricture was bulbar, present in 24 patients(Table 2).

Table 1 - Etiology

Cause	No. of patients
Lichen sclerosis (BXO)	28
Idiopathic	24
Iatrogenic	4
Total	56

Table 2 - Site of stricture

Site	No. of patient
Bulbar	24
Pan urethral	20
Penile	12
Total	56

The mean AUA symptom score was 23.2. The mean preoperative maximum flow rate was 7.2 ml/s with mean residual volume 89.2 ml (Table 3). Urine culture was done before surgery, 19 cultures were negative, 23 had insignificant bacteriuria and 24 showed significant bacteriuria. A dorsal onlay technique was used in all the patients. The mean operative time was 133 mins

(range 110 to 160 mins). No patients required post operative blood transfusion.

Table 3 - Pre-operative Parameters

Parameters	Mean (Range)
Mean age of patients	47.2 yrs (14-67)
Mean AUA symptom score	23.2 ml (19-21)
Mean pre op Q max	7.2 ml (2-11)
Preoperative mean residual volume	89.2 ml (57-175)
Mean stricture length	8.9 cm (3-13)
Mean urethral lumen diameter	8.6 Fr

None of our patients had donor site complications. Three patients had superficial wound infection at the recipient site which was managed conservatively. The mean follow up period was 25 months (range 14-36 months). Three patients developed recurrent strictures during follow up. One patient had recurrence after 6 months, second patient after 10 months and third patient after 23 months of surgery. Two patients underwent VIU and one underwent redo BMG urethroplasty. None of the patients with BXO developed recurrent stricture. The success rate was 94.64%. The AUA symptom score decreased from a mean of 23.2 (range 19-21) preoperatively to 4.9 (range 3-7) post operatively. Peak urinary flow rate improved from a mean of 7.2 ml/sec (range 2-11) preoperatively to 27.5 ml/sec (range 25-29) post operatively. The mean residual volume decreased from 89.2ml (range 57-175) pre operatively to 24.2 ml (range 10-35) post operatively (Table 4).

Table 4 - Comparison of Pre-operative and Post-operative Parameters

Assessment criteria	Pre-operative	Post-operative	P value
Mean AUA symptom score	23.2	4.9	<0.001
Mean residual volume (ml)	89.2	24.2	<0.001
Mean Q max (ml/sec)	7.2	27.5	<0.001

Discussion:

Humpy was the first to describe the use of buccal mucosa for urethral reconstruction in hypospadias repair in 1941(3). How-

ever, use of buccal mucosa for urethral stricture in adults was introduced in 1992 by EI Kasaby et al(4). Barbagli et al first proposed dorsal only BMG for augmentation urethroplasty in 1996(5-7). Stricture excision and end to end anastomosis remain the first and best option for dealing with short bulbar urethral strictures of ≤ 2 cm with excellent results(8). However longer bulbar urethral strictures are not amenable to this procedure, which can result in short urethra and formation of chordee(9). For strictures more than 2cm, many procedures have been advocated. High success rate of the buccal mucosa graft in the repair of bulbar strictures has made it the treatment of choice.

The use of buccal mucosa in urethroplasty would be modulated according to the exact stricture location and its characteristics. The graft can be placed on the ventral, lateral and dorsal urethral surface(10). Ventral onlay graft is more prone to fistula formation, sacculation and diverticular formation leading to urinary stasis and ejaculatory dysfunction(11-13) On the other hand, dorsal onlay graft procedure for the anterior urethral stricture provides the advantages of better mechanical support by the corporal bodies for the graft's better take up with less incidence of sacculation and fistula formation(10,14-16). It has been reported that dorsally placed graft can do better because of better mechanical support for the graft and a richer vascular bed from the underlying corporal bodies (17). Dorsal only BMG urethroplasty has shown a success rate of 57.1% to 100% with a follow up ranging from 22 to 41 months (15,16). Barbagli et al showed that placement of the grafts on the ventral, dorsal or lateral surface of the bulbar urethra provided the same success rates (83% to 85%) and stricture recurrence was uniformly distributed in all patients(10). Success with bulbar oral mucosal grafts has been high with a dorsal (6,7,14,17,18) or ventral (10,22,23) graft location, and the different graft positions have shown no difference in success rate (12,19-21).

In our study of 56 patients, all of them underwent dorsal onlay BMG urethroplasty. Three patients developed recurrent strictures after 6,10 and 23 months after surgery during follow up. Two patients were managed successfully with single attempt of VIU whereas one patient had to undergo re-do BMG urethroplasty. Our success rate was 94.4% our mean follow up period was 25 months. There were no donor site complications. Three patients had superficial skin infection at the recipient site which were managed conservatively.

Conclusion:

Our results show that dorsal onlay BMG urethroplasty for long anterior urethral stricture yield satisfactory medium term results with minimal morbidity and low complication rate. A longer follow up will be required to confirm the durability of our results.

REFERENCE

- Webster GD, Robertson CN: The vascularized skin island urethroplasty: its role and results in urethral stricture management. *J Urol.* 1985; 133: 31-3 | 2.Peterson AC, Webster GD: Management of urethral stricture disease: developing options for surgical intervention. *BJU Int* 2004;94:971-976. | 3.Humby GA: A one-stage operation for hypospadias. *Br J Surg.* 1941; 29: 84-92. | 4. El-Kassaby AW, El-Zayat TM, AzazyS,Tarek O. One-stage repair of long bulbar urethral strictures using augmented Russell dorsal strip anastomosis: outcome of 234 cases. *EurUrol* 2007;53: 420-4 | 5.Barbagli G, Selli C, Tosto A, Palminteri E: Dorsal free graft urethroplasty. *J Urol.* 1996; 155: 23-6. | 6. Barbagli G, Selli C, di Cello V, Mottola A: A one-stage dorsal free-graft urethroplasty for bulbar urethral strictures. *Br J Urol.* 1996; 78: 929-32. | 7. Andrich DE, Leach CJ, Mundy AR: The Barbagli procedure gives the best results for patch urethroplasty of the bulbar urethra. *BJU Int.* 2001; 88: 385-9 | 8. Morey AF, Duckett CP, McAninch JW. Failed anterior urethroplasty: guidelines for reconstruction. *J Urol* 1997;158:1383-7 | 9.Gupta NP, Ansari MS, Dogra PN, Tandon S: Dorsal buccal mucosal graft urethroplasty by a ventral sagittal urethrotomy and minimal-access perineal approach for anterior urethral stricture. *BJU Int.* 2004; 93: 1287-90 | 10. Barbagli G, Palminteri E, Guazzoni G, Montorsi F, Turini D, Lazzeri M. Bulbar urethroplasty using buccal mucosa grafts placed on the ventral, dorsal or lateral surface of the urethra: are results affected by the surgical technique? *J Urol* 2005; 174: 955-8 | 11. Orandi A: One-stage urethroplasty. *Br J Urol.* 1968; 40: 717-9. | 12. Morey AF, McAninch JW: Technique of harvesting buccal mucosa for urethral reconstruction. *J Urol.* 1996; 155: 1696-7. | 13.Venn SN, Mundy AR: Early experience with the use of buccal mucosa for substitution urethroplasty. *Br J Urol.* 1998; 81: 738-40. | 14. Iselin CE, Webster GD: Dorsal onlay graft urethroplasty for repair of bulbar urethral stricture. *J Urol.* 1999; 161: 815-8. | 15. Dubey D, Kumar A, Bansal P, Srivastava A, Kapoor R, Mandhani A, et al: Substitution urethroplasty for anterior urethral strictures: a critical appraisal of various techniques. *BJU Int.* 2003; 91: 215-8. | 16. Pansadoro V, Emiliozzi P, Gaffi M, Scarpone P, DePaola F, Pizzo M: Buccal mucosa urethroplasty in the treatment of bulbar urethral strictures. *Urology.* 2003; 61: 1008-10. | 17.Barbagli G, Palminteri E, Rizzo M: Dorsal onlay graft urethroplasty using penile skin or buccal mucosa in adult bulbourethral strictures. *J Urol.* 1998; 160: 1307-9. | 18.Barbagli G, Palminteri E, Lazzeri M, Turini D: Interim outcomes of dorsal skin graft bulbar urethroplasty. *J Urol.* 2004; 172(4 Pt 1): 1365-7; discussion 1367 | 19. Wessells H: Ventral onlay graft techniques for urethroplasty. *UrolClin North Am.* 2002; 29: 381-7. | 20. Armenakas NA: Long-term outcome of ventral buccal mucosal grafts for anterior urethral strictures. *AUA News.* 2004; 9: 17-8. | 21. Elliott SP, Metro MJ, McAninch JW: Long-term followup of the ventrally placed buccal mucosa onlay graft in bulbar urethral reconstruction. *J Urol.* 2003; 169: 1754-7 | 22. Barbagli G, Guazzoni G, Lazzeri M: One-stage bulbar urethroplasty: retrospective analysis of the results in 375 patients. *Eur Urol.* 2008; 53: 828-33. | 23. Abouassaly R, Angermeier KW: Cleveland clinic experience with buccal mucosa graft urethroplasty: intermediate-term results. *J Urol.* 2005; 173: 33