Section: Urology

Original Research Article

MANAGEMENT OF LONG SEGMENT ANTERIOR URETHRAL STRICTURES BY DOUBLE FACED BUCCAL MUCOSAL GRAFT URETHROPLASTY

Rammohan T[1], Banoth Ashok[2], Vijayalaxmi. Adepu[3]

[1]Associate Professor, Department of Urology, Government Medical College, Mahabubabad, Telangana, India.
[2]Assistant Professor, Department of Urology, Government Medical College, Mahabubabad, Telangana, India.
[3]Associate Professor, Department of Radiology, Government Medical College, Mulugu, Telangana, India.

Received : 16/09/2024
Received in revised form : 06/11/2024
Accepted : 21/11/2024

Keywords:
Urethral stricture, Buccal mucosal graft, Urethroplasty.

Corresponding Author:
Dr. Vijayalaxmi. Adepu,
Email: drramsknr.rammohan@gmail.com

DOI: 10.47009/jamp.2024.6.6.28

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (6); 140-144

Abstract

Background: The aim of this study is to evaluate the outcomes of double faced buccal mucosal graft urethroplasty by unilateral mobilisation of urethra with single dorsal urethrotomy incision in long and narrow anterior urethral strictures with preserving the narrow urethral plate and blood supply. **Materials and Methods:** Between November 2021 and November 2024, 26 men with long anterior urethral strictures underwent urethroplasty by our technique in a tertiary care teaching hospital. The urethra was mobilized only one side. Then, it was opened in the dorsal midline over the stricture. The first graft was secured on the tunica of the corporal bodies. Thereafter, the diseased mucosa on the ventral side of the urethra was excised and the second graft was placed as ventral inlay and fixed to the corpus spongiosum. The cut edges of urethra were closed by suturing to dorsally placed graft. Successful urethral reconstruction was defined as normal voiding without the need for any postoperative procedure. **Results:** Mean follow-up was 36 months and mean stricture length was 4.29 cm. Of these 26 cases, 23 (88.4%) were successful and 3 (11.53%) were treatment failures with re stricture. **Conclusion:** The Double faced buccal mucosal graft urethroplasty by unilateral mobilisation of urethra with single dorsal urethrotomy incision provides adequate urethral augmentation by preserving urethral vascularity and the narrow strip of urethral plate in long and tight anterior urethral strictures.

INTRODUCTION

Anterior urethral strictures are treated with various reconstructive techniques. Generally, short strictures (less than 2.5cm) are treated with excision and anastomotic urethroplasty, whilst longer strictures (more than 2.5 cm) are repaired by patch urethroplasty, preferably using a buccal mucosa graft.

Barbagli et al. introduced the dorsal grafting procedure through a dorsal urethrotomy approach in 1996.[1] In 2001, Asopa et al. described the dorsal graft urethroplasty using a ventral urethrotomy approach.[2] Morey and Mc Aninch introduced the ventral graft onlay technique.[3]

Anastomotic urethroplasty for long segment strictures results in chordee and sexual dysfunction. Whilst one side graft procedures could be insufficient to provide a lumen of adequate width in strictures with a particularly narrow area. Palminteri et al. described a technique of combined dorsal plus ventral graft urethroplasty for narrow anterior urethral strictures, without transecting the urethra but augmenting the preserved narrow urethral plate to obtain wider urethral lumen and to avoid sexual complications.[4] In this study, we adopted the approach of one-sided urethral mobilisation to place combined dorsal and ventral graft, its feasibility and short-term outcomes.

MATERIALS AND METHODS

From November 2021 to November 2024, 26 male patients with narrow anterior urethral (bulbar) strictures underwent combined dorsal and ventral graft urethroplasty. Mean patient age was 32.2 years (range 18–42 years). Stricture aetiology was unknown in 14 cases, inflammatory in 10 and iatrogenic in 2. Twenty patients (76.9%) had undergone an average of 1.75 prior urethrotomies (range 1–3) and dilatations at our centre. Anterior urethral strictures of more than 2.5cm were included in our study. Panurethral strictures, previous history of urethroplasty, post-traumatic strictures and

ISSN (O): 2687-5365; ISSN (P): 2753-6556

patients with active urinary tract infections were excluded from our study. Mean stricture length was 4.29 cm (range 2.6 to 7 cm). Preoperative evaluation included clinical history, physical examination, urine culture, uroflowmetry, retrograde voiding cystourethrography, sonourethrography and urethroscopy.

Surgical Technique: With the patient in the lithotomy position, an inverted -Y perineal incision was made and the bulbocavernosus muscles were divided, exposing the bulbar urethra. The urethra was not separated from the corporal bodies on one side and was only mobilised 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 with the aid of a guide wire and methylene blue previously injected to define the narrow lumen (Fig.1).This step avoided losing the lumen and did not damage the urethral plate during the urethral opening. The urethra was left open for 1 cm proximally and distally in the healthy urethra. First graft was applied with interrupted suture of polyglycolic 4/0 on the corporal bed to allow complete apposition (Fig. 2). Through the same dorsal urethrotomy incision, the second graft was placed and fixed as a ventral inlay over the corpus spongiosum after partly excising the diseased mucosa over ventral surface of the stricture site with preserving remaining urethral plate (Figs. 3 and 4). Then, the first graft edges were anastomosed to the dorsal urethrotomy margins as dorsal onlay after placing a 16 F silicone Foley catheter (Fig. 5). The preoperative assessment by urethrography and ultrasonography may help in selecting the procedure, but in urethral reconstruction, usually intra operative local factors will indicate the final choice of the technique. Thus, we used the combined double graft to enlarge the urethra better in narrow strictures in which a single graft seemed to be insufficient to make a wide enough lumen. In all patients after opening of the stricture, the diseased mucosa is partially excised from the ventral urethra whilst preserving the remaining urethral plate. Neo-urethras were created by anastomosing the buccal mucosal graft (BMG) ininlay/ onlay patch fashion to the spongiosal margins of the urethral plate.

We used a two-team approach,with one team harvesting the BMG and the second team exposing the stricture. The BMG was harvested from the inner cheek and the donor site was left open for re-epithelisation. In 4 patients, the two BMGs were harvested bilaterally from both cheeks, and in the other 22 patients, a wide single BMG was harvested from the cheek and subsequently tailored in to two smaller grafts, one for dorsal and another for ventral grafting.

The average length of the graft used dorsally was 4.95cm (range 3.6–8cm) and that of the graft used ventrally was 3.95 cm (range 2.6– 7cm). Average stricture length was 4.29cm (range 2.6–7cm). A 16F silicone Foley catheter was left in place. Patients were discharged home on the fifth postoperative day. Voiding cystourethrography was done at catheter removal 4 weeks after surgery. Uroflowmetry and urine cultures were repeated every 3 months during the first year and annually thereafter. Whenever obstructive symptoms developed or peak flow rate deteriorated to <15 ml/s, urethrography and urethroscopy were repeated. Successful reconstruction was defined as normal voiding without need for any postoperative procedure, including dilation, and peak flow rate more than 15 ml/s.

RESULTS

Mean follow-up was 36 months (range 12–46 months). Of the 26 cases, 23 (88.4%) were successful and 3 (11.53%) were treatment failures with re stricture. There were no early postoperative complications, such as wound infections, hematomas or bleeding. Postoperative mean peak urinary flow of successful patients was 22.91 ml/s versus the preoperative mean peak urinary flow of 7 ml/s. Of the successful cases, mean stricture length was 4.29 cm (range 2.6–7 cm), mean dorsal graft length 4.95 cm and mean ventral graft length 3.95 cm. Of the three patients in whom treatment failed, average stricture length was 6 cm (range 4.8–7 cm), mean dorsal graft length 7 cm and mean ventral graft length 6 cm. Of the three failures, two patients developed a restricture 1.3 cm long at the proximal site of the urethral reconstruction; one patient developed a stenotic ring at the distal site of the urethral reconstruction. All these patients were treated with internal urethrotomy. Primary stricture aetiology of the failures was unknown in all cases. Recurrences developed within 3 months after surgery in two cases and within 6 months in one case.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

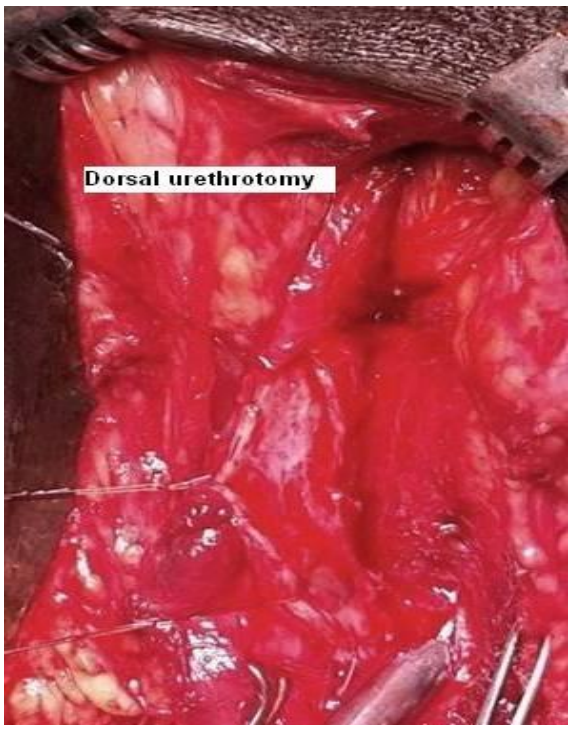

Figure 1: Showing dorsal urethrotomy

Figure 2: Showing dorsal graft being placed and fixed over ventral tunica of cavernosa

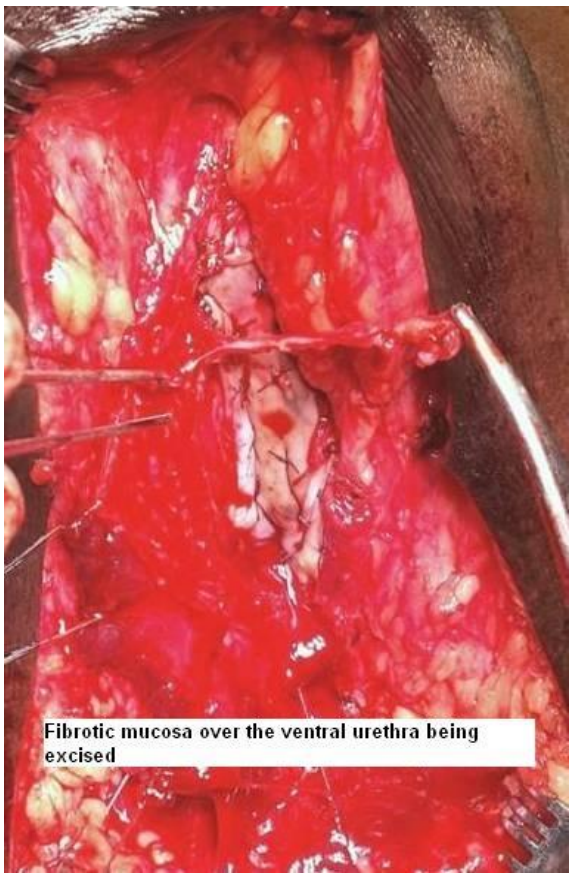

Figure 3: Showing fibrotic mucosa over ventral urethra being excised.

Figure 4: Showing dorsal and ventral grafts in position with strip of urethral plate in between

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Figure 5: Showing closure of urethrotomy margins with edges of the dorsal graft

DISCUSSION

Long anterior urethral strictures are usually treated with dorsal or ventral buccal mucosal graft urethroplasty.[5–8] The Barbagli procedure with circumferential mobilisation of the urethra for dorsal onlay patch has a success rate of 99 and 66% in the short- and long-term, respectively.[9] However, in long segment anterior urethral strictures, circumferential urethral mobilisation may jeopardise the lateral vascularity of the urethra.

Asopa's procedure of inlay patch by ventrally incising the urethra is another option for anterior urethral strictures. It preserves the lateral vascularity of the urethra. However, It has two potential drawbacks. Firstly, a wide rgraft may be difficult to be placed using this approach and may likely get folded. Secondly, we do not know how the long ventral sagittal 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.[2,10] Recently, Singh et al. have shown the superiority of the Asopa procedure over the Barbagli procedure in terms of success and complications.[11] This also supports the approach of restricting the mobilisation 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 whilst keeping the graft in a dorsolateral onlay fashion, we adopted the policy of limited urethral mobilisation, i.e., from ventral midline to beyond dorsal midline. We kept the dorsal grafts of up to 2.4 cm in width with a maximum length of 8 cm.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.It is important to avoid any undue stretching of the graft to avoid chordee. In 2008, Palminteri et al. described the combined dorsal and ventral grafting (DVG) for tight bulbar strictures, postulating some advantages.[4] The fibrotic tissue is partially excised whilst preserving the remaining urethral plate. Avoiding a wide single ventral graft, double grafting may reduce the possibility of fistula and diverticula. In non obliterative short strictures, the DVG represents an alternative to the aggressive anastomotic urethroplasty (AU) since in avoiding transection of the spongiosum, it preserves the urethral plate.[4,12] The aim of DVG is to maintain the integrity of the urethral vascularity and the urethral length, thus reducing the sexual complications related to AU.[13–17] In other double grafting procedures where the urethra was opened ventrally over more thick spongiosum causes more bleeding. In our technique, the urethra was opened dorsally at where the corpus spongiosum is usually thin, causing less bleeding. In other double grafting procedures, the dorsal graft which was placed through ventral urethrotomy approach is shorter in length and narrower in diameter and may likely get folded. In our technique, we placed dorsal graft over the corpora and anastomosed to single dorsal urethrotomy margins like Barbagli procedure. It facilitates wider and longer graft placement like Barbagli dorsal onlay procedure. Application of the graft over the tunica albuginea of the corpora cavernosa provides a more stable base to allow better fixation of the graft, facilitating the acquisition of a richer blood supply and reducing contracture during healing.[5] In other double grafting procedures, ventral graft appears to be more important to provide wider lumen, and it may more prone to displacement, infolding and diverticula formation as there is lessstable bed for fixation, and if ischemia of graft occurs, chance of fistula formation is more. In our technique, dorsal graft appears to be more important, sufficiently wider graft can be placed and fixed over the tunica of cavernosum, which is more stable and less prone for displacement and had rich vascular supply from the bed, and if ischemia of the graft occurs, there is no chance of fistula formation. Unlike combined grafts, tubularised grafts are reported to have poor results.[18]The combined graft technique with the inclusion of the residual lateral strips of the urethral plate allows a safer and more stable reconstruction,

ISSN (O): 2687-5365; ISSN (P): 2753-6556

avoiding a circumferential anastomosis and preserving the axial continuity of the lumen. In our patients, the grafts are securely fixed to their respective beds, thus promoting imbibitions and inosculation, whilst it is often not the case in a tubularised graft. Secondly, there is a dual blood supply and both grafts draw their blood supply from different graft beds. In our series population characteristics (age, stricture length and aetiology), criteria of urinary outcomes and follow-up were comparable to those used in other studies.[5–7,15,19] A successful urinary outcome of 88.4% was achieved, but we realise that a stronger follow-up methodology could detect unrecognised restrictures.With regard to our short restrictures treated with urethrotomy which are successful at the moment, we emphasise that many recurrences after BMG urethroplasty are diaphragms or rings occurring at the anastomotic site between the graft and urethra. This explains why these rings could be successfully dispelled by a simple urethrotomy. These should be considered differently from true longer recurrences associated with a wider spongiofibrosis.[5] 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. Using this approach, our short-term results for these long segment strictures are reasonable.

CONCLUSION

Double faced buccal mucosal graft urethroplasty with unilateral mobilization of urethra with single dorsal urethrotomy is a valid technique that offers the possibility of performing a wide urethral enlargement also in narrow strictures by preserving the urethral plate and length. Unilateral mobilisation preserves vascularity of urethra. In our study, we found it to be a technically feasible and successful procedure. In a short-term follow-up of 36 months, the results are encouraging.

REFERENCES

1. Barbagli G, Selli C, Tosto A et al (1996) Dorsal free graft urethroplasty. J Urol 155:12
2. Asopa HS, Garg M, Singhal GG et al (2001) Dorsal free graft urethroplasty for urethral stricture by ventral sagittal urethrotomy approach. Urology 58:657
3. Morey AF, McAninch JW (1996) When and how to use buccal mucosal grafts in adult bulbar urethroplasty. Urology 48:194
4. Palminteri E, Manzoni G, Berdondini E et al (2008) Combined dorsal plus ventral double buccal mucosagraft in bulbar urethral reconstruction. EurUrol 53:81
5. Patterson JM, Chapple CR (2008) Surgical techniques in substitution urethroplasty using buccal mucosa for the treatment of anterior urethral strictures. EurUrol 53:1162
6. KaneCJ,TarmanGJ,Summerton DJ et al(2002)Multi institutional experience with buccal mucosa onlay urethroplasty for bulbar urethral reconstruction. J Urol 167:1314
7. Barbagli G, Palminteri E, Guazzoni G et al (2005) 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 174:955
8. Elliott SP, MetroMJ, McAninchJW(2003)Long termfollow up of the ventrally placed buccal mucosa onlay graft in bulbar urethral reconstruction. J Urol 169:1754
9. Barbagli G, Morgia G, Lazzeri M (2008) Dorsal onlay skin graft bulbar urethroplasty: long-term follow-up. EurUrol 53:628–633
10. Pisapati VL, Paturi S, Bethu S, Jada S, Chilumu R, Devraj R et al (2009) Dorsal buccal mucosal graft urethroplasty for anterior urethral stricture by Asopa technique. EurUrol 56(1):201–205
11. Singh PB, Das SK, Kumar A, Sharma GK, Pandey AK, Swain S et al (2008) Dorsal onlay lingual mucosal grafturethroplasty: comparison of two techniques. Int J Urol 15:1002–1005
12. Abouassaly R, Angermeier KW (2007) Augmented anastomoticurethroplasty. J Urol 177:2211
13. Morey AF, Kizer WS (2006) Proximal bulbar urethroplasty via extended anastomotic approach—what are the limits? J Urol 175: 2145
14. Barbagli G, De Angelis M, Romano G et al (2007) Long-term follow up of bulbar end-to-end anastomosis: a retrospective analysis of 153 patients in a single center experience. J Urol 178:2470
15. Coursey JW, Morey AF, McAninch JWet al (2001) Erectile function after anterior urethroplasty. J Urol 166:2273
16. Guralnick ML, Webster GD (2001) The augmented anastomoticurethroplasty: indications and outcome in 29 patients. J Urol 165: 1496
17. Mundy AR (1993) Results and complications of urethroplasty and its future. Br J Urol 71:322
18. MundyAR(1995)The long-term results of skin inlay urethroplasty. Br J Urol 75:59–61
19. KesslerT,FishM,HeitzMetal(2002)Patient satisfaction with the outcome of surgery for urethral strictures. J Urol 167:2507

ISSN (O): 2687-5365; ISSN (P): 2753-6556