

SHORT TERM OUTCOME OF DORSAL ONLAY BUCCAL MUCOSA GRAFT FOR THE MANAGEMENT OF BULBAR URETHRAL STRICTURE

MD. LATIFUR RAHMAN MIAH¹, MOYNUL HOQUE CHOWDHUY³, ANUP ROY CHOWDHUY², MD. SHAWKAT ALAM⁴, MD. FAZAL NASER⁵, MD. SAFIUL ALAM BABUL⁶

Abstract:

Objective: To assess the success of buccal mucosal graft (BMG) urethroplasty by the dorsal onlay technique in long anterior urethral stricture (> 2 cm long).

Method: This prospective interventional study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from January 2016 to December 2017 over a period of two years. Thirty three patients with primary and recurrent stricture of anterior urethra involving the bulbar urethra scheduled for single buccal mucosa graft urethroplasty were included in this study. Written consent was taken from each patient. Patients with stricture at posterior urethra or at distal penile urethra or stricture length <2 cm or above 6 cm were excluded from this study. Urethral malignancy cases were also excluded. All the patients were treated with dorsal onlay BMG urethroplasty.

Results: Maximum patients were more than 40 years old. Mean age was 44.42 ± 7.43 years. Maximum patients had stricture more than 3 cm long. Mean length of stricture was 3.14 ± 0.65 cm. Cause of stricture was inflammatory (42.4%), idiopathic (27.3%), traumatic (21.2%) and iatrogenic (9.1%). Regarding clinical presentation, Poor urinary stream was found in 30 (90.9%) patients, urethral discharge in 12 (36.4%) patients, LUTS in 25 (75.8) patients and acute urinary retention in 9 (27.3) patients. Baseline peak urinary flow rate was 9.59 ± 1.68 ml/s. Peak urinary flow rate after 3 months of operation was 16.50 ± 2.19 ml/s and after 6 months of operation was 18.33 ± 4.40 ml/s. Post operative voided urine volume after 3 months of operation was 253.21 ± 41.22 ml and after 6 months of operation was 301.21 ± 50.38 ml. UTI was 3 (9.09) after 3 months and 5 (15.15) after 6 months of operation. Recurrence of stricture was 3 (9.09) after 3 months and 4 (12.12) after 6 months of operation. Urethra was seen narrow in 4 (12.12%) cases after 3 months and 6 (18.18%) cases after 6 months of operation. Regarding complications, Bleeding was in 4 (12.12%) cases, dribbling of urine in 5 (15.15%) cases, wound infection in 2 (6.06%) cases and 3 (9.09%) cases.

Conclusion: Dorsal onlay BMG urethroplasty seems as an effective method for the management of long anterior urethral strictures.

Bangladesh J. Urol. 2019; 22(1): 15-19

1. Assistant Professor, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka.
2. Assistant Registrar, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka.
3. Assistant Registrar, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka.
4. Associate, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka.
5. Associate Professor, Dept. of Urology, Shaheed Suhrawardy Medical College, Dhaka.
6. Assistant Registrar, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka.

Correspondences: Dr. Md. Latifur Rahman Miah, Assistant Professor, Dept. of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka

Received: 05 August 2018 **Accepted:** 15 November 2018

Introduction:

Urethral stricture is a relatively common disease in men with different etiologies[1]. The treatment of urethral strictures varies according to location, length, depth and density of the stricture. Several surgical techniques have been described to treat bulbar urethral strictures based on stricture length. Bulbar strictures <2 cm are generally repaired with excision and end-to-end anastomosis; for strictures 2–3 cm in length a graft-augmented anastomotic procedure has been advocated, whereas strictures >3 cm are usually repaired by patch urethroplasty using a buccal mucosa graft (BMG)[2-4].

The advantages of the BMG, compared to penile skin flaps or other kind of grafts such as genital/extragenital skin or bladder/intestinal mucosae, include a cosmetically superior incision, decreased operative time, low harvest morbidity, and better histologic characteristics of the graft[4,5].

BMGU was first reported by Sapezhko[6] in 1894, in a series of four cases. In 1941, the idea was re-explored by Humby[7] in the setting of hypospadias repair. El-Kasaby et al.[8] reported the use of mucosa from the lower lip, as a free graft, for the management of penile and bulbar urethral strictures in 1993. In 1996, two techniques were described using buccal mucosa for bulbar urethral strictures. Morey and McAninch⁹ described a ventral onlay technique, whereas Barbagli et al.¹⁰ described a dorsal onlay technique. Since that time, BMGU has been widely used in both one-stage and two-stage repairs.

BMGU has become an ideal urethral substitute because of ease of harvest, surgical handling characteristics, hairlessness, compatibility in a wet environment, and its early in-growth and graft survival. Because of these unique characteristics, buccal mucosa has endeared itself to the realm of reconstructive urology.

The present study was conducted to assess the success of buccal mucosal graft (BMG) urethroplasty by the dorsal onlay technique in long anterior urethral stricture.

Method:

This prospective interventional study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from January 2016 to December 2017 over a period of two years. Thirty three patients with primary and recurrent stricture of anterior urethra involving the bulbar urethra got admitted in the Department of Urology who were scheduled for single buccal mucosa graft urethroplasty were included in this study. Patients with stricture at posterior urethra or at distal penile urethra or stricture length <2 cm or above 6 cm were excluded from this study. Urethral malignancy cases were also excluded. Written consent was taken from each patient.

All the patients were evaluated by clinical history, physical examinations and investigations like urine for R/M/E & C/S, uroflowmetry, retrograde and micturating cystourethrography, urethroscopy and other necessary

investigations. All the patients were treated with dorsal onlay BMG urethroplasty.

Operation was performed under general anesthesia with nasotracheal intubation and the patient put in exaggerated lithotomy position. Operation was done in a 2-team approach-one team engaged in urethral procedure, and other team in harvesting the buccal mucosa. Through a midline perineal incision, the bulbocavernosus muscle was divided exposing the corpus spongiosum of the anterior urethra. Then the bulbar urethra was easily dissected from corpora cavernosa. The dissected urethra was rotated 180. The dorsal surface of the strictured segment was exposed and opened vertically extending the incision for about 1 cm both proximally and distally into the normal urethral lumen. The proximal and distal urethral lumina of the urethra were calibrated. The graft was sutured, splayed and quilted over the corpora cavernosa using few 5-0 polyglactin quilting sutures for reinforcement with good support and minimizing the dead space. The left margin of the urethral mucosa was sutured to the graft using 4-0 polyglactin interrupted stitches. A 16F pure silicone Foley catheter was inserted through the urethra into the urinary bladder. Then the urethra was rotated back to its original position and the right margin of the urethral mucosa was sutured similarly to the remaining margin of the buccal mucosal graft. At the end of the procedure, the graft was completely covered by the urethra. Perurethral catheter removed after three weeks of operation.

The patients were followed up after surgery at 3rd and 6th month. Qmax, voided urine volume, UTI, recurrence of stricture, RGU & MCU and other complications like dribbling of urine, wound infection, periurthral leakage were evaluated in each follow up.

Results:

Table I

Distribution of patients according to age in groups

Age (years)	Frequency	Percentage
≤40	11	33.3
>40	22	66.7
Total	33	100.0
Mean ± SD	44.42 ± 7.43 (31 - 55)	

Maximum patients were more than 40 years old. Mean age was 44.42 ± 7.43 years.

Table II*Distribution of patients according to length of stricture in groups*

Length of stricture (cm)	Frequency	Percentage
≤3	15	45.5
>3	18	54.5
Total	33	100.0
Mean ± SD	3.14 ± 0.65 (2 – 4.5)	

Maximum patients had stricture more than 3 cm long. Mean length of stricture was 3.14 ± 0.65 cm.

Table III*Distribution of patients according to causes of stricture in groups*

Etiology	Frequency	Percentage
Inflammatory	14	42.4
Traumatic	7	21.2
Iatrogenic	3	9.1
Idiopathic	9	27.3

Regarding etiology, maximum 14 (42.4%) patients cause of stricture was inflammatory followed by 9 (27.3%), 7(21.2%) and 3 (9.1%) patients cause of stricture was idiopathic, Traumatic and Iatrogenic respectively.

Table IV*Distribution of patients according to clinical presentation in groups*

Clinical presentation	Frequency	Percentage
Poor urinary stream	30	90.9
Urethral discharge	12	36.4
LUTS	25	75.8
Acute urinary retention	9	27.3

Regarding clinical presentation, Poor urinary stream was found in 30 (90.9%) patients, urethral discharge in 12 (36.4%) patients, LUTS in 25 (75.8) patients and acute urinary retention in 9 (27.3) patients.

Table V*Peak urinary flow rate at baseline and at different follow-ups after operation*

Peak urinary flow rate (Qmax)	Mean ± SD	Min-max
Baseline	9.59 ± 1.68	6 – 13
After 3 months	16.50 ± 2.19	12.1 – 20.70
After 6 months	18.33 ± 4.40	9 – 27.70

Table VI*Voided urine volume at different follow-ups after operation*

Voided urine volume (ml)	Mean ± SD	Min-max
After 3 months	253.21 ± 41.22	170 – 360
After 6 months	301.21 ± 50.38	185 – 400

Table VII*Urinary tract infection, recurrence of stricture and RGU & MCU findings at different follow ups after operation*

	After 3 months	After 6 months
Urinary tract infection (UTI)	3 (9.09)	5 (15.15)
Recurrence of stricture	3 (9.09)	4 (12.12)
RGU & MCU findings	4 (12.12)	6 (18.18)

UTI was found in 3 (9.09%) cases after 3 months and 5 (15.15%) cases after 6 month of operation. Recurrence of stricture was seen in 3 (9.09%) cases after 3 months and 4 (12.12%) cases after 6 month of operation. After 3 months of operation, urethra was seen narrow in 3 (9.09%) cases and after 6 month of operation, narrow urethra was seen in 5 (15.15%) cases.

Table VIII*Comparison of complications between groups*

Complications	Frequency	Percentage
Bleeding	4	12.12
Dribbling of urine	5	15.15
Wound infection	2	6.06
Periurethral leakage	3	9.09

Multiple responses

Regarding complications, Bleeding was in 4 (12.12%) cases, dribbling of urine in 5 (15.15%) cases, wound infection in 2 (6.06%) cases and 3 (9.09%) cases.

Table IX
Overall complications of the patients

Complications developed	Frequency	Percentage
Yes	8	24.24
No	25	75.76

Complications developed in 8 (24.24%) patients.

Table X
Outcome of the procedure

Outcome	Frequency	Percentage
Successful	27	81.82
Unsuccessful	6	18.18

Success rate was 81.82%.

Discussion:

Urethral strictures are difficult to manage. Surgeons like buccal mucosa grafts because of its excellent short and long-term results, low post-operative complication rate, and relative ease of use. It is utilized for most bulbar urethral stricture repairs and some pendulous urethral stricture repairs.

In this study maximum patients were more than 40 years old in both groups. 22 (66.7%) patients were more than 40 years old and 11 (33.3%) patients were less than or equal to 40 years old. Mean age of the patients was 44.42 ± 7.43 years in our study. Mean age of patients was 39.0 ± 7.86 years in the study of Prabha et al.¹¹. Mean age was 39.55 ± 15.98 years in the study of Tabassi and Ghoreifi^[12].

In this study maximum patients had stricture more than 3 cm long. 18 (54.5%) patients had stricture >3 cm and 15 (45.5%) patients had ≤ 3 cm stricture. Mean length of stricture was 3.14 ± 0.65 cm. Mean stricture length was 5.6 cm (range: 2.5-16 cm)^[13]. Mean stricture length was 8.5cm (range 4 to 12cm)^[11].

Regarding etiology, inflammatory was 14(42.4%), idiopathic was 9(27.3%), traumatic was 7(21.2%) and iatrogenic was 3(9.1%). The stricture was iatrogenic in 15 (33.3%) cases, idiopathic in 12 (26.7%), traumatic in 10 (22.2%) cases, and post inflammatory in 8 (17.8%)

cases in the study of Shalkamy et al^[13]. Dutta et al^[14]. found idiopathic 53.5%, Traumatic 20.9% and iatrogenic (9.3%).

Regarding clinical presentation, Poor urinary stream was found in 30 (90.9%) patients, urethral discharge in 12 (36.4%) patients, LUTS in 25 (75.8) patients and acute urinary retention in 9 (27.3) patients.

Pre and post operative peak urinary flow rate were recorded. Baseline peak urinary flow rate was 9.59 ± 1.68 ml/s. Peak urinary flow rate after 3 months of operation was 16.50 ± 2.19 ml/s and after 6 months of operation was 18.33 ± 4.40 ml/s. The mean postoperative Qmax was 24.6 ± 7.6 ml/sec.^[13] Mean Qmax at the 12-month follow-up was 24.0 ± 3.16 mL/sec (range 18-32mL/sec)^[11]. Qmax values at the last follow-up was significantly improved as compared to preoperative measurements (mean 22.7 ± 9.3 ml/s versus 6.4 ± 5.9 ml/sec, $p < 0.001$)^[15].

Post operative voided urine volume after 3 months was 253.21 ± 41.22 ml and after 6 months was 301.21 ± 50.38 ml.

In this study urinary tract infection was 3 (9.09%) after 3 months of operation and after 6 months of operation it was 5 (15.15%). Recurrence of stricture was 3 (9.09%) and 4 (12.12%) after 3 months and after 6 months of operation respectively which is comparable with the study of Shalkamy et al^[13]. and Datta et al^[14]. they found recurrent stricture in 8.9% and 11.6% cases respectively.

Regarding RGU & MCU findings, after 3 months of operation, urethra was seen narrow in 3 (9.09%) cases and 5 (15.15%) cases after 6 months of operation.

Regarding complications, Bleeding was found in 4 (12.12%) cases, dribbling of urine in 5 (15.15%) cases, wound infection in 2 (6.06%) cases, periurethral leakage in 3 (9.09%) cases and overall complications was 24.24% and 2 of them became ok after treatment. Overall success rate was 88.9% in the study of Shalkamy et al^[13] where as in our study it was 81.82%. Success rate was 72.5% in the study of Jiang et al^[16].

Conclusion:

According to this study finding, success rate is 81.82%. So, it can be concluded that Dorsal onlay BMG urethroplasty is an effective method for the management of long anterior urethral strictures.

References:

1. Lumen N, Hoebeke P, Willemsen P, De Troyer B, Pieters R, Oosterlinck W. Etiology of urethral stricture disease in the 21st century. *The Journal of urology*. 2009 Sep 1;182(3):983-7.
2. Santucci RA, Mario LA, McAninch JW. Anastomotic urethroplasty for bulbar urethral stricture: analysis of 168 patients. *J Urol* 2002; 167:1715–9.
3. Guralnick ML, Webster GD. The augmented anastomotic urethroplasty: indications and outcome in 29 patients. *J Urol* 2001;165:1496–501.
4. 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.
5. Baskin LS, Duckett JW. Buccal mucosa grafts in hypospadias surgery. *Br J Urol* 1995;76(Suppl): 23–6.
6. Sapezhko KM. To the treatment of urethral defects using mucosa grafts (in Russian). *Chirurgicheskaya Letopis* 1894;4:775–84.
7. Humby G. A one-stage operation for hypospadias repair. *Br J Surg* 1941;29:84–92.
8. El-Kasaby AW, Fathalla M, Noweir AM, El-Halaby MR, Zakaria W, El-Beialy MH. The use of buccal mucosa patch graft in the management of anterior urethral strictures. *J Urol* 1993;149(2):276–8.
9. Morey AF, McAninch JW. When and how to use buccal mucosal grafts in adult bulbar urethroplasty. *Urology* 1996;48:194–8.
10. Barbagli G, Selli C, Tosto A, Palminteri E. Dorsal free graft urethroplasty. *J Urol* 1996;155:123–6.
11. Prabha V, Devaraju S, Vernekar R, Hiremath M. Single stage: dorsolateral onlay buccal mucosal urethroplasty for long anterior urethral strictures using perineal route. *International braz j urol*. 2016 Jun;42(3):564-70.
12. Tavakkoli Tabassi K, Ghoreifi A. Dorsally Placed Buccal Mucosal Graft Urethroplasty in Treatment of Long Urethral Strictures Using One-Stage Transperineal Approach. *International scholarly research notices*. 2014;2014.
13. Shalkamy OA, Abdelrahim AF, Elmikkawy SA, Mourad MM, Eleweedy SM (2017) Long-Term Outcomes of Single Stage Dorsal Onlay Buccal Mucosa Urethroplasty for Different Anterior Urethral Strictures: A Prospective Study. *Urol Nephrol Open Access J* 5(5):
14. Datta B, Rao MP, Acharya RL, Goel N, Saxena V, Trivedi S, Dwivedi US, Singh PB. Dorsal onlay buccal mucosal graft urethroplasty in long anterior urethral stricture. *International braz j urol*. 2007 Apr;33(2):181-7.
15. Onol F, Basatac C, Tahra A, Guzel R, Boylu U, Onol SY, Istanbul. Dorsal inlay buccal mucosal graft (BMG) urethroplasty in the single stage management of long anterior urethral strictures. 2014. 191 (4S),
16. Jiang J, Zhu Y, Jiang L, Luo D, Wei X, Wazir R, Li H, Wang K. Combined Dorsal Plus Ventral Double-Graft Urethroplasty in Anterior Urethral Reconstruction. *Indian Journal of Surgery*. 2015 Dec 1;77(3):996-1000.