



## Comparison of Single versus Double BMG Urethroplasty in the Treatment of Bulbar Urethral Stricture

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### Abstract

**Background:** Bulbar urethral strictures require comprehensive and careful urological management. Augmentation urethroplasty is the preferred treatment method and buccal mucosa has gained widespread popularity as the graft of choice for bulbar urethroplasty.

**Objective:** To compare the outcomes of single versus double BMG urethroplasty in the treatment of bulbar urethral stricture.

**Methods:** This prospective observational study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from July 2018 to December 2019 over a period of one and half years. In this study, 22 patients had single BMG urethroplasty and 38 patients had double BMG urethroplasty. Qmax, dilation requirement, recurrent stricture and postoperative complications were recorded and compared. SPSS 12 was used for analysis. Categorical data were compared with Chi-square test and numerical data were compared with unpaired t test.

**Results:** Maximum patients were more than 40 years old in both groups. Mean age was  $40.77 \pm 8.52$  years &  $38.97 \pm 10.07$  years in single and double BMG group respectively ( $p > 0.05$ ). Most of the patients were either overweight or obese in both groups ( $p > 0.05$ ). In most of the cases aetiology of structure was unknown in both groups. Length of graft was  $4.59 \pm 0.65$  cm and  $4.43 \pm 0.51$  cm in single and double BMG group respectively. Pre-operative Qmax was  $8.00 \pm 1.54$  ml/sec and  $7.61 \pm 1.73$  ml/sec in single and double BMG group respectively. Postoperative Qmax after 1 month and after 3 months was significantly higher in double BMG group than single BMG group ( $23.87 \pm 1.79$  ml/sec vs  $21.73 \pm 2.37$  ml/sec and  $20.71 \pm 3.25$  ml/sec vs  $14.95 \pm 1.29$  ml/sec). Percent increment of Qmax after 3 months comparing pre-operative was significantly higher in double BMG urethroplasty group than that of single BMG urethroplasty group. Wound infection was higher in single BMG group than that of double BMG group but difference was not statistically significant (27.3% vs 13.2%;  $p = 0.310$ ). Recurrent of stricture was significantly higher in single BMG urethroplasty group than that of double BMG urethroplasty group (45.5% vs 21.1%;  $p = 0.04$ )

**Keywords:** Urethroplasty, Single BMG, Double BMG and bulbar urethral stricture.

**Conclusion** Double BMG urethroplasty is better than single BMG urethroplasty in the treatment of bulbar urethral strictures.

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**Introduction:**

*The most common site of anterior urethral stricture is Bulbar urethra.<sup>1</sup> About 40% are idiopathic of the bulbar urethral strictures, particularly in the developed world. One-third of all bulbar urethral strictures were reported to be due to instrumentation, including surgery for hypospadias, the rest of the patients have a history of infection, especially history of sexually transmitted diseases.<sup>2,3</sup> Various surgical techniques and approaches with or without buccal mucosal graft (BMG) have been defined for bulbar urethroplasty operations performed for bulbar urethral strictures.*

Over the past decade, buccal mucosa graft (BMG) has become popular for urethral reconstruction because it is readily available in all patients, has robust handling characteristics, and has been associated with excellent outcomes.<sup>4,5</sup>

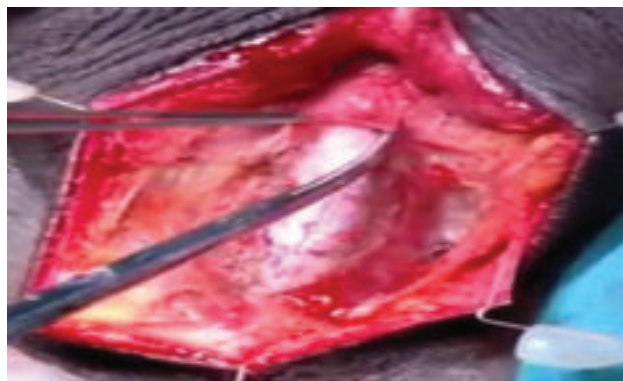
However, there has been controversy as to which surgical technique is the most appropriate for graft application. Patterson and Chapple found that in experienced hands, the outcomes of both dorsal onlay grafts and ventral onlay grafts in bulbar urethroplasty are similar.<sup>6</sup> Double-graft bulbar reconstruction (using BMG for both grafts) was popularized by Palminteri et al. with excellent results in moderate length strictures (mean stricture length 3.6 cm, 90% success rate, and mean follow-up time of 22 months),<sup>7</sup> but with no comparison group to know if this was truly superior to single-graft techniques.

The purpose of the present study was to compare the outcomes of single versus double BMG urethroplasty in the treatment of bulbar urethral stricture.

**Methods:**

This prospective observational study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from July 2018 to December 2019 over a period of one and half years. Ethical clearance was taken from the ethical committee of the institute. Preoperatively all patients were assessed by clinical evaluation of LUTS as well as Urine RME and C/S, S. Creatinine, USG of KUB & Prostate volume with MCC & PVR, uroflowmetry, RGU & MCU. 22 patients were scheduled for dorsal graft urethroplasty and 38 for both dorsal and ventral graft urethroplasty were enrolled in this study. All operations were done under general anesthesia. All procedures were performed by a fulltime reconstructive urologist. Regarding the technique, the

strictured urethra was opened, guided by a guide wire and strictured segment was measured by a scale.



**Fig-1:** Mobilization of urethra

In double BMG urethroplasty, the urethra is then laid open twice at the site of stricture both ventrally and dorsally without mobilize it from its bed for 0.5 cm both proximally and distally into the healthy urethra. BMG was harvested and defatted. First Buccal mucosal graft was secured in the dorsal urethral defect.



**Fig-2:** Buccal mucosal graft was harvested

Subsequently, second graft is sutured with incised ventral urethral margin over a 14 Fr Foley's catheter.



**Fig-3:** Placement of graft dorsally



**Fig.-4:** Ventral graft placement

In single BMG urethroplasty, bulbar urethra was mobilized dorsolaterally. Stay suture were taken and urethra was then incised along it's strictured segment with 0.5 cm both proximally and distally into the healthy urethra. Graft was anchored to the incised medial margin and a 14 Fr foley's catheter was introduced into the bladder. Then graft was secured with lateral margin over the catheter. After proper hemostasis a drain tube was kept in situ and wound was closed in layers.

Indwelling urethral catheter was left for 3 weeks plus supra-pubic cystocath. Urethral catheter was removed after 3 weeks followed by cystocath removal in next 2-3 days when voiding satisfactorily.

Qmax, OIU, recurrent stricture and postoperative complications were recorded and compared. SPSS 12 was used for analysis. Transfusion requirement, peri and postoperative complications were compared with Chi-square test and operative time, length of hospital stay, loss of bleeding were compared with unpaired t test.

**Results:**

Maximum patients were more than 40 years old in both groups. Mean age was 40.77 ± 8.52 years & 38.97 ± 10.07 years in single and double BMG group respectively. Most of the patients were either overweight or obese in both groups. But there were no significant differences in age and BMI between in single and double BMG group. In most of the cases aetiology of stricture was unknown in both groups. Length of graft was 4.59 ± 0.65 cm and 4.43 ± 0.51 cm in single and double BMG group respectively. 7 patients in single and 13 patients in double BMG urethroplasty group were previously treated by OIU which is not statistically significant.

**Table I :** Baseline characteristics of the study subjects (N=60)

	Single (n=22)	Double (n=38)	p-value
Age (years)			
20 - 29	3 (13.6)	7 (18.4)	
30 - 39	6 (27.3)	9 (23.7)	
40 - 49	9 (40.9)	17 (44.7)	
e"50	4 (18.2)	5 (13.2)	
Mean±SD	40.77 ± 8.52	38.97 ± 10.07	0.484
BMI (kg/m <sup>2</sup> )			
Normal weight	6 (27.3)	8 (21.1)	
Over weight	9 (40.9)	17 (44.7)	
Obese	7 (31.8)	13 (34.2)	
Mean±SD	27.31 ± 4.13	27.70 ± 3.86	0.712
Aetiology			
Trauma	5 (22.7)	11 (28.9)	0.367
Balanitis xerotica obliterans	1 (4.5)	1 (2.6)	
Unknown	16 (72.7)	26 (68.4)	
Graft			
Length (cm)	4.59 ± 0.65	4.43 ± 0.51	0.303
Width (cm)	1.02 ± 0.11	1.00 ± 0.00	0.191
Length of stricture	3.75 ± 0.91	3.84 ± 0.66	0.652
Previous treatment	7 (31.8)	13 (34.2)	0.850

**Table II:** Pre and postoperative Qmax (N=60)

	Single (n=22)	Double (n=38)	p-value
<b>Pre-operative</b>	8.00±1.54	7.61 ± 1.73	0.380
<b>Postoperative</b>			
After 1 month	21.73±2.37	23.87±1.79	<0.001
After 3 months	14.95±1.29	20.71±3.25	<0.001
% increment (after 3 months)	96.68±58.51	188.58±86.56	<0.001

Preoperative Qmax was 8.00 ± 1.54 ml/sec and 7.61 ± 1.73 ml/sec in single and double BMG group respectively. Postoperative Qmax after 1 month and after 3 months was significantly higher in double BMG group than single BMG group (23.87 ± 1.79 ml/sec vs 21.73 ± 2.37 ml/sec and 20.71 ± 3.25 ml/sec vs 14.95 ± 1.29 ml/sec). Percent increment of Qmax after 3 months comparing pre-operative was significantly higher in double BMG urethroplasty group than that of single BMG urethroplasty group.

**Table III:** Postoperative complications (N=60)

Complications	Single (n=22)	Double (n=38)	p- value
Wound infection	6 (27.3)	5 (13.2)	0.310
Fistula	1 (4.5)	2 (5.3)	0.624
Post void dribbling	0	0	
Erectile dysfunction	0	0	
Ejaculating dysfunction	0	0	

Postoperative fistula was almost similar in both the groups. Wound infection was higher in single BMG group than that of double BMG group but difference was not statistically significant (27.3% vs 13.2%; p=0.310)

**Table IV:** OIU required and recurrent stricture (N=60)

	Single (n=22)	Double (n=38)	p- value
OIU required	12 (54.5)	10 (26.3)	0.029
Recurrent stricture	10 (45.5)	8 (21.1)	0.047

Requirement of OIU was significantly higher in single BMG group than that of double BMG group (54.5% vs 26.3%; p=0.029). Similarly recurrent of stricture was significantly higher in single BMG group than that of double BMG group (45.5% vs 21.1%; p=0.047).

### Discussion:

There are lots of studies where dorsal inlay was compared with ventral inlay in the treatment of bulbar urethral stricture. But there is scarcity of study where dorsal inlay was compared with both dorsal & ventral inlay in the treatment of bulbar urethral stricture. In this study, maximum patients were more than 40 years old in both groups. Mean age was  $40.77 \pm 8.52$  years &  $38.97 \pm 10.07$  years in single and double BMG group respectively. In the study of Jiang et al., mean age in single-inlay group was  $41.2 \pm 16.9$  years, while double group was  $48.9 \pm 17.7$  years.<sup>8</sup>

Most of the patients were either overweight or obese in both groups. But there were no significant differences in age and BMI between single and double BMG group. In most of the cases aetiology of stricture was unknown in both groups in our study and Trauma was 22.7% in single graft group and 28.9% in double graft group. Trauma was 21.6% in single -inlay group and 15.4% in

double-inlay group.<sup>8</sup> Length of graft was  $4.59 \pm 0.65$  cm and  $4.43 \pm 0.51$  cm in single and double BMG group respectively. Width of graft was  $1.02 \pm 0.11$  cm and  $1.00 \pm 0.00$  cm in single and double BMG group respectively. In the study of Jiang et al., length of graft was  $3.4 \pm 1.5$  cm and width of graft was  $1.6 \pm 0.6$  cm in single - inlay group; in double -inlay group length of graft was  $4.4 \pm 2.0$  cm and  $2.4 \pm 1.3$  cm in ventral and dorsal respectively, width of graft was  $1.1 \pm 0.4$  cm and  $0.5 \pm 0.2$  cm in ventral and dorsal respectively.<sup>8</sup>

Pre-operative Qmax was  $8.00 \pm 1.54$  ml/sec and  $7.61 \pm 1.73$  ml/sec in single and double BMG group respectively. Postoperative Qmax after 1 month and after 3 months was significantly higher in double BMG group than single BMG group ( $23.87 \pm 1.79$  ml/sec vs  $21.73 \pm 2.37$  ml/sec and  $20.71 \pm 3.25$  ml/sec vs  $14.95 \pm 1.29$  ml/sec). Percent increment of Qmax after 3 months comparing pre-operative was significantly higher in double BMG urethroplasty method than that of single BMG urethroplasty method.

Postoperative fistula was almost similar in both the groups (4.5% vs 5.3%; p=0.624). Wound infection was higher in single BMG group than that of double BMG group but difference was not statistically significant (27.3% vs 13.2%; p=0.310). Rate of fistula was higher in single-inlay group (5.9%) than double-inlay group (3.8) but the difference was not statistically significant; wound infection was almost similar in both groups.<sup>8</sup>

Requirement of OIU was significantly higher in single BMG group than that of double BMG group (54.5% vs 26.3%; p=0.029). Similarly, recurrence of stricture was significantly higher in single BMG group than that of double BMG group (45.5% vs 21.1%; p=0.047).

### Conclusion:

According to Qmax improvement rate, OIU required rate and recurrent stricture rate it can be concluded that double BMG urethroplasty is better than single BMG urethroplasty in the treatment of bulbar urethral stricture.

### References:

1. Hampson LA, McAninch JW, Breyer BN. Male urethral strictures and their management. *Nat Rev Urol* 2014;11:43-50.
2. Mundy AR, Andrich DE. Urethral strictures. *BJU Int* 2011;107:6-26.
3. Andrich DE, Mundy AR. What is the best technique for urethroplasty? *Eur Urol* 2008;54: 1031-41.

4. Barbagli G, Lazzeri M (2007) Surgical treatment of anterior urethral stricture diseases: brief overview. *Int Braz J Urol* 33:461-469
5. Peterson AC, Webster GD (2004) Management of urethral stricture disease: developing options for surgical intervention. *BJU Int* 94: 971-976
6. Patterson JM, Chapple CR (2008) Surgical techniques in substitution urethroplasty using buccal mucosa for the treatment of anterior urethral strictures. *Eur Urol* 53:1162-1171
7. Palminteri E, Manzoni G, Mordondoni E, Di Fiore F, Testa G, Poluzzi M, Molon A (2008) Combined dorsal plus ventral double buccal mucosa graft in bulbar urethral reconstruction. *Eur Urol* 53:81-90
8. 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.