



OUTCOME ANALYSIS OF BUCCAL MUCOSA URETHROPLASTY IN A TERTIARY CARE CENTRE

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ABSTRACT

Introduction: Urethral strictures are difficult to cure. Treatment options include simple dilation, optical internal urethrotomy, and a variety of urethral reconstructive techniques such as substitution urethroplasty. There was resurgence of buccal mucosa grafts (BMG) in urethroplasty in the late 1980s. Standard bulbar urethroplasties using BMG have a reported lifetime success rate approaching 92%. We conducted a study to evaluate the success rate of buccal mucosa urethroplasty in our institute.

Methods and Materials: 35 patients who underwent buccal mucosa urethroplasty were included in the study. During the follow up period re-assessment was done at 6 weeks, 6 months and 1 year, which included the IPSS scoring system and uroflowmetry.

Results: The success rate in our study was 71.4% at 12 months. In our study the perineal complications included wound infection in 3(8.6%) cases, UTI in 3 cases (8.6%) and hematoma formation (2.9%) in 1 case. Graft site complications of the oral cavity included oral numbness in 20(57.1%) patients, oral pain in 15(42.9%) patients and restricted mouth opening in 8(22.9%) patients. A strong correlation was seen between the mean maximum flow rate, IPSS score and failure of procedure.

Conclusion: Buccal mucosa graft urethroplasty (BMGU) is a well tolerated and worthwhile procedure by patient's point of view. The change in flow rate (Qmax) and IPSS score after urethroplasty may be promising noninvasive tests to screen for stricture recurrence.

KEYWORD

stricture, buccal mucosa graft, urethroplasty

ARTICLE HISTORY

Submitted: 16-11-2016

Accepted: 24-12-2016

Published: 10-01-2017

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INTRODUCTION

Urethral stricture is a relatively common disease in men with an associated prevalence of 229-627 per 100,000 males.(1) Pathologically stricture is the replacement of the corpus spongiosum deep to the urethral epithelium by dense fibrous tissue causing narrowing of urethral passage.(2) Urethral strictures are difficult to cure. Treatment options include simple dilation, optical internal urethrotomy, and a variety of urethral reconstructive techniques such as substitution urethroplasty. However, the diversity of treatment modalities reflects the scarcity of an optimal technique.(3)

Simple, cheap, rapid and easily available methods of treatment such as dilatation and internal urethrotomy could quickly treat many patients in the first instance, but the

recurrence rate is as high as 40% for strictures shorter than 2 cm and 80% for those longer than 4 cm for both procedures after 12 months of follow up.(4)

There was resurgence of buccal mucosa grafts (BMG) in urethroplasty in the late 1980s although Humby described the use of buccal mucosa for urethral substitution as early as 1941.(5) Standard bulbar urethroplasties using BMG have a reported lifetime success rate approaching 92%.(6)

Although a standardized protocol after urethroplasty is yet to be defined, non invasive testing and questionnaires play a critical role in assessing stricture recurrence.

We conducted a study to evaluate the success rate of buccal

mucosa urethroplasty in our institute.

MATERIAL AND METHODS

This retro-prospective, observational study was conducted in Department of Urology, Institute of Renal Sciences in Sir Ganga Ram Hospital, New Delhi, India. The study was done from June 2016 to Dec 2017. Retrospective data of 15 patients was collected from March 2014 to May 2016.

INCLUSION CRITERIA

All patients having urethral strictures planned for buccal mucosa urethroplasty.

EXCLUSION CRITERIA

1. Patients with complex strictures (like associated with fistula.) and patients with staged operation.
2. Patients with active oral lesions.

METHODOLOGY

After clearance from the ethical committee we included patients in the study who fulfilled the inclusion and exclusion criteria. 35 patients who underwent buccal mucosa urethroplasty were included in the study. Informed consent was taken from the participants. Preoperative evaluation included history taking, physical examination, uroflowmetry, IPSS score, RGU and MCU. Buccal mucosa urethroplasty was done in dorsal or ventral onlay fashion (Figure 1-2). Urethral catheter was removed on 21-25 days postoperatively. During the follow up period re-assessment was done at 6 weeks, 6 months and 1 year, which included the IPSS scoring system and uroflowmetry .In case of urinary symptoms and/or an obstructive uroflow pattern, urethrogram was performed. The patients were assessed for improvement in the IPSS score in which a change of 10 points was taken as a screen for stricture recurrence and uroflowmetry (Q_{max}) in which a change in maximum flow rate of less than 10 ml per second was taken as a screen for stricture recurrence. Complications and treatment failure (which was defined as any patient requiring secondary procedures such as dilatation,optical internal

urethrotomy or redo urethroplasty).

The retrospective data of 15 patients was collected from medical records of Department of Urology, Sir Ganga Ram Hospital, New Delhi. Only those patients were included in the study whose follow up was available.

All statistical calculations were done using computer programs Microsoft Excel 2007 (Microsoft Corporation, NY, USA) and SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 21.

RESULTS

The mean age of the patients was 44.97 (range, 30-62) years. Distribution of cases according to site of stricture & etiology is shown in (Table-1). In our study mean length of the stricture was 6.23 +/- 3.09 cm. Distribution of cases according to length of stricture can be seen in (Table-2). 31 (88.6%) patients underwent dorsal onlay urethroplasty and 4 (11.4%) patients underwent ventral onlay urethroplasty. 10 patients were found to have recurrent strictures .Seven out of these 10(20%) strictures recurred between 6 weeks to 6 months of surgery and 3(8.6%) strictures recurred between 6 months to 1 year. In our study by 6 months, 28 cases had satisfactory Q_{max} (Table-3). Comparing the successful cases with failures we found that the mean Q_{max} of successful cases was significantly higher compared to the failures (21.47ml/s vs. 11.84ml/s). The successful cases as expected had a higher mean maximum flow rate compare to the failed cases (18.47ml/s vs. 11.17ml/s) which was statistically significant. (p<0.01)

The mean IPSS score at 6 months was maintained in successful cases (Table-4). There was a higher 6 month IPSS score in patients with a recurrence (13.28 vs. 6.42- p<0.01).

At 1 year as expected there was a higher 1 year IPSS score in those 3 patients who recurred compared to successful cases (14.67 vs. 7.08- p<0.01).

Table No 1: Distribution of cases according to Site of stricture & Etiology

	Site of stricture			Etiology			
	Bulbomebranous	Panurethral	Penobulbar	BXO	Iatrogenic	Idiopathic	Trauma
n (%)	8 (22.9)	9 (25.7)	18 (51.7)	9 (25.7)	7 (20.0)	16 (45.7)	3 (8.6)

Table No 2: Distribution of cases according to Length of Stricture.

	Length of stricture			Total
	Les than 2cm	2-4 cm	>4cm	
0.0	14 cases (40.0%)	16 cases (60.0%)	35 cases (100%)	

Table No 3: Preoperative and Postoperative mean maximum flow rate (Q_{max})

Variables	N	Mean	SD	Mean dif. from baseline	p-value*
Q_{max}	Pre intervention	35	4.33	1.77	<0.01
	At 6 weeks PI	35	26.24	3.53	
	At 6 months PI	35	19.54	5.05	
	At 1 year PI	28	17.68	3.81	

*Comparison are from Baseline

Table No 4: Preoperative and Postoperative IPSS score.

Variables	N	Mean	SD	Mean dif. from baseline	p-value*
IPSS	Pre- Intervention	35	18.74	3.97	<0.01
	At 6 weeks PI	35	5.00	1.40	
	At 6 months PI	35	7.80	3.20	
	At 1 year PI	28	7.89	2.54	

*Comparison are from Baseline

DISCUSSION

Stricture urethra is common in men with an estimated incidence up to 0.6 %.(1) All patients in our study were males as female urethral strictures are rare. Etiology of strictures in our study was idiopathic in 16(45.7%) cases, BXO in 9(25.7%) cases, iatrogenic in 7(20%) cases and trauma in 3(8.6%) cases. There is significant variation in the etiology of urethral stricture disease in different parts of the world as

demonstrated by several single-institution studies.(7)

Various techniques of BMGU have been described including dorsal onlay ,ventral onlay, lateral onlay and combined techniques, all having success rates in excess of 80%, of which, dorsal onlay and ventral onlay techniques are the most commonly used.(8)

In our study 31(88.6%) patients underwent dorsal onlay urethroplasty and 4(11.4%) patients underwent ventral onlay urethroplasty.

In the present study, we observed 70.97% versus 75% success rate with dorsal onlay versus ventral onlay BMGU.

Our study cannot be compared to the literature because of the wide disparity in the number of cases between ventral and dorsal onlay graft.(6)

The preoperative mean Q_{max} was 4.33ml/s (range 1.5- 9) ml/s and rose to 26.24 (range 18.5-32.3) ml/s 6 weeks postoperatively. In the successful cases, the mean 6 months post operative Q_{max} was 21.47 ml/s v/s 11.84 in failures and the mean 1 year post operative Q_{max} in successful cases was 18.46 ml/s v/s 11.17 in failures.

These findings suggest that uroflowmetry is a useful investigation in the follow-up of patients after urethroplasty.

The mean IPSS score preoperative, 6 weeks, 6 months and 1

year postoperative were respectively 18.74, 5, 7.8 and 7.9. The scores after 6 weeks, 6 months and 1 year were significantly better compared to the preoperative score. Comparing the 10 patients with a recurrence versus the other patients, there was a higher 6 month (13.28 vs. 6.42) and 1 year (14.67 vs. 7.08) IPSS score in patients with a recurrence.

This suggests that a high IPSS might be predictor of stricture recurrence. This was also observed in other studies, a persistent high symptom score correlated well with a recurrent stricture.(9),(10) If symptoms of voiding difficulty or changes in uroflowmetry were present, we proceeded to more invasive evaluation.

The drawback of the use of both, maximum urinary flow and IPSS, is the lack of specificity for recurrence of urethral stricture disease.

In our study oral complications included numbness in the oral cavity in 20 patients which was transient, oral pain in 15 patients, restricted mouth opening in 8 patients (which subsided within a month).

Other studies also report that restrictions in mouth opening are common, but self-limiting and will resolve within the first few months of surgery.(11)

The success rate in our study was 71.4% at 12 months. Out of the 35 patients included in the study 10 patients had recurrent strictures. In our study, of the 4 ventral onlay BMGU 1 (25%) had recurrence and out of the 31 dorsal onlay BMGU 9 (29.03%) had recurrence. Two failure patients were later managed by redo urethroplasty, 6 patients required OIU and 2 were kept on self dilatation.

BMG urethroplasty has been reported with success rates varying from 66.5% to 96% in various studies. The reason of our lower success may be secondary to long length of the stricture and more cases of panurethral strictures due to lichen sclerosus.(6)(12)

The stricture rate in our series calls for a closer audit. Restriction in the initial periods following surgery is usually due to improper selection of cases or poor technique. A large number of patients in our study consumed paan masala and tobacco, which compromises oral mucosal health; as also shown by Tan . and Sinha (13) In our study all the patients underwent a single stage repair. Out of the 35 patients 25.7 % of the patients had lichen sclerosis. When LS occurs in the urethral plate, foreskin and penile skin may be affected so severely that reconstruction should have be performed in multiple stages.(14) This might be the reason of higher failure rate in our study.

Panurethral stricture management is a difficult entity to manage. Again we managed all panurethral strictures with a single stage buccal mucosa urethroplasty. Multiple other authors recommend a staged procedure as the disease process is usually extensive.(15) This may be another reason for our low success rates compared to other studies in the literature given the large number of panurethral strictures in our study. Moreover urethroplasty is a technically demanding surgery, and most urologists don't have much experience with it. Faris et al. reported a series of 613 cases from six surgeons, and there was a significant trend towards improved surgical outcomes with increasing number of cases.(16)

CONCLUSION

Buccal mucosa graft is an ideal substitute for the urethra. Buccal mucosa urethroplasty is a well tolerated and worthwhile procedure by patient's point of view. In general, complications are rare after BMG urethroplasty. The change in flow rate (Q_{max}) and IPSS score after urethroplasty may be a

promising noninvasive metric to screen for stricture recurrence. Buccal mucosa urethroplasty has a decent success rate compared to other procedures; however a longer follow up is required before definitive decision can be made.

REFERENCES

- Alwaal A, Blaschko SD, McAninch JW, Breyer BN. Epidemiology of urethral strictures. *Transl Androl Urol.* 2014 Jun;3(2):209-13.
- Beard DE, Goodyear WE. Urethral Stricture: A Pathological Study. *J Urol.* 1948 Apr 1;59(4):619-26.
- What is the Best Technique for Urethroplasty? - UCL Discovery [Internet]. [cited 2019 Mar 13]. Available from: <http://discovery.ucl.ac.uk/1313101/>
- Steenkamp JW, Heyns CF, de Kock ML. Internal urethrotomy versus dilation as treatment for male urethral strictures: a prospective, randomized comparison. *J Urol.* 1997 Jan;157(1):98-101.
- A one-stage operation for hypospadias - Humby - 1941 - BJS - Wiley Online Library [Internet]. [cited 2019 Mar 13]. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1002/bjs.18002911312>
- Buccal mucosal urethroplasty: is it the new gold standard? - Bhargava - 2004 - BJU International - Wiley Online Library [Internet]. [cited 2019 Mar 13]. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1464-410X.2003.04860.x>
- Palminteri E, Berdondini E, Verze P, De Nunzio C, Vitarelli A, Carmignani L. Contemporary urethral stricture characteristics in the developed world. *Urology.* 2013 Jan;81(1):191-6.
- Andrich DE, Mundy AR. What is the best technique for urethroplasty? *Eur Urol.* 2008 Nov;54(5):1031-41.
- Heyns CF, Marais DC. Prospective evaluation of the American Urological Association symptom index and peak urinary flow rate for the followup of men with known urethral stricture disease. *J Urol.* 2002 Nov;168(5):2051-4.
- Aydos MM, Memis A, Yakupoglu YK, Ozdal OL, Oztekin V. The use and efficacy of the American Urological Association Symptom Index in assessing the outcome of urethroplasty for post-traumatic complete posterior urethral strictures. *BJU Int.* 2001;88(4):382-4.
- Tolstunov L, Pogrel MA, McAninch JW. Intraoral morbidity following free buccal mucosal graft harvesting for urethroplasty. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1997 Nov;84(5):480-2.
- Markiewicz MR, Lukose MA, Margarone JE, Barbagli G, Miller KS, Chuang S-K. The oral mucosa graft: a systematic review. *J Urol.* 2007 Aug;178(2):387-94.
- Sinha RJ, Singh V, Sankhwar S, Dalela D. Donor site morbidity in oral mucosa graft urethroplasty: implications of tobacco consumption. *BMC Urol.* 2009 Sep 21;9:15.
- Levine LA, Strom KH, Lux MM. Buccal mucosa graft urethroplasty for anterior urethral stricture repair: evaluation of the impact of stricture location and lichen sclerosis on surgical outcome. *J Urol.* 2007 Nov;178(5):2011-5.
- Datta B, Rao MP, Acharya RL, Goel N, Saxena V, Trivedi S, et al. Dorsal onlay buccal mucosal graft urethroplasty in long anterior urethral stricture. *Int Braz J Urol.* 2007 Apr;33(2):181-7.
- Faris SF, Myers JB, Voelzke BB, Elliott SP, Breyer BN, Vanni AJ, et al. Assessment of the Male Urethral Reconstruction Learning Curve. *Urology.* 2016 Mar;89:137-42.