Print ISSN: 2321-6379
Online ISSN: 2321-595X

Original Article

Outcome of Augmented Versus Anastomotic Urethroplasty Comparison in Bulbar Stricture Urethra of 2–3 cm Length

Arshad Hasan[1], A S Paul[1], Samir Swain[2]

[1]MCh Resident, Department of Urology and Renal Transplant, SCB Medical College and Hospital, Cuttack, Odisha, India, [2]Assistant Professor, Department of Urology and Renal Transplant, SCB Medical College and Hospital, Cuttack, Odisha, India

Abstract

Introduction: Stricture urethra, that is, fibrous narrowing of urethra is one of the challenging urethral conditions which occur due to inflammation of urethra, trauma to urethra, or due to idiopathic cause. There are various methods of the treatment of stricture urethra which depends on length, location, depth, and density. Because the bulbar urethra is relatively mobile, removal of the narrowing of lesser size and re-join the ends over a catheter is called anastomotic urethroplasty. Longer, recurrent, or complicated strictures need to be widened by cutting into the narrowed area and inserting a graft material is known as augmentation urethroplasty.

Aim: This study aims to know outcome of augmented and anastomotic urethroplasty in strictures of 2–3 cm by retrospective analysis.

Materials and Methods: This was a retrospective study performed in 64 patients of bulbar urethral strictures equal or <3 cm admitted to the department of urology. It is compare of success rate, complications, and patient satisfaction in two types of urethroplasties augmented versus anastomotic. Patient's basic demographic parameters, diagnostic investigations for the urethral strictures, pre-operative uroflowmetry, surgical procedures, post-operative complications, and follow-up uroflowmetry and cystoscopy findings were analyzed and compared.

Results: Most of the patients in the age groups of 31–40 and trauma is the leading cause of stricture. Anastomotic group patients stayed more in the hospital. Augmented urethroplasty had very superior success rates (100%) than to the anastomotic urethroplasty (84.6%). Complications were also more in anastomotic urethroplasty.

Conclusion: In this study augmented, urethroplasty is superior to anastomotic urethroplasty with fewer post-operative complications.

Key words: Complication, Fibrotic narrowing, Mucosal graft, Spongiogibrosis, Trauma, Urethrography

INTRODUCTION

Urethral stricture is the fibrotic narrowing of the urethra.[1] Spongiofibrosis due to fibrosis of periurethral corpus spongiosum causing the loss of distensibility of the urethra. It is caused by inflammation, trauma, and idiopathic. Trauma is usually iatrogenic mainly due to per urethral instrumentation. Straddle injuries and pelvic fractures are other contributory traumatic etiology. Idiopathic urethral strictures are believed to part of congenital anomaly. Pathology of urethral stricture disease is less understood but structural and functional change of the urethral epithelium and sub-epithelial spongy tissue caused by any its etiological factors are supposed to result of narrowing of the urethra. Prolong urethral obstruction may cause secondary complications in the rest of the urinary tract.[2] Its treatment is very challenging due to high failure rates and multiple post-operative complications. Maisonneuve (1854) and Otis (1872) developed the urethrotome to cut the structured part of

Access this article online

www.ijss-sn.com

Month of Submission : 05-2021
Month of Peer Review : 05-2021
Month of Acceptance : 06-2021
Month of Publishing : 07-2021

Corresponding Author: Dr. Arshad Hasan, Department of Urology and Renal Transplant, SCB Medical College and Hospital, Cuttack, Odisha, India.

the urethra.[3] Sachse (1974) revolutionized the treatment by optical urethrotomy.[4] Excision of the stricture and primary end-to-end anastomosis is preferred for short segment strictures. For long segment, strictures augmented graft urethroplasty is preferred. Humby was the first who describe about use of buccal mucosal graft for urethral reconstruction.[5] Due to high failure rate treating surgeon surgeons should concentrate on the correct indications and surgical techniques based on advantages and disadvantages of the different types of urethroplasties. In this study, success rate, complications, and patient satisfaction assessed after two type's urethroplasties augmented versus anastomotic.

MATERIALS AND METHODS

This retrospective observational study was carried out on 64 stricture urethra patients admitted to the department of urology September 2016 to March 2019. Informed consent was taken from all patients. Patient's basic demographic parameters, diagnostic investigations for the urethral strictures, pre-operative uroflowmetry, surgical procedures, post-operative complications, and follow-up uroflowmetry and cystoscopy findings were analyzed and compared. Bulbar urethral strictures ≤3 cm are included in the study. All female patients with urethral stenosis, urethral stricture developed after partial or total amputation of penis, staged urethroplasy, pelvic floor urethral distraction defect, and stricture after hypospadias or epispadias repair were excluded from the study. The exact length of the stricture and its site was diagnosed with the help of combined retrograde urethrography (RGU) and micturating cysto-urethrography (MCU) [Figure 1]. The infant feeding tube was used to assess the distal end of the stricture from the external urethral meatus. Patients were divided into two groups: Group-1 who underwent augmented urethroplasty and Group-2 of anastomotic urethroplasty. Twelve patients had undergone augmented urethroplasty. This technique of urethroplasty was decided on basis of urethral stricture calibration which was equal or more than 8 French and healthy oral mucosa. Buccal mucosa or lingual mucosa was taken for augmentation from the mucosal surface of the cheek or lateral tongue, respectively [Figure 2]. The length of graft was dependent on the length of stricture. In all these patients, dorsal onlay technique was used. After defating graft was quilted over the dorsal aspect of urethral bed [Figure 3]. Margins of the longitudinally incised strictured segment were stitched with that of the margins of quilted graft over a silicone Foley catheter size 14Fr. Group-2 patients which include 52 urethral stricture patients underwent anastomotic urethroplasty [Figure 4]. All these patient had either urethral stricture calibration less than 8 French or unhealthy oral mucosa. Both the groups after complete patient workup were planned for surgery under spinal anesthesia. Patients

Figure 1: Retrograde urethrography+ micturating cysto urethrography combined study

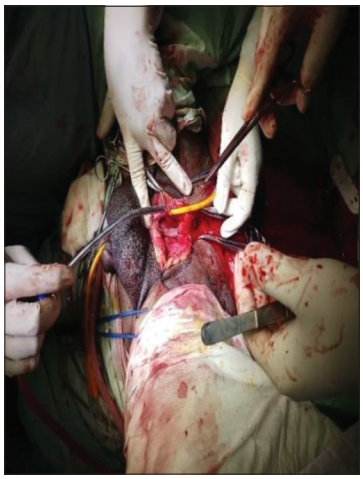

Figure 2: Intraop Dorsal onlay buccal mucosa graft urethroplasty

Figure 3: Oral mucosal graft

were placed in the lithotomy position. A midline or lambda perineal incision was made. Subcutaneous tissue incised to expose the bulbospongiosus muscle. The bulbospongiosus muscle divided in the midline to expose the underlying urethra. Circumferential mobilization of urethra was done. In Group 2, patients strictured segment was excised with 5 mm of normal urethral tissue on either side of the stricture segment with both ends spatulation and then anastomosis on urethral catheter number-14, by interrupted PDS 3-0 sutures [Figure 4]. The mobilized urethra was then hitched to the urethral bed. Wound was closed in layers with corrugated drain. Compression dressing applied. In both the groups', suprapubic catheter was maintained. Drain was removed on post-operative day 2. The silicone catheter was removed on post-operative day 21, and then micturating cystourethrogram was done and if no contrast extravasation seen and 16Fr perurethral catheter were placed and simultaneously suprapubic catheter was removed, after 1 week, perurethral catheter was removed. Follow-up uroflowmetry, cystoscopy, and International index of erectile function (IIEF-15) scoring were done at 6 and 12. All complications were recorded. Success rate and post-operative complications of these two types of urethroplasty were compared and analyzed.

RESULTS

A total of 64 patients analyzed retrospectically during the study period in which 12 underwent augmented urethroplasty where as in 52 patients anastomotic urethroplasty was done. All the post-operative events in these patients during follow-up period of 15 months recorded and evaluated. Mean age in Group 1 is 33.3 years where as in Group 2 it is 40.2 years [Table 1].

Most patient's develop urethral stricture due to trauma and mostly occurred at bulbar part of urethra [Table 1]. Stricture length which was measured by RGU and patient having stricture length 2–3 cm who was operated by any of the two procedures analyzed. Average length in Group 1 patients was 2.9 cm where as in Group 2 it was 2.1 cm. Traumatic stricture was develop mostly by straddle injury. Complications which include both intra-operative and post-operative were noted and analyzed. Post-operative complications such as fever, wound discharge, and urinary tract infections were analyzed according to Clavien-Dindo grading system. Most of the patients in both the groups having Clavien 1 and 2 grade classification which subsided by observation and conservative management. Mean duration of surgery in Group 1 is 152 min whereas 130 min in Group 2 [Table 2]. Hospital stay was more in Group 2 and major complications in post-operative period occurs in Group 2. Wound infections occurs 33.3% in Group 1 and 69.2% in Group 2. Wound gap [Figure 5], recurrent stricture urethra, urethra-cutaneous fistula, and erectile

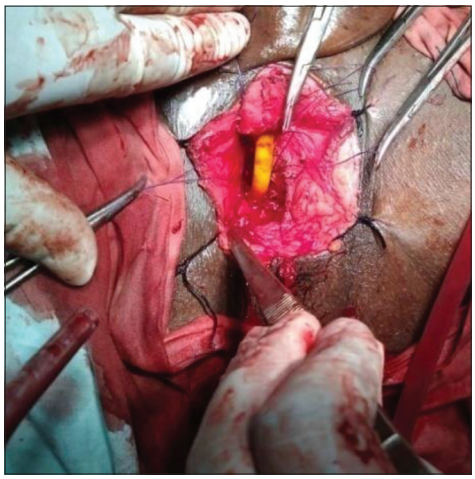

Figure 4: Intraoperative PEEAU

Figure 5: Post-operative wound gap

Table 1: Age distribution, etiology, and location of stricture in the study

Age (years)	Group 1 (*n*=12)	Group 2 (*n*=52)	Etiology	Number *n*=64	Location of stricture	Number *n*=64
21–30	4	7	Idiopathic	9	Bulbar	39
31–40	6	22	Trauma	38	Penobulbar	14
41–50	2	15	Post-infective	12	Panurethral	7
51–60	0	5	Post-catheterization Or instrumentation	5	Penile	4
61–70	0	3				

Table 2: Post-operative complications and success rate

Clavien-dindo grade	Group 1 (*n*=12)	Group 2 (*n*=52)
1 and 2	8 (66.7%)	36 (69.2%)
3	1 (8.3%)	8 (15.3%)
4	0	8 (15.3%)
Mean duration of surgery (minute)	152	130
Major complications		
Average hemoglobin drop (gm)	2	1.8
Hospital stay day (mean)	5	6.2
Wound gap	0	4 (7.6%)
Wound infections	4 (33.3%)	36 (69.2%)
Urethrocutaneous fistula	0	6 (11.5%)
Recurrent stricture	0	8 (15.3%)
Erectile dysfunction	0	2 (3.8%)
Success rate	100%	84.6%

dysfunction occurs in Group 2 in 7.6%, 15.3%, 11.5%, and 3.8%, respectively, where as these complications were not recorded in Group 1 patients up to the follow-up period. Hence, the result of augmented urethroplasty (Group 1) had very superior success rates (100%) than to the anastomotic urethroplasty (84.6%) [Table 2]. Minor infections were treated by antibiotics and wound gaps were managed by regular dressing. Only four patients were transfused blood in post-operative period. Urethrocutaneous fistula was repaired surgically by different method of fistula repaired.

Recurrent urethral stricture requires second operation which occurred in Group 2 patients and re perineal end to end urethroplasty was done. Although, minor complications common in both the groups but most of the morbid complications associated in Group 2 only. All the reoperations are done in Group 2 patients. Erectile dysfunction was also occurred in anastomotic group patients [Table 2].

DISCUSSION

For clinical purpose, male urethra divided into anterior and posterior urethra. Anterior urethra includes penile and bulbar urethra whereas posterior urethra contains membranous and prostatic urethra.[6] The term urethral stricture refers to anterior urethral disease, or a scarring process involving the urethral epithelium or spongy erectile tissue of the corpus spongiosum (spongiofibrosis). In contrast, posterior urethral "strictures" are not included in the common definition of urethral stricture. Posterior urethral stricture is an obliterative process in the posterior urethra that has resulted in fibrosis and is generally the effect of distraction in that area caused by either trauma or radical prostatectomy.[7] Consequences of the obstruction of any part of urethra can impair patient's quality of life by causing micturition disturbances also damage the entire urinary tract. It can affect any age groups but in our study, most of the patients in the age group between 30 and 40 years. Oguike *et al.* in his publication showed that 61.9% patients were aged between 21 and 50 years, and 55.9% of the strictures were traumatic in origin.[8] Beard and Goodyear found an incidence of 56.4% in middle age in a series of 211 patients between the ages of 30 and 50.[9] According to the publication by Shadab *et al.*, maximum 24% of the cases were in the age group of 31–40 years followed by age group 41–50 years (20%).[10] In a series of 100 cases, Webster *et al.* found a mean patient age of 47.[11] Tritschler *et al.* published that 45% of urethral strictures are iatrogenic, 30% idiopathic, and 20% due to bacterial urethritis. Iatrogenic causes result from urethral manipulations during traumatic indwelling catheter, transurethral interventions, correction of hypospadias, prostatectomy, and brachytherapy.[12] Pelvic trauma during road and traffic accident also one of the important cause of urethral stricture. The development of broad spectrum antibiotics has reduced the incidence of urinary tract infections, infective urethritis and its sequel of stricture formation also have significant portion of etiology contribution. The main symptoms of urethral stricture are increased urination time, feeling of incomplete bladder emptying, increased micturition frequency, and urgency. Although the diagnosis of urethral stricture is based on RGU and MCU, urethral calibration with Infant feeding tube helps significantly to locate the distal end of the stricture. Stricture urethra can be managed by different modalities of treatments. Urethral dilatation was the first method for relieving partial stricture. Urethrotomy good suited for single, short, and primary stricture. The overall recurrence rate recorded by Pansadoro and Emiliozzi after the first attempt urethrotomy is 68% and repeated urethrotomies do not improve the success rate.[13] Good results can be achieved by urethrotomy if the stricture is single or primary, shorter than 10 mm and if the caliber is wider than 15F.[13] Results of Mohanty *et al.* study revealed that 35% had recurrence who underwent repeated urethrotomies under local anesthesia.[14] Optical internal urethrotomy with steroids decreases recurrence rate of stricture urethra.[15] Importantly long stricture can be treated by augmented urethroplasty. Augmentation during urethroplasty repair can be done with different body tissues, such as prepuce, skin from the pinna, oral (buccal/lingual) mucosa, and even urinary bladder mucosa. Among these, buccal mucosal graft has become an ideal urethral substitute because it can be easily harvested under local anesthesia; it is hairless, compatible in a wet environment and is early taken up by the urethral bed.[16,17] All these unique characteristics

make buccal mucosa an integral part of reconstructive urology. End-to-end anastomotic urethroplasty is also one of the treatment modality for stricture urethra and Micheli *et al.* in his publication concludes it is as the treatment of choice for short bulbous urethral strictures, giving cure rates close to 100%.[18] In this study, the two best techniques (end-to-endanastomosis and augmented urethroplasty) were considered. The success rate of augmented urethroplasty is 100% and stricture excision and end-to-end anastomosis of the urethra is 84.6%. Published literatures on performed resection and end-to-end anastomotic urethroplasty recorded a good result.[19,20] These proposed that tension free anastomosis could be achieved by excision of the stricture of shorter length with adequate mobilization of urethra although penile chordee may be concerning. This chordee problem is not noticed with augmented urethroplasty. In augmented urethroplasty augmented tissue can be placed dorsally or ventrally. In the penile urethra, most surgeons would place it dorsally where as in bulbar urethra, ventrally, or combined ventral, dorsal, and even laterally. Both dorsal and ventral tissue placement provides good blood supply and mechanical support. Standard bulbar urethroplasties using buccal grafts should have a lifetime success rate approaching 92%.[21] Barbagli *et al.* showed that success rates are equal between dorsal and ventral buccal mucosal graft urethroplasty.[22] Dubey *et al.* retrospectively compare the outcome of various techniques of substitution urethroplasty and concludes that dorsal free graft/flap onlay urethroplasty gives better results than ventrally placed free grafts/flaps. Dorsal onlay buccal mucosal urethroplasty is a versatile procedure and associated with fewer complications than other substitution methods.[23] Ventral-onlay buccal mucosal graft placement has comparable success rates (84–100%).[24-27] Kulkarni *et al.* described a full length pan urethral repair using buccal mucosal graft with a success rate of 91–100% and concluded it better than staged repair.[28] Sawant *et al.* retrospectively review records of patients who underwent urethroplasty for anterior urethral strictures and found that success rate for anastomotic urethroplasty was 87%; 85% for staged urethroplasty and 57% for augmented urethroplasty.[29] Secondary success rate for augmented urethroplasty after single Visual Internal Urethrotomy was 86%.[25] In our study, success rate for augmented urethroplasty is more mostly due to lesser number of patients in that groups in comparison to other because patent urethral lumen required for augmentation. However, it is retrospective study so more experimental studies are required with more patients with longer follow-up period. Selection and randomization of patients into groups should free of biases with proper matched base line characteristics.

CONCLUSION

In this study, the success rate of augmented urethroplasty is superior to anastomotic urethroplasty with fewer post-operative complications. Result of this study is comparable to other published literature. Although success rate depends on many factors, augmented urethroplasty can be done in proper selected patients.

REFERENCES

1. McCammon KA, Zuckerman JM, Jordan GH. Surgery of the penis and urethra. In: Wein AJ, Kavoussi LR, Partin AW, Peters CA, editors. Campbell-Walsh Urology. Amsterdam, Netherlands: Elsevier; 2016. p. 916-38.
2. Perez PR, Linares AM. Complications of the lower urinary tract secondary to urethral stenosis. Acta Urol Esp 1996;20:786-93.
3. Matouschek E. Internal urethrotomy of urethral stricture under vision a five-year report. Urol Res 1978;6:147-50.
4. Smith P, Dunn M, Dounis A. Sachse optical urethrotome in management of urethral stricture in the male preliminary communication. J R Soc Med 1978;71:596.
5. Humby G. A one-stage operation for hypospadias repair. Br J Surg1941;29:84-92.
6. Joshi P, Kaya C, Kulkarni S. Approach to bulbar urethral strictures: Which technique and when? Turk J Urol 2016;42:53-9.
7. Wein A, Kavoussi L, Partin A, Peters C. Campbell-Walsh Urology. 11th ed. Amsterdam, Netherlands: Elsevier; 2015. p. 916-31.
8. Oguike TC, Onuora VC, Obarisiagbon E. The changing pattern of urethral stricture disease in Midwestern Nigeria. J Biomed Sci 2006;5:50-4.
9. Beard DE, Goodyear WE. Urethral stricture: A pathological study. J Urol 1948;59:61.
10. Shadab M, Pankaj D, Muni S, Anand M, Ali MS. A study of types of urethral stricture and their management. Int Surg J 2016;3:1906-10.
11. Webster GD, Koefoot RB, Sihelnik SA. Urethroplasty management in 100 cases of urethral stricture: A rationale for procedure selection. J Urol 1985;134:892-8.
12. Tritschler S, Roosen A, Füllhase C, Stief CG, Rübben H. Urethral stricture: Etiology, investigation and treatments. Dtsch Arztebl Int 2013;110:220-6.
13. Pansadoro V, Emiliozzi P. Internal urethrotomy in the management of anterior urethral strictures: Long-term followup. J Urol 1996;156:73-5.
14. Mohanty NK, Khetan M, Jha AK, Arora RP. Optical internal urethrotomy under local anaesthesia. Indian J Urol 2000;17:28-30.
15. Gupta S, Roy S, Pal DK. Efficacy of oral steroids after optical internal urethrotomy in reducing recurrence of urethral strictures. Turk J Urol 2018;44:42-4.
16. Bhargava S, Chapple CR. Buccal mucosal urethroplasty: Is it the new gold standard? BJU Int 2004;93:1191-3.
17. Zimmerman WB, Santucci RA. Buccal mucosa urethroplasty for adult urethral strictures. Indian J Urol 2011;27:364-70.
18. Micheli E, Ranieri A, Peracchia G, Lembo A. End-to-end urethroplasty: Long-term results. BJU Int 2002;90:68-71.
19. Park SI, McAninch JW. Straddle injuries to the bulbar urethra: Management and outcomes in 78 patients. J Urol 2004;171:722.
20. Koraitim MM. On the art of anastomotic posterior urethroplasty: A 27-year experience. J Urol 2005;173:135-9.
21. Morey AF, McAninch JW. When and how to use buccal mucosal grafts in adult bulbar urethroplasty. Urology 1996;48:194-8.
22. 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;174:955-7.
23. 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.
24. 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.
25. Heinke T, Gerharz EW, Bonfig R, Riedmiller H. Ventral onlay urethroplasty using buccal mucosa for Complex stricture repair. Urology 2003;61:1004-7.
26. Kane CJ, Tarman GJ, Summerton DJ, Buchmann CE, Ward JF, O'Reilly KJ, *et al*. Multi-institutional experience with buccal Mucosa onlay urethroplasty for bulbar urethral reconstruction. J Urol 2002;167:1314-7.
27. Kellner DS, Fracchia JA, Armenakas NA. Ventral onlaybuccal mucosal grafts for anterior urethral strictures: Long-term followup. J Urol 2004;171:726-9.
28. Kulkarni S, Barbagli G, Kirpekar D, Mirri F, Lazzeri M. Lichen sclerosus of the male genitalia and urethra: Surgical options and results in a multicenter international experience with 215 patients. Eur Urol 2009;55:945-54.
29. Sawant AS, Savalia AJ. Audit of anterior urethroplasty techniques. J Clin Diagn Res 2018;12:PC17-21.

How to cite this article: Hasan A, Paul AS, Swain S. Outcome of Augmented Versus Anastomotic Urethroplasty Comparison in Bulbar Stricture Urethra of 2–3 cm Length. Int J Sci Stud 2021;9(4):55-60.

Source of Support: Nil, **Conflicts of Interest:** None declared.