Is urethral stricture only a circumferential disease? Reason for change in the plan of urethroplasty for bulbous urethral strictures shorter than 2 cm

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ABSTRACT

Objective: To understand the reasons for choosing the type of urethroplasty for bulbous strictures shorter than 2 cm in length that were ideally suited for anastomotic urethroplasty (AU).

Materials and Methods: Data of adult men, who underwent urethroplasty between November 2002 and September 2011 for isolated bulbous strictures less than 2 cm in length, as measured intra-operatively, were reviewed. Patients who had undergone urethroplasty before were excluded. Data recorded were details of previous interventions, the etiology of the stricture and the type of urethroplasty performed.

Results: Out of 277 men who underwent urethroplasty for bulbous stricture, 65 men fulfilled the inclusion criteria. The etiologies were trauma in 24, post catheterization in 16, and idiopathic in 25. The mean stricture length was 1.60 cm (range 0.8 to 1.9). Anastomotic urethroplasty was performed in 41 men (Group 1). In the remaining 24 men, buccal mucosa graft urethroplasty was performed in 20 and augmented AU in 4 (Group 2). Comparing the two groups we found that Group 2 patients had undergone more internal urethrotomies (mean 2.45±0.88 vs. 1.58±0.63; \(P=0.005\)) and had longer stricture length as compared to men in Group 1 (mean 1.8±0.83 vs. 1.48±0.23 cm; \(P=0.005\)). The reason why AU could not be performed (Group 2) was shortening of the length of the urethra, making mobilization difficult.

Conclusions: Even short strictures are associated with urethral shortening as the fibrosis is not only circumferential but also longitudinal. The surgeon should be prepared for an alternate plan even for bulbous urethral strictures shorter than 2 cm.

Key words: Reconstruction, urethra, urethral stricture, urethroplasty

INTRODUCTION

The treatment options for bulbous urethral stricture include optical internal urethrotomy, anastomotic urethroplasty, substitution urethroplasty and rarely, two-stage urethroplasty. The treatment is mostly planned on the basis of the length of the stricture assessed on urethromgrams or intra-operatively, although other factors like etiology of stricture, and presence or absence of urethrococutaneous fistula also influence the plan of surgery. Anastomotic urethroplasty is considered the ‘gold standard’ for treatment of short bulbous urethral strictures as it has the best long-term results.\(^1\)-\(^4\) Longer strictures are best managed by substitution urethroplasty.\(^1\)

Every surgeon is aware of the possibility of a change in the plan of urethroplasty with the most important reason being underestimation of the length of stricture on urethrogram. Some surgeons have therefore advocated the use of either urethral ultrasonography or cystoscopy to better delineate the length of stricture and also identify the ‘grey urethra’ as defined by Turner-Warwick to better plan the type of urethroplasty.\(^4\)-\(^5\) If after these investigations or intra-operatively when the stricture is found to be short then anastomotic urethroplasty is considered the first treatment option, especially for strictures shorter than 2 cm. However, we have experienced that in spite of the stricture length being short (less than 2 cm; confirmed intra-operatively) sometimes substitution urethroplasty or augmented anastomotic urethroplasty has to be done. We present our
experience in the management of men with short strictures (confirmed intra-operatively) and discuss the possible causes for choosing a particular type of urethroplasty.

MATERIALS AND METHODS

After obtaining Institutional Review Board clearance, in this retrospective study, the records of adult men who underwent urethroplasty between November 2002 and September 2011 for isolated bulbous urethral stricture were reviewed. Inclusion criteria included patients who had bulbous urethral strictures shorter than 2 cm during intra-operative measurement and had not undergone urethroplasty before. Information retrieved from the records included the etiology of stricture, previous interventions, and the site and length of stricture as measured intra-operatively and the type of urethroplasty performed. The site of stricture was classified as either proximal bulbous or distal bulbous. The urethroplasties were performed by either consultants (AG, SNS) or urology Fellows under supervision of these consultants. The statistical analysis was performed using student’s t test and P value <0.05 was taken as significant.

RESULTS

A total of 277 adult men underwent urethroplasty for bulbous urethral stricture. Out of these 65 men had strictures shorter than 2 cm and fulfilled the inclusion criteria. The mean age was 38.3 years (range 18–58). All men had undergone one to four endoscopic internal urethrotomies before (mean of 1.9 procedures). Five men were on suprapubic urinary catheter. The etiology of stricture was trauma in 24, post-catheterization in 16, and idiopathic in 25. The mean stricture length was 1.60 cm (range 0.8 to 1.9). The urethral plate was found obliterated in five men (these men were on suprapubic catheter). Anastomotic urethroplasty was performed in 41 men (Group 1). In the remaining 24 men (where anastomotic urethroplasty was ideally suited), buccal mucosa graft urethroplasty was performed in 20 and augmented anastomotic urethroplasty in 4 (Group 2). The reason (as felt by the surgeon) was that there was shortening of the length of the bulbous urethra making mobilization difficult. Subgroup analysis showed that men in Group 2 had a mean stricture length of 1.8 cm (SD 0.83) as compared to 1.48 cm (SD 0.23) in the men of Group 1 and this difference was statistically significant (P=0.005). The etiology of stricture in Group 2 was post-catheterization in 9, trauma in 10 and idiopathic in 5. The mean previous internal urethrotomies in Group 1 were 1.48 (SD 0.23) while they were 1.8 (SD 0.83) in Group 2 and this difference was statistically significant (P=0.005). The stricture location was proximal in 24 (out of 41) and 11 men (out of 24) in Group 1 and Group 2 patients respectively (P=NS). The location of the stricture did not influence whether anastomotic urethroplasty was possible or not.

DISCUSSION

Anastomotic urethroplasty is considered the best, and therefore, the preferred treatment for short bulbous urethral strictures as success rates as high as 95% have been reported.[1-4] Normally, the bulbous urethra takes a slightly curvaceous route and therefore, it is possible to excise the diseased segment and perform end-to-end urethral anastomosis after spatulation. Currently, there is no consensus about the exact length of stricture at which anastomotic urethroplasty should be performed. Most surgeons would however agree that strictures 2–3 cm in length definitely qualify for an anastomotic procedure but because of good results some surgeons recommend anastomotic urethroplasty for stricture lengths up to 5 cm.[4,6]

At our institute the general policy is to perform anastomotic urethroplasty for bulbous strictures shorter than 2 cm. However, sometimes, we noticed that the plan has to be changed even though the stricture is shorter than 2 cm as found intra-operatively. To postulate the possible cause of this we evaluated our data for bulbous strictures that were less than 2 cm as measured intra-operatively and were ideally suited for anastomotic urethroplasty.

Some authors believe that anastomotic urethroplasty is only suitable for bulbous strictures less than 1 cm in length[7,8] but have not elaborated the reason for difficulty in strictures longer than 1 cm. One reason could be that anastomotic urethroplasty can be technically challenging and may require various maneuvers for mobilization to achieve a tension-free anastomosis. However, we believe that an important cause can be shortening of the length of the urethra as the spongiosis is not only circumferential thus narrowing the lumen, but also longitudinal, thus shortening the length of the urethra (making the bulbous urethra straighter on urethrogram) [Figures 1 and 2]. As the fibrosis evolves it brings...
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Figure 2: Representative retrograde urethrograms showing shortening and straightening of the bulbous urethra

On comparing the results of men in both the groups we found that more men in Group 2 had inflammation or trauma as the etiology of stricture. Also, men in Group 2 had longer stricture length (mean=1.8 cm) as compared to the men of Group 1 (mean=1.48 cm). Men in Group 1 had undergone lesser number of internal urethrotomies than the men in Group 2 (mean of 1.5 vs. 2.4). All these reasons (inflammatory/traumatic etiology, longer stricture length and more previous interventions) predispose to difficulties in mobilization and also lead to more fibrotic reactions. A major limitation of our data is the small number of patients. One reason for the small number is that short bulbous strictures are less common than strictures longer than 2 cm.

Anastomotic urethroplasty is easier in men with strictures in the proximal bulb as compared to strictures located in the distal bulb. However, we found that stricture location did not influence the decision to perform anastomotic urethroplasty in our series of patients.

It is already known that previous urethrotomy is a well-known risk factor for subsequent poor outcome of urethroplasty. Our data suggest that in men with previous urethrotomies it may be difficult to perform anastomotic urethroplasty even when the stricture is short. As the number of patients in this study is small more studies are needed before this observation can be confirmed.

Figure 3: Flattening of the glans due to stricture of glanular urethra

The problem of change in plan of urethroplasty has been highlighted by others also. Joseph et al., reported that stricture length is often longer than estimated on urethrography. As the plan for urethroplasty may change at the time of surgery they advocate that all strictures should be first opened by a dorsal stricturotomy (even the shortest strictures). By doing this maneuver the authors can accurately determine the length of stricture and for deciding whether to perform patch urethroplasty. We also feel that if anastomotic urethroplasty is planned, the urethra should not be divided without confirming the actual length of stricture and assessing the mobility of the urethral ends. Once transected it may be difficult to perform substitution urethroplasty as the ends of the urethra retract like a bowstring once they are freed from their attachments.

Shortening of the length of the bulbous urethra has not been reported previously as it is difficult to document these changes. Firstly, the length of the normal bulbous urethra is not known. Moreover, documenting the length of the bulbous urethra on retrograde urethrogram is difficult as the length may vary depending on the pull exerted on the penis at the time of study. Therefore, it may be difficult to objectively prove the shortening of the urethra. We believe
that the reconstructive surgeon should be aware that the plan to perform anastomotic urethroplasty may have to be changed intra-operatively even for short strictures, especially if the etiology is inflammatory, the stricture is longer than 1.5 cm and there is history of more than one internal urethrotomy.

CONCLUSION

To conclude, anastomotic urethroplasty can become difficult even in men with strictures shorter than 2 cm in length as there could be shortening of the length of the bulbous urethra making adequate mobilization difficult for tension-free anastomosis. We believe that stricture urethra is not only a circumferential disease but also shortens the length of the urethra. Anastomotic urethroplasty may not be possible to perform if the etiology of stricture is inflammatory or traumatic, the stricture length is more than 1.5 cm and if there is history of multiple previous internal urethrotomies. However, larger studies are needed to document/verify our observations.

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