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COMPARATIVE ANALYSIS OF VENTRAL AND DORSAL BUCCAL MUCOSA GRAFT AUGMENTATION URETHROPLASTY IN STRICTURE BULBAR URETHRA.

Surgery

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ABSTRACT

Objective: To compare long term outcomes of buccal mucosa graft(BMG) augmentation urethroplasty for long-segment bulbar urethral strictures done by placing the graft ventrally and dorsally.

Material And Methods: We conducted a single institution retrospective study on 32 patients who underwent BMG augmentation urethroplasty for non traumatic bulbar urethral stricture between January 2010- December 2018. The cases were divided into two groups based on the site of placement of the BMG graft i.e (a) Ventral (n=22) , (b)Dorsal(n=10). Follow-up period was from one year to five years. Patients with failed outcomes underwent Urethroscopy or Retrograde Urethrogram to note the site of recurrence of stricture.

Results: Out of 32 cases 26 (81%) were successful and 6 (19%) failed.The success rates for ventral and dorsal BMG augmentation procedures were 81% and 70%,respectively(p=0.45).Among 6 failed cases 3 (9%)cases had stricture at proximal anastomotic site,2 (2%)cases at distal anastomotic site& 1 (1%)case at pan graft site(p=0.08).

Conclusion: The overall success rate for BMG augmentation urethroplasty is equal for all techniques.Dorsal onlay urethroplasty provides better exposure of proximal anastomotic site thus it is associated with minimum proximal anastomotic site recurrence rates.Patient with extensive spongiofibrosis and long segment strictures had higher rate of failure.

KEYWORDS

Augmentation Urethroplasty;buccal mucuosal graft;urethroplasty;urethroplaty failure.

INTRODUCTION:

Urethral stricture is a sequel to any process that would injure the urethral epithelium, beyond the point of healing. Minimally invasive surgery done for the management of most cases with urethral strictures ,and increasing number of reconstructive urologist prefer to do urethroplasty rather than repeated endoscopic dilations or multiple visual internal urethrotomies .[1]

Augmentation urethroplasty is now done universally for the management of non-traumatic long-segment bulbar urethral stricture with the most common donor site being buccal mucosa.While doing augmentation urethroplasty buccal mucosa graft can be placed on two different sites,it can be placed dorsally(the entire urethra is mobilized and the graft placed on cavernosal bodies) and ventrally (a urethrotomy is made ventrally on the stenotic segment and graft placed on the urethrotomy defect).

Our objectives is to compare the long term outcomes of BMG augmentation urethroplasty for long segment bulbar urethral strictures based on the surgical success rates and relation to the site of placement of graft i.e. dorsal and ventral,to evaluate the failure patterns in terms of site of recurrence of stricture i.e. proximal anastomotic ,distal anastomotic or pan-graft, and finally to assess the site of recurrence dependent on the site of graft placement.

MATERIAL AND METHODS:

A single institutional retrospective study was conducted on 32 cases of BMG augmentation urethroplasty for bulbar urethral stricture performed from January 2010 to December 2018.Patient with >2cm non-traumatic purely bulbar urethral stricture who underwent BMG augmentation urethroplasties and patients who had follow up >1yr included in the study.BMG augmentation site was noted minimum of period of 1 yr patients were followed up.If maximum post-operative flow rate was >15 ml/sec. detected on normal retrograde urethrogram and/or urethroscopy and absence of voiding symptoms defines the outcome of surgery was successful.Maximum flow rate <15ml/sec.Or voiding symptoms with stricture diagnosed on retrograde urethrogram and/or urethroscopy stricture is seen defined as failure of surgery.Stricture seen on urethroscopy requires endoscopic intervention,self –dilatation of urethra or Redo-urethroplasty.

Statistical Analysis:

All patients whose BMG augmentation procedures failed underwent urethroscopy to identify the site of stricture.The obtained data of the patients were analysed with chi-square test to find out whether any association could be established between the site of BMG augmentation and the pattern of stricture recurrence and also whether the site of graft placement affected the outcome.As the analysis was retrospective ,so it involves purely data analysis of records without disclosure of patients identity,patient consent and ethics committee approval were not required.

RESULTS:

Out of 32 cases of BMG augmentation urethroplasty, ventral (n=22), dorsal (n=10) augmentation procedures were performed in respective number of patients.Out of 32 cases that underwent BMG augmentation, 27 cases (84%) were successful and 5 cases failed (16%).

Table1. Site Of Onlay Repair And Outcomes

Site of BMG Onlay (n)	Outcomes Success rates	Failure rates	Site of recurrence of stricture among failed procedure Proximal	Distal	Pan-graft
Ventral (n=22)	18 81%	4 18%	2	1	1
Dorsal (n=10)	7 70%	3 30%	1	1	1
Total (n=32)	26 81%	6 19%	3 9%	2 2%	1 1%

Table 2.results Of The Literature Review Comparing The Two Techniques

Study	Dorsal onlay Success rates,% (n)	Ventral onlay Success rates,(n)
Barbagli et al.[8]	81% (n=28)	87%(n=13)
Hosseini et al.[9]	78% (n=18)	80% (n=18)
Wang et al.[10]	84% (n=193)	82% (n=250)
Vasudeva et al.[11]	90% (n=14)	89% (n=12)

DISCUSSION:

Incidence of 0.6% of male urethral stricture disease is seen in some susceptible populations.[2]Etiology and distribution of stricture which was investigated in majority of studies are single institutional studies.
Men presented with obstructive voiding pattern to frank urinary retention leads to urethral stricture which is a great source of morbidity.The urethral stricture can be infectious, traumatic and post interventional,though in many cases the cause can't be ascertained.Non-traumatic bulbar urethral stricture can be iatrogenic,secondary to lichen sclerosis or post infection.Ischemia is responsible for spongiofibrosis with end result being urethral stricture.According to multigeographic study ,demography of urethral stricture concluded that lichen sclerosis and trauma were responsible for stricture in developing countries compared to developed countries where iatrogenic injury in particular failed hypospadias repair is more

frequently seen.[3]The treatment mainly comprises of three strategies ,1) Visual internal urethrotomy (VIU),2) Endoscopic dilation ,3) Urethroplasty (anastomotic and augmentation).

The success rate of VIU and urethral dilation is relatively low with only half of the patients remain stricture free at 48 months.Results are much worse with repetition of the procedure.[4]The results are worse for long segment(>2cm) strictures.[5]

So the option is urethroplasty! But it remains to be underutilized with few institutes offering the present standard of care.[1]

Urethroplasty across many centers performing the procedure offers a cure rate of 80% to 90%.[6,7] BMG augmentation urethroplasty is the standard of care for long segment non-traumatic bulbar urethral stricture. Dorsal placement of graft as decreased chance of diverticula formation and better chance of neo-vascularisation with graft line on cavernosal bodies which is not seen if graft replaced ventrally.Ventral placement in bulbar urethra has better access to proximal site of stricture, less mobilization of urethra preserving its vascularity and bulbocavernous muscle prevent diverticula formation.Ventral augmentation provide least erectile dysfunction as it involve least dissection.We found that it is easier to place and suture the graft at the proximal anastomotic site when approached ventrally then dorsally. This is the region for reduce rate of proximal anastomotic site stricture when graft is placed ventrally.The ease of access decreases with dorsal onlay and with compare to ventral onlay,we noticed hesitancy of the operating surgeon in performing a generous spatulation at proximal anastomotic site.This hesitancy on surgeon account for increased failure rate at proximal anastmotic site seen with ventral onlay graft. We propose dorsal onlay graft placement for bulbar strictures specially when the stricture involves the proximal bulbar urethra. In the majority of non traumatic urethral strictures,by doing urethroplasty we are not curing the disease.The disease process is continuous one which is evident by spongiofibrosis even in non stenosed part of urethra just proximal and distal to stenosed urethra.Hence we recommend wide spatulation of both proximal and distal anastomotic site to cover the spongiofibrosis.Spongiofibrosis represent ishchemia and extensive spongiofibrosis shows narrow lumen are prone to recurrences with pan graft restenosis due to scanty blood supply to the graft resulting in graft shrinkage.

There are few limitations in our study.
1) The study was carried over period of 9 years,as though all surgeries were performed at single institute it was not performed by single surgeon.All surgeries were performed under the supervision of same professor and hence the expertise were more or less same.

2) Both method of augmentation urethroplasty were done over same time period and choice between the both method was decided by the operating surgeon based on his comfort with particular procedure and hence no randomization was done.

3) Bulbar urethra is very heterogenous group and classification of the disease as per the stricture length ,stricture diameter and location i.e proximal –bulbar,mid –bulbar,& distal bulbar and its effect on outcome,since it was retrospective study the same detail was not available on analysis.

4) In conclusion ,BMG urethroplasty gives excellent results for long-segment bulbar urethral strictures. Strictures at proximal anastomotic site leads to more than half of the failure rates, hence we should be more careful while performing this anastomosis. Ventral onlay repair provides best access to proximal anastomotic site among all the techniques and hence it is favoured technique especially for strictures involving proximal bulbar urethera as evident by statististically significant reduction in stricture recurrence at proximal anastomotic site with ventral onlay compared to other two techniques.Wide spatulation of both anastomotic sites is recommended to cover spongiofibrosis localized proximal and distal to the stricture site.

5) However , we would like to state that all three techniques gave similar results in terms of success and failure rates but the pattern of recurrence helps us to understand the need to individualise the timing, and choice of the technique to be used.

Informed Consent:
Since it was retrospective study the information was obtained from the medical records. Also it was an observational study and no name has been disclosed in the study.

Conflict Of Intrest:
No conflict of interest was declared by the authors.

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