



Dorsolateral Onlay Buccal Mucosal Graft Urethroplasty in Management of Inflammatory Stricture Urethra: a Prospective Clinical Study

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ABSTRACT

INTRODUCTION : Urethroplasty can be done by placing buccal mucosal graft (BMG) ventrally, dorsally or dorsolaterally. The objectives of our study were to evaluate the success rate and complications associated with dorsolateral onlay BMG urethroplasty.

METHODOLOGY : This is a prospective study of 30 patients with inflammatory stricture of anterior urethra over a 2 year period treated with dorsolateral onlay BMG urethroplasty. The test statistics used to analyze the data were descriptive statistics, Chi-square test, and Student's t-Test.

RESULTS : The etiology of stricture was lichen sclerosis in 90%. Panurethral strictures were more common. The mean length of stricture was 7.3 + 3.1 cm. 20% had minor complications at surgical site. Success which was defined as Qmax >15ml/sec was seen in 96% patients.

CONCLUSION : Dorsolateral onlay BMG urethroplasty avoids the extensive circumferential mobilization of the urethra and preserves vascular, muscular and neurogenic support. The morbidity and complications are low and outcomes are excellent.

KEYWORDS : stricture, buccal mucosa, urethroplasty, lichen sclerosis

INTRODUCTION

The management of urethral stricture in males is one of the oldest problems known to urology. Various modalities of treatment ranging from simple dilatation, end to end anastomosis and various urethroplasties have been advocated over the years but, even today there is not much agreement as to the best mode of tackling this problem. Buccal mucosa graft for urethroplasty is highly beneficial because of its excellent short and long-term results. It has become an ideal urethral substitute because of ease of harvest and its early in-growth and graft survival [1]. In many series authors reported repair of urethral stricture by single stage buccal mucosal graft urethroplasty (BMGU) by placing buccal mucosa ventrally, dorsally or dorsolaterally [2]. In our present study we have proposed to use Dorsolateral Onlay Buccal Mucosal Graft urethroplasty for strictures of anterior urethra. The objectives of our study were to evaluate the clinical outcome and complications with dorsolateral onlay BMGU.

METHODOLOGY

This is a prospective study of 30 patients with inflammatory stricture of anterior urethra (bulbar and penile urethra) treated in our hospital during the period of November 2013 to November 2015. All patients were treated with the modified technique of BMGU (Dorsolateral onlay BMGU) by a unilateral urethral mobilization approach. Patients having short segment (<1cm) stricture, etiologies other than inflammatory like iatrogenic, traumatic and idiopathic were excluded from the study. In all the patients demographic data was collected, physical examination and investigations like uroflowmetry and retrograde urethrogram (RGU) were done. Institute ethical committee's approval was taken to perform the study. For all patients irrespective of stricture location and length dorsal onlay buccal mucosal graft urethroplasty was done as a single stage procedure. Postoperatively both SPC and per urethral Foley's catheter was kept for one month and catheter free trial was given. Patients were further followed-up with Clinical examination, uroflowmetry and RGU at three months and six months interval. A working proforma was developed to collect all relevant patient information. Complications at the surgical site and donor site complications were also assessed.

The results were classified into 2 outcomes -

1. Success was defined as a maximum flow rate of $\geq 10-15$ ml/sec in patients according to their age specific flow rates, and normal urethral imaging in retrograde urethrogram.
2. Failure was defined as the presence of obstructive urinary tract symptoms, Qmax <10-15 ml/sec based on age specific flow rates, stricture diagnosed on retrograde urethrogram and the need for further postoperative urethral intervention.

Data were processed and analyzed using SPSS 16.0 (Statistical Package for Social Sciences) software. The test statistics used to analyze the data were descriptive statistics, Chi-square test, and Student's t-Test. For all analytical tests, the level of significance was set at 0.05 and p <0.05 was considered significant.

RESULTS

This prospective study was done in 30 male patients with inflammatory anterior urethral stricture. Mean age of the study group was 49 years (range 30-70 years). The Etiology of inflammatory strictures was lichen sclerosis in 27 patients and Gonococcal urethritis in 3 patients. The patients with Gonococcal urethritis were in the 30-40 age group and have come from tribal areas where proper medical treatment was not available to them. Due to their late presentation, the gonococcal urethritis has led to stricture formation at this young age. However, this finding cannot be statistically proven because of the small proportion in the study group.

Table 1: Etiology of Inflammatory strictures

Etiology	Number of patients	Percentage of patients
Lichen sclerosis	27	90
Gonococcal urethritis	3	10

The commonest presentation was difficulty in passing urine (LUTS) which occurred in 83 % of the patients. Acute urine retention was seen in 20 % of the patients. Three patients with gonococcal urethritis

had past history of urethral discharge. Two patients came to our department with in situ suprapubic catheter.

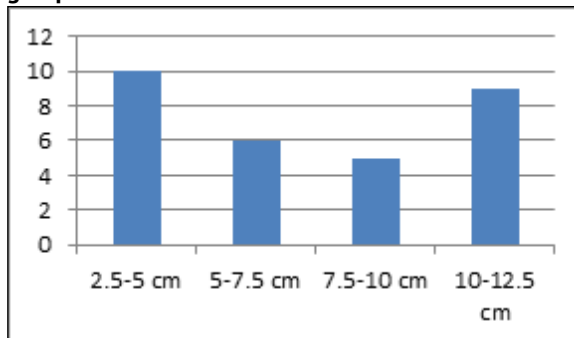
In the study group, strictures were located at bulbar urethra in 5 patients, at penile urethra in 12 patients and panurethral involvement in 13 patients.

Table 2: Site of stricture urethra

Site of stricture	No. of patients	Percentage of patients
Bulbar Urethra	5	16
Penile Urethra	12	40
Panurethral	13	44

The mean length of the stricture in the study group was 7.3 ± 3.1 cm. 9 patients had long strictures of 10.1 to 12.5 cm. 10 patients had a stricture length ranging from 2.5 to 5.0 cm. 11 patients had stricture length of 5.1-10.0 cm.

Graph 1: Distribution of stricture length in the study group.



Four patients had a history of previous urethrotomy, 2 patients had urethral dilatation and 1 patient had history of meatotomy, while 23 patients had no history of prior interventions.

At the Buccal mucosal harvest site, since the defect was not sutured and left to heal by granulation tissue formation; most of the patients had minor discomfort in the first two post operative days. Restriction of mouth opening was seen in 6 patients. Oral numbness was noted in 3 patients. One patient had reactionary bleeding and two patients had delayed healing. All these patients were managed with conservative treatment.

Table 3: Complications at Buccal Mucosal Harvest Site.

Complications	Number of patients	Percentage of patients
Oral numbness	3	10
Restriction of Mouth opening	6	20
Reactionary bleeding	1	3
Delayed healing	2	6

Out of the 30 patients, complications were noted in 7 patients. Infections, haematoma and scrotal swelling were the early complications noted in the study group. These complications were managed with conservative treatment. During follow up of patients at 3 months, one patient presented with meatal stenosis.

Table 4: Showing Complications at surgical site

Complications	Number of patients	Percentage of patients
Haematoma	1	3
Infection	3	10
Scrotal swelling	2	6
Meatal stenosis	1	3

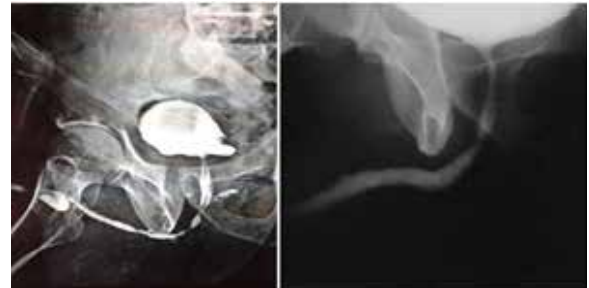
In our study success was noted in 29 out of the 30 patients, which equals to about 96% of the study group. Failure with $Q_{max} < 10-15$ ml/sec was noted in one patient who had meatal stenosis and was treated by meatoplasty. This corresponds to 3% of the study group.

Table 5: Showing Results classified in 2 outcomes

Result	Number of patients	Percentage of patients
Success	29	96.6
Failure	1	3.3

REPRESENTATIVE IMAGES

CASE 1: Pre and postoperative images of panurethral stricture



CASE 2: Panurethral stricture with improvement in calibre seen in post operative RGU. Pre and post operative RGU



DISCUSSION

In non industrialized countries, urethral stricture is more commonly infectious or inflammatory in origin and, thus, typically affects a much- younger populace and with more frequency than in the West [3]. The average age group in our study was 49 years. Barbagli has proposed a classification scheme for lichen sclerosus atrophicus (LSA) inflammatory strictures and of the disease process when it involves the penis and urethra [4]. His proposal is as follows:

Stage 1: LSA only involves the foreskin.

Stage 2: LSA involves the foreskin, the coronal sulcus and meatus.

Stage 3: The foreskin, glans, and external meatus are effected, as well as an associated stricture of the fossa navicularis and anterior urethra. At times, the infectious process spreads to the glands of Littre and the patient develops a pan urethral stricture.

Stage 4: An associated premalignant or cancerous lesion is also present.

Inflammatory strictures secondary to gonococcal urethritis, are relatively very uncommon today. At the turn of the century or in contemporary undeveloped countries, more than 90% of strictures are inflammatory, and commonly involve the bulbar and pendulous urethra. In the study group, most of the patients presented with strictures secondary to lichen sclerosus (27 out of the 30 patients). All these patients were in stage 3 category according to the Barbagli classification for lichen sclerosus. 3 out of the 30 patients in the study

group had strictures secondary to gonococcal infection. These patients were in the 30-40 age group and have come from tribal areas where proper medical treatment was not available to them. Due to their late presentation, the gonococcal urethritis has led to stricture formation at this young age. This finding cannot be statistically proven because of the small proportion in the study group.

In the standard dorsal onlay procedure, the entire

bulbospongiosus muscle is cut and separated from its natural attachment over the bulb. Circumferential mobilization of the urethra, as suggested in the original dorsal onlay graft technique, severs the vascular connections between the corpus spongiosum and the tunica albuginea, and the lateral vascular connection between the urethra and the superficial perineal tissue on both sides [5]. We realize that in performing dorsal placement of the graft in the albuginea, the full circumferential dissection of the urethra is unnecessary and may compromise the residual blood supply to the urethra. In 2008, Barbagli et al showed that the dorsal urethral surface could be easily approached leaving the bulbospongiosum muscle and the central tendon of the perineum intact, thus also preserving the branches of the perineal nerves from surgical injury [6,7]. In our dorsolateral onlay technique, we adopted the policy of limited urethral mobilization, i.e., from ventral midline to beyond dorsal midline. We kept the grafts of up to 2.2 cm in width with a maximum length from the proximal bulbar up to the meatus (up to 12.5 cm). In this procedure, the urethra is not completely mobilized off the corpora; hence, graft sizing is more appropriate, preventing the chordee. By using our approach, at least the one-sided bulbospongiosus muscle remains intact along with ipsilateral intact vascularity to the urethra. Whether this concept will translate clinically into better sexual and ejaculatory functions is to be seen by further studies. Using this approach, our short-term results for these long segment strictures are reasonable.

CONCLUSION

Dorsolateral Onlay Urethroplasty using Buccal mucosal graft by a unilateral urethral mobilization approach is an effective method of treatment and is a satisfactory technique for the treatment of long segment anterior urethral strictures. This method may be effective in all types of urethral strictures (penile, bulbar, and panurethral). The morbidity and complications are low and outcomes are excellent. Using this approach, our short-term results for anterior urethral strictures are reasonable.

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