

Dorsal Onlay Buccal Mucosal Graft Urethroplasty for Anterior Urethral Stricture: Single Center Experience

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ABSTRACT:

BACKGROUND:

Urethral stricture remains a great challenge. We reported dorsal onlay BMG urethroplasty for repair of anterior urethral stricture.

AIM OF THE STUDY:

is to analyze short term outcome of Dorsal Onlay Buccal mucosal graft Urethroplasty, in regarding the result and complication rate in surgical specialties hospital /Medical City.

PATIENTS AND METHODS:

From January 2017 to June 2019, a total of 20 cases were enrolled in this study with anterior urethral strictures managed by dorsal onlay BMG Urethroplasty.

Patients with lichen sclerosus, previous failed urethroplasty and posterior urethral stenosis were excluded; those patients were followed up at 3 weeks, 3 months and at 6 months with history, physical examination, uroflowmetry, PVRV and retrograde urethrogram. Successful outcome was defined as normal voiding pattern with no need for surgical intervention after catheter removal.

RESULTS:

Mean patients age was 41 years. Mean stricture length was 3.5cm. Two patients developed stricture recurrence, during follow-up and required further intervention and was considered as failure. One patient developed wound infection which resolved after regular dressing. Success rate was 90%.

CONCLUSION:

Dorsal BMG urethroplasty is a reliable and satisfactory procedure to manage long bulbar urethral strictures with a lower complication rate.

KEY WORDS: urethroplasty, buccal graft, urethral stricture, complications.

INTRODUCTION:

URETHRAL STRICTURE DISEASE

Definition

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). By consensus of the World Health Organization conference, the term stricture is limited to the anterior urethra. Distraction defects are processes of the membranous urethra associated with pelvic fracture. Other narrowings of the posterior urethra are termed urethral contractures or stenoses ⁽¹⁾. Numerous surgical techniques have been described to repair bulbar urethral strictures according to

stricture length, including end-to-end anastomosis, augmented roof strip anastomotic urethroplasty, onlay repair using flap, or graft and multistaged procedures.⁽²⁾ Urethral strictures longer than 2 cm in length can be treated with stricturotomy and onlay augmentation urethroplasty using a BMG. It is useful when peri-urethral spongiofibrosis is relatively limited and the urethra is patent ⁽³⁾. Recently, the equally popular dorsal and ventral approaches to augmentation urethroplasty have demonstrated similar stricture free rates ⁽⁴⁾ with the advantage of the ventral onlay graft being ease of approach and limited mobilization of the urethra.

The disadvantage to the ventral approach is that of bleeding when one incises the stricture on the thicker ventral aspect as compared to the dorsal bulbar urethra.

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There is evidence to support the ventral onlay graft in proximal bulbar strictures ⁽⁵⁾ and dorsal onlay graft technique in distal bulbar strictures ⁽⁶⁾. Palminteri et al. ⁽⁷⁾ suggested that in addition to the placement of a dorsal inlay graft via a ventral sagittal approach, a ventral onlay could be performed with high success rates.

The Monseur urethral reconstruction was applied in only a few select centers ⁽⁸⁾. In this technique, the urethrostomy was made through the stricture on the dorsal wall.

The edges of the stricture were sutured open to the underlying triangular ligament or corpora cavernosa, or both. Barbagli and associates subsequently modified the Monseur technique (Fig. 1). In their modification, the urethrostomy is performed through the stricture on the dorsal wall. In the area of the urethrostomy, a graft is applied and spread fixed to the triangular ligament or corpora cavernosa, or to both. The edges of the stricturotomy are sutured to the edges of the graft and to the adjacent structures. ⁽⁹⁾

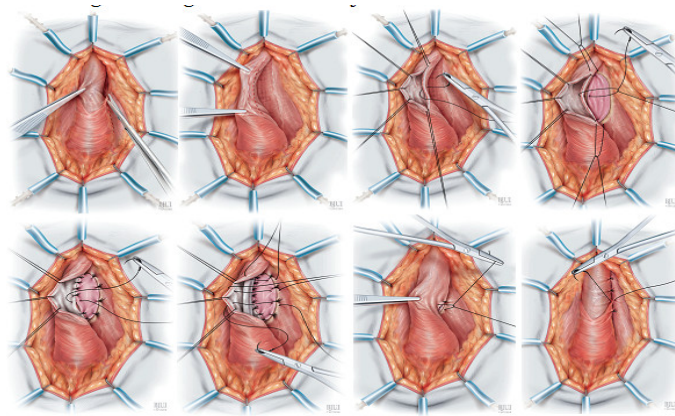


Figure 1: Technique of Dorsal onlay oral mucosal graft for bulbar urethroplasty⁽¹⁰⁾

AIM OF THE STUDY:

Is to analyze short term outcome of Dorsal Onlay Buccal mucosal graft Urethroplasty, in regarding the result and complication rate in surgical specialties hospital /Medical City.

PATIENTS AND METHODS:

This study is a prospective study conducted at Ghazi Al-Hariri surgical specialties and Nursing Home Hospital at Baghdad Medical city. The duration of study was through the period from January 2017 to June 2019.

Inclusion Criteria

1. Primary and recurrent stricture of anterior urethra involving the bulbar urethra,
2. Patients with significant lower urinary tract symptoms(LUTS)

Exclusion criteria

1. Stricture involving posterior urethra
2. Previously failed urethroplasty and
3. Patients with significant oral pathology
4. Patients with lichen sclerosis were excluded from our study.

Twenty patients with Anterior urethral stricture involving the bulbar urethra were managed by single stage urethroplasty with a dorsal onlay buccal mucosal graft were selected after eligibility to inclusion and exclusion criteria. The detail of surgical procedure and possible intra and post-operative complication were explained to the patient

Preoperative evaluation:

Each of those patients has been evaluated with history, physical examination, for presence of scar in the perineal region noting any evidence of phimosis, lichen sclerosis, and looking for any meatal abnormality including Hypospadias or meatal stenosis. Assessment of both knee joint and hip movement is essential for allowing placement in lithotomy position. Preoperative testing includes GUE and Urine culture with treating any existing infection according to result of culture and sensitivity prior to surgery.

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Imaging modalities used in our study include Abdominal Ultrasound for Post voiding residual volume (PVRV) assessment, retrograde urethrogram (RUG) and voiding cystourethrogram (VCUG) along with other routine laboratory investigations required for anaesthetic fitness. Blood preparation and cross matching was done to the entire patients. Lower abdomen, genitalia and upper thighs were thoroughly scrubbed with betadine scrub night before surgery. Uroflowmetry was done before and after surgery and the measurement of Qmax was recorded.

All the Operations were performed under general anesthesia with nasotracheal intubation and orotracheal intubation if failed nasotracheal intubation. The patients were put in lithotomy position. With proper placement of the calves and buttock and putting elastic compression stocking to prevent nerve injury and DVT respectively. Pre-operative antibiotic was given at time of induction for all patients according to culture and sensitivity. The skin of the suprapubic region, inner thigh, scrotum, and perineum were shaved, prepared and draped appropriately. Before any incision is made, we perform check urethroscopy to mark the distal end of the urethral stricture (which would be the start of our incision) and antegrade flexible cystourethroscopy to evaluate bladder neck and proximal urethra if the patient was already on Suprapubic catheter. A midline perineal incision is made as previously mentioned on the stricture site, the bulbocavernosus muscles are splitted in the midline. The urethra is then freed from the bulbocavernosus muscles and the muscles are fixed to ring retractor. The bulbar urethra is the dissected away from the corpora cavernosa. The urethra is rotated 180° using four stay sutures and the distal end of the stenosis is identified by gently inserting a 16F catheter with a soft round tip until it meets resistance or by inserting sound dilator till it meets the resistance.

The dorsal urethra is incised in the midline until the Tip of the catheter or the meatal dilator tip and urethral lumen are visible. The stricture is then incised along its whole length by extending the urethrotomy incision more distally and proximally. Once the whole stricture has been laid open, the length and width of the remaining urethral plate is measured.

Harvesting BMG technique: If the patient is intubated by nasotracheal tube, this will give us enough space for easily harvesting the BMG , but

if not then we can ask the anesthetist to fix the tube and to put small gauze inside the mouth to prevent blood from entering the airway with the tip of the gauze fixed outside the oral cavity. The patient is draped again and we harvest the BMG usually from the inner cheek by using a mouth retractor. The inner mucosal surface of the cheek is disinfected after visualizing the stenson duct opening and taking multiple stay suture to the edges of the planned graft then we inject Normal saline using insulin syringe in the submucosa to develop a plain for easier dissection and harvesting. If the stricture is lengthy, then bilateral Buccal mucosal graft can be harvested in the same maneuver. Careful hemostasis using bipolar cutterly and we usually close the site with vicryle suture 40. The graft is then put in Normal saline and defatted using micro scissor and tailored according to site and length of the stricture.

Graft placement: The graft is spread fixed to the tunica albuginea of the corpora cavernosa at the apex and bottom of stricture site and then quilted with 2 to 3 columns of sutures. 5-0 vicryle suture is placed in each of the apices of the urethrotomy, with the needles left on. Once these are laid out, they are then passed through the apices of the graft, through the tunica albuginea of the corporal bodies and tied. The edge of the urethral is then sewn to the lateral aspect of the BMG buccal mucosal graft and underlying corporal bodies along the length of the urethrotomy with interrupted fashion over an 18F catheter. Closure of the muscle with 40 vicryle suture and closure of the wound by layers with small curregate drain inserted from small incision and Mebo ointment dressing after completion of the closure. Suprapubic catheterization was done in all patients if not already done pre operatively.

Postoperative care: The patient can resume cold beverages and ice cream then a clear liquid diet before advancing to a soft, then regular diet. The patient can ambulate on the first postoperative day we remove the curregate drain at night and patient were discharged from the hospital 2 day after surgery. All patients receive postoperative broad-spectrum antibiotics and are maintained on oral antibiotics until catheter removal. Three weeks after surgery we do periurethrogram if the contrast passed to the bladder and no extravasation seen, we remove the catheter and clamp the SPC suprapubic

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catheter and ask the patient to void, the SPC was removed next day if the patient is voiding well.

Postoperative complications:

Early and late post operative complications include surgical site infection and stricture recurrence, scrotal swelling, tightness with erection and dribbling together with Oral harvesting site complication include surgical site infection and oral numbness were looked for and documented through the follow up period.

Post operative evaluation and Follow up:

All the patients were advised to visit consultation department at Ghazi Al-Hariri surgical specialties on 3 weeks and on 3 months and 6 months for follow up. During follow up patient's history, physical examination, PVRV assessment and uroflowmetry were done. If uroflowmetry showed significant obstruction and/or we have high PVRV then retrograde urethrogram (RGU) and voiding cystourethrogram (VCUG) was done with flexible cystoscope as required. A successful outcome was defined as normal voiding with no need of any kind of surgical intervention.

Ethical considerations: Agreement was taken from Ghazi Al-Hariri surgical specialties Hospital administration, a written informed consent was taken from the patient.

Statistical analysis The data of patients were analyzed by application of Microsoft excel program and Statistical Package for Social Sciences (SPSS) version 23. Outcomes of analysis were arranged in scales variables (means & standard deviation) and in categorical variables.

RESULTS:

In defined period from 2017 to 2019, total of 20 cases were enrolled in this study; all patients were admitted in Ghazi Al-Hariri of surgical specialties hospital, all operations were done under general anesthesia. All patients had anterior urethral stricture involving the bulbar urethra. All patients managed in one-stage repair using dorsal onlay buccal mucosal graft. Sixteen out of twenty patients had undergone previous urethrotomy or dilation. Only one patient required blood transfusion intra operatively.

The average stricture length was $3.5 \text{ cm} \pm 0.81 \text{ SD}$ (ranging from 2.3 to 5.1 cm)

Age of patients:

The age of the patients range was from 17 years to 65 years, with mean age $41 \pm 13.9 \text{ SD}$,

The total operative time was ranging (150-270) minutes with the mean of 202 minutes. The uroflowmetry of these patients shows mean Qmax of 6ml/sec preoperatively ranging from (0-12) ml/sec while post operative Qmax shows mean of 18.85ml/sec ranging from (4-28) ml/sec. In the Preoperative Qmax group, we have 3 patients who were already on SPC and their Qmax was zero. Regarding the post voiding residual volume, we found that the pre operative mean PVRV was 195.25 ml and post operatively was 40.65ml. We followed the patients postoperatively in regular periods at three weeks, three months and six months. One patient had surgical site infection, for which he was sent for culture and sensitivity and treated by 3rd generation cephalosporin injectable antibiotic for 5 days used with regular dressing patient had complete resolution without residual sequelae. Stricture recurrence was seen in two patients during the period of follow, and required intervention so they were considered failure. One patient has early post operative retention and was not able to void and the other had bothersome symptom and have low Qmax and significant PVRV and required Check urethroscope and dilatation. During the first week, two patients had scrotal swelling which resolved spontaneously during the three weeks visit by only elevation and prophylactic antibiotic. Also two patients had dribbling in the early post operative period which resolved spontaneously during follow up for the 6 months visit. One patient reported tightness with erection but have normal intercourse without chordee or ejaculatory problems.

No penile shortening was reported or urethral diverticulum seen during follow up MCUG. Regarding the oral complications after harvesting Buccal mucosal graft there was one patient who developed whitish covering at the site of the harvestation which was treated as fungal infection with antifungal solution (Nystatin) and mouth wash and one patient developed numbness at the inner cheek and mental region but these symptoms faded spontaneously during the follow up.(table 1)

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Table 1: The percentage of each complication in patient group.

| Complication | Frequency | Percentage |
|-------------------------------|-----------|------------|
| Surgical site infection | 1 | 5% |
| Scrotal haematoma/ swelling | 2 | 10% |
| Stricture recurrence | 2 | 10% |
| Tightness with erection | 1 | 5% |
| Dribbling | 2 | 10% |
| Peri oral numbness | 1 | 5% |
| BMG harvesting site infection | 1 | 5% |

We reported 18 out of 20 patients met the criteria in our study on follow up and were considered success, while 2 patients developed stricture recurrence and required intervention in form of Internal urethrotomy and dilatation; so, were considered a failure during follow up.

DISCUSSION:

In this study we enrolled 20 patients with anterior urethral stricture involving the bulbar urethra and operated them using dorsal onlay Buccal mucosal graft technique. The mean age of these patients was 41 years; the age and number of patients were comparable with Barbagli Et al⁽³⁾ and AL-Asad H et al⁽¹¹⁾. The mean operative time of the procedure in our institute was 202 minutes which was longer than reported by the pioneer Barbagli et al who report that their mean time was 100 min⁽¹²⁾. This fact is mostly due to the presence of two teams, one for the urethroplasty and the other team for harvesting buccal mucosa and preparation of the Buccal mucosa to be ready for grafting while in this study the same team has to scrub twice to complete the procedure which will increase the operative time significantly. The success rate of using buccal mucosal graft in urethroplasty has been extensively studied in many literature with different results, the success rate of this was 90% which was comparable to the result of Barbagli Et al⁽¹³⁾ which achieved 92%. AL-ASAD H et al and Mohamed H et al reported the same result as our study (around 90 %)^(11,14)

Laurence A. Levine et al⁽¹⁵⁾ from Chicago, United States shows a success rate 86% with dorsal onlay group. These results are slightly below our result this may be because we excluded patient with lichen sclerosus from our study while they did not. We did not image the urethra during the six months follow up after surgery but relied on patient symptoms, Qmax and PVRV and the need for further procedures to define failure. This has the advantage of being

patient-centered and therefore of most value in cost-effectiveness terms and for less radiation exposure, but we might have missed subclinical stricture of the repaired augmented segment of the urethra.

In our study, two patients (10 %) had recurrence of stricture at the previous site of urethroplasty, during evaluation by checkurethroscopy, one patient has a complete obliteration and the other has only fibrous ring which was seen in the proximal part of the anastomosis for which he underwent optical urethrotomy, the finding of the recurrence of the stricture in the proximal end of the graft anastomosis may be explained by an incomplete extension of the urethral incision to the appropriate area proximally owing to the difficulty in exposure and proximity of the proximal bulb to the external sphincter⁽¹⁶⁾ and in this procedure, we don't usually remove the scarred fibrous tissue of the urethra; so, we need to extend our incision till healthy urethra. Barbagli et al⁽¹⁷⁾ found that there is no basic difference in the outcome of bulbar urethral strictures based on which surgical technique or substitution material. Complete graft failure and anastomotic ring stricture continue to be unpreventable complications on urethral reconstructive surgery. Two patients had scrotal swelling which resolved spontaneously during follow up with elevation and prophylactic AB only and no wound hematoma occurred in our study, this is probably because we use curregate drain, while Acimovic⁽¹⁸⁾ from Serbia reported two cases of hematoma in his study out of 32 patients.

Whether to use drain or not is another controversy, because some authors discourage the use of curregate drain in the perineal area to avoid the risk of infection while other put a suction drain or curreagate drain

to prevent post operative hematoma and collection. We use small curregate drain and remove it in the next day if it's not draining. Babagli et al (12) uses suction drain for one day. The time of catheter removal is also a matter of debate. We usually keep the catheter for 3 weeks and perform pericatheter urethrogram to evaluate for any leak in the operation site, other authors remove the catheter and perform traditional urethrogram because the pressure of pericatheter urethrogram is much less than traditional RUG. We usually fill the bladder with sterile saline and close both SPC and follis catheter and do the periurethrogram to outcome this pressure effect. The periurethrogram is beneficial because if we find a leak, we can keep the catheter in place for 1 more week for new evaluation and avoid additional morbidity for the patient. There has been considerable controversy about which site of Buccal mucosa to be harvested. Some take it from the lips other harvest it from the cheek and some take it from the sublingual area. In our study we harvest the Buccal mucosa graft from the inner aspect of the cheek, and we close the defect with absorbable suture, Wong et al.(19) noted that closure of the buccal mucosa harvest site decreases pain and improve oral intake in the immediate postoperative period. Buccal mucosa has been shown to be an effective and versatile graft material for the urethra, and in our experience rarely results in adverse effects from the donor site, except for one patient who had fungal infection which was treated successfully.

Numbness in the inner cheek and paresthesia has been reported by one patient which was transient and subsided during follow up, this is similar to the study of Marco Raber (20) from Milan, Italy who had only one case of lip paresthesia in his BMG group.

CONCLUSION:

Dorsal BMG urethroplasty is a reliable and satisfactory procedure to manage long bulbar urethral strictures with minimum complications.

Recommendations:

Avoid Recurrent and unnecessary dilatation and DVIU as it worsens the spongiofibrosis and to transfer to the specialist or tertiary center if indicated. Longer follow-up on a larger series of patients is necessary, compare it with other

technique of grafting (ventral, lateral) and address the sexual issue as parameter by using International Index of Erectile Function IIEF for future studies. Apply Dorsal onlay graft urethroplasty in our daily practice and teaching it to the new urologist for starting on what other has ended

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