

The Battle of the Onlays: Ventral vs Dorsal Buccal Mucosa Graft Urethroplasty

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ABSTRACT

Stricture urethra is a common condition faced by urologists in their daily clinical practice, of which bulbar urethra is the most common site with a variety of management options. For substitution urethroplasty, options available are skin, dartos fascia, bladder mucosa, intestinal mucosa, labial, lingual and buccal mucosal graft. Buccal mucosal graft (BMG) is most preferred for reconstruction of anterior urethra. BMG was initially kept on the dorsal surface of the urethra but, the graft can be kept ventrally also. In this study, we are comparing the success rate of ventral onlay BMG and dorsal onlay BMG for bulbar urethral stricture to determine the easier and shortest surgical method of bulbar urethral stricture reconstruction repair. Totally 40 Patients with Bulbar Urethral Stricture more than 3 cm were studied prospectively as well as retrospectively for over a period of 2 years at various hospitals in Chennai performed by the same team of urologists. We concluded that success rate for ventral onlay BMG urethroplasty is equal to dorsal onlay BMG urethroplasty for bulbar urethral stricture. There is lesser operative time for ventral onlay on comparing with dorsal onlay. With previous history of urethrotomy, ventral onlay is preferred because of increased success rate.

Keywords

Bulbar stricture, BMG Urethroplasty, Dorsal onlay, Ventral onlay

Introduction

The male urethra is divided into anterior and posterior urethra. The anterior urethra is covered by the corpus spongiosum. Anterior urethra is divided into two parts: Bulbar & Penile urethra. Bulbar urethra covered by bulbospongiosus muscle, extending from urogenital diaphragm to penoscrotal junction. Penile urethra extends from penoscrotal junction to external urethral meatus. Anterior urethra is having epithelial lining inside and corpus spongiosum outside urethra. Any mucosal injury and corpus spongiosum injury will result in stricture urethra. Bulbar Urethra is the most common site for stricture. Bulbar urethral stricture management options are internal urethrotomy, end to end urethroplasty and substitution urethroplasty. For substitution, options available are skin,

dartos fascia, bladder mucosa, intestinal mucosa, labial, lingual and buccal mucosal graft. Buccal mucosal graft (BMG) is most preferred for reconstruction of anterior urethra. BMG was initially kept on the dorsal surface of the urethra but, the graft can be kept ventrally also. Dorsal onlay BMG initially done with success rate of 80-90% and ventral onlay BMG is becoming more acceptable and equally successful because of presence of Bulbospongiosus muscle. In this study, we are comparing the success rate of ventral onlay BMG and dorsal onlay BMG for bulbar urethral stricture.

Materials and Methods

A total of 40 Patients with Bulbar Urethral Stricture more than 3 cm were studied prospectively as well as retrospectively for over a period of 2 years at various hospitals in Chennai performed by the same team of urosurgeons.

Inclusion Criteria

1. Idiopathic Stricture
2. Inflammatory Stricture
3. Iatrogenic Stricture

Exclusion Criteria

1. Traumatic Stricture
2. Previous Failed Urethroplasty
3. Previous Irradiation
4. Previous failed Hypospadias

All patients had undergone complete history evaluation, Physical examination, Blood sugar, Complete blood count, Renal function tests, Urine routine examination, Urine culture and sensitivity, HBsAg, ELISA for HIV and anti HCV.

Specific investigations included X-Ray KUB (Kidney, Ureter and Bladder), Retrograde Urethrogram, USG-KUB, Uroflowmetry and PVR taken for all patients. For all patients dental opinion obtained for oral hygiene and patients advised mouth wash with chlorhexidine two times a day and to maintain perineal hygiene with washing for one week. Pre – operative anesthetic fitness was obtained. Written consent obtained and the procedure is explained to the patient. For culture positive patients, course of antibiotic given according to culture and sensitivity. Patients were given prophylactic Ceftriaxone 1 gm intravenously one hour before procedure.

Operative Procedure

After providing nasal tube general anesthesia patients positioned in extended lithotomy. Vertical midline perineal incision made. Bulbospongiosus muscle was incised in midline. Bulbar urethra and stricture identified.

For Ventral onlay:

- 2 cm above and below the stricture dissected on ventral surface and ventral urethrostomy done. Stricture length measured.
- Adequate buccal mucosal graft taken and defatted, graft is patched and anastomosed to the edges of urethral lip with 4-0 Vicryl, then 16 or 18 Fr silastic Foley inserted.
- Bulbospongiosus muscles approximated in midline. After keeping suction drain, wound closed in layers.

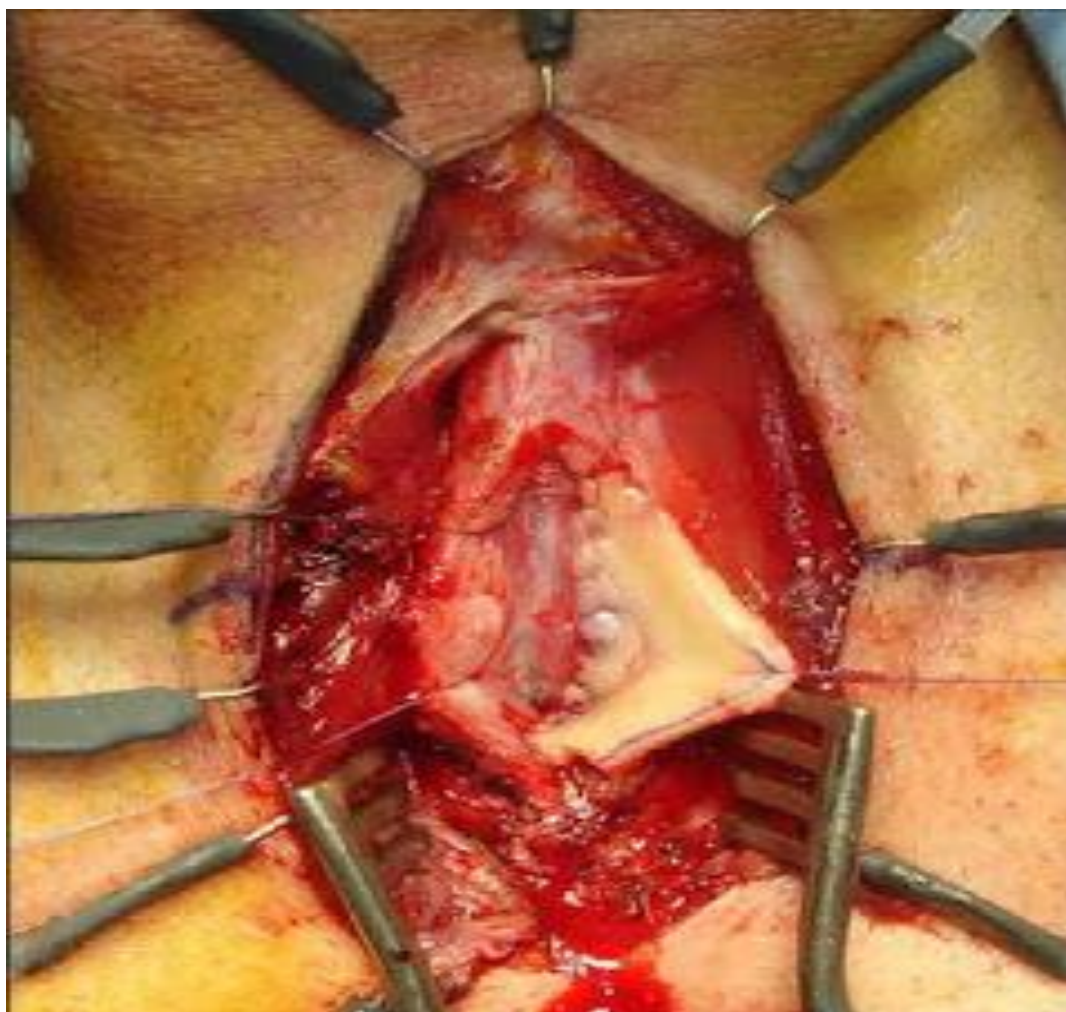


Figure 1. Intra operative image of Ventral BMG Urethroplasty.

For Dorsal Onlay (Barbagli):

- Urethra mobilized from corpus cavernosum, dorsal urethrostomy done. Adequate buccal mucosal graft harvested and fixed to the floor (corpus cavernosum). Then graft edges anastomosed to urethral lip on either side with 4-0 vicryl.
- Bulbospongiosus muscles approximated in midline. After keeping suction drain, wound closed in layers.

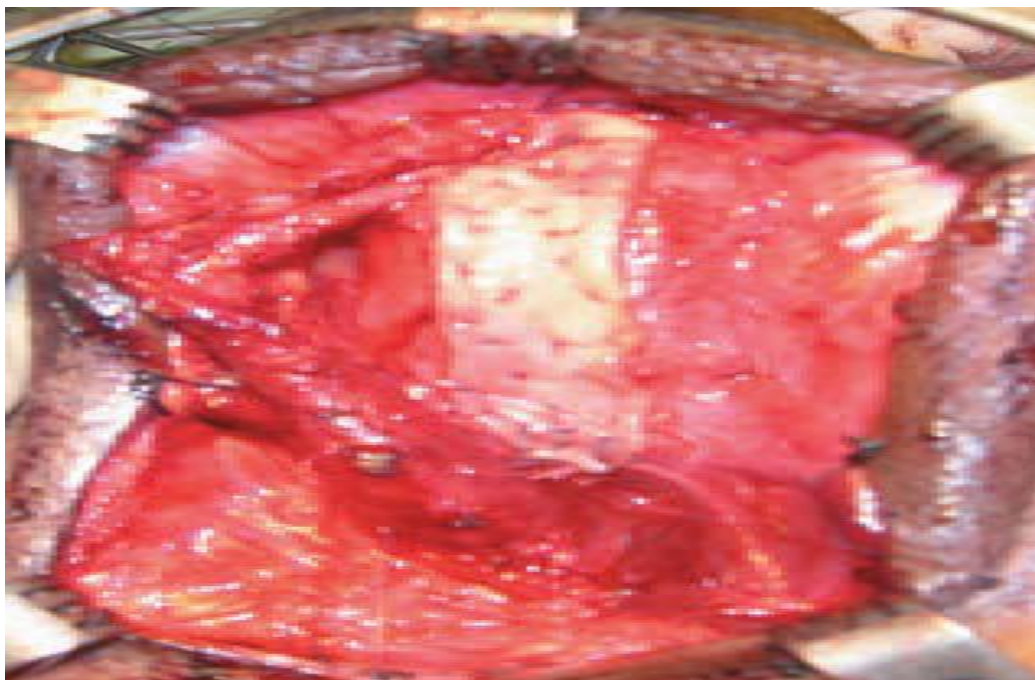


Figure 2. Intra operative image of Dorsal Buccal mucosal graft Urethroplasty

Post Operative Management

- Oral hygiene maintained, clear liquids allowed for first three days, on the third day, soft diet started and the drain removed. On the tenth day sutures removed and discharged.
- All patients have received intravenous ceftriaxone for five days, and then switched over to oral ciprofloxacin.
- Patients advised to return on 21st day and Pericatheter study was done, and foley removed.
- Patients followed up on 3, 6, 12th month with USG-KUB, Uroflowmetry and PVR.
- RGU done in symptomatic patients.
- The clinical outcome was considered as failure if any post operative procedure was needed.

Results

- Out of total 40 patients 20 patients underwent ventral onlay BMG urethroplasty and 20 patients underwent dorsal onlay BMG urethroplasty.
- Age of the patients range from 29 years to 64 years (mean= 48 years) in ventral onlay group and 22 years to 67 years (mean= 47 years) in dorsal onlay group.
- Of total 20 patients in ventral onlay group 60% had idiopathic stricture, 25 % had inflammatory stricture, and 15% had iatrogenic stricture. Whereas out of 20 patients in dorsal onlay group 50% had idiopathic stricture, 30% had inflammatory stricture and 20% had iatrogenic stricture.
- Of total 20 patients in ventral onlay group stricture length was 3-4 cm in 5 patients (25%), 4-5 cm in 8 patients (40%) and 5-6.5 cm in 7 patients (35%). Average stricture length was 4.3 cm. Whereas in dorsal onlay group stricture length was 3-4 cm in 6 patients (30%), 4-5 cm in 8 patients (40%), 5 to 6.5 cm in 6 patients (30%) and average stricture length was 4.5 cm.

- In ventral onlay group mean operative time was 135 min with 10 patients (50%) requiring 90-120 minutes, 7 patients (35%) requiring 120-150 minutes and 3 patients (15%) requiring >150 minutes. Whereas in dorsal onlay group mean operative time was 165 min with 3 patients (15%) requiring 90-120 min, 9 patients (45%) requiring 120-150 minutes and 8 patients (40%) requiring >150 minutes.
- Qmax was <5 ml/sec in 7 patients each in ventral onlay and dorsal onlay group. It was 5-10 ml/sec in 5 patients in ventral onlay and 7 patients in dorsal onlay group respectively. It was 10-15 ml/sec in 8 patients in ventral onlay and 6 patients in dorsal onlay groups respectively.
- Out of total idiopathic stricture cases success was achieved in 83.3% patients in ventral onlay group compared to 80% patients in dorsal onlay group.
- Out of total inflammatory stricture cases success was achieved in 80% patients in ventral onlay group compared to 83.3% patients in dorsal onlay group.
- Out of total iatrogenic stricture cases success was achieved in 100% patients in ventral onlay group compared to 75% patients in dorsal onlay group.
- Success rate for stricture length 3-4 cm was 80% in ventral onlay group compared to 100% in dorsal onlay group.
- Success rate for stricture length 4-5 cm was 87.5% in ventral onlay group compared to 75% in dorsal onlay group.
- Success rate for stricture length 5-6.5 cm was 85.7% in ventral onlay group compared to 66.70% in dorsal onlay group.
- In ventral onlay group post operative Qmax was <15 ml/sec in 15% patients and >15 ml/sec in 85% patients. Mean Qmax was 19 ml/sec.
- In dorsal onlay group post operative Qmax was <15 ml/sec in 20% patients and >15 ml/sec in 80% patients. Mean Qmax was 18 ml/sec.
- Internal urethrotomy was required in 3 patients in ventral onlay and 4 patients in dorsal onlay groups respectively.

Discussion

Long stricture urethra (>3cm) requires graft interposition to prevent chordee and impotence. Buccal mucosal graft is the best among the other possible grafts like bladder mucosa, intestinal mucosa and skin. It is easy to harvest and easy to handle the grafts (1, 2). The BMG can be placed dorsally or ventrally at strictured site of urethra. Multiple studies have shown that both ventral and dorsal onlay BMG have good blood supply and mechanical support.

Ventral Onlay:

Technical advantages include easy visualization of strictures. The caliber of the urethral lumen can be exactly delineated with ventral urethrotomy. This procedure allows to identify the mucosal edges, measure the size of the graft, and to do the mucosa to mucosal anastomosis (5, 6, 7). Ventral onlay has been criticized because of excessive blood loss and a high incidence of diverticulum formation. With a healthy spongiosum, bleeding is expected. Many studies have proved that presence of bulbospongiosus muscle prevents diverticular formation at ventrally repaired bulbar urethral stricture. Limitations to ventral onlay urethroplasty include severe spongiobrosis due to

prior failed urethroplasty or pelvic irradiation and strictures of the distal penile urethra. Spongiosum is not abundant, and spongioplasty is difficult to achieve (4, 5).

Dorsal Onlay:

Dorsal onlay urethroplasty can be performed by two techniques. Dorsal urethrostomy requires exposure, dissection from tunica albuginea, and rotation of stricture urethra. This technique takes longer operative time, and it causes more blood loss though not amounting to significant fall in post-operative hemoglobin and possibility of ischemia due to mobilization of urethra involving injury to circumflex and perforating vessels.

Pansadoro and colleagues reported a success rate of 98% for 56 patients who received dorsal onlay BMG (3). Only 1 patient having a recurrence was found on postoperative urethrography. Dubey and associates reported a success rate of 87% in 16 patients undergoing dorsal onlay BMG. Andrich and coworkers compared results of ventral onlay with dorsal onlay buccal mucosal bulbar urethroplasty (5). After a follow-up of 48 to 60 months, success rates of 86% and 95% were reported in ventral and dorsal onlay groups, respectively.

In 2005, Barbagli and colleagues repaired 50 bulbar urethral strictures with BMG (8, 9). The graft was placed on the ventral, dorsal, and lateral bulbar urethral surface in 17, 27, and 6 patients, respectively. The ventral, dorsal, and lateral graft provided success rates of 83%, 85%, and 83%, respectively, suggested that different position of the grafts showed no difference in the success rate. The operative time was 125 minutes for ventral onlay and 145 minutes for dorsal onlay.

Asopa et al. explored a ventral sagittal approach for dorsal onlay BMG urethroplasty techniques (3, 4). The urethra was not separated from corporal bodies and was opened in the midline over the stricture. The floor was incised, and an elliptical raw area was created over the tunica on which a full thickness graft of buccal mucosa graft was secured. After a follow-up of 8–40 months, 90% success rate was noted.

Conclusion

Success rate for ventral onlay BMG urethroplasty is equal to dorsal onlay BMG urethroplasty for bulbar urethral stricture. There is lesser operative time for ventral onlay on comparing with dorsal onlay. With previous history of urethrotomy, ventral onlay is preferred because of increased success rate.

Footnotes

Source of Support: Nil.

Conflict of Interest: None.

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