

## Post-Surgical Outcomes of Dorsolateral Onlay Urethroplasty

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### ABSTRACT

**Background:** The standard management of urethral strictures involving the anterior urethra is dorsal onlay buccal mucosa augmentation urethroplasty. This requires circumferential mobilisation of the urethra, which might cause ischemia of the urethra in addition to chordee. In this research, we managed the anterior urethral stricture, applying a dorsolateral onlay urethroplasty.

**Methodology:** This prospective study was conducted in the Department of Urology, BIRDEM General Hospital & some private hospitals from July 2009 to June 2015, the outcomes of a total cases of 103 of one sided anterior dorsolateral onlay OMG Urethroplasty were assessed and compared. Patients with anterior and recurrent urethral stricture more than 1 cm were included as study population. Urethrogram and Uroflowmetry were the mainstay of assessment. Success was defined as a maximum flow rate of >20 ml/sec., normal RGU, and/or urethroscopy. Poor outcomes were defined as the presence of obstructive urinary tract symptoms, Qmax <15 ml/sec., stricture diagnosed on retrograde urethrogram/ urethroscopy, and the need for any postoperative urethral intervention.

**Result:** Of the 103 patients, 97 had (94.2%) successful outcome and 6 (5.8%) were failure. Four failed cases underwent optical internal urethrotomy and two patients had persistent narrowing and they were managed by BMG Urethroplasty. Follow up period was 12 months on an average. In conclusion, it can be said that the preservation of one sided vascular supply to the urethra and its entire muscular and neurogenic support represent significantly towards perfecting the surgical technique of urethral reconstruction using a minimally invasive approach.

**Conclusion:** In this study, we found it to be a technically feasible, easily adoptable and finally successful procedure.

**Key Words:** Dorsolateral Onlay Urethroplasty, urethral strictures

### Introduction

Management of anterior urethral stricture poses a continuing urological challenge. For the management of anterior urethral stricture, dorsal, ventral or lateral onlay urethroplasty may be employed as single-stage procedure<sup>1</sup>. Out of these, dorsal onlay urethroplasty currently is the most favoured<sup>2</sup>. We performed dorsolateral onlay urethroplasty by unilateral urethral mobilisation<sup>3,4</sup>. In this technique the lateral vascular supply on one side is preserved, which minimises ischaemia. Since circumferential mobilisation of urethra is not carried out in this technique, there is less chances of

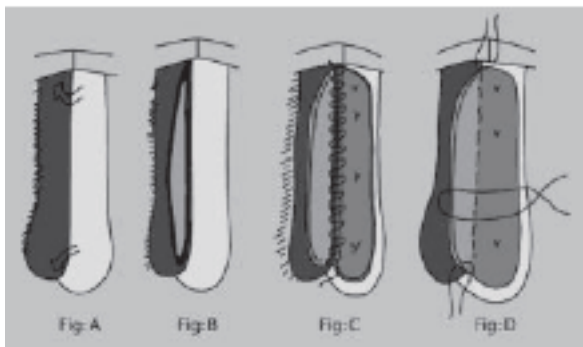
developing ischemia with resultant chordee. Entire procedure is carried out by a perineal incision and no incision is made on the penis except meatotomy. The pendulous urethra is accessed by penile eversion through the perineal wound. Obviating penile incisions minimise chances of wound infection and fistula formation. The preservation of the one-sided vascular supply to the urethra is perfecting the surgical technique of urethral reconstruction using a minimally invasive approach. Outcome of this technique was assessed in this series.

## Method And Material

This prospective study was conducted in the department of urology, BIRDEM General Hospital and some other private hospitals from July 2009 to June 2015 having a total cases of 103 onlay OMG Urethroplasty. The age limit of the study population was 20 to 63 years. Patients with anterior and recurrent urethral stricture more than 1 cm were included as study population. Patients with severe co-morbidity and soft stricture below 1 cm were excluded from the study group.

Preoperative evaluation included history, physical examination, urinalysis, ultrasonography of KUB region with post-voided residual, retrograde & micturating cystourethrography and Uroflowmetry.

An intra-operative urethroscopy was performed to evaluate the caliber of the urethra and stricture. We performed the dorsolateral onlay procedure only when a guide wire could be negotiated through the non obliterative stricture segment. Urethroplasty was performed in perineal approach, with the patient in high lithotomy position.



**Figure 1:** (A) Mobilization of urethra beyond midline dorsally, (B) Dorsal urethrotomy, (C) Graft sutured to medial urethral margin, (D) Free margin of the graft sutured to lateral urethral margin.

The penis was everted through the perineal incision. The urethra was mobilized from left side of the ventral aspect to beyond the midline on the dorsal aspect [Figure 1A]. Fascia and vascular attachments on the other side of the urethra were left intact. Maximum distal and proximal limits of dissection were meatus and bulbomembranous junction. Urethrotomy was made in the midline dorsally [Figure 1B].

Oral mucosa at least 1:1 ratio to be incised urethral plate was harvested. One edge of the graft was sutured to the margin, was fixed to the corpora [Figure 1C]. A 16Fr Foley's catheter was kept. The other margin of the graft was sutured to the lateral margin of the urethra and the

tunica of corpora [Figure 1D]. Graft was placed unstretched to prevent chordee. The bulbospongiosus muscle was approximated in the midline in case of involvement of bulbar urethra.

The catheter was left in situ for 2-3 weeks. The patient was ambulated on the first postoperative day and was discharged from the hospital 3-5 days after surgery. All patients received broad-spectrum antibiotics and were maintained on oral preparation till removal of catheter. All patients were followed at 3, 6, 9, and 12 months postoperatively. At every visit, patients were assessed for symptoms, urine culture & sensitivity, ultrasound to assess post void residual urine and uroflowmetry. The average follow up period of study population was 12 months.

**Table 1:** Grading of postoperative outcomes

	GOOD (A)	FAIR (B)	POOR (C)
<b>Patient satisfaction</b>	Satisfactory voiding, no instrumentation required	Satisfactory voiding, but require OIU	Not satisfactory; require BMG urethroplasty
<b>Uroflowmetry</b>	Q max > 20 ml/sec	Qmax 15-20 ml/sec	Qmax < 15 ml/sec
<b>Retrograde Urethrography</b>	Good caliber	Partial narrowing at stricture site	Persistent stricture

The results were classified into the following outcomes. Success was defined as a maximum flow rate of >20ml/sec., normal RGU, and/or urethroscopy. Poor outcomes were defined as the presence of obstructive urinary tract symptoms, Qmax <15 ml/sec., stricture diagnosed on retrograde urethrogram/urethroscopy, and the need for any postoperative urethral intervention (Table I).

Data were processed and analyzed using SPSS (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.

## Result

The age of the patients range from 20 to 63 years with mean age of 39.3 years. The age distribution with preoperative characteristics of the study population is defined in table 2.

**Table 2:** Preoperative evaluation

Age (in years)	Length of stricture (cm)	RGU/MCU-site of stricture	Uroflow metry Qmax (mL/sec)	USG KUB/PVR (mL)
R: 20-63 M: 39.3	R: 2.4-11.66 M: 6.9	Bulbar: 33 Penobulbar: 43 Penile: 27	R: 3-10 M: 6.08	R: 120-200 M: 145.25

**R:** range, **M:** mean

Mean length of stricture was 6.9 cm with standard deviation 3.84. Most of the strictures (41.7%) were present in both bulbar and penile urethra, 27 (26.2%) patients had in penile urethra and 33 (32.1%) had in bulbar urethra. The most common presentation was poor flow. The etiology of the stricture was infection (41.25%), followed by balanitis xerotica obliterans (26.25%), 17.5% was idiopathic and 15% was iatrogenic urethral trauma due to instrumentation. During post-operative follow up six (5.8%) patients developed wound infection. Mean preoperative Qmax was 6.08 ml/sec and mean postoperative Qmax was 29.8 ml/sec. Paired t test was done and showed the difference was statistically significant (p value was <0.001) at the end of last follow up. Pre operatively sonography showed average post voided residual volume was 145.25 ml which was significantly high. But post operatively majority of the patients 97 (94.2%) did not show any significant PVR. Operative time was 1.5 hours to 2.5 hours.

**Table 3:** Mean Value of Peak flow rate following urethroplasty at the end of follow up period

Pre and postoperative peak flow rate	Mean±SD	P value
Preoperative and 1 month postoperative	6.08±1.95 29.78±3.06	0.001 <sup>S</sup>
Preoperative and 3 month postoperative	6.08±1.95 30.02±3.13	0.001 <sup>S</sup>
Preoperative and 6 month postoperative	6.08±1.95 29.06±2.80	0.001 <sup>S</sup>
Preoperative and 9 month postoperative	6.08±1.95 28.60±2.40	0.001 <sup>S</sup>
Preoperative and 12 month postoperative	6.08±1.95 29.04±2.77	0.001 <sup>S</sup>

**Table 4:** Outcome of Urethroplasty after completion of 12 months follow up

	Patient satisfaction	Uroflowmetry	RGU with MCU	Number of patients
<b>GOOD (A)</b>	Satisfactory voiding, no instrumentation required	Q max	Good caliber	97
<b>FAIR (B)</b>	Satisfactory voiding, but require optical internal urethrotomy	Qmax 15-20 ml/sec	Partial narrowing at stricture site	04
<b>Poor (C)</b>	Nonsatisfactory, required OMG urethroplasty.	Qmax < 15 ml/sec	Persistent stricture	02

97 patients were satisfied with surgery and had Qmax > 20 ml/sec. Four patients had narrowing at graft site and voided with poor stream. We managed above patients with optical internal urethrotomy. Two patients had persistent narrowing and they were managed by BMG Urethroplasty.

### Discussion

In the dorsal onlay technique, the conventional circumferential dissection of the whole anterior urethra risks the vascularity of the urethra, which may be more important if the meatus is involved with disease and the distal-most urethra is extensively dissected, such as is seen with concomitant balanitis xerotica obliterans. The Barbagli procedure with circumferential mobilization of the urethra for dorsal onlay patch has a success rate of 99% and 66% in the short- and long-term, respectively<sup>5</sup>. However, in long segment anterior urethral strictures, circumferential urethral mobilization may jeopardize the lateral vascularity of the urethra. Barbagli also described the lateral onlay procedure with results similar to dorsal and ventral onlay for bulbar urethral strictures<sup>6</sup>. In the pendulous urethra, ventral and lateral onlay grafts have the risk of diverticulum formation.

Asopa's procedure of inlay patch by ventrally incising the urethra is another option for anterior urethral strictures<sup>7</sup>. It preserves the lateral vascularity of the urethra. However, it has two potential drawbacks. Firstly, a wider graft may be difficult to be placed using this approach and may likely get folded. Secondly, we do not know how the long ventral sagittal incision on the scarred urethra will behave in the long-term follow-up. In the short-term follow-up, this procedure has shown good results<sup>7,8</sup>. Singh, et al., have shown the superiority of the Asopa

procedure (86%) over the Barbagli procedure (66%) in terms of success and complications<sup>9</sup>. This also supports the approach of restricting the mobilization of the urethra from its bed in patch urethroplasties for long segment anterior urethral strictures.

To maintain the urethral vascularity on one side of the urethra while keeping the graft in a dorsolateral onlay fashion, we adopted the technique of Kulkarni. Technically, it is as easy as the Barbagli procedure. It also preserves the one-sided bulbar artery in addition to maintaining the native lateral vascularity at the meatus and the distal urethra. Furthermore, by using this approach, we did not find postoperative chordee in any case. In this procedure, the urethra is not completely mobilized off the corpora; hence, graft sizing is more appropriate, preventing the chordee. In our study, during postoperative follow up, six patients (5.8%) developed wound infection & subsequent urethral stricture. Four were managed by OIU and two were managed by OMG Urethroplasty. Regarding post-operative patients' compliance, it was found in this research study that 97 (94.2%) patients were satisfied with surgery.

In a research study by Shah et al<sup>10</sup> it was reported that 7.5% was associated with poor post-surgical outcomes, with an overall success rate of approximately over 90%. Songraet al<sup>11</sup> (2005) reported overall success rate was 85.71% and only 2 patients had re-stricture out of 14 patients. Iselin & Webster<sup>12</sup> in their series of 29 men who underwent dorsal onlay graft urethroplasty reported a high early success rate of 97% at a median follow-up of 19 months. Study on One sided anterior Urethroplasty by Kulkarni et al<sup>13</sup> shows study on 24 patients with mean follow up of 22 months shows 22(92%) had a successful outcome and two (8%) were failures. In our study, mean preoperative Qmax was 6.08 ml/sec and mean postoperative Qmax was 29.04 ml/sec. In the study by Singh et al<sup>9</sup> (2009) mean preoperative Qmax was 6.7 ml/sec (Range 3.8 - 9.5) and mean postoperative Qmax was 16.4 ml/sec (Range 8-21.2). So, the result is well comparable to other studies.

### Conclusion

The preservation of one sided vascular supply to the urethra and its entire muscular and neurogenic support represent significantly towards perfecting the surgical technique of urethral reconstruction using a minimally invasive approach. In this study, we found it to be a technically feasible, easily adoptable and finally successful procedure.

**Conflict of interest:** none

### Reference

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