Surgery-in-Motion: Brief Correspondence

Double-face Augmentation Urethroplasty for Bulbar Urethral Strictures: Technical Implications and Short-term Outcomes for a Dorsal Versus Ventral Approach

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Abstract

This study describes technical implications and compares short-term outcomes after a dorsal versus ventral approach for double-face augmentation urethroplasty (DFAU) for treating a near-obiterated bulbar urethral stricture (BUS). This was a retrospective evaluation of a prospectively collected database of patients with BUS (<2 cm) who underwent DFAU. The choice between the approaches depended on (1) landmark identification (the relation between the bulbospongious muscle and the distal end of the stricture) and (2) corpus spongiosum width. In DFAU, inlay augmentation was at the level of the narrowed urethral plate (<6 Fr). Patient follow-up data (symptom score and uroflowmetry) were assessed every 3 mo for the first year, and every 6 mo thereafter. A successful outcome was defined as a normal urinary flow rate without obstructive voiding symptoms. Fifty-two patients underwent DFAU for BUS (dorsal approach, n = 30; ventral approach, n = 22). The maximum flow rate and symptom scores significantly improved in both groups. The overall success rates (86%) were similar. In conclusion, a dorsal approach for DFAU is versatile and can be considered in all circumstances. A ventral approach should be performed in patients with proximal BUS. The short-term outcomes were similar for both approaches.

Patient summary: We assessed whether double-face augmentation urethroplasty is a suitable option for treating near-obiterated bulbar urethral strictures using two free grafts for augmentation to improve the urinary flow. This operation can be performed using two methods and both techniques were safe with similar short-term outcomes.

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Nontraumatic near-oblitervative bulbar urethral strictures (BUS) of <2 cm in length can be managed with nontra-secting anastomotic bulbar urethroplasty or augmented anastomotic urethroplasty [1–3]. However, if the obliterative stricture segment is >2 cm and the urethral caliber is <6 F, augmentation with a single graft may not be sufficient [4,5]. In these cases, double-face augmentation urethroplasty (DFAU) is indicated. DFAU can be performed using either a dorsal (dorsal onlay and ventral inlay) or ventral (ventral onlay and dorsal inlay) approach [4,5]. A buccal mucosal graft (BMG) or a free inner preputial graft (IPG) can be used for the urethral plate augmentation [6]. Reports in the literature regarding clear indications for a dorsal or ventral approach in DFAU are sparse. The aim of this study was to describe the technique and assess short-term functional outcomes for a dorsal versus ventral DFAU approach for near-oblitervative BUS.

This was a retrospective evaluation of a prospectively collected database of patients with BUS (<2 cm) who underwent DFAU in our institute between January 2016 and May 2019. Reports for patients who were followed for a minimum of 6 mo were included. Prior approval was obtained from our institutional review board. All patients gave informed consent before surgery. Patient demographics and clinical data were retrieved from our hospital’s online database system. The American Urological Association (AU) symptom score, blood investigations, and radiological imaging (abdominal ultrasound, retrograde urethrogram, and maximum urinary flow rate (Q\text{max})) were evaluated before surgery.

DFAU was carried out using either a dorsal or ventral approach. All the perineal procedures were performed by a single surgeon (B.E.). The BMG was harvested by a separate team. An IPG was considered for patients with poor oral hygiene. A near-oblitervated BUS was defined as a urethral caliber <6 F on urethroscopy [7]. The choice between both approaches was intraoperative based on (1) landmark identification (the relation between the bulbospongious muscle, and the distal end of the urethral stricture) and (2) corpus spongiosum width. Inlay augmentation with free graft was done at the level of the narrow urethral plate (<6 mm), and overlapping of the distal and proximal edges of the grafts was avoided.

A dorsal approach for DFAU was considered in all circumstances, especially for cases in which the BUS extended distally to the bulbospongious muscle, for primary urethroplasty, and for strictures with dense spongiofibrosis (corpus spongiosum width <15 mm). In this approach, the urethra was mobilized on the left side [8]. Dorsal urethrotomy was performed at the level of the stricture. A free graft was harvested and fixed to the apex of the proximal urethral margin using interrupted sutures (sutured to the median urethral margin and the underlying corpora cavernosa). Ventral inlay augmentation with a free graft was at the level of the narrowed urethral plate (<6 mm) and the urethra was closed over a 16 F catheter.

A ventral approach for DFAU was considered for patients in whom the distal end of the BUS was proximal to the bulbospongious muscle (and extended into the proximal bulb urethra) [6]. The ventral approach was also considered when the width of the corpus spongiosum (measured using calipers) was >15 mm [9]. Ventral sagittal urethrotomy was performed and the urethral stricture was opened until the normal urethral lumen was identified. Dorsal inlay augmentation with a free graft was at the level of the narrowed urethral plate (<6 mm). The urethral lumen was augmented ventrally with the free graft over a 16 F urethral catheter. Spongiosoplasty was performed and the bulbospongious muscle and perineal surgical site were approximated in two layers.

The urethral catheter was removed after 3 wk. AU symptom score, complications, and Q\text{max} were assessed every 3 mo during the first year after surgery, and every 6 mo thereafter. Complications were assessed according to the Clavien-Dindo classification [10]. A successful outcome was defined as a normal urinary flow rate without any obstructive voiding symptoms. Results for continuous variables are presented as the mean ± standard deviation. Data for categorical variables are presented as the frequency and percentage. A χ² test was used to compare preoperative and postoperative data. Outcomes for the dorsal and ventral approaches were compared using Student’s t test. Statistical significance was set at p < 0.05.

### Table 1 – Demographics and stricture characteristics for the dorsal and ventral groups for double-face augmentation urethroplasty

| Parameter* | Dorsal group (n = 30) | Ventral group (n = 22) | p value |
|------------|----------------------|-----------------------|--------|
| Age (yr)   | 46 ± 4.1             | 52 ± 5.5              | 0.68   |
| Stricture etiology, n (%) |                    |                      | 0.555  |
| Post-instrumentation | 13 (43.3) | 12 (54.5) |          |
| Inflammatory | 11 (36.7) | 5 (22.7) |          |
| Idiopathic | 6 (20)              | 5 (22.7)             |        |
| Previous interventions, n (%) |              |                      | 0.959  |
| Single OIU | 7 (23.3)             | 5 (22.7)             |        |
| Multiple OUs/dilations | 23 (76.75) | 17 (77.3) |          |
| Stricture length (cm) | 5.8 ± 0.6 | 5.1 ± 0.7 | 0.977  |
| Type of graft, n (%) |                      |                      | 0.913  |
| Buccal mucosal graft | 27 (90) | 20 (90.9) |          |
| Inner preputial graft | 3 (10) | 2 (9.1) |          |

OU = optical internal urethrotomy.
* Results for continuous variables are presented as mean ± standard deviation.
Fifty-two patients underwent DFAU for BUS (dorsal approach, \( n = 30 \); ventral approach, \( n = 22 \)). The demographics and stricture characteristics were similar in both groups (Table 1). Perioperative parameters, complications, and outcomes for the two groups are shown in Table 2.

Our study highlights the technical considerations for a dorsal or ventral approach for DFAU. The most important landmark is the distal end of the bulbospongious muscle in relation to the distal end of the BUS. The distal bulbar urethra has deficient spongy tissue and inadequate bulbospongious muscle. Hence, ventral urethrotomy in this region would result in a risk of urethral diverticulum [1]. A ventral approach is safe only for strictures involving the proximal two-thirds of the bulbar urethra [1,5]. For these strictures, the width of the corpus spongiosum is important (width > 15 mm is normally safe for a ventral approach [9]). However, a dorsal DFAU approach is safe and can be considered for all BUS cases [1]. Following ventral or dorsal urethrotomy, the decision on inlay augmentation is crucial. A stricturectomy with inlay augmentation can be considered if the width of the urethral plate is <6 mm and the structure length is <2 cm (with focal spongiosfibrosis). However, if the urethral plate width is <6 mm and the structure length is >2 cm, then a stricturectomy with inlay augmentation is considered. Overlapping of the distal and proximal edges of the grafts (inlay and onlay) should be avoided to prevent anastomotic rings. The limitations of our study include the retrospective analysis of a small cohort with short-term follow-up.

In conclusion, the choice between ventral and dorsal approaches should be made intraoperatively according to the position of the stricture in relation to the bulbospongious muscle, the corpus spongiosum width, and the degree of spongiosfibrosis. A dorsal DFAU approach is versatile and can be considered in all circumstances. The ventral approach, although technically easy, should be performed selectively in patients with proximal BUS. Short-term outcomes were comparable for both approaches.

Author contributions: Bhavatej Enganti had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Enganti, Bendigeri.
Acquisition of data: Enganti, Pandya.
Analysis and interpretation of data: Enganti, Bendigeri, Pandya.
Drafting of the manuscript: Enganti, Ragoori.
Critical revision of the manuscript for important intellectual content: Chiruvella, Reddy, Ghose.
Statistical analysis: Enganti.
Obtaining funding: None.
Administrative, technical, or material support: Reddy.
Supervision: Chiruvella.
Other: None.

Financial disclosures: Bhavatej Enganti certifies that all conflicts of interest, including specific financial interests and relationships and affiliations relevant to the subject matter or materials discussed in the manuscript (eg, employment/affiliation, grants or funding, consultancies, honoraria, stock ownership or options, expert testimony, royalties, or patents held, received, or pending), are the following: None.

Funding/Sponsor and role of the sponsor: None.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.euros.2021.01.008.
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