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Dorsal Onlay Buccal Urethroplasty in the Female Is Associated with High Quality of Life Using Validated Lower Urinary Tract Symptom Instruments

Charles R. Powell II * and David Daniels

From the Department of Urology, Indiana University School of Medicine, Indianapolis, Indiana, and Siouxland Urology (DD), Sioux City, Iowa

Abstract

Introduction: Female urethral stricture is rare and decreases quality of life. Buccal mucosa has become the most popular graft material for male urethroplasty but little is written about females. Rare case reports of buccal mucosa grafting in the female appear in the literature as an alternate method to more commonly performed vaginal flap urethroplasty (Blandy-style flap) or free vaginal mucosa graft urethroplasty. The hypothesis is that dorsal onlay buccal mucosa grafting will improve quality of life scores and provide acceptable recurrence-free rates.

Methods: We compiled a retrospective case series from 2009 to 2013 to identify female patients treated with dorsal onlay buccal urethroplasty via a suprameatal approach. All patients underwent pelvic exam as well as a supine stress test. Study end points included stricture recurrence verified by cystoscopy, uroflow, post-void residual urine, presence of urinary tract infection, pain, fistula formation, incontinence and complications at the donor site and the vagina.

Results: Six patients were identified. Mean followup was 18.6 months. No stress incontinence was noted preoperatively and none developed postoperatively. No fistulas were noted. Mean stricture length was 1.2 cm and mean graft length was 2.75 cm. Two stricture recurrences (33%) were noted, requiring dilation. Mean pain score went from 7.2 to 0 on a 10-point Likert scale ($p = 0.004$). The number of urinary tract infections per year decreased from 4.3 to 0.3 ($p = 0.038$). Maximum voided velocity increased from 5.6 to 13.1 ml per second ($p = 0.003$) and mean post-void residual urine decreased from 270 to 34 ml ($p = 0.094$). No urethral or vaginal complications were reported. Two patients reported donor site morbidity but no clitoral anesthesia or pain was reported.

Conclusions: Dorsal onlay buccal urethroplasty provided acceptable but not improved cure rates compared with the published failure rates of alternative methods. Patients experienced significant improvements in pain, urinary flow and quality of life. It can be safely considered instead of ventral onlay vaginal flap urethroplasty or serial dilation in females with stricture.

Key Words: urethral stricture, urinary tract infections, female, autografts, quality of life

Abbreviations and Acronyms

DOBU = dorsal onlay buccal urethroplasty

IIQ-7 = Incontinence Impact Questionnaire-7

LUTS = lower urinary tract symptoms

PVR = post-void residual urine

Qmax = maximum voided velocity

UDI-6 = Urogenital Distress Inventory-6

UTI = urinary tract infection

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* Correspondence: Department of Urology, Indiana University School of Medicine, 535 Barnhill Dr., Suite 420, Indianapolis, Indiana 46202 (telephone: 317-274-1747; FAX: 317-274-0174; *e-mail address:* crpowell@iupui.edu).

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Female urethral stricture is a rare but morbid condition that decreases quality of life significantly. It causes LUTS and is often managed by repeat dilation procedures.[1] Due to its rare nature, controversy exists regarding the optimal surgical exposure and graft material.[2] Many women are treated with serial urethral dilation, which is costly and painful, and seldom leads to a lasting cure.[3] Others have described ventrally placed vaginal graft and flap techniques.[4,5]

We offer dorsally placed buccal grafting as an alternative to ventral repairs. It is hypothesized that this technique provides an excellent alternative with acceptable outcomes for chronic female urethral stricture with minimal morbidity. In particular, buccal mucosa may be more desirable when the patient has preexisting vaginal morbidity such as atrophy, lichen sclerosis or a narrow introitus, making a vaginal graft less desirable. Buccal mucosa has become the most popular and effective graft material for male urethral stricture but to our knowledge it has not been evaluated critically in females, although its use has been described.[6,7] The suprameatal approach and the dorsal onlay technique may protect from fistula formation and sacculation of the graft, and it may facilitate future procedures for incontinence[8] compared with more commonly used vaginal flap urethroplasty techniques such as the Blandy-style vaginal advancement flap. However, definitive comparison is difficult because reports of the dorsal approach are much less common in the literature.[2] It is hypothesized that patients will have low postoperative scores on LUTS instruments that are validated in females.

We believe that the technique described is simple enough for an experienced reconstructive surgeon to successfully perform DOBU for female urethral stricture.

Methods

After receiving institutional review board approval we retrospectively compiled case series from 2009 to 2013 to identify patients treated with DOBU. All patients underwent a preoperative and a postoperative pelvic exam as well as a supine stress test. All had confirmation of urethral stricture and measurement using flexible cystoscopy. Retrograde urethrogram was attempted in some patients. Because it did not consistently fill the urethra and reveal the stricture, this evaluation was abandoned in subsequent patients.

A 5Fr ureteral catheter marked in cm was used to gauge the length from the meatus to the distal aspect of the stricture and the diameter of the stricture. Uroflow and PVR were done preoperatively and postoperatively. Study end points included stricture recurrence verified by cystoscopic exam, uroflow and PVR. Specifically, the reviewer asked about urinary tract infection, pain and complications at the donor site and the vagina. Pelvic exam using a vaginal speculum was performed at every postoperative visit. Continence was determined by absent leakage on physical exam with the bladder full, patient report of no incontinence at any followup visit, no urinary pad use and negative answers to the validated urinary bother questionnaires.

The paired t-test was used to compare continuous variables. Outcomes included pain score on a Likert scale of 0 to 10, Qmax in ml per second, PVR in ml and the number of UTIs per year. Incontinence was assessed by the supine stress test as well as UDI-6, quality of life score and IIQ-7.[9] UDI-6 was chosen specifically for its responsiveness to bladder outlet obstruction in women (question 5).[10] Quality of life was assessed by a 10-point Likert scale.

Technique Description

The stricture is visualized by cystoscopy (fig. 1). The location of the stricture is determined in relation to the urethral meatus by counting lines on a 5Fr open-ended catheter, which is marked in cm. Fluoroscopy is not used intraoperatively. If the stricture is too stenotic to admit the catheter, a hydrophilic coated guidewire is used to navigate the urethra and advance the catheter. In our experience seldom can anything be visualized beyond the distal edge of the stricture. Therefore, the suprameatal dissection, which was first described by Petrou et al,[11] is carried to a point beyond the leading edge of the stricture and deep to the pubic symphysis, similar to suprameatal urethrolysis. [F1]

The catheter serves as a guide as the tenotomy scissors are used to open the urethra dorsal until it can be calibrated to 24Fr, similar to the dorsal onlay technique first described by Tsivian et al.[6] Proximal there is limited room to maneuver, which can be improved by extending dissection laterally. There are concerns for more bleeding and potentially for incontinence as the compressor urethrae muscle is expected laterally as well.[3]

After opening, the length of the stricture is estimated by counting lines on the 5Fr open ended catheter (figs. 2 and 3). This determines the graft length. The width should be 2 to 3 cm. Retrograde urethrogram is sometimes helpful (fig. 4). [F2] [F3] [F4]

After the urethra is incised dorsally a buccal mucosa graft is harvested and sutured in place using 5-zero monofilament delayed absorbable suture (fig. 3). The entire distal urethra is grafted whether or not the distal urethra is involved in the stricture. A nasal speculum is often helpful to expose the proximal urethra. The graft is quilted to the undersurface of the clitoral bodies superiorly by taking full-thickness bites of the graft and the underlying clitoral bodies with 5-zero absorbable suture to aid in immobilizing the graft for inosculation and imbibition (fig. 5). The edges of the graft are [F5]