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Buccal mucosa substitution urethroplasty: A modality with excellant results

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***Abstract*---**Objective: We present our experience of buccal mucosa substitution urethroplasty in all segments of the Anterior urethra, as the buccal mucosal graft (BMG) is now recognized as the tissue of choice for single-stage reconstruction of bulbar urethral strictures. Patients and methods: Twenty-five patients underwent BMG substitution urethroplasty at our center between January 2015 and January 2019: 18 underwent a single-stage dorsal on lay BMG urethroplasty (pendulous, bulbous), 2 underwent a single-stage ventral onlay BMG urethroplasty (1 pendulous, 1 bulbous), 2 underwent an inlay buccal mucosa grafting (pendulous) followed by tabularization for six months. Results in terms of recurrence, comorbidities, and aesthetics were evaluated. Results: In six months follow-up period, 23 (88%) patients with a one-stage reconstruction remained stricture-free. One patient experienced a recurrence after 3 months and was treated with a one-stage optical urethrotomy, and another patient developed an urethro-cutaneous fistula and was treated with clean, self-intermittent catheterization once a day for 1 month, then twice a week for 3 months. Conclusion: When the

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anterior urethra is affected by a stricture, a BMG urethroplasty performed in a single stage is highly effective. The BMG is the only urethral substitute that has been shown to be effective in both one-stage and two-stage restoration of the complete anterior urethra, making it the most flexible option.

***Keywords*---**buccal mucosa, urethroplasty, anterior urethra.

Introduction

Substitution urethroplasty is necessary for anterior urethral strictures since they cannot be repaired with end-to-end anastomosis. Penile flaps of skin or free grafts of full-thickness skin, bladder, or buccal mucosa (BMG) are two methods that can be used to accomplish this. Since the BMG has great graft properties and can be retrieved without minimal morbidity, it is quickly becoming the most versatile urethral replacement [1]. For the reconstruction of bulbar urethral strictures, there is adequate data to indicate that it is the connective tissue of choice [3,4]. Since penile skin cannot be used as a graft or flap in cases of strictures caused by balanitis xerotica obliterans (BXO), this alternative is used instead [5-7]. In challenging cases, BMGs can be coupled to additional urethral reconstructive methods with great success [8].One-stage BMG reconstruction of meatal, pendulous, and pan-urethral stricture illness has not been frequently reported, despite its success in the bulbar region. For the reconstruction of the fossa navicularis [9,10], pendulous [11,12], and pan-urethral strictures [13,14], penile skin flaps have been the favored method. It was [15] described higher morbidity by using the flaps and so favor free BMG whenever possible, despite the fact that stricture rates of recurrence have proven comparable for both graft and penile skin-flap urethroplasty [15,16]. In this article, we report the outcomes of one- and two-stage BM urethroplasty for strictures affecting the whole urethra.

Patients and Methods

Total number of patients with mean age 37.2 years, 11-64 range affected with anterior urethral stricture disease underwent substitution urethroplasty with free BMGs between January 2015 and January 2019. In all of these cases, inflammation was the stricture cause of the. Total, two patients had previous urethral dilatations, twenty-three patients previously a background of direct visual internal urethrotomy, and two patients had undergone urethroplasty in the past.

Uroflowmetry, as well as retrograde urethrogram and nullifying cystogram contrast studies, were performed prior to urethroplasty. The mean (range) stricture measurement indicated 5.6 (3-17) cm, and the stricture site was either bulbar (43) or pendulous in 21 or pan-urethral in 28 cases. Table 1 shows the distribution of patients who underwent dorsal onlay urethroplasty against those who underwent a two-stage procedure. The Diffuse inflammation of urethra and a seriously injured urethra leads to a circumferential constriction < 6F are also criteria for a phased operation. Fifty-four patients had buccal mucosa taken from a single cheek (38 bulbar, 16 pendulous), 21 patients had buccal mucosa taken

from both cheeks (five bulbar, five pendulous, 11 pan-urethral), and 17 patients had buccal mucosa taken from the cheeks along with the lower lip. Six pan-urethral strictures (patients) had to have a combination operation (Table 1). Because the presented buccal mucosa was not sufficient. During 1998, data were gathered in retrospect, whereas information was gathered prospectively beginning in 1999.

Table 1
Method, rate of success, and follow-up

Method	No. of Patients	Success	Follow up duration in Months
One-stage	75	68	36.2
Bulbar	41	37	36.2
pendulous	16	14	-
pan-urethral	12	10	-
Two-stage	17	15	24.2
Bulbar	2	2	24.2
pendulous	5	-	-
pan urethral	10	-	-

Technique

All the patients received general anesthesia and nasotracheal intubation, the affected urethra becomes visible via cut, and the removal of stricture was performed by the second surgical team. A circumcoronal incision is utilized for pendulous urethral strictures, while a midline perineal incision serves for more proximal strictures. A urethrotomy is done, and the spongiosum is dissected corpora dorsally. Stricturotomy extends to the meatus in patients who also have a fossa navicularis or meatal stricture. The pendulous urethra is divided in two using a dorsal meatotomy, which is subsequently joined to the dorsal stricturotomy.

Depending on the extent of the stricture, buccal mucosa is removed from cheeks, stitched to corpora using interrupted 5-0 polyglactin sutures, and then with continuous sutures, cut ends of the urethra are sutured. The most distal BMG is secured to the dorsally cut borders of the meatus using interrupted 5-0 polyglactin sutures during meatal restoration.

In the first of a two-part process, the urethra is opened, the fibrotic tissue is excised in its entirety, and BMG is onlaid. The second phase, which occurs four to six months following the first, entails reconstructing the urethra.

After 3-5 days, the patient is released from the hospital with a suprapubic and urethral catheter in place. Micturating cysto-urethrography is performed three weeks later to remove catheters. After the initial year, patients were followed at 6-month intervals with uroflowmetry, clinical history, and urethral calibration; contrast-medium investigations were performed as needed. Relapse of symptoms and inability to regulate using a 16 F Foley catheter were considered failure criteria.

Results

Three pan-urethral fistulas, one pendulous fistula, and one bulbar fistula developed in a total of five patients; all five healed after an additional 7-10 days of catheterization. There were a total of 84 patients who finished their first year of follow-up, and another 12 who had made it to year 5. The median (range) follow-up was 34 (8-72) months. In nine patients, the stricture returned, but it was the same in each location along the urethra (four bulbar, three pan-urethral (Fig. 1a,b), and two pendulous (Table 1). Recurrences occurred on average every 9 months (3-17 months). Six required an internal urethrotomy, while the remaining three required either a pan-urethral or pendulous urethroplasty as a second procedure. There was complete graft loss following the first stage of a two-stage urethroplasty in 50% of patients at a mean follow-up of 24.2 (9-56) months. Both patients required further buccal mucosa onlays. After a two-stage operation, three other patients experienced little graft loss with no ill effects. In two individuals, the glans-cleft narrowing made it impossible to restore an appropriate meatus during the second stage. The overall success rate was 15/17 (Table 1), with 2 patients experiencing recurrences within the bulbar section that were treated with internal urethrotomy.

Figure 1. Six month follow-up cysto-urethrogram of a patient with single-stage dorsal onlay urethroplasty with numerous bladder-muscle-grafts (BMGs)

After urethral restoration, we observed no cases of penile deformity or erectile dysfunction. There was also a vanishingly small rate of bothersome postvoid dribbling and graft outpouching. From one patient extraction achieved i.e three BMG strips experienced minor mouth dryness for an extended period of five months. Slight pain and paraesthesia at the site of donor lasted for the period of three and eight months in two patients who undergone BMG extracted. Whether grafts were taken from a single location or multiple locations, there was no discernible increase in mortality. None of our patients were left with an unsightly scar or physical disfigurement.

Discussion

The current findings demonstrate that a single-stage dorsal onlay BMG urethroplasty is capable of restoring all segments of the anterior urethra in the event of a viable urethral plate. For complicated anterior urethral strictures, we previously described [15] our experience with replacement urethroplasty utilizing penile skin flaps and BMG, with dorsal onlay BMG urethroplasty appearing to be the approach associated with the fewest problems. These positive findings have led us to favor buccal mucosa for rebuilding the entire front urethra. Because of this, we only utilize penile skin flaps in really exceptional cases where the graft bed is badly impaired, and their use has rapidly decreased during the last few years.

Excellent results from dorsal onlay free-graft urethroplasty for bulbar urethral strictures have been described in multiple trials [3,17]. Dorsal onlay has been argued to be superior to ventral onlay in cases of bulbar urethroplasty [3,15], whereas ventral onlay has been observed to have great long-term outcomes [5,18]. For strictures in the proximal bulb, where the graft must be stretched into the membranous urethra, we have previously discussed the possible benefits of dorsal onlay flap [19] and graft [15] urethroplasty. A dorsal flap or graft is more straightforward to implement technically than a ventral onlay, which necessitates vascular spongiosum in this case. Results from other centers are consistent with the present study's findings. The study's medium-term success rate for bulbar urethroplasty was 90%.

BMG replacement for meatal, pendulous, and pan-urethral strictures has had limited experience despite its widespread use for bulbar urethroplasty. Ventral onlay penile skin flaps have traditionally been used to repair the fossa navicularis and pendulous strictures [9-12]. Because the spongiosum is inadequate in the pendulous urethra and vascularity is inadequate to sustain graft take, Wessels and McAninch [22] warned against using free grafts there. When placing the transplanted tissue on the underside of the spongiosum, these worries are warranted. The corpora cavernosa along with partially the spongiosum are responsible for graft take in dorsal onlay urethroplasty. When the urethral plate was still functional, dorsal onlay BMG urethroplasty was highly effective in treating pendulous urethral strictures. For BXO-related strictures in which the urethral plate had a large enough calibre (>6 F), we have also developed this strategy. Our show did not feature any sexual dysfunction or chordee. Successful treatment of pendulous urethral strictures (1.5–4 cm) using dorsal onlay skin graft urethroplasty was initially reported by Barbagli et al.[20]. In the future, Grady et al.[23] documented an 87% success rate in treating 24 pendulous strictures with buccal mucosa urethroplasty. Asopa et al.[21] used a ventral sagittal technique to successfully implant BMGs dorsally on the pendulous urethra. The recent description of outstanding short-term results for combined bulbopenile and pan-urethral strictures by Gupta et al.[24] lends credence to this strategy.

With this method, linked meatal strictures can be reconstructed at the same time, which is a major benefit. In a recent article [19], we discussed using a penile skin flap implanted dorsally to repair both the meatus and the proximal urethra at the

same time. The BMG is placed on the dorsal aspect of the incised meatus and fossa navicularis using a same procedure, preventing the need to slice the ventral glans. The results of the current investigation demonstrate that dorsal grafting of the pendulous urethra and meatus can yield outcomes comparable to those described using other procedures, but only in carefully selected instances. In addition, the proposed method produces a better cosmetic output than penile skin flaps while violating the penile skin less.

Inflammatory or BXO-related pan-urethral strictures necessitate extensive penile skin flaps [13,14] or a combination of several urethral replacements [25,26] for a one-stage restoration. For lengthy, intricate strictures, Wessels et al.[25] detailed how they primarily used the fasciocutaneous flap. Reconstructing the distal urethra using penile skin flaps and the proximal urethra with grafts in seven patients with lengthy anterior urethral strictures. The BMG and Penile skin flap was used to repair the urethras of 18 patients with mean stricture measurement of 15.1 cm, as reported by Berglund et al.[26]. Because of the risks associated with fasciocutaneous flaps, we prefer to use a combination of BMGs for the management of such strictures. The usage of penile skin is specifically discouraged for BXO-related strictures. We have successfully reconstructed urethral lengths up to 17 cm utilizing grafts from both cheeks and the lower lip. Six of the patients in the current series did not have enough buccal mucosa to cover stricture length, therefore we combined the use of buccal mucosa with the use of a dorsal onlay penile skin flap. Collecting buccal mucosa from many places, in our opinion, does not increase the risk of serious complications. This was reinforced by the findings of Jang et al.[2], discovered no inconsistency in terms of morbidity between cheek and lower lip grafts. Though, patients ought to be made aware of the possibility of paresthesia and numbness, which can last up to months.

In difficult strictures, such as those involving BXO or a current infection, a two-stage urethroplasty procedure has been recommended. When the urethral plate is damaged beyond repair, we do a two-stage operation. Complete graft loss occurred in two of our patients during the first phase, necessitating grafting. Four individuals required post-stage 1 stomal revision. Many adjustments were documented by Andrich et al.[27] after the initial step of a phased urethroplasty. The total success rate was 15 for 17 despite the fact that there were intervening procedures.

In conclusion, BMG urethroplasty yields equivalent medium-term outcomes for reconstructing all urethral segments, and it is observed to be the most adaptable tissue that can be used for reconstruction, yielding outstanding outcomes in one- and two-stage urethroplasty. Moreover, both short term and medium-term outcomes are encouraging, but further study is required before BMG can be considered the ideal urethral alternative.

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