Ventral Buccal Mucosa Graft Urethroplasty for Penile Urethral Strictures: A Predictable Failure?

V. Jinga¹, M. Hurduc¹, V. Voinescu⁺, F. Filipoiu¹, M. Balgradeanu¹

¹University of Medicine and Pharmacy “Carol Davila”, Bucharest, Romania
⁺Department of Urology, “Prof. Dr. Th. Burghelu” Hospital, Bucharest, Romania

Abstract

Background: In the case of buccal mucosa graft (BMG) urethroplasty for penile urethral strictures (PUS), it is supposed that the ventral onlay (VO) would not assure sufficient nutritional and mechanical support. Because VO requires only one ventral incision of the stenotic urethral segment and does not affect the urethral vasculature, we have design a prospective study related to this issue.

Methods: We selected 27 consecutive patients with PUS, other than due to lichen sclerosus or to multiple hypospadias surgery. Surgical technique used: circular incision of the penile skin just below the glans, degloving, incision mediană ventrală a segmentului uretral stenozat, croirea grefei de mucoasă bucală pe sondă 22 Ch și fixarea de marginile mucoasei uretrale, acoperind grefa cu 2 lambouri laterale din dartos.

Results: Follow-up consisted of clinical examination, uroflowmetry, and urethral ultrasonography. In one patient urethral fistula occurred and in two patients a fibrous diaphragm at the proximal end of the neourethra appeared. For the rest of the patients the neourethra lumen was stable, between 6 and 7mm at urethral ultrasonography control, the success rate being 88.89%.

Conclusion: The VO of BMG by the technique described, is a good solution for selected patients with PUS

Key words: buccal mucosa graft, urethra stricture, urethroplasty, ventral onlay
Introduction

There are a variety of surgical techniques used for treating the penile urethral strictures, focused on reducing the morbidity rate and reaching the best result, with the lowest number of complications. However, the superiority of a certain technique over the others hasn’t been clearly demonstrated yet (1-3).

One of the procedures that have been less commented in the literature refers to the ventral fixation of the buccal mucosa graft at the level of the penile urethra. In order to evaluate this procedure, we have performed a prospective study between January 2009 and November 2011. The results have then been compared with the ones in the specialty literature.

Material and Method

The study included consecutive patients with penile urethral strictures, excluding the ones with the stricture having a lichen sclerosus et atrophicus etiology or multiple surgeries for hypospadias. In these cases, the glans and meatus are cicatrizable, the penile skin is also deficient and cicatrizable, ventral choordee is often present and the dartos fascia is absent or fibrous, the recommended procedure being the two stage urethroplasty. Another criteria for exclusion was the diameter of the urethral lumen in the affected area. Patients with a lumen less than 2mm in diameter have been excluded as in this case the two stage technique is more appropriate.

The pre-surgical evaluation consisted of anamnesis, clinical examination, urine culture, measuring of the post void residual bladder volume, uroflowmetry, urethral ultrasound, retrograde and anterograde urethrography. During the above mentioned period, 27 patients were included in the study. In 4 of the cases, the stricture also included the fossa navicularis. The medium length of the penile urethral strictures treated with the method described below was of 3 centimetres, the minimum and maximum limits being of 2 and 12 cm.

A circular incision is made 5 millimeters inferior of the glans, followed by the degloving of the skin to the base of the penis. The penile urethra is exposed through minimum dissection. The strictured area is identified and marked. The urethra is opened through a ventral, longitudinal incision on the median line at the stricture level. A 22 Ch silicone urethro-bladder catheter is inserted. The graft of buccal mucosa is sutured at the edges of the urethral mucosa incision, using a 4-0 absorbable multifilament suture. The graft is usually harvested from the right cheek, however, if the required length is not covered, the left cheek is used as well. The presence of the catheter previously inserted allows for the precise tailoring of the graft. The neourethra is covered with a lateral dartos flap, sutured to the corpus cavernosum albuginea. The dartos flap offers mechanical and vascular support for the graft. In case the strictures are too long to be covered by a singular flap, two lateral ones can be used, fixated in the vest manner. The penile skin is sutured, similarly to the circumcision, after the excision of the excess skin which, if not removed, would represent a high risk of post-operatory necrosis. A circular, slightly compressive bandage is used to avoid the postsurgery edema and penile ischemia. The penis is fixed on the abdominal wall and the patients spend 3 post-operatory days in the hospital, the urethro-bladder silicone catheter being removed 10 days after surgery.

Results

Patients have been under surveillance for an average of 21 months, the minimum period being of 4 months, while the maximum of 35 months. The surveillance protocol consisted of anamnesis, clinical examination, uroflowmetry and urethral ultrasound. We considered as insucces the necessity of instrumentalization and fistula appearance. There were problems with 3 out of the 27 patients. One of the cases presented a urethral fistula on the median ventral line, at the level of the
skin suture. Two other patients developed a diafragma at the proximal end of the neourethra and an optical internal urethrotomy had to be performed. In all the other cases, the urethral lumen maintained a 6-7 milimeters diameter over time, as it appeared on the urethral ultrasound, therefore, the success rate was 88.89%. All patients were satisfied with the cosmetical aspect of the penis and with their sexual life after surgery.

Discussions

The modern history of one stage urethroplasty in the cases of penile urethral strictures dates back to 1999, when Hayes and Malone, paediatric surgeons from the UK, described the dorsal fixation of the buccal mucosa graft (BMG) after the incision of the urethral plateau in hypospadias cases. The authors combined the Sbodgrass technique principles (4) and the utilisation of the buccal mucosa graft, placed in the space formed after the incision of the urethral plateau (5). In 2001, Asopa et al. from India described a similar technique for the anterior urethral strictures. The Asopa technique is considered to be the most important evolution of one stage urethroplasty (6).

The various studies that have focused on using dorsally placed buccal mucosa grafts present a success rate between 67% (Barbagli et al.) and 100% (Andrich, Mundy et al) (3). Therefore, with an 88.89% success rate, the results of our study follow the literature accordingly. In regard to the ventral fixation of the buccal mucosa grafts, the literature doesn’t
buccal mucosa can easily be adapted to any type of urethroplasty and is rarely affected by lichen sclerosus et atrophicus (10,11).

The first phase of the grafting is also known as a plasmatic imbibition. In this stage, the transplanted tissue feeds from the existent exudate on the wound. The diffusion of nutrients, oxygen and metabolites is being made to and from the wound bed (12). This process lasts for the first 48 hours, followed by the second stage in the acceptance of the graft, the inosculation. This process consists of the formation of anatomical connections between the hosts and the graft and neoformation vessels are being formed (13). A new vascular system is being created in this way, which will continue to sustain the graft. To make sure the graft is sustained, an adequate vascular support is necessary. Another major cause related to the failure of the graft transplant is the formation of a hematoma which can interrupt the fragile vascular communication of the first days. Therefore, there is a great need for a mechanical support, apart from the nutritional one (14).

In the above described technique, these two goals are achieved, considering that the dartos flaps cover the neourethra and compensate for the relative deficit of tissue which appeared in the ventral fixation described by Wessells et al. It is also essential to remember that in the case of the Devine et al. study, the neourethra was covered with spongy tissue only (8), which can be insufficient in some cases.

Conclusion

The results obtained in the discussed study are similar to those described by the specialty literature in case of penile urethral strictures treated through an urethroplasty performed with a buccal mucosa graft dorsally fixed. The dartos flap that covers the neourethra assures a mechanical and nutritional support sufficient for the survival of the graft, lowering the risk of fistula formation. The advantages of the ventral fixation of the graft consist in the low interference with tunica albuginea of corpus cavernosum integrity, as the graft is not placed on it and in the facile tailoring of the graft, on the 22Ch uretro-bladder catheter. In addition, the vascularization of the urethra is less affected than in the case of the dorsal fixation of the graft, when the dissection and the mobilisation of the urethra are more aggressive.

The conclusion is therefore that in the selected cases, the ventrally placed buccal mucosa graft urethroplasty for penile urethral strictures is a viable alternative.

Acknowledgment statement

This corresponding author certifies that: No other persons have made substantial contributions to this manuscript to be included in an Acknowledgment section.

Conflict of interest

None of the contributing authors have any conflicts of interest, including specific financial interests and relationships and
affiliations relevant to the subject matter or materials discussed in the manuscript. No funding or other financial support was received.

References