

Two-Stage Buccal Mucosal Graft Urethroplasty

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INTRODUCTION

Several surgeons have described urethroplasty techniques using free graft of tissue, such as skin and bladder mucosa.

In 1941 Humby reported a case of urethral reconstruction for hypospadias using a buccal mucosa free graft. Surprisingly, the potential of this technique was not recognized and no accounts of other similar experiences were published.

This technique was completely forgotten until the 1990s, when Dessanti et al., published the first clinical report of reconstruction of the urethra for hypospadias using buccal mucosa free graft. After we had read about the experience in the field of eye surgery, where buccal mucosa is used successfully to cover defects in palpebral and bulbar conjunctiva [8].

El-Kasaby et al., [3] reported that a buccal mucosal graft from the lower lip was used for treatment of penile and bulbar urethral strictures in adult patients without hypospadias.

Morey and McAninch [7] reported indications, operative techniques, and outcome in 13 adult patients with complex urethral strictures in which buccal mucosa was used as a non-tubularized ventral onlay graft for bulbar urethra reconstruction. Since that time, buccal mucosa has become an increasingly popular graft tissue for penile or bulbar urethral reconstruction performed in single or multiple stages.

Buccal mucosa free graft from the inner lip and inner cheek has been used for urethral reconstruction in complicated cases of failed hypospadias repair. Only in rare cases has it been performed as primary surgery. The mucosa has been used for hypospadias as tube graft or onlay but also as a flap for the correction of urethral stenosis. We

report our experience using buccal mucosa free graft as primary surgery for hypospadias in 7 posterior penile and scrotal hypospadias patients.

MATERIAL AND METHODS

Between January 2006 and June 2011, 9 patients with posterior penile [4] and scrotal [3] hypospadias were treated using oral mucosal graft urethroplasty on two stages.

Cases were done in Cairo University, Pediatric Surgery Department by multiple surgeons.

Pre-operative evaluation included clinical history, physical examination, urine culture were done.

A broad-spectrum antibiotic was administered intravenously during the procedure and for 7 days afterward. All patients used 0.5% metronidazole mouthwash for 2 days prior to and 7 days following the surgery.

Surgical techniques:

The patients were placed in a standard supine position. All surgeries were performed under general anesthesia with nasotracheal intubation.

During stage 1 the neourethra was unroofed along the ventral midline proximally until healthy tissues were encountered (Fig. 1).

All scarred tissues were excised along the surface of the corpora cavernosa. Glans wings were created to establish a deep glanular groove while removing midline fibrotic tissue. When scar contracture of the corporal surface produced ventral penile curvature, multiple superficial transverse incisions were made through the scar until straightening was achieved without use of corporal grafts.

Next a proximal urethrostomy was created, spatulating the urethra ventrally and then securing it to the corpora cavernosa and adjacent skin.



Fig. (1): Unroofing of the new urethra.

Harvesting the mucosal graft:

The aim of operation is to raise a mucosal graft that is similar in thickness to a full thickness skin graft. The mucosa does not separate as easily from its underlying tissues as the dermis does from its underlying fat. A rectangular piece of mucosa may be raised from the buccal surface of either cheek.

An estimate of the amount of mucosa that is required may be given, but for practical purposes it is wise to harvest the maximum amount that anatomical constraints will allow as this may obviate the need for bilateral procedures [1].

The rectangle is marked out in pen, orientated to avoid the parotid papilla.

The area should not encroach on the mental nerve, nor extend further back than the pterygo-mandibular raphe, and leave a cuff of mucosa 1cm from the labial commissure. The area is then infiltrated with a generous amount of adrenaline-containing local anaesthetic solution (bupivacaine 0.25% with 1:200,000 adrenaline). This results in hydrodissection as well as haemostasis. The anterior, superior, and inferior margins of the rectangle are incised and dissection with a scalpel raises a small portion at the anterior free edge of the graft.

The insertion of multiple traction sutures on the lip (Fig. 2) greatly aids the dissection by placing the tissues under tension.

The graft is then raised from front to back by either scissors or scalpel.

The adherence of the mucosa to the underlying muscle and fascia is variable.

Once the posterior limit has been reached the mucosa is incised along the fourth side of the rectangle and any areas still attached are released.

The graft is now pinned out on a board and thinned [4].



Fig. (2): Traction sutures to aid elevation of the graft.

Haemostasis should be confirmed (Fig. 3) and small amount of bupivacaine dribbled on to the raw area may aid in postoperative analgesia.



Fig. (3): Complete haemostasis confirmed.

The graft was defatted and then secured with interrupted polyglactin sutures proximally to the urethrostomy, laterally to shaft skin and distally to the glans wings. Sutures near the future meatus were placed subepithelially to minimize scars.

After the perimeter was sewn, quilting stitches were placed through the graft into the underlying corporal surface approximately one-half cm apart in the midline along the length of the graft. Then additional quilting was done on either side until the entire graft was secured (Fig. 4).

A catheter was placed through the urethrostomy and a tie-over dressing was applied, consisting of a roll of petroleum jelly gauze held in Place by polypropylene sutures along the graft margin.

Young patients were discharged home the following day, while teens and adults continued bed rest for 48 hours. The catheter and tie-over dressing remained 10 days during which time trimethoprim/sulfamethoxazole was prescribed.

Paracetamol and a nonsteroidal anti-inflammatory drug are usually adequate analgesics. Salt water and benzydamine hydrochloride mouth washes are also prescribed.

Graft take was visually assessed during the waiting period between stages. If scarring or contracture was noted which would compromise tubularization, an interval operation was done to patch the area before stage 2.

Minimum time between procedures was always 6 months.

At stage 2 margins of the buccal strip were injected with 1:100,000 epinephrine and a long "U" shaped incision made, beginning on the glans at the point to become the ventral lip of the new meatus and extending proximally around the urethrostomy, taking care to minimize inclusion of hair follicles (Fig. 5).

Tubularization inverted the buccal epithelium with a 2-layer polyglactin closure (Fig. 6).

Glansplasty was done beginning at the ventral neomeatus and proceeding to the corona with subepithelial polyglactin or polydioxanone sutures.

Skin also was approximated in the midline with subepithelial stitches (Fig. 7).

A urethral catheter provided urinary diversion for 10 days. Postoperative antibiotics and antian-drogens were used as after the first stage.



Fig. (4): Securing the graft over the ventral surface.



Fig. (5): "U" shaped incision made, beginning on the glans.

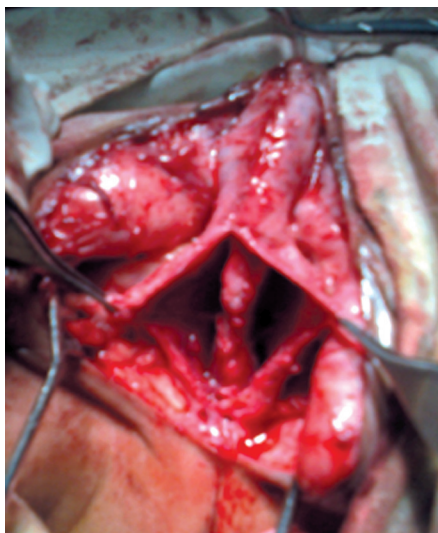


Fig. (6): Tubularization inverted the buccal epithelium with a 2-layer polyglactin closure.



Fig. (7): Skin also was approximated in the midline with subepithelial stitches.

RESULTS

There were no complications involving the cutaneous urethrostomy or graft donor sites. Graft take without significant scarring or contracture was noted in 8 (88%) patients after stage 1. In 1 case there was loss of part of the graft which needed partial excision and regrafting.

In stage 2 there was no evidence of urethral stricture in one case, there was no meatal stenosis or diverticulum in any patient.

Fistulas occurred in one case which needed regrafting after 3 months.

Partial glans dehiscence occurred in one case only.

Therefore in this initial experience one patient had complications from urethroplasty leading to another procedure. No patient had complications from both the first and second stage. All patients completing surgery have a vertical, slit-like meatus properly positioned on the glans.

No patient had extensive or complete graft loss.

DISCUSSION

Urethroplasty with buccal mucosa free graft to correct severe forms of hypospadias is presently a surgical technique "under observation". It is a matter of debate whether it is better to use it as primary surgery or only as a rescue procedure in cases of previous surgical failure. Despite it being used prevalently in re-do hypospadias cases with insufficient well vascularized tissue to cover the graft because of scarring, the results are satisfactory, and so it is difficult to understand the reluctance to perform it as a technique of first choice. When available, local tissue is generally used, particularly if the urethral plate can be preserved. This is the procedure followed in the technique of a meatal based flap for distal hypospadias without chordee when the plate is used to create the dorsal neourethra (Mathieu's technique) [5].

In our experience the complication and reoperation rates of buccal mucosa free graft are 22% and 11% respectively. The most common complication reported is urethral stenosis 11%.

It is likely that stenosis occurs mainly when the onlay method is used. In these cases there is no glandular tunnel, and so the neourethra is cov-

ered with 2 hemi-glands and consequently a longitudinal suture is contiguous with the graft. Therefore, the risk of fistulas, particularly urethral strictures, meatal stenosis or more seriously graft necrosis is higher.

In regard to which buccal mucosa to use, we believe that labial mucosa is preferable to mucosa from the cheek. Labial mucosa is thinner and, therefore, grafts more easily. Harvesting from the lip is much quicker and easier without the risk of complications that occur when procuring mucosa from the cheek.

Conclusions:

Staged buccal graft repair is an excellent option to import fresh tissue for urethroplasty.

This approach creates a well vascularized urethral plate substitute.

After tubularization, dartos or tunica vaginalis flaps provide native barrier layers to reduce fistulas. The neourethra in our patients has healed without stricture or diverticulum, and the neomeatus has been vertical and slit.

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