Points of Technique

Onlay urethroplasty after sectioning of the urethral plate: early clinical experience with a new approach – the ‘three-in-one’ technique

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Accepted for publication 4 November 2003

INDICATIONS

Surgery for primary complex hypospadias, in which preservation of the urethral plate is not possible, is usually either a two-stage procedure (orthophalloplasty and Thiersh-Duplay) [1] or with a tubularized island preputial flap technique (Duckett) [2]. The disadvantages of both these techniques are widely recognized; the two-stage procedure requires a second surgical event, with its accompanying costs and increase in family anxiety. The neourethra made from the internal tubularized prepuce has a high rate of complications, notably those of circular stenosis. Some studies show complication rates of up to 69% [3]. Therefore it is accepted that onlay urethroplasties are better than tubularized flaps, because there are only two lines of sutures and this decreases the chances of tissue retraction and narrowing of the neourethra [4].

The use of buccal mucosa tissue for constructing the neourethra was introduced by the group in Mainz, Germany, in cases of hypospadias and urethral stenosis [5,6], and soon became an excellent choice of urethral substitute in cases of cripple-hypospadias [7].

We herein introduce an original treatment strategy termed the 'three-in-one' technique, which combines three distinct tissues, the use of which are already well established in hypospadias surgery, in the form of two flaps and one graft. The difference is that this procedure uses the buccal mucosa as a support for the neourethra, making it possible to rebuild the urethral plate, sectioned near the coronal region to correct the curvature. Having a new urethral plate composed of skin from the penis and buccal mucosa makes it possible to anastomose a flap of onlay internal prepuce to this plate, therefore rebuilding the urethra. As this technique concerns complex hypospadias (Fig. 1), a flap of tunica vaginalis and cremaster muscle is used to cover the neourethra and protect it against fistulae and dehiscence.

METHODS

The operative technique comprises: (i) Degloving the penis after a subcoronal circular incision with delineation of the urethral plate, then sectioning the plate using two parallel incisions and rectifying the penis (Fig. 2); (ii) Tensionless fastening of the urethral plate, with polydioxanone 4/0 sutures, to Buck's fascia of the corpora cavernosa. The hypospadiac meatus maintains its original position and is followed by a streak of urethral plate covering a variable length of the penile body. There is then a defect in the ventral surface of the penis, between the urethral plate and the distal glans region; this is the place that the
FIG. 1. Initial aspect of scrotal hypospadias with penoscrotal transposition.

FIG. 2. Complete penile degloving and the sectioned urethral plate is fixed with no tension to the proximal portion of the penile body.

FIG. 3. The urethral plate is rebuilt from a fixed flap of buccal mucosa creating a bed for the future neourethra, followed by onlay anastomosis of the prepuce to the urethral plate.

FIG. 4. The final aspect (a) during surgery, and (b) 30 days afterward.

FIG. 5. The three critical moments of the 'three-in-one' technique: the buccal mucosa used to rebuild the plate; the preputial; and vaginalis-dartos flaps.

neourethra should reach; (iii) Retrieving free buccal mucosa from the inferior lip, as usual; (iv) Rebuilding of the urethral plate together with fixing the buccal mucosa to Buck’s fascia, therefore establishing continuity of the urethral plate with the new plate of buccal mucosa, and so laying complete foundations for the future urethra (Fig. 3); (v) Delineation of a transverse flap of the internal preputial region, which is then transposed to the ventral region and anastomosed to the urethral plate made from buccal mucosa (suturing contiguously with polydioxanone 5/0 or 6/0 (Fig. 4); (vi) Delineation of a flap of tunica vaginalis and tunica dartos, which should completely cover the neourethra (Fig. 5); (vii) Maintenance of a urethral silicone tube and suprapubic cystostomy. The bandages are only occlusive and should be kept intact during the first week. The urethral tube and the cystostomy are kept open for 3 weeks.

This technique has so far been used in 11 patients, of whom nine had scrotal-penoscrotal primary hypospadias, one perineal and one repeat penile hypospadias. The mean (range) age of the patients was 2 (0.6–14) years and the mean follow-up 7 (1–14) months. There were two complications, the most serious being a complete neourethral dehiscence, which was in the first case. The preputial flap anastomosis was connected only to the buccal mucosa which became completely loose. From this case onwards we started to anchor the preputial anastomosis to the buccal mucosa and to Buck’s fascia of the corpora cavernosa, thus giving greater urethral stability. The other complication was a urethrocutaneous fistula in another patient; the complication rate was therefore 18%, but considering the lessons of the first few cases these results can be improved.

ADVANTAGES AND DISADVANTAGES

This method is an original approach to treating primary complex hypospadias and includes various elements of different techniques, producing a safe reconstruction in only one surgical stage and in accord with the present tendency of onlay reconstruction of the urethra. The greatest advantage of the technique is that it is in one surgical stage, whatever the patient’s degree of chordee. The harvesting of the buccal mucosa from the inferior lip is safe and widely available. The buccal mucosa can be easily attached to the corpora cavernosal bed with its mucosal surface facing the future neourethra. The vascular bed allows good flap integration, which is to be kept straight with fixation sutures only at the extremities and at the lateral part of the transplanted tissue. The
other principles of urethroplasty are already well known and the anastomosis of the preputial flap is common practice in hypospadias surgery. The tunica vaginalis flap should cover the entire neourethra, giving it full support from well vascularized tissue and protecting it against fistulae.

A disadvantage of the technique is that it demands considerable expertise from the surgeon in hypospadias surgery, which might limit its practical application. However, as this technique is designed to treat complex scrotal and perineal hypospadias, and hence only likely to be managed by experienced surgeons, only surgeons capable of using it will be those with the opportunity to do so.

The initial follow-up is still limited but considering that the principles are well established individually, further use of this technique should eventually confirm the excellent results so far.

CONFLICT OF INTEREST
None declared.

REFERENCES
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