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Buccal versus lingual mucosal graft urethroplasty for complex hypospadias repair

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Abstract *Objectives:* To compare surgical outcomes and donor site complications of buccal and lingual mucosa used as ventral onlay graft for complex hypospadias cases.

Patients & methods: Forty four cases with complex hypospadias after failed previous surgery were prospectively included. All had severely scarred penile skin with reasonable residual urethral plate. Cases were categorized into two groups: Group I (23) where buccal mucosal graft [BMG] was used and group II (21) where lingual mucosal graft [LMG] was used. Donor site complications as well as functional and esthetic outcomes were recorded for each group.

Results: Mean follow up was 20.8 months (range 12–24). Average graft harvesting time was 24 min for BMG and 19 min for LMG. Donor site pain was reported with both techniques but recovery was earlier with LMG. Slurred speech and difficult tongue protrusion were reported with lingual but not buccal grafts; however mouth tightness, peri-oral numbness and persistent oral discomfort were reported only with buccal grafts. Successful urethroplasty was obtained in 78.2% of BMG compared to 76.1% of LMG.

Conclusion: Surgical outcomes of LMG urethroplasty were comparable to those of BMG in complex hypospadias cases. Compared to buccal mucosa, LMG is easy to harvest, with minimal donor site complications.

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Introduction

In most cases of hypospadias repair the use of local tissues such as the urethral plate, penile shaft or preputial skin is the best option [1]. However, failure of hypospadias repair is mostly associated with penile skin loss with deficient local tissues, so extra-genital tissue is needed. A wide variety of grafts have been tried for urethral reconstruction [2]. Over the past few years oral mucosa has emerged as a reliable and popular donor tissue for urethral substitution. Buccal mucosa was first proposed by Humby in 1941 [3], but it was Bürger et al. [4] in 1991 who reintroduced it in the management of multiple operated hypospadiac urethral strictures. However, buccal mucosal graft (BMG) harvesting from cheek is not without donor site complications, such as numbness, tightness of the mouth, salivatory changes, motor deficits, scarring and lip deviation or retraction [5–8]. In 2006, good functional and esthetic results were achieved in a pioneering study by Simonato et al. [9] who was the first to use tongue mucosa as an alternative donor site for graft urethroplasty. LMG was studied for treatment of urethral stricture disease with promising results. Most reports emphasized that LMG is a potential alternative to BMG in substitution urethroplasty [2,10–12]. The aim of this study was to compare the surgical outcomes as well as donor site complications of buccal and lingual mucosa used as ventral onlay graft urethroplasty for complex hypospadias after failed previous surgery.

Patients and methods

Between June 2007 and May 2011, 44 cases with complex hypospadias were prospectively included in this study. Their mean age was 12.3 (range 8.7–19.8) years. Inclusion criteria were: (1) two or more failed previous hypospadias repairs, (2) reasonable residual urethral plate that can be further utilized, and (3) no available healthy penile skin suitable for flap procedure. Patients with severely scarred urethral plate and those with any oral pathology were excluded from the study. Following approval from our institutional ethics and review board and receipt of informed consent signed by parents, cases were randomized into two groups (closed envelopes were used for random selection of the operative procedure). Group I patients underwent ventral onlay urethroplasty using buccal mucosal graft [BMG] and group II patients underwent the same procedure using lingual mucosal graft [LMG]. Preoperative evaluation included history taking, physical examination with oral examination, urine culture and sensitivity, CBC and coagulation profile. Two days preoperatively the patients were instructed to use 5% povidone iodine mouth wash three times daily.

Technique

Broad spectrum antibiotic prophylaxis was started 3 h preoperatively and continued until catheter removal. Under general anesthesia (using oral or nasal tracheal intubation) patients were placed in the supine position. An annular incision was made 5–8 mm proximal to the coronal

sulcus and directed ventrally in a U-shaped manner just proximal to the meatus; keeping the urethral plate intact. After complete penile degloving and excision of all scarred tissues, penile straightening was tested by artificial erection. If any curvature was noticed, two dorsal plications at 2 and 10 o'clock were performed. The length of the urethral graft needed was measured, keeping in mind the 20% shrinkage of the graft size.

Technique of buccal mucosal grafting

The opening of the parotid duct was first identified and then buccal mucosa needed was marked. Nor-epinephrine (1:200,000) was infiltrated and the graft was harvested from the inner cheek as described by Eppley et al. [13]. However, when more graft length was needed the graft harvest was extended to the inner part of the lower lip for no more than 1 cm. The donor site was closed with running catgut suture, starting from the posterior end and closing only the buccal part, while the labial part, if used, was left to heal spontaneously.

Technique of lingual mucosal grafting

According to Barbagli et al. [10], a stitch was passed through the apex of the tongue for traction outside the mouth and the ventral surface of the tongue was then fully exposed. No infiltration was done for the donor site. The opening of Wharton's duct was identified. The course of the underlying lingual nerve was carefully identified. The graft needed was measured and marked on the ventral surface of the tongue. If the length of the urethral defect exceeded the limits of one side of the tongue, extension to the other side was performed. The graft borders were incised using a scalpel and then the graft was removed using sharp scissors. The donor site was closed with running catgut suture, starting from the posterior end.

In both groups, graft harvesting was done by another surgeon working simultaneously with the urethroplasty surgeon after determining the graft length needed. Defatting of the graft was performed and then it was sutured as a ventral onlay flap to the urethral plate using 6/0 vicryl running subcuticular sutures. In all cases, a vascularized tunica vaginalis flap was used to cover the graft and then the glans wings were closed, followed by skin cover.

Peri-operative care

All patients were discharged one day postoperatively with a urethral catheter. Patients were instructed to return for outpatient follow-up after one week for checking of both wound healing and graft take, after another week for catheter removal, after two more weeks and then every 3 months for 24 months. At each visit the following were reported: meatal location and shape; force of the urinary stream (as reported by the patient and uroflowmetry); patient satisfaction (obtained by a single question for Over all satisfaction: satisfied, fair, dissatisfied); penile complications such as wound dehiscence; infection; fistula; penile curvature; and lastly any local oral complications.

Success was defined as satisfactory esthetic penile appearance, with normal voiding and without need for any postoperative procedure. Data were collected, tabulated

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