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Outcome analysis of tubularized incised urethral plate using dorsal dartos flap for proximal penile hypospadias repair

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Abstract *Purpose:* To assess the outcome of tubularized incised plate (TIP) urethroplasty in conjunction with a dorsal dartos flap for primary proximal penile hypospadias.
Materials and methods: Forty-nine patients with proximal penile hypospadias underwent a one-stage TIP urethroplasty with single-layer closure using polyglactin suture. A dorsal dartos (subcutaneous) flap, harvested from the dorsal penile shaft was used to cover the neourethra ventrally. Glanuloplasty was also performed in all cases. All patients had a well preserved urethral plate after straightening of the penis. Complications and cosmetic appearance were documented during follow-up.
Results: Mean patient age at surgery was 23 months (16—72 months). Mean operative time was 180 min (154—240 min). At the mean follow-up of 36 months, the overall complication rate was 12% (4 fistulae, 1 meatal stenosis). Glandular dehiscence occurred in one patient, and 38 patients (78%) required dorsal Nesbit plication. No patient had residual chordee, neourethral stricture or a urethral diverticulum, and the neomeatus with a slit-like appearance was positioned at the glans tip.
Conclusions: TIP urethroplasty with dorsal dartos layer covering the neourethra is an effective treatment for primary proximal penile hypospadias with a preserved urethral plate and without severe curvature. There is a good cosmetic outcome with low risk of complications.

Introduction

Various surgical techniques have been described for primary proximal penile hypospadias repair. For many years a variation of transverse island flap onlay urethroplasty and graft were the mainstays of proximal hypospadias repair. They were performed with low complication rates, but less than ideal cosmetic outcomes [1,2].

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Since Snodgrass initially reported the tubularized incised plate (TIP) urethroplasty for distal hypospadias repair in 1994, it has gained widespread acceptance for repairing distal and mid-shaft hypospadias [3—5].

TIP repair for proximal penile hypospadias has become the technique of choice for many pediatric urologists [6—8]. In this study, we evaluated the surgical results of this procedure in combination with a dorsal dartos flap covering the neourethra for primary proximal penile hypospadias repair.

Materials and methods

Patients

Our study involved 49 patients with proximal penile hypospadias who underwent the TIP procedure. Proximal meatal opening designation was based on meatal position at the beginning of urethroplasty.

Surgical technique

All patients were operated using the same surgical technique, as described in this article. Patients with a specific contraindication to this technique (e.g. urethral plate transaction, unhealthy incised urethral plate) were not included.

Cefuroxime (100 mg/kg) was given preoperatively to all patients. Operations were performed under general anesthesia with caudal analgesia, allowing the use of less anesthetic, using loop magnification. A circumscribing skin incision was made below the corona and proximal to the meatus, and the penile shaft was degloved, followed by an artificial erection to determine if there was any ventral curvature. Orthoplasty for curvature correction was performed by dorsal plication (Nesbit) using polypropylene (5/0), after transverse incision of the tunica albuginea and identification and avoidance of the neurovascular bundles, to create fibrosis. An adequate flap from the dorsal subcutaneous tissue prepared by dissection of preputial and penile skin was placed ventrally in order to cover the neourethra. The urethral plate was defined by two parallel longitudinal incisions and the plate was tubularized following a midline incision including mucosa and submucosa from the native urethral meatus to the end of the glans. Glanuloplasty was performed by incising the glans wings deeply. The tube was closed over an 8-Fr catheter with a one-layer subcuticular running (6/0) polyglactin inverting suture. A bloodless field was maintained during surgery with a penile tourniquet. The anastomotic line was then covered entirely with the prepared subcutaneous pedicled flap with 6/0 polyglactin before glanuloplasty and skin closure. Finally, the glans wings were closed in the midline by (6/0) poliglecaprone sutures. The ventral penile shaft was closed with a variety of skin flaps. A circumferential Tegaderm (3M, St. Paul, MN, USA) dressing was applied in all cases, after local application of Terra-Cortril 5-mg eye ointment (oxytetracycline 5 mg, hydrocortisone acetate 10 mg and polymyxin B 10,000 units). All patients were catheterized for 7—9 days after surgery. Prolonged prophylaxis with sulfamethoxazole/trimethoprim (4 mg/kg twice daily) and antimuscarinics (oxybutynin 0.4 mg/kg/day in three doses) was routinely used in all children.

Follow-up

Children were seen 3—4 weeks and 4—6 months following hypospadias surgery and yearly thereafter. During follow-up visits the external genitalia were examined, particularly concerning urethrocutaneous fistula, meatal stenosis, urinary stream and dehiscence of the tube. Parental penile straightening observations for any residual curvature and cosmetic appearance were evaluated. No routine calibration of the neourethra was performed.

Statistical analysis was performed using the SPSS 14 software package. Results are expressed as means ± SEM.

Results

The mean age of the children was 6.9 years (4—13). The mean age at operation was 23 months (16—72) with a mean operative time of 180 min (154—240). Intramuscular testosterone injections (2 mg/kg every 3 weeks for three injections) were given preoperatively in two patients with a small penis, associated with a small glans (Table 1).

The severity of penile curvature was mild in 45 (92%) patients and more severe in four (8%) patients. Following mobilization and removal of chordee tissue, of the 49 patients, 38 patients had persistent ventral curvature that needed dorsal placation. A straight penis was achieved with a single dorsal plication stitch in 33 patients and two stitches in five patients (Table 1). A thin distal urethra was cut back proximally in one (2%) patient with a mid-shaft meatus extended to a proximal position (Table 1). The neomeatus with a vertically located slit-like appearance was positioned at the glans tip with conical glanular configuration, and was cosmetically acceptable.

During the mean follow-up period of 36 months (14 months—6 years), a urethrocutaneous fistula developed in four patients (8%) alongside the tubularized urethral plate, requiring surgical repair 6 months after urethroplasty. One (2%) had meatal stenosis, for which a meatotomy was performed under local anesthesia. Glanular dehiscence developed in one (2%) patient. The overall complication rate was 12% (Table 2). All these complications had occurred in early cases in the series. No other complications, including meatal regression, skin sloughing or urethral diverticulum, occurred.

Table 1 Patient data for 49 boys with proximal hypospadias.

Mean age	6.9 years (4—13)
Mean follow-up	36 months (14—72)
Mean age at operation	23 months (16—72)
No. Preop. testosterone	2 (4%)
No. Dorsal plication	38 (78%)
No. Urethral cut back	1 (2%)
No. Urethroscopy	3 (6%)