

Unstented Tubularized Incised Plate Urethroplasty Combined with Foreskin Reconstruction for Distal Hypospadias

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Abstract

Background and aim: Urethral stent has recently been proven to be unnecessary for normal healing in an animal model of tubularized incised plate (TIP) urethroplasty. We report our experience with unstented TIP repair combined with foreskin reconstruction for distal hypospadias in children.

Patients and Methods: We retrospectively reviewed the records of 162 children consecutively treated by TIP urethroplasty for a distal or mid-shaft hypospadias without urethral stent over a 6 years period. The mean age \pm SEM at surgery was 15.7 ± 1.2 months. A foreskin reconstruction was performed with the hypospadias repair in 136 boys (84%). One hundred thirty one children (81%) underwent this surgery as an outpatient procedure.

Results: With a mean follow-up of 12.4 ± 1.0 months, urethrocutaneous fistula was observed in 9 children (5.6%), and meatal stenosis in 4 (2.5%). Postoperative urinary retention requiring suprapubic catheter insertion was observed in 4 cases (2.5%) without later complications. Cutaneous dehiscence of the reconstructed foreskin occurred in 6 children (4.4%) and phimosis in 13 (9.5%).

Conclusions: Absence of urethral stent after TIP urethroplasty for distal hypospadias repair does not seem to increase postoperative complication rate. Foreskin reconstruction in distal hypospadias surgery has an acceptable complication rate.

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Keywords: Urethral stent; Hypospadias; Foreskin reconstruction; Tubularized incised plate

1. Introduction

Modern management concepts in distal hypospadias repair are based on conservation of the native urethral plate. Various techniques of tubularization have been developed, until Snodgrass described the concept of tubularization of a urethral plate widened by a relaxing midline incision [1]. This tubularized incised plate (TIP) urethroplasty has rapidly become the procedure of choice for distal hypospadias repair, but also for proximal defects and redo-procedures [2–4]. In most of the reported series, an indwelling catheter is left for a few days postoperatively, to prevent stenosis, fistula,

and postoperative retention. However, Hafez et al. recently showed that urethral stent was unnecessary to achieve normal urothelial healing in a rabbit model of TIP repair [5]. Performing unstented repair should simplify the postoperative care and avoid the catheter-related morbidity (migration, bladder spasms). The foreskin reconstruction has the reputation of a high complication rate [6], such as cutaneous dehiscence or secondary phimosis. We report our experience with unstented TIP repair and foreskin reconstruction for distal hypospadias in children.

2. Patients and methods

From 1996 to 2002, 204 boys consecutively underwent TIP urethroplasty for distal or mid-shaft hypospadias primary repair at

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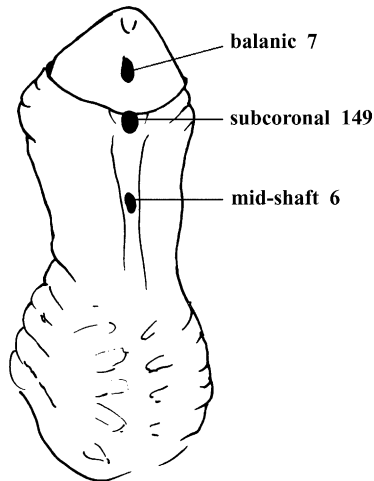


Fig. 1. Preoperative position of the meatus.

our institution. Among them, 42 children older than 3 years and toilet-trained had postoperative urethral stent, whereas 162 had unstented repair. We retrospectively reviewed the records of these 162 children treated by TIP technique without urethral stent. Quantitative data were expressed as mean (\pm SEM) or as median and range. Statistical analysis was performed using the Fisher's exact two-tailed test.

2.1. Patients

The mean age at the time of the procedure was 15.7 ± 1.2 months (median: 11.3 months, range: 2–149). One hundred forty-four boys (89%) were younger than 2 years. Preoperative position of the hypospadiac meatus was glanular in 7 cases, coronal or subcoronal in 149, and mid-shaft in 6 (Fig. 1). In 12 children

(7.4%), the hypospadias was associated with a major chordee. Hormonal penile stimulation (50 mg testosterone intra-muscular injection) was performed preoperatively in 6 cases (3.7%) of small penis.

2.2. Technique

The procedure was performed under general anaesthesia, completed by either a penile block or a caudal analgesia according to anaesthetist preference. The technique used was a Tiersch-Duplay tubularized urethroplasty, as modified by W. Snodgrass [1]. A V-shape incision around the ectopic meatus extended along the edges of the foreskin, to prepare the preputial reconstruction (Fig. 2). Two longitudinal balanic incisions isolated the urethral plate and both glans wings were deeply dissected laterally from the corpora cavernosa. A deep relaxing midline incision allowed tubularization of the plate around an 8 F urethral stent. The glanular wings were closed ventrally to the neourethra and the division of the corpus spongiosum was approximated ventrally to cover the proximal portion of the urethroplasty. In most of the cases, a foreskin reconstruction was performed: the preputial wings closure started with a 7/0 polydioxanone running suture of the mucosal side of the foreskin (Figs. 3 and 4), followed by two intermediate layers of subcutaneous tissue interrupted sutures, and closure of the outer skin side. Such a foreskin reconstruction was performed in 136 cases (84%), whereas a circumcision was made in 11 children according to parental preference. One boy had already been circumcised in another institution, and two children had glanular



Fig. 2. Ventral incision extending along the edges of the foreskin.

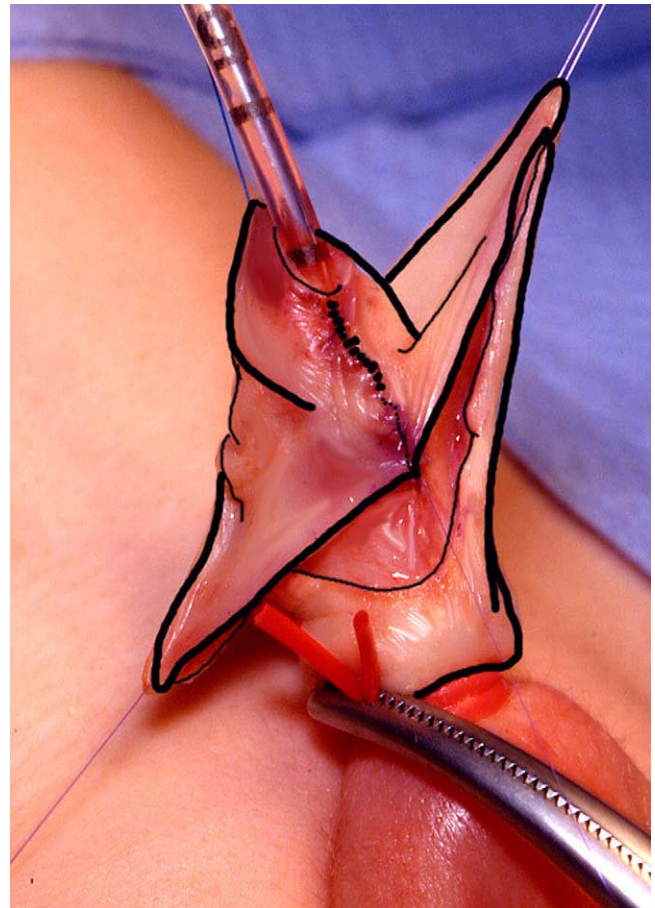


Fig. 3. Penile aspect after urethroplasty and closure of the glans.

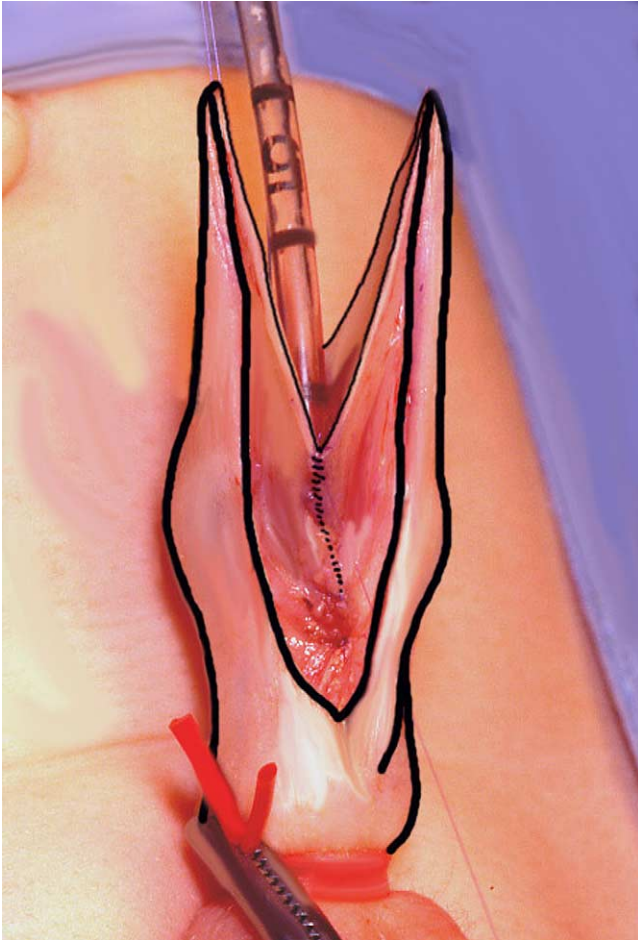


Fig. 4. Closure of the inner skin of the foreskin.

hypospadias with normally formed prepuce. In the remaining 12 children (8%), the foreskin reconstruction was not possible because of a significant chordee. After complete penile skin degloving, artificial erection test and Nesbitt dorsal plication, the dorsal preputial flaps were used to close the ventral shaft skin defect. No urinary diversion or urethral stent was used in any of the 162 children.

2.3. Postoperative care

No dressing was applied unless excess oozing was observed at the end of the procedure. The parents were advised to maintain the scars as dry as possible, and to gently wash with clear water and soap to allow adequate hygienic cleansing if soiling occurred. Systematic postoperative analgesic treatment (paracetamol oral 15 mg/kg \times 4 per day) was given on a regular basis during for 2 or 3 days, completed if necessary with nalbuphine (0.2 mg/kg IV) during the first hours after the procedure. One hundred thirty-one children (81%) underwent this procedure as a day-case surgery. The criteria for outpatient surgery included age less than 30 months, living a maximum of 1 hour from hospital, and parents with good understanding. When these criteria were not met, the children were discharged at day 1 ($n = 29$) or day 2 ($n = 4$) postoperatively. No routine calibration of the neourethra was performed. All patients were scheduled for an outpatient assessment at 1 month and 1 year postoperatively. The mean follow-up was 12.4 ± 1.0 months.

3. Results

3.1. Retention

Four boys (2.5%), aged 9 to 27 months, presented with postoperative urinary retention requiring bladder drainage. In 2 cases, urinary retention was observed a few hours after the procedure, and was treated by insertion of a suprapubic catheter. Two children both presented at day 6 postoperatively with persistent pain and chronic urinary retention, and suprapubic catheter was then inserted. The catheter was removed after 7 to 10 days of drainage, and none of these children later developed meatal stenosis or fistula with a median follow-up of 33 months (15–48).

3.2. Fistula

Urethrocutaneous fistula was observed in 9 children (5.6%). In 8 of the 9 cases, the fistula was diagnosed at one month postoperatively. Eight fistulae were successfully treated 8 to 22 months after the first surgical repair by one ($n = 7$) or two ($n = 1$) redo-procedures. The remaining boy is awaiting repair. The incidence of fistula seemed to be linked to a learning curve, as 5/9 occurred in the first 40 children of the series compared to one in the last 40 cases.

3.3. Stenosis

No neourethral stricture was recognized clinically, but 4 children developed a meatal stenosis (2.5%). The stenosis was diagnosed 8 to 23 months after the hypospadias repair, in boys complaining of a narrow stream and difficulties of voiding ($n = 2$), or febrile urinary tract infection ($n = 2$). The boys with postoperative stenosis were significantly older at the time of the initial surgical repair, with a mean age of 35.5 months, (vs. 15.2 months, $p < 0.01$). The stenosis was successfully managed by a single meatal dilatation under anaesthesia ($n = 2$), surgical revision (enlargement meatoplasty, $n = 1$), or unsuccessful dilatation followed by meatoplasty ($n = 1$). None of these children developed fistula.

3.4. Foreskin reconstruction

The cosmetic result assessed by the surgeon was considered as good or excellent with a normally appearing foreskin in 130 of the 136 children who had benefit from a preputial reconstruction. Six children (4.4%) had ventral cutaneous dehiscence of the reconstructed foreskin, of whom 2 underwent subsequent circumcision, and 2 redo foreskin reconstruction. In the remaining two, the dehiscence was considered as minor by the parents and no surgical revision was necessary. A secondary phimosis occurred in 13 children (9.5%)

after the foreskin reconstruction, successfully treated in 11 cases with topical steroids application (0.1% beta-methasone), or by a secondary preputial plasty based on Duhamel dorsal incision ($n = 2$).

4. Discussion

The technique of TIP urethroplasty is currently a widely used procedure and has virtually supplanted all other methods for correcting distal hypospadias, since it provides excellent functional and cosmetic results with a normally appearing slit-like neomeatus [1,2]. The most common complications after TIP repair are fistula and meatal stenosis, which seem more likely to occur within the first 6 months after the procedure [7,8]. The present study shows an 8% overall rate of urethral complications in TIP urethroplasty without urethral stent in distal hypospadias repair. Although these data were not obtained from a comparative trial, they seem comparable to the usually admitted complication rate of distal hypospadias stented surgery.

In the present study, we observed that the absence of postoperative urethral catheterization was not associated with excessive immediate morbidity. Postoperative retention had an incidence of 2.5%, and no effect on surgical outcome since children with urinary retention did not later develop urethral complications. As shown in an experimental study [5], urethral stent is not necessary to achieve urothelial healing of the incised urethral plate. Urine flow might be responsible for keeping the healing edges of the plate separate during urothelial regeneration. Series of unstented TIP urethroplasties have been reported in a few occasions [9–11], with contrasted results regarding to the complications. Samuel et al. reported no cases of urinary retention requiring catheterization after a large series of unstented TIP repairs, in boys of mean age 18 months [10]. Conversely, El-Sherbiny showed that the absence of stent in toilet-trained children was associated with a 24% rate of urinary retention, and a high re-operation rate [11]. These series indicate that age at surgery is a crucial point, and that an indwelling catheter is a reasonable option in toilet-trained children. When possible, we schedule this surgery between 9 and 12 months of age, and always before toilet-training age. During this period, the automatic bladder activity makes the child unable to restrain from voiding and decreases the risk of postoperative urinary retention.

The fistula rate observed in the present study is similar to other series, which reported 5 to 9% rates [7,8,12], although we did not cover the neourethra with

a vascularized subcutaneous pedicle. A second layer coverage with de-epithelialized pedicle flap is thought to significantly decrease fistula formation [7]. We may hypothesize that performing a spongioplasty and a foreskin reconstruction creates a multilayer coverage of the proximal end of the urethroplasty and reduces fistula formation [13]. Meatal stenosis is an uncommon event: reported incidence in recent large series [7,8,12] of TIP urethroplasties is 0.5 to 2%, similar to the 4/162 incidence in the present study. The clinical impression that the neourethra healed without significant scars [14] has been confirmed by experimental studies on animal models [5,15] which demonstrated that healing of the incised urethral plate occurred by re-epithelialization of the urothelium with normal tissue ingrowth and no fibrosis. Daily urethral dilatations have been proposed to maintain an optimal caliber in the neourethra [16], but Lorenzo et al. showed that routine calibration was unnecessary to prevent urethral stricture or meatal stenosis [17]. We report in this study the rate of symptomatic sternoses. Postoperative uroflowmetry data were not available for a significant number of patients, as most of the children were not toilet-trained at the end of follow-up. However, in a study with late uroflowmetry evaluation in toilet-trained patients, Hammouda et al. showed that a third of the boys had low peak flow rates after TIP repair [18]. This emphasizes the need for a functional follow-up until puberty.

There has been a wide variety of dressings described in hypospadias surgery, from compressive dressing with cast immobilization, adhesive biomembrane dressing, to complete absence of dressing. The supposed advantages of dressing included decreased swelling, wound disruption, and improved hemostasis. However, two prospective randomized trials [19,20] have clearly showed that the surgical outcome in distal hypospadias surgery was not compromised by the absence of dressing, especially after techniques preserving the urethral plate [19]. It is our impression that the dressing unnecessarily adds to the parental anxiety and to the complexity of postoperative care. Regarding to the risk of infections, the absence of dressing with regular hygienic cleansing of the scars seems more manageable for the parents than a dressing soiled by the feces in the nappies.

The preputial reconstruction has been suspected to carry a high complication rate. In a comprehensive analysis of different published series, Erdenetsetseg reported a 28.6% complication rate after 206 foreskin reconstructions [21]. This was not confirmed by the present study, as only 6/136 reconstructions presented foreskin dehiscence. Secondary phimosis is the most frequent complication, but it is easily manageable with

topical steroids application like in primary phimosis [22]. It is unlikely that the foreskin reconstruction has major impact on the outcome of the urethroplasty, but it is our belief that the cosmetic result is far superior when reconstructing the foreskin, as it allows restitution of a completely normal anatomy of the penis. In France as in many European countries, routine circumcision is not performed in newborns except on parental request for religious reasons. As the goal of management of distal hypospadias should be to restore a penile aspect as normal as possible, we consider the preputial reconstruction as a major step of this surgery.

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5. Conclusions

TIP urethroplasty is a reliable technique for distal hypospadias repair, and combined foreskin reconstruction carries an acceptable complication rate. If proposed to boys before toilet training, the TIP procedure can be performed without leaving an indwelling catheter, without compromising the surgical outcome.

However, if the absence of stent does not affect the urological result, the impact on postoperative discomfort (pain, anxiety) remains to be evaluated in a comparative trial.