

Minimizing the postoperative complications of severe hypospadias using a simple technique

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Background The aim of this study was to decrease complication rates in proximal hypospadias surgery.

Methods A simple method of stenting using a polypropylene stent has been developed for the most severe form of hypospadias during the period from January 2008 to January 2011 in the Department of Pediatric Surgery. The total number of patients was 46. The patients were classified into group 1 ($n=23$), in which a polypropylene stent was used, and group 2 ($n=23$), in which a polypropylene stent was not used.

Results In group 1, complications occurred in three patients (13.04%), whereas in group 2 it occurred in 12 patients (52.2%). The difference in the total number of complications between groups was highly significant ($P<0.001$). In group 1, no patient needed redo surgery, and in group 2 four patients (17.39%) needed redo surgery

($P<0.05$). All other patients responded to repeated dilatation in the follow-up.

Conclusion Although the sample size was small, this simple modification can decrease the complication rate significantly in the most severe form of hypospadias. *Ann Pediatr Surg* 8:32–34 © 2012 Annals of Pediatric Surgery.

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Keywords: polypropylene stent, proximal hypospadias, surgical complications, urethroplasty

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Introduction

Proximal hypospadias is one of the most challenging conditions to correct [1–3]. The multiple numbers of procedures that have been described over the years is indicative of the fact that no procedure has been universally acceptable.

In this study, we present a new technique to decrease the complication rates in proximal hypospadias repair.

In both groups, Duckett's combined scrotopreputial urethroplasty was performed [4–6].

Materials and methods

This was a prospective randomized study conducted from January 2008 to January 2011 in the Department of Pediatric Surgery of the University Hospital. It was approved by the hospital's Ethical Committee. Written and informed consent was obtained from the parents of the patients. Only cases of proximal penile hypospadias were included in this study. Both groups were matched for age.

Group 1 comprised the study group and group 2 comprised the control group. Hemogram, urine examination, and abdominal ultrasound were carried out in all patients. All of them underwent Duckett's combined scrotopreputial urethroplasty using a 5-0 polyglycoamide suture. A feeding tube catheter was used for stenting, the size of which was according to the age of the patient and size of the urethra. In group 1, after completion of urethroplasty, an open suprapubic cystostomy was performed after inflating the urinary bladder with normal saline passed through a urethral catheter. The tip of the urethral catheter was taken out from the bladder and a polypropylene 1-0 suture was tied at the tip of the urethral catheter and the other end of

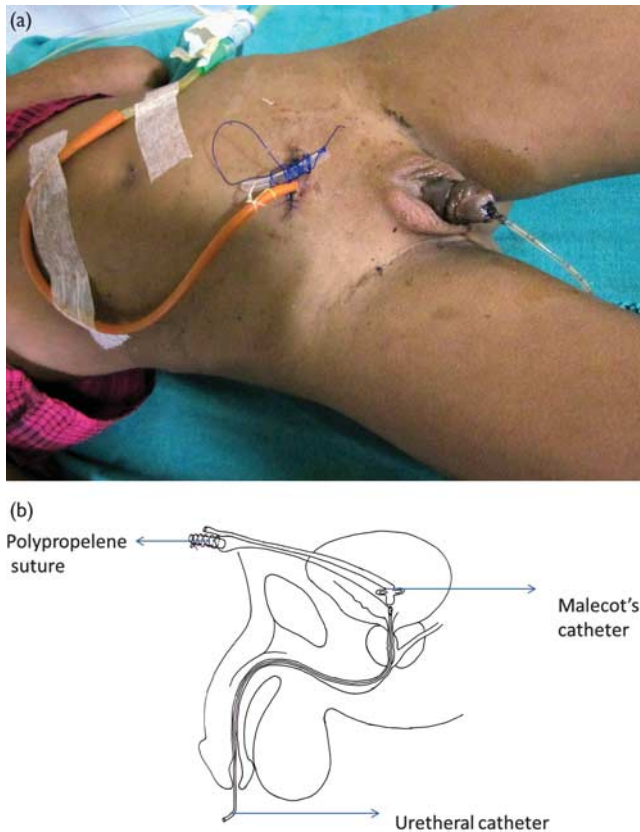
the polypropylene suture was taken out by suprapubic cystostomy incision. The extra length of the polypropylene suture was rolled over a piece of catheter and taped to the abdominal wall (Fig. 1a and b). Simultaneously, using a Malecot catheter of size 14 or 16 Fr, a suprapubic urinary diversion was also made. In control group 2, it was managed by conventional urethroplasty, which included placement of the catheter for 14 days and dilatation when needed.

All patients stayed in the hospital for 7–10 days. The dressing was removed on the fifth postoperative day, and the feeding tube was taken out on day 7. The polypropylene suture, which was tied to the tip of the feeding tube, came out through the neomeatus and was tied with the other end of the suture present in the suprapubic area (Fig. 2). All the patients were discharged on a suprapubic catheter and polypropylene suture loop.

In the follow-up visit, after 14 days of discharge, the suprapubic catheter was removed. The patients were followed up monthly for 6 months and evaluated for complications such as urethrocutaneous fistula, urethral stricture at proximal anastomosis or in tube, meatal stenosis, and diverticula. The stent suture was removed after 3 months.

Statistical analysis was carried out using SPSS 12.0 version for Windows (SPSS Inc., Chicago, IL, USA). The Student *t*-test was applied to test the difference in mean age between the study groups. Fisher's exact probability test was used to find out the significant difference in the proportion of complications occurring between the groups. The values are expressed as mean \pm SD. A *P*-value of less than 0.05 was considered as statistically significant.

Fig. 1



(a) The suprapubic Malecot's catheter and prolene rolled up in the suprapubic region, which is tied to the tip of the indwelling catheter inside the bladder. (b) Schematic diagram of (a).

Fig. 2



The prolene loop coming out from the tip of the neomeatus to the suprapubic area.

Results

A total of 46 cases of proximal hypospadias were operated upon during the study period, each group having 23 patients. The ages ranged between 2 and 8 years (mean 4.83 ± 1.64 and 4.85 ± 1.54 , respectively; $P > 0.05$).

In group 1, the complications were meatal stenosis in one patient and junctional stricture in two patients. In group 2, the complications were junctional urethral stricture in six, meatal stenosis in two, urethrocutaneous fistula in two, and diverticula due to distal stricture in two patients (Table 1). The difference in total number of complications in both groups was highly significant ($P < 0.001$).

In group 1, no patient needed redo surgery, and all complications responded to repeated dilatation (four dilatations and an interval of 1 month). In group 2, only four patients (17.39%), including two cases of fistula and two cases of diverticula, needed redo surgery ($P < 0.05$). All other patients responded to repeated dilatation (four dilatations) in the follow-up.

Discussion

Hypospadias is due to failure of the male urogenital fold to fuse in various regions, resulting in a proximally displaced urethral meatus [7]. The incidence of hypospadias has been calculated as one in 300 live births [8]. The most commonly used classification of hypospadias is based on

the location of the abnormal meatus. In one study, the incidence of various types has been reported as anterior in 50%, middle in 30%, and posterior in 20% of the cases [8].

Surgery is the only modality of treatment. The aim of surgery is to achieve a straight penis, with the meatus at the tip, uninterrupted urinary flow, and good cosmesis, and also to increase self-confidence of the child. The surgical management of primary severe hypospadias (proximal hypospadias with severe chordee) remains controversial. Major trends in management have significantly changed during the last few decades. In the 1960s and 1970s, two-stage repair was considered as the standard. In the 1980s, single-stage repair gained universal acceptance, mainly because of the increased use of preputial, buccal, and bladder mucosal flaps [9].

The standard two-stage approach involves initial correction of penile curvature, along with preparation of a ventral bed of tissue, which is composed of transposed flaps of prepuce, grafts of preputial skin, or buccal mucosa. This neourethral plate can then be tubularized at a second setting. The two-stage approach may be the most common method of correcting proximal hypospadias, in part because it is reliable and relatively easy. However, this approach inherently requires every child to undergo two procedures, with many requiring a third or more operations for complications that may develop.

Table 1 The complication rate between the two groups

Type of hypospadias	Complications					Total
	Meatal stenosis	Fistula at proximal anastomosis	Junctional stricture	Urethral stricture	Diverticula	
Group 1 (n=23)						
Penoscrotal	1 (8.33)	0	0	0	0	12 (52.17)
Scrotal	0	0	0	0	0	8 (34.78)
Perineal	0	0	2 (66.67)	0	0	3 (13.05)
Group 2 (n=23)						
Penoscrotal	2 (16.67)	0	0	3 (25)	0	12 (52.17)
Scrotal	0	2 (25)	1 (12.5)	1 (12.5)	0	8 (34.78)
Perineal	0	0	1 (33.33)	0	2 (66.67)	3 (13.05)

Numbers in parentheses show the percentage in the respective groups.

The reported incidence of complications ranges from 6 to 30%, which may vary with the severity of hypospadias [8–10]. The single-stage surgery is associated with 68.5% success, whereas 31.5% will need a second repair [11–13].

In this study, complications occurred in three patients (13.04%) out of 23 in group 1, which was reported in their first follow-up visit. In group 2, 12 patients (52.2%) developed complications out of 23 patients. Diverticula formation was noticed in two patients in group 2 in the fifth month of follow-up. All other complications were reported during their first follow-up visit usually after 2 weeks.

The advantages of a 1/0 polypropylene stent through the neourethra and suprapubic urine diversion are as follows:

- (1) No fistula formation at the proximal anastomosis. We believe that turbulence of the urinary stream at the proximal anastomotic site decreased because of the presence of the polypropylene stent, which acts as a guide to propel the flow of urine anteriorly with minimal shearing force at the side wall of the neourethra, thereby protecting the anastomotic site.
- (2) Suprapubic urinary diversion helped in complete diversion of urine, thus helping to heal the wound well.
- (3) At follow-up, all patients having meatal stenosis and stricture urethra responded well to dilatation. Dilatation became easy because of the polypropylene stent. The urethral end of the polypropylene suture was tied to a feeding tube, which was pulled into the bladder by pulling the other end of the polypropylene suture in a retrograde manner, thus dilating the urethra without creating any false passage or trauma.

Despite suprapubic diversion, postoperatively, the patient passes urine through the urethra as well, a week after edema subsides; hence, there is some amount of periurethral leak of urine causing delayed anastomotic stricture and diverticulation. Besides, blind retrograde dilatation in such cases causes further trauma and stricture formation. This was observed in our initial study when suprapubic diversion was performed without polypropylene stenting. For this reason stenting was performed.

The existence of a learning curve has been well recognized in hypospadias surgery [13–15]. Cases of delayed

presentation of complications following urethroplasty up to 22.9 months postoperatively have been reported, emphasizing the need for larger number of patients and longer follow-up.

Our study is another effort in improving outcome in cases of severe hypospadias. The future will decide the definite results of using polypropylene as a stent in the neourethra.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

References

- 1 Hayashi Y, Sasaki S, Kojima Y, Maruyama T, Tozawa K, Mizuno K, et al. One-stage repair of moderately severe hypospadias using a transverse preputial tubularized island flap. *Int J Urol* 2001; **8**:165–170.
- 2 Stock JA, Cortez J, Scherz HC, Kaplan GW. The management of proximal hypospadias using a 1-stage hypospadias repair with a preputial free graft for neourethral construction and a preputial pedicle flap for ventral skin coverage. *J Urol* 1994; **152** (6 II):2335–2337.
- 3 Castañón M, Muñoz E, Carrasco R, Rodó J, Morales L. Treatment of proximal hypospadias with a tubularized island flap urethroplasty and the onlay technique: a comparative study. *J Pediatr Surg* 2000; **35**:1453–1455.
- 4 Duckett JW Jr. Transverse preputial island flap technique for repair of severe hypospadias. *Urol Clin North Am* 1980; **7**:423–430.
- 5 Elbakry A. Complications of the preputial island flap-tube urethroplasty. *BJU Int* 1999; **84**:89–94.
- 6 DeFoor W, Wacksman J. Results of single staged hypospadias surgery to repair penoscrotal hypospadias with bifid scrotum or penoscrotal transposition. *J Urol* 2003; **170** (4 II):1585–1588.
- 7 Baskin LS, Ebberts MB. Hypospadias: anatomy, etiology and technique. *J Pediatr Surg* 2006; **41**:463–472.
- 8 Duckett JW. Hypospadias. In: Walsh PC, Retik AB, Vaughan ED, Wein AJ, editors. *Campbell's urology*. 7th ed. Philadelphia: W. B. Saunders; 1998. pp. 2093–2116.
- 9 Snodgrass WT, Elmore J, Snyder H, Mokhless IAS, Kryger J. Initial experience with staged buccal graft (Bracka) hypospadias reoperations. *J Urol* 2004; **172** (4 II):1720–1724.
- 10 Beuke M, Fisch M. Salvage strategies after complications of hypospadias repair [Salvagestrategien nach komplikationen der hypospadiachirurgie]. *Urologe A* 2007; **46**:1670–1675.
- 11 Hansson E, Becker M, Aberg M, Svensson H. Analysis of complications after repair of hypospadias. *Scand J Plast Reconstr Surg Hand Surg* 2007; **41**:120–124.
- 12 Cemil Uygur M, Ünal D, Tan MO, Germiyanoglu C, Erol D. Factors affecting outcome of one-stage anterior hypospadias repair: analysis of 422 cases. *Pediatr Surg Int* 2002; **18**:142–146.
- 13 MacEdo A Jr, Liguori R, Ottoni SL, Garrone G, Damazio E, Mattos RM, et al. Long-term results with a one-stage complex primary hypospadias repair strategy (the three-in-one technique). *J Pediatr Urol* 2011; **7**:299–304.
- 14 Powell CR, McAleer I, Alagiri M, Kaplan GW. Comparison of flaps versus grafts in proximal hypospadias surgery. *J Urol* 2000; **163**:1286–1289.
- 15 Lay L, Zamboni WA, Texter JH, Zook EG. Analysis of hypospadias and fistula repair. *Am Surg* 1995; **61**:537–538.