

Correction of proximal hypospadias with severe chordee with a new technique using vertical preputial double-layered island flap

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Background

Hypospadias is a common genitourinary anomaly affecting every 1/300 male newborn. Numerous operative techniques have been reported for the repair of hypospadias.

Patients and methods

A vertical preputial double-layered island flap technique for correction of perineal and penoscrotal hypospadias with or without penoscrotal transposition and with severe chordee with the utilization of both the foreskin and the hind skin of the prepuce was performed and completed with glanuloplasty using one-stage or two-stage technique. A total of 40 patients with perineal and penoscrotal hypospadias with or without penoscrotal transposition and with severe chordee were managed with this technique.

Results

All corrected patients showed accepted cosmetic outcome without penile rotation or remaining gross ventral curvature. Fistulas were seen in 5% of patients at the site of anastomosis between the flap and the hypospadiac meatus, and 2.5% of them needed surgical closure.

Conclusion

The vertical preputial double-layered island flap technique corrects proximal hypospadias with severe chordee in one stage and can be performed in all patients with reasonable outcomes.

Keywords:

penoscrotal, chordee, hypospadias, perineal, transposition

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Introduction

Hypospadias is a common genitourinary anomaly with an incidence ranging between 0.8 and 8.2 live male births [1]. Proximal hypospadias or severe types, including proximal penile shaft, penoscrotal, scrotal, and perineal types represent 20% of cases [1]. These types are usually associated with severe chordee that causes significant penile curvature. The chordee should be released to straighten the penis.

On operating for hypospadias, the surgeon should keep in mind the goals of repair that include straightening of the penis, constructing a neourethra with an appropriate caliber, creating a near-normal location of the meatus, and the cosmetic final appearance of the glans and the whole penis.

After straightening of the penis in severe cases, the urethral plate is destroyed, making its use for repair of hypospadias impossible. Hence, numerous techniques were described for repair of proximal hypospadias with severe curvature using different tissues to create a neourethral tube.

Free grafts from bladder and buccal mucosa have been described for staged repair of severe and recurrent hypospadias, especially when the prepuce is absent.

Mobilized vascularized preputial flaps when there is a prepuce are more reliable compared with free grafts due to its blood supply.

Many techniques using mobilized vascularized preputial flaps were described to correct severe hypospadias; these techniques include transverse preputial island flap urethroplasty and horseshoe preputial island flap for the more severe cases. The flaps are tunneled and anastomosed to the native urethral meatus proximally and implanted into the glans by means of either splitting or tunneling.

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In the vertical preputial double-layered island flap technique, the prepuce is tunneled into a tube and passed ventrally to be anastomosed to the native urethra, and the tube is completed anteriorly by tubularizing the glans urethral plate and anastomosing it to the distal end of the preputial tube.

Those who treat this difficult problem must be well oriented with a variety of these techniques, which reportedly number more than 200.

Patients and methods

A total of 40 children with proximal hypospadias and severe chordee who were presented to the Pediatric Surgery Unit at Zagazig University hospitals during the period from June 2012 to January 2016 were corrected using the vertical preputial double-layered island flap technique using both the preputial hind skin and the foreskin, and then the tube was completed with tubularized incised plate (TIP) urethroplasty for the remaining distal part either in the same sitting or after 6 months (Fig. 1). Patient's parents have been consented in a written consent form and the research had been approved by the local research committee.

Inclusion criteria were proximal penile and penoscrotal hypospadias with severe chordee.

The following patients were excluded from the study:

- (1) Previously circumcised patients.
- (2) Recurrent cases with absent prepuce.
- (3) Absent or mild degree of chordee for which TIP urethroplasty can be performed with good results.

Figure 1

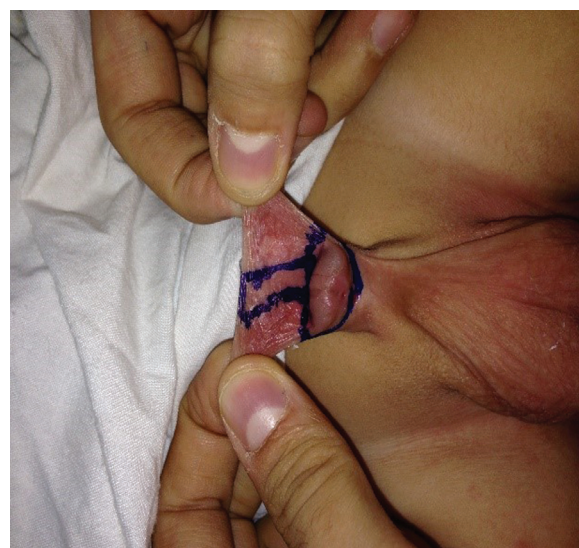


Proximal hypospadias with severe chordee.

Surgical technique

Neourethra was designed from the preputial hind skin and lengthened by 0.5 cm from the dorsal preputial foreskin (Figs 2 and 3). A transverse incision of 0.5–1 cm was made in the hind skin immediately behind the glans penis. Two parallel incisions were made in the hind skin from the ends of the transverse incision to the junction between the hind skin and the foreskin of the prepuce and extended to 0.5 cm in the foreskin on the dorsal aspect of the prepuce. A transverse incision was made on the dorsal aspect of the preputial skin connecting the two ends of the previously extended incisions coming from the ventral aspect of the prepuce.

Figure 2



Lines of incision in the preputial mucosa.

Figure 3



Lines of incisions in the dorsal skin.

Starting with elevation of 0.5 cm of skin from the dorsal aspect of the prepuce to elongate the preputial hind skin, the hind skin was minimally elevated from foreskin on sides to allow its tubularization without complete separation from the dorsal skin. Tubularization of the neourethra around a 6–8 Fr catheter was started with the skin elevated from the dorsal aspect and continued to the hind skin of the inner aspect of the prepuce with 5/0 polyglycolic acid sutures (Fig. 4).

A 0.5-cm longitudinal incision (button hole) was made on the dorsal aspect of the penile skin 1–1.5 cm from the root of the penile shaft to allow transferring of the glans penis through it without interfering with the preputial vascularity (Fig. 5).

A transverse incision was made in the short fibrous urethral plate down to the corpora cavernosa and dissection of all

fibrous tissues was carried out to straighten the hooked penis. The skin around the hypospadiac urethral meatus was elevated from the opening.

After full straightening of the penile shaft and excision of all fibrous tissues, the glans penis was passed through the dorsal skin opening behind the catheter and the neourethra.

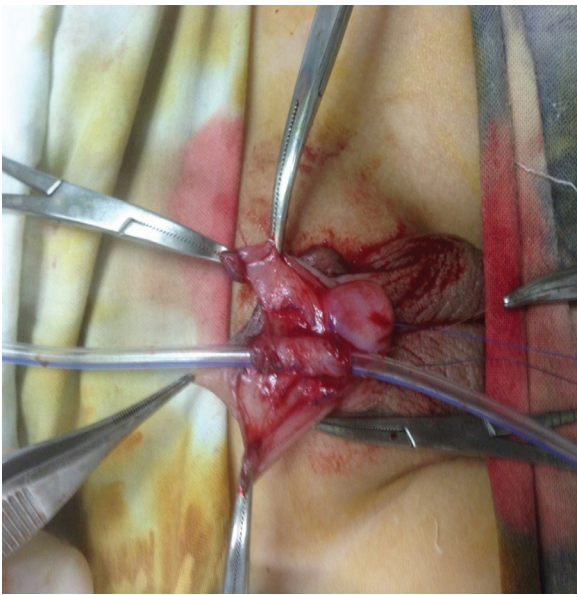
The catheter was then passed into the hypospadiac urethral opening and introduced into the urinary bladder; the formed neourethra was anastomosed to the prepared proximal hypospadiac urethral opening around the catheter. A layer of subcutaneous sutures was then inserted to cover the anastomosis and separate it from skin sutures (Fig. 6).

The remaining part of the divided urethral plate after complete excision of the chordee and straightening of the curved penis had been used to complete and elongate the urethra to reach the needed position on the glans penis using the TIP urethroplasty technique [2], either in the same sitting or after 6 months (Fig. 7).

Dressings were removed 48 h after correction, and the penis left exposed with the application of local antibiotic cream. Children were discharged from hospital 2–3 days after correction, and the urinary catheter was removed 15 days after correction.

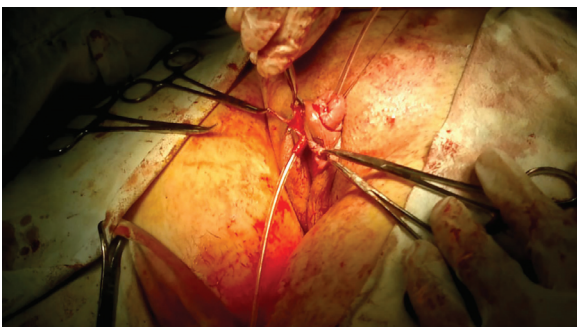
Patients were followed up and urethral calibration performed every week for 1 month, and every 2 weeks for another 4–6 months.

Figure 4



Neourethra formed around 8 Fr catheter.

Figure 5



The glans penis passed through dorsal incision.

Figure 6



Postoperative without repair of the glandular part.

Figure 7



Postoperative final result of the technique.

Results

A total of 40 children with perineal and penoscrotal hypospadias were corrected using the vertical preputial island flap technique at ages ranging between 12 and 48 months with a mean age of 26.7 months over the period of study.

All corrected patients were carefully followed up and examined postoperatively; mild postoperative edema was seen in seven (17.5%) patients that disappeared few days after operation. No penile rotation or any remaining considerable ventral curvature was reported in any of the corrected patients. Fistulae developed between the flap and the hypospadiac meatus in two (5%) cases; one of them closed spontaneously after insertion of a catheter for one more week followed by repeated dilatation, and the other one needed surgical closure (2.5%). Diverticulum occurred in one (2.5%) patient and surgical reconstruction of the tube was performed after 6 months.

Discussion

Different procedures were described to manage proximal hypospadias associated with sever chordee; these procedures were one stage procedure or two staged procedures by putting a graft; buccal, bladder mucosal or preputial, after releasing chordee as a first stage and then tubularizing a urethra at the second stage.

The success of techniques of hypospadias repair using vascularized preputial flaps has led to their wide application for the last decade [3]. Of those techniques,

transverse or longitudinal double preputial flaps are particularly attractive [4].

In one-stage techniques, the chordee is completely dissected to correct the curvature. Hence, the transverse preputial flap is spirally rotated around the penile shaft by its pedicle to be positioned ventrally and anastomosed to the native urethra and then a urethral tube is designed. This spiral rotation may cause tethering of the opposite edge and penile rotation [5].

In the vertical preputial island flap technique, tethering and penile rotation do not occur as the flap is passed ventrally through the dorsal (button-hole incision).

The vertical preputial island flap technique allows reconstruction of the urethra with sutures that becomes turned to be placed on the dorsal surface of the designed urethra, and the ventral aspect of the urethra become covered by healthy skin after passing the glans penis through the dorsal incision (button hole); these conditions reduce the risks of development of urethral fistulae.

Moreover, this technique provides elongation of the urethra with adequate straightening of the curved penis, construction of the urethra, and correction of the chordee in one stage, in contrast to two or three stage correction discussed by Greenfield *et al.* [6].

In distal hypospadias, dartos mobilization alone is often adequate to relieve chordee [7] and allows one-stage repair with preservation of the urethral plate [8]. In penoscrotal hypospadias, dartos mobilization alone fails to relieve chordee in the majority of cases [9]; however, urethral mobilization may help [10]. If urethral mobilization does not help, the urethral plate must be transected before performing one-stage repair and either Duckett transverse preputial flap [11] or the vertical preputial island flap can be performed.

Kenneth *et al.* [12] preserved the urethral plate as Snodgrass [2] and stated that fistula developed in 50% of their patients and this incidence is similar to that using the two-stage technique, whereas the incidence of fistula in the vertical preputial island flap technique was 5% between the flap and the hypospadiac meatus and only 2.5% became permanent and needed surgery.

Apart from regular urethral dilatations needed for 3–6 months after correction to prevent development of urethral stenosis no other precautions were required.

Conclusion

The vertical preputial island flap technique designed for correction of proximal hypospadias with severe chordee in one stage is a feasible technique and can be performed in all patients with proximal hypospadias and severe chordee with better outcomes when compared with other techniques designed to solve the same problem.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

- 1 Patrick Murphy J. Hypospadias [chapter 59]. In: Holcomb GW, Murphy JP, Ostlie DJ, editors. *Ashcraft's pediatric surgery*. London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto: Elsevier Saunders; 2014: 794–809.
- 2 Snodgrass W. Tubularized incised plate urethroplasty for distal hypospadias. *J Urol* 1996; 151:464–465.
- 3 Asopa HS, Elhence IP, Atri SP, Bansal NK. One stage correction of penile hypospadias using a foreskin tube. A preliminary report. *Int Surg* 1971; 55:435–440.
- 4 Chen S, Wang G, Wang M. Modified longitudinal preputial island flap urethroplasty for repair of hypospadias: results in 60 patients. *J Urol* 1993; 149:814–816.
- 5 Duckett JW. Transverse preputial island flap urethroplasty with glans channel. In: Frank JD, Gearhart JP, Snyder HM, editor. *Operative pediatric urology*. London, Edinburgh, New York, Philadelphia, St Louis, Sydney, Toronto: Churchill Livingstone; 2006:155–156.
- 6 Greenfield SP, Sadler BT, Wan J. Two stage repair for severe hypospadias. *J Urol* 1994; 152:498–501.
- 7 Koyanagi T, Nonomura K, Asano Y, Gotoh T, Togashi M. Onlay urethroplasty with parametatal foreskin flap for distal hypospadias. *Eur Urol* 1991; 19(3):221–224.
- 8 Elder JS, Duckett JW, Snyder HM. Onlay island flap in the repair of mid and distal penile hypospadias without chordee. *J Urol* 1987; 138:376–379.
- 9 Mollard P, Mouriquand P, Felfela T. Application of the onlay island flap urethroplasty to penile hypospadias with sever chordee. *Br J Urol* 1991; 68:317–319.
- 10 Duckett JW. The island flap technique for hypospadias repair. *Urol Clin North Am* 1981; 8:503–511.
- 11 Glassberg KI. Augmented Duckett repair for severe hypospadias. *J Urol* 1987; 138:380–381.
- 12 Kenneth IG, Faith H, Mark H. The koyanagi-nonomura 1-stage Duckett repair of severe hypospadias with and without penoscrotal transposition. *J Urol* 1998; 160:1104–1107.