Preputial reconstruction and tubularized incised plate urethroplasty in proximal hypospadias with ventral penile curvature

Amilal Bhat, Ajay Gandhi, Gajendra Saxena, Gautam Ram Choudhary
Department of Urology, S. P. Medical College Bikaner, Rajasthan, India

ABSTRACT

Aims: Objective of this study was to assess the feasibility and results of preputial reconstruction and tubularized incised plate urethroplasty (TIP) in patients of proximal hypospadias with ventral penile curvature.

Materials and Methods: Twenty-seven patients of proximal hypospadias who underwent preputioplasty with TIP were evaluated retrospectively. Ventral curvature was corrected by mobilization of the urethral plate with the corpus spongiosum and the proximal urethra; dorsal plication was added according to the severity of curvature. Feasibility of preputial reconstruction was assessed by applying 3 stay sutures—the first to fix the skin at the corona, the second at the junction of the inner and outer preputial skin for pulling up the skin over the glans, and the third stay on penile skin at the level of the corona for retracting the skin. Preputial reconstruction consisted of a standard 3 layered re-approximation of the margins of the dorsal hood.

Results: Age of the patients varied from 10 months to 21 years with an average of 6 years and 4 months. Ventral curvature (mild 10, moderate 13, and severe 4 cases) was corrected by the mobilization of the urethral plate and spongiosum in 14 patients, 11 cases had mobilization of the proximal urethra in addition and 2 patients required single stitch dorsal plication with the above-mentioned steps. Two patients developed urethral fistula and 1 had preputial dehiscence.

Conclusions: Preputioplasty with TIP is feasible in proximal hypospadias with curvature without increasing the complication rate. Postoperative phimosis can be prevented by on-table testing of the adequacy of preputial skin by 3 stay sutures.

Key words: Preputioplasty, hypospadias, tubularized incised plate urethroplasty, urethroplasty, repair

INTRODUCTION

An intact prepuce is demanded by parents of many hypospadias patients due to their religious sentiments in Asian countries and among the Hispanic populations in Western countries. Prepuce is usually utilized in proximal hypospadias repair as a water proofing layer of dorsal dartos cover on the neourethra. In proximal hypospadias with a well-developed urethral plate and spongiosum, the urethral plate can be preserved, while correcting the ventral curvature, making tubularized incised plate (TIP) feasible. A well-done tension-free suture spongioplasty after mobilization of spongiosum is an effective water proofing measure in itself or else scrotal dartos/tunica vaginalis is used as water proofing. Prepuce can be preserved for preputioplasty in such cases. Most of the reported experience of preputial reconstruction is in distal hypospadias. The objective of this study was to assess the feasibility and results of preputioplasty and TIP in proximal hypospadias with ventral penile curvature.

MATERIALS AND METHODS

Patients’ selection

We retrospectively reviewed the case sheets of preputial reconstruction in cases of proximal hypospadias with ventral curvature. We included only those patients in the study where the dorsal hood was of adequate size, had a well-
developed urethral plate and corpus spongiosum and who attended a minimum of 3 follow-up visits. All surgical procedures were done by a single surgeon (ALB). We had 27 patients of proximal hypospadias with mild to severe curvature who had preputial reconstruction and TIP as inpatients from 2006 to December 2009. The age of the patients varied from 10 months to 21 years with an average 6 years and 4 months.

Surgical technique
Adequacy of preputial width is assessed by applying 3 stay sutures, one each at the level of the corona, the distal end of preputial hood at the junction of inner and outer preputial skin and the penile shaft skin at the level of corona after urethroplasty [Figure 1a]. Preputial skin is pulled over the glans by the second stay suture after fixing the inner preputial skin at the corona by the first stay suture [Figure 1b and c] and then is retracted by the third stay suture. When the skin can easily be pulled over the glans and retracted, the preputial hood is considered to be adequate. Preputioplasty is done after reconstruction of the neourethra by tubularization of the urethral plate and spongiosoplasty [Figure 2] with or without waterproofing with tunica vaginalis or scrotal dartos. The prepuce is reconstructed in 3 layers after freshening the edges by standard technique. To start with, the first suture is placed at the corona (where the first stay suture is applied at the inner preputial skin) and then sutured distally up to the third stay suture. Dartos is sutured as the second layer and then the outer skin sutures are applied. Suture material used is 7/0 polydioxanone with interrupted sutures irrespective of the age of the child. Compression dressing is applied and all patients are put on cephalosporin as prophylactic antibiotics for 10 days. The patients are discharged from hospital in 3–5 days and are asked to come for urethral stent removal in 7–10 days. The patients are followed-up at 1, 3, 6, 12 months postoperatively and then yearly. The patients/parents are asked to start retracting the prepuce after 3 months onward in follow-up visits (when the skin has healed well), while taking bath and application of cortisone cream if the preputial skin is tight. They are interviewed for cosmesis, retractability of the prepuce, and any complication, such as fistula, phimosis, residual/recurrent ventral penile curvature and meatal stenosis.

RESULTS
The site of the meatus in the patients was proximal penile (15), penoscrotal (5), and scrotal (7). The ventral curvature (assessed at the beginning of urethroplasty by Gittes test) was mild in 10 cases, moderate in 13 cases, and severe in 4 cases. Correction of ventral curvature was possible by mobilization of the urethral plate with the spongiosum in 14 cases, additional mobilization of the proximal urethra in 11 cases, and single stitch dorsal plication after complete mobilization of the urethra in 2 patients (scrotal hypospadias with severe curvature). Penile de-gloving was not done in 10 patients with mild curvature. Waterproofing was done with tunica vaginalis in 8 cases and with scrotal dartos in 5 cases in addition to spongiosoplasty where the spongiosum was hypoplastic. All patients had a well-formed retractable prepuce and an adequate preputial opening. Twenty four (88.88%) patients and/or their parents were fully satisfied with the outcome of surgery and cosmesis. None of the patients/parents reported residual deformity or recurrence of ventral penile curvature or phimosis. One patient (3.70%) had a complete preputial dehiscence that required circumcision, and 2 patients (7.40%) had a fistula and underwent fistula repair. Three patients required cortisone cream application locally for a tight prepuce and finally had a good outcome preventing phimosis. Urethroplasty-related complications were noticed in 7.40 % cases only. Three adult patients reported having pain-free sexual intercourse. Follow-up varied from 6 months to 2 years with a mean of 1.5 years.

DISCUSSION
Modern approach in repair of hypospadias is to preserve the urethral plate. Presently, TIP is being done more frequently.
in proximal hypospadias with acceptable complications (14%).\(^2,^3,^10\) The concept of TIP urethroplasty is the procedure of choice for the treatment of proximal hypospadias.\(^1\) Our good results of TIP in proximal hypospadias\(^2\) encouraged us to add preputioplasty in these cases seeing the demand of intact prepuce among Indian population. Surgical principle of any procedure in congenital anomaly is to restore normal/near normal anatomy. Circumcision is less acceptable to both the general population and the medical profession; the prepuce can be preserved and refashioned to achieve good cosmetic results.\(^4\) The child is also psychologically benefited as he feels equal to his counterparts. Additionally, it serves as a skin reserve where, should the hypospadias repair fail, the inner prepuce can be utilized in repair. We used the preputial skin in 2 of our cases for the second surgery. The human foreskin is highly innervated and vascularized. Being a sensitive erogenous tissue, it plays an important role in the human sexual response and plays an important part in normal copulatory behavior.\(^12\)

Reconstruction of the prepuce should be considered in those cases where one can approximate the foreskin in the midline at the level of coronal groove without tension. Those cases, where the gap between the ventral aspects of the foreskin is wide, should not be taken for preputioplasty.\(^6\) Our 3 stay suture technique to measure the adequacy of the dorsal hood as well as the distal limit of preputial reconstruction on table and reduces the chances of phimosis or preputial dehiscence. We did not come across phimosis in the present series. The method of preputioplasty in 3 layers used by us is similar to that which was done by others with a midline outer skin closure mimicking the median raphe.\(^1,^4-^6\) But Giplin et al. have done Z-plasty closure to prevent tension on the suture line and prevent phimosis.\(^7\) Preputioplasty is advised in patients with coronal or glanular hypospadias because it alone gives an aesthetic appearance of a normal penis without any handicap.\(^8\) Klijn et al.\(^6\) discouraged preputioplasty because of increased complications compared with cases of distal hypospadias where circumcision is performed. Snodgrass et al.\(^1\) and Erdenetsetseg and Dewan\(^5\) suggested that circumcision instead be performed when complete de-gloving is needed for dorsal plication in chordee correction. They believe that preputioplasty is best suited for cases with minimal or no ventral curvature but can
also be considered for mild curvature. But in our opinion even moderate to severe penile curvature and the site of the meatus are not limitations for preputioplasty as long as the urethral plate is healthy, and a well-developed corpus spongiosum, tunica vaginalis, and scrotal dartos are available for water proofing; the penile curvature is correctable without transection of the urethral plate. We could correct penile curvature in all the cases preserving the urethral plate. Water proofing was done mainly with spongiosplasty, but 29.63% cases had additional tissue of tunica vaginalis and in 18.52 % cases scrotal dartos was used where the spongiosum alone was considered to be inadequate because of its hypoplasia.

Penile de-gloving and correction of ventral penile curvature did not adversely affect the results of preputioplasty in our experience. However, we did not de-glove the penis in cases of mild curvature where we could correct the ventral curvature by mobilization of urethral plate and spongiosum. Preputioplasty can be done in these cases after freshening of the skin edges but care is to be taken during penile de-gloving, so as not to injure the skin vessels on the ventral surface. The overall complications in proximal hypospadias with curvature (11.11 %) who required a second surgery were similar to Snodgrass et al.[1](preputial dehiscence with fistula 2%, isolated preputial dehiscence 2%, and patients requiring circumcision of disfigurement 6%) and slightly higher than Papouis et al. (phimosis 3.8% and foreskin dehiscence 2.5%) in distal hypospadias without curvature. There was no significant increase in complications despite the fact that we did preputioplasty in proximal hypospadias after ventral curvature correction and penile de-gloving, whereas others have done in distal hypospadias without curvature or minimal curvature.[1,4,9] Approximately 88.8% patients had excellent results and 3 of the adult patients said that parameter variation of results as would be found with multiple operators and using the same type of suture material and sutures.

CONCLUSIONS
Preputioplasty with TIP is feasible in proximal hypospadias with penile curvature without increasing urethroplasty related complications. Preputioplasty with urethroplasty and spongioplasty reconstructs a cosmetically normal penis, which is more satisfying to the parents/patients of hypospadias. Our 3 stay suture technique to verify the adequacy of the prepuce and distal limit of preputial suturing reduces the chances of phimosis and preputial dehiscence. Postoperative phimosis can be reduced by regular preputial retraction during bathing after healing of the local skin, at about 3 months and application of local cortisone cream. We advocate preputioplasty in all the cases where the inner prepuce is not utilized in urethroplasty and parents are willing to have an intact prepuce.

REFERENCES
1. Snodgrass WT, Koyle MA, Baskin LA, Caldamone AA. Foreskin preservation in penile surgery. J Urol 2006;176:711-14.
2. Bhat A. Extended urethral mobilization in incised plate urethroplasty for severe hypospadias: a variation in technique to improve chordee correction. J Urol 2007;178:1031-5.
3. Snodgrass WT, Prieto J. Straightening of ventral curvature while preserving the urethral plate. J Urol 2009;182:1720-25.
4. Gray J, Boston BE. Glanular reconstruction and preputioplasty repair for distal hypospadias a unique day case method to avoid urethral stenting and preserve prepuce. Brit J Urol Int 2003;70:268-70.
5. Erdenetsetseg G, Dewan PA. Reconstruction of hypospadiac hooded prepuce. J Urol 2003;169:1822-24.
6. Klijn AJ, Dik P, Dejong TP. Results of preputial reconstruction in 77 boys of distal hypospadias. J Urol 2001;165:1255-7.
7. Giplin D, Clement WBE, Boston VE. Grp repair; single stage reconstruction of hypospadias as an outpatient procedure. Br J Urol 1993;71:226-9.
8. Walton P, Saintsupery G, Bucco P. Prepuce plastic surgery in distal hypospadias. Chir Pediatr 1984;25:53-7.
9. Papouis G, Kasealas C, Skoumis K, Kasealas V. Repair of Distal Hypospadias and Preputioplasty in One Operation: Risks and Advantages. Urol Int 2009;82:183-6.
10. Snodgrass WT, Yucel S. Tubularized Incised Plate for Midshaft and proximal hypospadias repair. J Urol 2007;177:698-702.
11. Mustafa M. The concept of tubularized incised plate hypospadias repair for different types of hypospadias Int Urol Nephrol 2005;37:89-91.
12. Taylor JR, Lockwood AP, Taylor AJ. The prepuce specialized mucosa of penis and its loss. Br J Urol 1996;77:291-5.