Urethral mobilization and advancement for distal hypospadias

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Background/purpose Despite the existence of numerous techniques for the repair of distal penile hypospadias, none of them is completely satisfactory. Advancing the urethra without mobilization for repair of glanular hypospadias has the advantage of avoiding a common problem occurring with other techniques: urethrocutaneous fistula. This study aims at evaluation of our experience with this technique for repair of distal hypospadias.

Materials and methods A prospective study was conducted on patients with glanular, coronal and subcoronal hypospadias during the period from December 2012 to December 2014. Recurrent cases were excluded. Feasibility of the technique and postoperative complications were recorded.

Results A total of 30 boys between 9 months and 7 years of age were included in the study. They underwent repair of glanular (five), coronal (10), and subcoronal (15) hypospadias. The urethra was mobilized to the proximal shaft in almost all cases. Three cases developed postoperative hematoma, which were managed conservatively and resolved spontaneously. Two cases developed wound infection and were managed with antibiotics and daily dressing until infection resolved. None of the patients had major complications such as dehiscence, urethral stricture, or fistula. Three patients developed meatal stenosis; two of them responded to repeated dilatation twice weekly for 2 weeks; and one needed meatoplasty. In one patient, the most distal of the glans approximation sutures disrupted, leading to a minor detachment in the glans. There was no recurrent chordee. Two patients underwent meatal retraction, wherein the urethra migrated proximally but still within the glans; only one of these patients required a second procedure.

Conclusion The urethral mobilization technique seems to be a good method for the repair of distal hypospadias with or without chordee with satisfactory cosmetic and functional results. The procedure has the advantage of avoiding the need for a second layer of tissue covering during repair. Moreover, there is no chance for the development of urethrocutaneous fistula, a major postoperative complication of other surgical techniques creating a neourethra. Postoperative management is simple and a brief hospital stay is sufficient. *Ann Pediatr Surg* 11:239–243 © 2015 Annals of Pediatric Surgery.

Introduction

Any technique to repair distal hypospadias should be simple, easy, and result in satisfactory functional and cosmetic outcomes. Despite continued refinement of numerous repair techniques, there is no completely satisfactory technique in terms of complications and cosmesis [1].

Advancing the urethra without mobilization for repair of glanular hypospadias was first advocated by Beck [2]. However, this procedure was not consistently successful [3]. Koff [4], and Waterhouse and Glassberg [5] popularized the technique and used extensive mobilization of the urethra and corpus spongiosum. Proponents of urethral mobilization recommend using this technique

Fig. 1

Degloving of the skin and excision of the tissue causing the chordee.

Fig. 2

Circumcising incision around the glans and starting mobilization.

Fig. 3

Mobilization completed.

mainly for management of distal hypospadias; several techniques have been reported in the last two decades, most of them for glanular defects [3,6,7].

The advantage of this technique is the decreased incidence of development of urethrocutaneous fistula. However, it carries the risk of development of chordee secondary to taut urethra, potential injury to the urethra during dissection, or development of ischemia from extensive dissection.

We report 30 patients with distal hypospadias who were operated on using the urethral mobilization and advancement technique.

Materials and methods

This was a prospective study conducted on patients admitted during the period from December 2012 to December 2014. Patients with glanular, coronal, and subcoronal hypospadias were included in the study. Recurrent cases were excluded. A signed informed consent was obtained from the parents. A database was constructed to include the following data: age at presentation, associated anomalies, site of the urethral meatus, status of the prepuce, urethral plate, presence or

absence of chordee, penile torsion or scrotal transposition, surgical technique, and intraoperative and postoperative complications. An informed signed consent was obtained from parents of all patients included in the study.

Surgical technique

The procedure was performed under loupe magnification (at least ×3) to avoid injury of the urethra during dissection. A traction suture was placed through the glans, and a 6–8 Fr catheter was passed into the bladder. The distance between the hypospadias meatus and the distal margin of the glans groove was measured and recorded.

A circular incision was made dorsally at 3 mm proximal to the corona. Ventrally, the incision was made proximal to the urethral meatus. The penile skin was degloved down to the penoscrotal junction, releasing any cutaneous chordee. An artificial erection test was conducted to see whether there is any remaining chordee. The urethral meatus was circumscribed by means of sharp dissection

Fig. 4
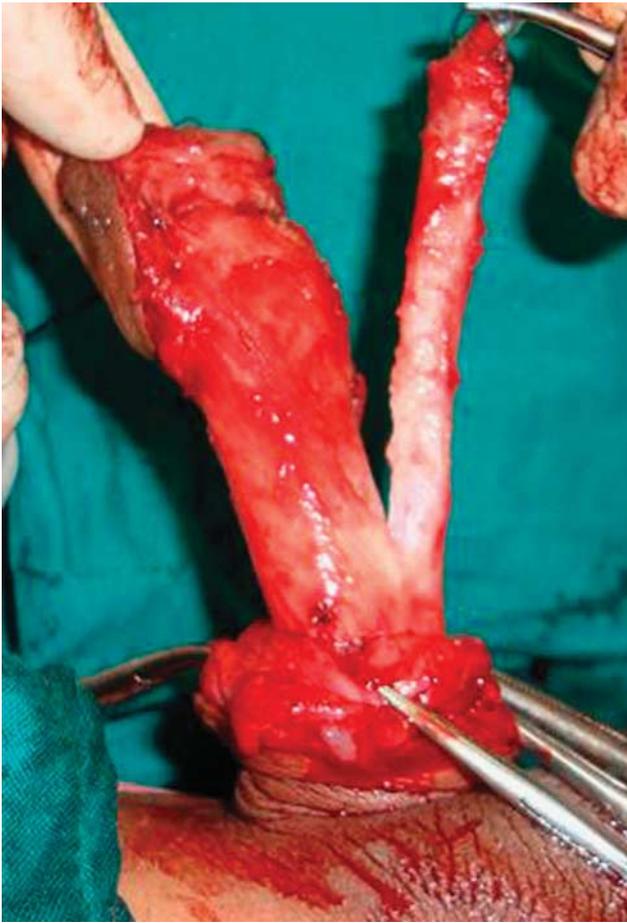
A case that required more proximal mobilization.

Fig. 5

Glans wrapped around the urethra.

Fig. 6

Wound closure.

and mobilization was started. The distal fanned thin corpus spongiosum was excised. Mobilization was continued through the avascular plane between the corpora cavernosa and corpus spongiosum using the catheter for gentle countertraction. Dissection was continued until a ratio of 4:1 to 5:1 was achieved between the length of the mobilized urethra and the initial distance measured and recorded from the urethral meatus to the distal margin of the glanular groove. Bleeding was controlled with a tourniquet. Glanular wings were developed and adequately mobilized laterally. The separated urethra was then measured against the straight penis. Further urethral mobilization was performed if needed to ensure a tension-free anastomosis between the glans and urethra. A 6-0 absorbable suture was placed on the dorsal aspect of the urethral meatus and through the most distal margin of the glans incision. The urethral meatus was further attached to the glans with interrupted sutures around three-fourths of the dorsal circumference.

The two glans wings were approximated over the urethra in two layers with 6-0 absorbable sutures. The meatal anastomosis was completed by placing ventral lateral sutures. The excess penile skin was resected. The skin was reapproximated with 6-0 absorbable sutures, and dressing was applied around the penis. The catheter was

secured with a glanular suture. The dressing was removed after 2 days (Figs 1–7).

Antibiotic ointment was applied to the penis with every diaper change for a few weeks.

Follow-up
Follow-up in the outpatients' clinic continued for 6 months to record any complications.

Fig. 7

Good meatal position with no stenosis or retraction, straight stream of urination.

Results

We operated on 30 boys between 9 months and 7 years of age (median 2 years). They underwent repair of glanular (5 cases), coronal (10 cases) and subcoronal hypospadias (15 cases). Six cases were circumcised, whereas 24 cases were uncircumcised. Chordee were present in 12 boys, which was mild in eight and moderate in four (Table 1).

All chordee were managed with cutaneous and dysplastic tissue dissection and needed no further techniques. The urethra was mobilized to the proximal shaft in almost all cases.

Three cases developed postoperative hematoma, which were managed conservatively and resolved spontaneously. Two cases developed wound infection and were managed with antibiotics and daily dressing until infection resolved.

Patients were discharged on the third postoperative day (except if complications such as hematoma or infection

Table 1   Patients' epidemiology

	n (%)
Age (years)	
1 or less	8 (26.6)
>1–5	20 (66.67)
>5–7	2 (6.675)
Meatus	
Glanular	5 (16.67)
Coronal	10 (33.3)
Subcoronal	15 (50)
Circumcision	
Yes	6 (20)
No	24 (80)
Chordee	
Non	18 (60)
Mild	8 (26.67)
Moderate	4 (13.3)
Penile torsion	
Yes	5 (16.67)
No	25 (83.3)

Table 2   Postoperative complications

	n (%)
Major	
Fistula	0
Urethral stricture	0
Minor	
Hematoma	3 (10)
Wound infection	2 (6.67)
Mild glanular disruption	1 (3.3)
Meatal stenosis	3 (10)
Meatal retraction	2 (6.67)

were present), and were advised to come back on the 10th postoperative day to have the catheter removed.

Follow-up of patients in the outpatient clinic continued for 6 months. None of the patients had major complications: dehiscence, urethral stricture, or fistula.

Three patients developed meatal stenosis, two of them responded to repeated dilatation twice weekly for 2 weeks, and one needed meatoplasty. In one patient, the most distal of the glans approximation sutures disrupted, leading to a minor detachment in the glans. There was no recurrent chordee. Two patients underwent meatal retraction in which the urethra migrated proximally but still within the glans; only one of these patients required a second procedure (Table 2).

Discussion

In 1977, Belman [8] reported his experience with wide urethral mobilization and advancement. Since then, many articles in the literature have reported experiences with the use of urethral advancement procedures, with several techniques and modifications described. The urethra can be mobilized partially down to the penoscrotal junction [9–11] or to the bulbar region [12,13]. Once mobilized, the urethra can either be tunneled into the glans [4,6,12] or placed over the corpora cavernosa through a ventrally incised glans [7,9,11,14].

The main drawbacks of this technique were meatal stenosis and the need for high degree of expertise in the surgeons to dissect the urethra without causing injury [15].

Although extensive mobilization of the male urethra may injure the urethral blood supply and lead to the development of spongiosclerosis or vascular erectile dysfunction, a short mobilization can cause chordee and failure due to a lack of tension-free anastomosis. We agree with Atala [3], who found that the urethra must be mobilized proximally until a 4 : 1 to 5 : 1 ratio is achieved between the length of the mobilized urethra and the initial distance measured from the meatus to the distal margin of the glanular groove. This ratio allows for a tension-free anastomosis, which is essential to avoid meatal retraction and curvature. This urethral length mobilization is easy to accomplish, but it requires patience and gentle dissection under loupe magnification.

To avoid meatal stenosis, we incised the glans deeply and glanular wings were mobilized adequately laterally in a manner similar to that described by Keramidas and Soutis [16]. El-Saadi [17] claimed that it is not sufficient to just incise the glans deeply down to the corpora cavernosa, but a wide glans dissection is needed to avoid meatal stenosis. Problems with glanular disruption, meatal retraction or stenosis, which have occurred when the urethra was tunneled into the glans, or the glans was just incised, may be avoided by performing a wide lateral mobilization of the glans wings. Recent reports incorporated the technique with preservation and tubularization of the urethral plate in the management of more proximal hypospadias [18]. In this study, we had three cases of meatal stenosis, although every effort was made to adequately incise and dissect the glans. Small glanular size plays a role in the development of latter stenosis.

We did not encounter any case with complications related to dissection of the urethra, such as recurrent chordee or spongiosclerosis. However, the follow-up period (6 months) is short to substantiate this result.

None of our patients developed urethral strictures as there was no anastomosis performed and therefore no obstructive complaints occurred. Most of the complications in our study were minor and acute and were treated conservatively in the hospital. All patients voided normally with a good urinary stream.

Conclusion

The urethral mobilization technique seems to be a good method for the repair of distal hypospadias with or without chordee with satisfactory cosmetic and functional results. The procedure has the advantage of avoiding the need for a second layer of tissue covering during repair. Moreover, there is no chance for development of urethrocutaneous fistula, a major postoperative complication of other surgical techniques creating a neourethra. Postoperative management is simple and a brief hospital stay is sufficient.

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