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Outcome of urethral mobilization and advancement after anterior hypospadias surgery

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Abstract

Background: In hypospadias surgery, despite continued refinement of various surgical procedures, there is no completely satisfactory technique in terms of complications and cosmesis. In recent literature, urethral mobilization and advancement (UMA) is gaining popularity in the management of distal penile hypospadias with no or very low complication rate as compared to all other techniques. The aim of this study is to share our results by using UMA in the management of anterior hypospadias with or without chordae.

Results: A total of 60 patients of anterior hypospadias having the mean age 57.15 ± 38.73 months were included. The mean length of hospital stay was 2.83 ± 1.33 days. The only peroperative complication was urethral injury during urethral mobilization seen in one patient. The most common postoperative complication was hematoma seen in five (8.3%) cases. Two patients (3.3%) had retraction of urethra. One patient had wound infection. Stenosis was labeled in four (6.6%). At 3 months follow-up, 93.3% patients had slit-like meatus and good urinary stream.

Conclusion: We found that UMA technique had good functional as well as excellent cosmetic outcome, so the technique can be adopted for anterior hypospadias correction.

Keywords: Urethral mobilization, Advancement, Anterior, Hypospadias

Background

Hypospadias is the most common congenital abnormality of urethra occurring in approximately 1 in 200 male live births which need surgical correction. The general principles of hypospadias surgery combine correction of the penile curvature and reconstruction of the neourethra to provide functional as well as cosmetically acceptable results [1]. Till now, more than 200 methods of original surgery for the treatment of hypospadias have been described and each termed differently. Despite continued refinement of various surgical procedures, there is no completely satisfactory technique in terms of complications and cosmesis [2].

About 100 years ago, Beck introduced a technique of advancement of distal urethra without urethral mobilization for correction of glanular hypospadias. Later on, Glassberg and

Waterhouse, Belman, and Koff adopted a method for extensive mobilization of the urethral canal and corpus spongiosum. Finally, Nasrallah and Minott reported the successful method of urethral mobilization [3].

Urethral mobilization is recommended mainly in the management of distal penile hypospadias [4]. Recent studies incorporated the technique with preservation and tubularization of the urethral plate in the management of more proximal hypospadias [5]. Over the last 1 year, we have used urethral mobilization from the penile shaft and advancement as the main technique in the management of coronal, subcoronal, and distal penile hypospadias with or without chordee. The aim of this study is to report our results in using urethral mobilization and advancement in the management of different types of hypospadias.

Methods

This was a prospective study conducted on patients admitted during the period from July 2017 to December 2018 at

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The Children's Hospital & Institute of Child Health, Lahore, after approval from the ethical committee. Patients with glanular, coronal, subcoronal, and distal penile hypospadias were included in the study. Recurrent cases of anterior, fresh, and recurrent proximal hypospadias were excluded. A self-structured proforma was used to collect the data. This proforma had portion includes the demographic details like age at presentation, medical record number, and date of admission and discharge. Second portion was subdivided under three headings: (I) *peroperative assessment* like circumcised or not, site and shape of the urethral meatus, shape of meatal groove, presence or absence of chordae, and quality of urinary stream; (II) *intraoperative complications* such as excessive bleeding, urethral injury, and failure of urethral advancement; and (III) *postoperative period* including complications after procedure and on follow-up. Duration of catheterization and hospital stay were also recorded. An informed signed consent was obtained from the parents of all patients included in the study. All the patients were followed up in the outpatients' clinic and continued for 3 months to record any complications.

The collected data was entered and analyzed by using SPSS version 20.

Surgical technique

The procedure was performed under general anesthesia with caudal block. A traction suture was placed through the glans, and a 6–8-Fr catheter was passed into the bladder. A circular incision was made dorsally at 3 mm proximal to the corona (Fig. 1). 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 if there is any residual chordee. The urethral meatus was circumscribed by means of



Fig. 1 Marking of incision around the meatus

sharp dissection and mobilization started. The distal 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 adequate length of urethra is achieved to reach the distal margin of the glanular groove (Fig. 2). Bleeding was controlled with a tourniquet. Glanular wings were developed and adequately mobilized laterally. A 6-0 absorbable (PDS) 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 PDS 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 (Fig. 3), and dressing was applied around the penis. The catheter was secured with a glanular suture. The dressing was removed after 2 days. Antibiotic ointment was applied to the penis with every diaper change for 2 weeks.

Results

A total of 60 male patients of anterior hypospadias were selected for this study. The age of the patients was between 16 and 144 months, and the mean age was 57.15 ± 38.73 months. The mean duration of catheterization was 3.75 ± 1.23 days. The mean length of hospital stay was 2.83 ± 1.33 (Table 1).

Anterior hypospadias were further divided into glanular, subcoronal, and distal penile type according to the location of external urethral meatus, and we found 52.50% were subcoronal, 40% were distal penile type, only 7.50% cases were of glandular type.



Fig. 2 Urethral mobilization to achieve adequate length



Fig. 3 Skin reapproximated with 6-0 absorbable sutures

Each patient was assessed peroperatively after the induction of anesthesia, and the characteristics shown in Table 2 were noted.

Complications were divided into peroperative complications and postoperative complications. The only peroperative complication was urethral injury during urethral mobilization seen in one patient which was repaired at the time of surgery. The most common immediate postoperative complication was hematoma seen in five (8.3%) cases; all patients with hematoma were managed conservatively. Two patients (5%) had retraction of the urethra for which redo surgery was carried out; in both cases, meatal advancement glanuloplasty (MAGPI) procedure was performed. Only one patient had wound infection. After 2–3 weeks of surgery, four (6.6%) patients had narrow urinary stream and labeled as stenosis; these patients were managed with urethral dilatation weekly for 2 to 3 weeks. At 3 months follow-up, 93.3% patients had slit-like meatus and good urinary stream (Table 3).

Table 1 Showing mean age, duration of catheterization, and length of hospital stay of patients

<i>N</i> = 60	Mean ± SD
Age (months)	57.15 ± 38.73
Duration of catheterization (days)	3.75 ± 1.23
Length of hospital stay (days)	2.83 ± 1.33

Table 2 Preoperative findings the patients

	<i>N</i> = 60
Circumcised	
Yes	10 (16.6%)
No	50 (83.3%)
Chordae	
Yes	40 (66.6%)
No	20 (33.3%)
Shape of meatus	
Pinpoint	46 (76.6%)
Adequate	14 (23.3%)
Depth of meatal groove	
Shallow	44 (73.3%)
Deep	16 (26.6%)

Discussion

Hypospadias is classified in various types on the basis of meatus location, i.e., glanular, subcoronal, coronal, distal, mid-penile, proximal, penoscrotal, scrotal, and perineal [6]. Hypospadias distal to the mid-penile shaft is called anterior hypospadias or distal penile hypospadias. Single-stage urethroplasty or advancement procedures are advocated for its correction [7]. Common techniques under practice are the MAGPI, the glans approximation procedure (GAP), the Mathieu, and the Snodgrass modification and urethral mobilization and advancement [8].

Table 3 Complication and finding on follow-up

Preoperative	
Excessive bleeding	0 (0%)
Urethral injury	1 (1.6%)
Failure of urethral advancement	0 (0%)
Postoperative	
Wound site infection	1 (1.6%)
Stenosis	4 (6.6%)
Hematoma	5 (8.3%)
Retraction	2 (3.3%)
Urethral fistula	0 (0%)
Urethral ischemia	0 (0%)
Chordae	0 (0%)
Torsion	0 (0%)
Follow-up at 3 months	
Meatus shape	
Slit-like	56 (93.3%)
Narrow	4 (6.6%)
Urinary stream	
Good	56 (93.3%)
Poor	4 (6.6%)

The patients with anterior hypospadias were aged between 16 and 144 months. Hammouda et al. corrected the anterior hypospadias in a similar age group. We found the mean time for removal of catheter as 3.75 ± 1.23 days, and the results were comparable with Hammouda et al. as they kept the catheter for 24 h after urethral mobilization [9]. However, Hashish et al. reported that they removed the catheter immediately after surgery. The result of the present study showed that the mean hospital stay was 2.83 ± 1.33 , while Hashish et al. mentioned that the hospital stay was 2 to 10 days [3].

The only per-operative complication was urethral injury during urethral mobilization in one patient in our study. Hamdy and colleagues also faced one urethral injury in their case series of 46 patients [10]. In our study, hematoma was seen in three (7.5%), retraction of urethra in two (5%), and wound infection in one patient. Atala also operated with a similar technique and found hematoma in one patient and urethral retraction in two patients; however, infection rate was not mentioned [5].

We saw no urethrocutaneous fistula or urethral stricture after UMA procedure, and our results were comparable with various authors [3, 5, 9–13].

Conclusion

On the basis of our study results, we found that UMA technique had good functional as well as excellent cosmetic outcome, so the technique can be adopted for anterior hypospadias correction. UMA technique is effective as technically there is no chance of postoperative urethrocutaneous fistula formation which is the most common reason of redo surgery after hypospadias repair with other techniques.

Abbreviations

GAP: Glans approximation procedure; MAGPI: Meatal advancement and glanuloplasty; PDS: Polydioxanone suture; UMA: Urethral mobilization and advancement

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Authors' contributions

NH designed the study, conducted the study, performed the surgeries, and wrote the manuscript. IH performed the surgeries and helped in collecting the data. MA interpreted and analyzed the data and helped in writing the manuscript. ARW helped and guided throughout the study. SH kept the proforma, helped in the follow-up of the patients, and recorded findings on the proforma. AH assisted the surgeries and data collection. MS gave the idea of the study, performed the surgeries, and proofread the manuscript. All authors have read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was conducted after ethics approval from the ethical review board of The Children's Hospital & Institute of Child Health, Lahore. An informed written consent was taken from the parents of the patients to participate in the study.

Any reference number is not given by the ethical review board.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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