

# Urethral advancement procedure in the treatment of primary distal hypospadias: a series of 20 cases

Mohamed S. Hashish, Mohamed I. Elsayaf and Mohamed A. Moussa

**Introduction** Distal hypospadias is the most common genital anomaly, occurring in almost 65% of all hypospadias cases. Although there are several surgical techniques for the treatment of distal hypospadias, it is clear that none can be used to correct all forms of hypospadias. The aim of the study was to evaluate urethral advancement in the repair of primary distal penile hypospadias with regard to feasibility, complication rates and the final cosmetic outcome.

**Patients and methods** Between October 2014 and June 2015, the urethral mobilization technique was used in 20 patients who presented at the Pediatric Surgery Unit, Tanta University Hospital, with primary distal hypospadias. A submeatal crescent-like incision was performed a few millimeters proximal to the meatus with two vertical incisions from the lateral ends of the submeatal incisions. The urethra within the corpus spongiosum was dissected from the skin of the ventral surface and from the glans and corpora cavernosa for a distance of  $\sim 4:1$ . The urethra was advanced till the urethral meatus reached its normal position without any tension. Spongioplasty can be performed, and covering Buck's or Dartos' layers can be used. The follow-up was conducted on a weekly basis in the outpatient clinic in the first month, and then every month for 6 months.

**Results** The age of the patient at the time of operation ranged from 6 to 24 months, with a mean age of 10.5 months. The operative time ranged from 60 to 90 min, with a mean time of 73.5 min. Intraoperative urethral injury

occurred only in one patient. In all patients, the catheter was removed immediately postoperatively except for one patient who had operative urethral injury. Deep wound infection was noticed in only one patient, followed by partial glanular disruption. Only one patient had urethrocutaneous fistula and two patients had meatal retraction.

**Conclusion** Urethral advancement can be used safely in the mobilization of the distal urethra with wide glanular dissection and wide lateral mobilization of glanular wings. However, it should be stressed that in the presence of hypoplastic distal urethra and/or persistent ventral curvature, another technique should be adopted. The majority of our patients had very good cosmetic results and minimal complication. However, the technique requires further studies with a larger number of patients and longer follow-up periods to draw more precise and final conclusions. *Ann Pediatr Surg* 13:29–37 © 2017 Annals of Pediatric Surgery.

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**Keywords:** distal hypospadias, primary, urethral advancement

Pediatric Surgery Unit, Department of Surgery, Tanta University Hospital, Tanta, Egypt

Correspondence to Mohamed S. Hashish, MD, PhD, Pediatric Surgery Unit, Department of Surgery, Tanta University Hospital, Tanta 31111, Egypt  
Tel: +20 100 351 4397; fax: +20 403 311 5000;  
e-mail: dr\_mohamed\_hashish@yahoo.com

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## Introduction

Distal hypospadias is the most common genital anomaly, occurring in almost 65% of all hypospadias cases. Distal hypospadias is classified according to the meatal position into glanular, coronal, and subcoronal up to 3–4 mm proximal to the coronal sulcus [1].

The major goal of hypospadias surgery has been the achievement of excellent cosmetic and functional results without complications in order to create normal voiding in a straightforward direction from the tip of the glans with normal appearance of the penis [2]. There are several surgical techniques for the treatment of distal penile hypospadias. However, it is clear that none can be used to correct all forms of hypospadias [3].

Beck and Hacker (1898) presented a special technique for the distal type of hypospadias without chordee. They undermined and mobilized the urethra and advanced it into the glans. Tunneling of the glans was performed with the help of a trocar-like instrument [4]. This technique was made popular by Belman in 1977, Waterhouse and Glassberg in 1981 and Koff in 1981 [2,4]. Distal urethral advancement

involves moving the distal urethra 0.5–1 cm. This procedure is based on the amenability of the urethra for mobilization and advancement to the tip of the glans [4].

The aim of the study was to evaluate urethral advancement in the repair of primary distal penile hypospadias with regard to feasibility, complication rate, and the final cosmetic outcome.

## Patients and methods

Between October 2014 and June 2015, the urethral mobilization technique was used in 20 patients who presented in the Pediatric Surgery Unit, Tanta University Hospital, with primary distal hypospadias. We included in this study all patients presenting with primary distal penile hypospadias (glanular, coronal, and subcoronal up to 3–4 mm proximal to the coronal sulcus) including those with small glans and a poorly developed urethral plate.

However, we excluded from our study all patients with mid-penile and proximal types of hypospadias, patients aged less than 6 months, patients with a small phallus, patients with a hypoplastic urethra, recurrent and crippled

cases, patients with severe chordae, and patients with associated major cardiac anomalies.

All patients were subjected to full history taking including complete medical history of the patient and his mother during pregnancy, complete general examination for milestones and growth, and any associated congenital anomaly.

Meticulous local examination was performed carefully with attention to the site and size of the meatus, the presence or absence of chordae and its severity, glans configuration, circumcised or not, shape of the prepuce, width of the urethral plate, presence of torsion and force and caliber of the urinary stream.

The study protocol was fully approved by legal ethical committee in Tanta university hospital research committee (approval number: TUH 41042014).

### Operative technique

- (1) The operation was performed under general anaesthesia with third-generation cephalosporin administered (100 mg/kg) with induction of anaesthesia. Calibration of the urethral meatus was performed first if the meatus was narrow; meatal dilation was performed using 8 Fr Nelaton's catheter; if failed, dorsal meatotomy was necessary. Measurements of the distance from the meatus to the tip of the glans were recorded.
- (2) The glans was stabilized with a longitudinal midline dorsal stay suture. A urinary catheter was inserted with a tourniquet placed on the root of the penis. A submeatal crescent-like incision was performed a few millimeters proximal to the meatus, and two vertical incisions beginning from the lateral ends of the submeatal incisions were made to converge at the tip of the glans, thus forming a triangular configuration around the meatus and the glanular groove (Pic. 1).
- (3) The stay suture was inserted at the tip of the meatus, the meatus was circumscribed and the urethra within the corpus spongiosum was dissected from the skin of the ventral surface and from the glans and corpora cavernosa within a plane behind the urethra, which was easily reached from the top of the triangular incision. Special attention was paid to preservation of both the urethra and the thin penile skin, thus avoiding the risk postoperative fistula formation (Pic. 2).
- (4) The mobilization of the urethra was completed when the urethral meatus could reach the tip of the glans without tension. The urethra within the corpus spongiosum was dissected for a length of ~4:1.
- (5) In order to release any remaining chordae, two lateral incisions were made along the coronal sulcus, each of them including up to one-quarter of the circumference of the sulcus. Wide mobilization of the glanular wings was performed to create a conical glans.
- (6) The urethra was advanced till the urethral meatus reached its normal position without any tension. Suturing of the meatus to the tip of the glans and tucking of the urethra using dorsal suture with the glanular tissue were carried out. The two glanular wings were sutured into two layers over the urethra, burying it without tension. Spongioplasty can be

**Pic. 1**



Tourniquet placement and circumeatal incision.

performed, and covering Buck's or Dartos' layers can be used (Pics 3 and 4).

- (7) The skin was closed starting in the coronal area with removal of the urinary catheter immediately postoperatively. Patients were discharged on the second postoperative day after ensuring normal voiding (Pic. 5).

### Follow-up

The follow-up was conducted on a weekly basis in the outpatient clinic in the first month, and then every month for 6 months. It included observation of the meatus and glans regarding meatal retraction, meatal stenosis, wound dehiscence, wound infection or hematoma, urine stream and the final cosmetic outcome.

### Results

Our study included 20 male infants who suffered from distal hypospadias in the Pediatric Surgery Unit, Tanta University Hospital, Egypt. They all had hypospadias repair using urethral mobilization.

### Demographic data

The age of our patients at the time of presentation ranged from 1 to 180 days. The majority of our patients (14 patients) were discovered during routine neonatal examination, whereas two patients were discovered at attempted circumcision. The age of the patients at the time of operation ranged from 6 to 24 months, with a mean  $\pm$  SD age of  $10.5 \pm 4.2$  months. A history of consanguinity was found in five (25%) patients, whereas

**Pic. 2**



Stay sutures in the urethra, glanular tip and wings; dissection of the urethra within the corpus spongiosum.

**Pic. 3**



The urethra reaches the tip of the glans without tension and Suturing of the meatus to the tip of the glans.

**Pic. 4**



First-layer closure of glanular wings.

**Pic. 5**



Removal of the urinary catheter immediately postoperatively.

the incidence of associated anomalies was presented in only four (20%) patients Table 1.

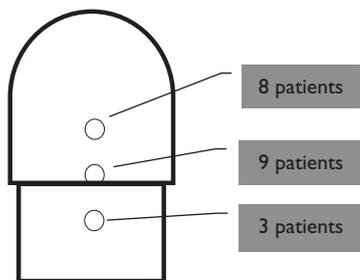
**Preoperative examination**

Eight (40%) patients had glanular hypospadias, nine (45%) patients had coronal hypospadias and three (15%) patients had subcoronal hypospadias (Fig. 1). Three

**Table 1 Demographic data for cases with distal hypospadias**

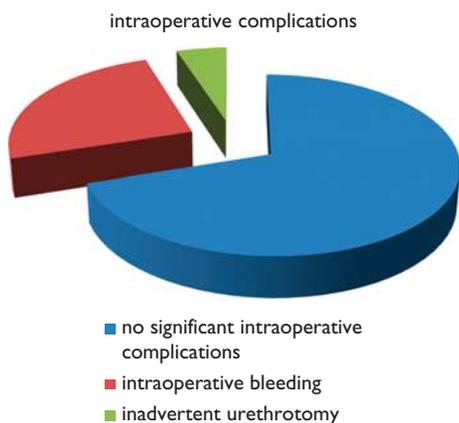
	Results [n (%)]
Age of presentation (days)	
Range	1–180
Mean ± SD	14.9 ± 40.6
Mode of presentation	
Neonatal examination	9 (45)
Relatives	8 (40)
At circumcision	2 (10)
At pediatric clinic	1 (5)
Weight at surgery (kg)	
Range	6–12
Mean ± SD	10.2 ± 3.2
Age at surgery (months)	
Range	6–24
Mean ± SD	10.5 ± 4.2
Family history	
Positive consanguinity	5 (25)
Similar condition	2 (10)
Associated anomalies	
Cardiac anomalies	1 (5)
Congenital inguinal hernia	2 (10)
Undescended testis	2 (10)

**Fig. 1**



Meatal position in our patients.

**Fig. 2**



Intraoperative complications.

(15%) patients had stenosis of the meatus and complained of straining during micturition; a 6Fr Nelaton’s catheter could be inserted in two cases, and one case had a pin-hole meatus. The width of the urethral plate ranged between 7 and 11 mm, with a mean ± SD width of 8.25 ± 1.68 mm. However, only one (5%) patients was circumcised at the age of 2 weeks. Regarding the chordee, only five (25%)

patients had mild chordee due to skin tethering, and two (10%) of them had significant torsion.

**Operative data**

The operative time ranged from 60 to 90 min, with a mean ± SD time of 73.5 ± 8.44 min. The five patients with skin chordee had complete degloving of the penis, which resulted in good intraoperative orthoplasty, whereas the remaining 15 (75%) patients had incomplete degloving as required for mobilization and advancement of the urethra. Meatal dilatation was performed in three (15%) patient who had meatal stenosis using an 8Fr Nelaton catheter intraoperatively.

**Operative complications**

Inadvertent urethral injury occurred in one (5%) patient, whereas intraoperative bleeding occurred in five (25%) cases, which was easily controlled by bipolar electrocautery. No significant intraoperative complications occurred in 14 patients (Fig. 2 and Table 2).

**Postoperative data**

In all patient, the catheter was removed immediately postoperatively, except for one (5%) patient who had

**Table 2 Operative and postoperative complication**

	n (%)
Operative complications	
Urethral injury	1 (5)
Intraoperative bleeding	5 (25)
Early postoperative complications	
Edema	4 (20)
Haematoma	2 (10)
Wound infection	3 (15)
Partial glanular disruption	1 (5)
Late postoperative complications	5 (25)
Meatal stenosis	3 (15)
Meatal retraction	3 (15)
Distorted meatus	3 (15)
Penile torsion and angulation	2 (10)
Urethrocutaneous fistula	1 (5)

**Pic. 6**



Postoperative edema.

inadvertent urethrotomy and had the catheter removed on the seventh postoperative day. In all patients, the dressing was removed at the second postoperative day. The patients stayed in the hospital for 2–10 days postoperatively, with mean  $\pm$  SD time of  $2.4 \pm 1.7$  day. Only one patient stayed for 10 days due to partial glanular disruption after removal of the catheter on the seventh day.

### Postoperative complications

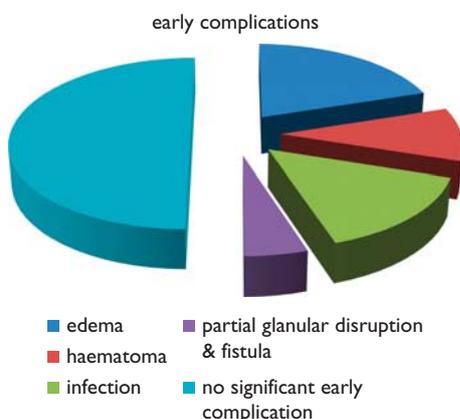
#### Early postoperative complications

Edema occurred in four (20%) patient and was treated by antiedematous agents (Pic 6). Two (10%) patients had a small haematoma and were treated conservatively by compression. Three (15%) patients had superficial wound infection and had daily dressing and stayed in the hospital for 6–7 days. One (5%) patient had deep wound infection followed by partial glanular disruption. The catheter of this patient was blocked on the fifth postoperative day, and was irrigated with normal saline and removed at the seventh postoperative day with appearance of fistula at removal of the catheter. This patient was discharged from the hospital on the 10th postoperative day with recommendation of daily dilatation with 8Fr Nelaton's catheter (Fig. 3 and Table 2).

#### Late postoperative complications

Five (25%) patients had significant late postoperative complications. One patient had meatal stenosis and urethrocutaneous fistula, two had meatal retraction, distortion and stenosis, one had meatal retraction and distortion with  $10^\circ$  curvature during erection and one had  $10^\circ$  curvature during erection with no other complications. The three (15%) patients who had meatal stenosis responded well to daily dilatation with 8Fr Nelaton's catheter and no further surgical intervention was required, except for one patient who had urethrocutaneous fistula (5%). He had fistula closure 6 months after the operation using the purse sting technique. The three (15%) patients who had meatal retraction required no further surgical intervention as the meatus remained within the glans (Pics 7 and 8 and Table 2).

Fig. 3



Early postoperative complications.

### Follow-up

The follow-up was conducted on a weekly basis in the outpatient clinic in the first month, and then every month for 6 months (Pic 9).

### Discussion

Hypospadias is a common congenital anomaly that is characterized by incomplete development of the anterior urethra with an incidence of 3/1000 live male births [2]. The major goal of hypospadias surgery has been the achievement of excellent cosmetic and functional results without complications in order to create normal voiding in a straightforward direction from the tip of the glans with normal appearance of the penis [2].

There are a lot of surgical techniques for the treatment of distal hypospadias. However, it is clear that none can be used to correct all forms of hypospadias [3]. These techniques include urethral mobilization (1898) [2], the Paulus technique (1993) and its modification [5], meatal advancement and glanuloplasty incorporated (1981) [6], glanular approximation procedure (1984) [7], tubularized incised plate (1994) and its modification [8] and meatal mobilization (2007) [9].

The current study was conducted on 20 patients presenting to the Pediatric Surgery Unit, Tanta University Hospitals, with primary distal hypospadias from

Pic. 7



Urethrocutaneous fistula.

October 2014 to June 2015 and had primary repair using urethral mobilization. Atala *et al.* [10], Paparel *et al.* [11], Hassan *et al.* [12], Awad Mohamed *et al.* [13] and Elemen

*et al.* [14] reported operating on 73, 26, 30, 72 and 47 patients, respectively. Türken *et al.* [15] reported successful results in 42 cases [2,15]. Ekinçi *et al.* [2] and

**Pic. 8**



Meatal distortion, meatal migration and meatal stenosis.

**Pic. 9**



Postoperative photographs of multiple patients.

Alkan *et al.* [16] also used the urethral mobilization technique in 171 patient and 71 patients respectively with satisfactory results.

In our study, the age of our patients at operation ranged between 6 and 24 months, with a mean  $\pm$  SD age of  $10.5 \pm 4.2$  months. Ekinici *et al.* [2] reported a mean age at surgery of 4.5 (range: 1–17) years. Alkan *et al.* [16] reported a mean age at operation of  $5.9 \pm 3.1$  years. Atala *et al.* [10] reported an age range of 4 months to 12 years. Paparel *et al.* [11] reported a mean age of 36.3 (14–117 months) months. Hassan *et al.* reported an age range between 9 months and 7 years [12]. Awad Mohamed *et al.* [13] reported a mean age of 2.8 years, with a range of 2–18 years. Elemen *et al.* [14] reported a mean  $\pm$  SD age of  $32.76 \pm 23.65$  months. The age at the operation in our study was the lowest among reviewed literature, but it agrees with the standard timing of primary hypospadias repair. The advantages of early surgery include easier after-care, which includes better restraint for hygienic purposes and less likelihood of urinary catheter dislodgement, less separation anxiety, less need for analgesia, less postoperative emotional disturbance, and better parent-infant bonding [17,18].

The operative time ranged from 60 to 90 min, with a mean  $\pm$  SD time of  $73.5 \pm 8.44$  min. Elemen *et al.* [12] reported a mean operation time of  $58.82 \pm 22.87$  min, and Awad Mohamed *et al.* [11] reported a mean operative time ranging from 30 to 50 min, with an average of 45 min.

Mcgowan and Waterhouse [19] reported that there is a fine network between the urethral branch of the internal pudendal artery and terminal branches of the dorsal penile artery, which creates an important vasculature of the urethra [20]. In our study, we found that the fear of devascularization due to urethral mobilization seems to be absent, in agreement with Haberlik *et al.* [21]. A wide glanular dissection is needed. It is not sufficient to just incise the glans deeply down to the corpora cavernosa. We avoided problems such as glanular disruption, meatal stenosis or retraction by performing a wide lateral mobilization of the glanular wings, which allowed sufficient glanular tissue in each glanular wing to be secured well to each other. Care must be taken to ensure that the glans closure is not tight around the urethra. This agreed with the technique reported by Atala *et al.* [10], who emphasized the importance of wide glanular dissection.

Problems related to this procedure are related to the risk of impaired blood supply of the mobilized urethra, penile curvature and meatal stenosis. The normal bulbopenile urethra has a primary antegrade blood supply from the posterolateral bulbar vessels and secondary retrograde vascularization from the glans [22,23]. A critical issue that minimizes the rate of delayed ischaemic stenosis in our study was that we did not mobilize the urethra for a distance more than four times the needed length for the hypospadiac meatus to reach the glanular tip. Adequate mobilization is mandatory as under-mobilization will lead to curvature or meatal retraction and over-mobilization will also lead to curvature and stenosis due to ischaemia

and fibrosis of the distal urethra. We strictly applied this point to all our cases, in contrast to Atala *et al.* [10], who mobilized more from the midshaft to distal hypospadias (14 glanular, 38 subglanular and 20 midshaft), and hence reported meatal retraction that required surgical correction. This point is agreed by Hammouda *et al.* [24] on urethral advancement for anterior hypospadias. Three-fold penile urethral mobilization, deep interballanitic incision and wide dissection of the glans can provide a slit-like orthotopic meatus with conical glans [24]. In the present study, we started urethral dissection distally from the hypospadiac meatus with adequate tissue around it to prevent meatal stenosis, and then dissection progressed proximally in the avascular plane between the corpus spongiosum and the corpora cavernosa.

The urethral mobilization technique had many advantages in distal redo cases with unhealthy scarred urethral plate and glanular tissue. However, reports of urethral mobilization in recurrent distal hypospadias are few in the literature, except for a study conducted by Elemen and Tugay [25]. Another study by Negm *et al.* [26] reported redo of 15 recurrent hypospadias cases with two incidence of postoperative meatal stenosis and one incidence of fistula. Also, Karamürsel *et al.* [27] reported the use of urethral advancement for recurrent distal hypospadias fistula treatment where they carried the fistulous opening to the glans tip with extensive urethral mobilization and advancement. In our study, we excluded recurrent cases as the choice of technique in these cases depended considerably on the expertise of the surgeon and the condition of the penis. Also, working on primary cases allows better assessment of the technique and better evaluation of results.

The urethral mobilization technique has two main limitations. First, its use in proximal hypospadias is not feasible. It is not advised to use this technique in cases where the distance between the hypospadiac meatus to the proposed position is more than 2 cm. Furthermore, the release of chordee may increase the distance between the urethral meatus and the glans, and the use of this technique in greater distance may apparently result in secondary chordee and even penile shortening [2,21]. The second limitation of the urethral mobilization technique is the presence of a thin and transparent urethra proximal to the meatus. High skill and meticulous dissection is necessary to avoid injury to the urethra, which may lead to fistula formation. When a thin urethra was present, some authors extended the urethral mobilization length slightly more to be ready to excise this portion after repositioning and securing the urethra in the glanular wings if needed [28]. In our study, we excluded patients with mid-penile and proximal hypospadias and those with hypoplastic distal urethra.

In our study, we did not use a postoperative urethral stent except in one patient who had intraoperative inadvertent urethrotomy who had the catheter placed for 7 days, thus avoiding the complications that may arise from the presence of a urethral catheter. These include catheter-associated infection, mechanical pressure of the catheter over the suture line with its ischaemic effect and the possibility of its obstruction in the early phases of wound

healing with the bad consequences of wound soiling. Ekinci *et al.* [2] left the urethral catheter for a mean  $\pm$  SD duration of  $2.3 \pm 0.5$  days. Alkan *et al.* [16] left the urethral catheter for a mean  $\pm$  SD duration of  $4.64 \pm 1.07$  days. Atala *et al.* [10] left the urethral catheter overnight. Awad Mohamed *et al.* [13] reported removal of catheter after 48 h. Elemen *et al.* [14] reported a mean catheter stay period of  $4.00 \pm 1.63$  days. None of our patients developed urinary retention postoperatively. Awad Mohamed *et al.* [13] reported, among their 72 patients, postoperative urine retention in seven (9.7%) patients and one of them required bladder drainage.

In our study, edema occurred in four (20%) patient and was treated medically. To our knowledge, there were no reports on the rate of postoperative edema in the reviewed literature. Two (10%) patients had a small hematoma and were treated conservatively by compression. Three (15%) patients had superficial wound infection and had daily dressing and stayed in the hospital for 6–7 days. One (5%) patient had deep wound infection followed by partial glanular disruption. The catheter of this patient was blocked at the fifth postoperative day and was irrigated with normal saline and was removed at the seventh postoperative day with appearance of fistula at the removal of catheter. This patient was discharged from the hospital on the 10th postoperative day with recommendation of daily dilatation with 8 Fr Nelaton's catheter. None of our patients developed urine retention. Hassan *et al.* [12] reported, among their 30 patient, three cases of postoperative hematoma (10%), which were managed conservatively and resolved spontaneously. This was similar to the incidence of hematoma in our study. Two (6%) patients developed wound infection and were managed with antibiotics and daily dressing until infection resolved. In one (3%) patient, the most distal of the glans approximation sutures disrupted, leading to a minor detachment in the glans [12]. Ekinci *et al.* [2] reported no early complications such as bleeding, hematoma and wound infection. Paparel *et al.* [11] reported, among their 26 patients, four cases of postoperative bleeding (15%) and one of them had to be taken back to the theatre to stop the bleeding. Atala *et al.* [10], among their 73 patients, reported a single case of postoperative haematoma (1.3%).

In our study, five (25%) patients had late postoperative complications. One had meatal stenosis and urethrocutaneous fistula, two had meatal retraction, distorsion and stenosis, one had meatal retraction and distorsion with  $10^\circ$  curvature during erection and one had  $10^\circ$  curvature during erection with no other complications. The latter two patients with curvature had penile torsion ( $> 30^\circ$ ). The three (15%) patients who had meatal stenosis responded well to daily dilatation with 8 Fr Nelaton's catheter and no further surgical intervention was required, except for one (5%) patient who had urethrocutaneous fistula. He had fistula closure 6 months after the operation using the purse sting technique. Three (15%) patients who had meatal retraction required no further surgical intervention as the meatus remained within the glans. Three (15%) patients had a distorted meatus: two of them resulted from superficial wound infection and one from a flat glans. Hassan *et al.* [12]

reported, among their 30 patients, three (10%) patients who developed meatal stenosis: two (6%) of them responded to repeated dilatation twice weekly for 2 weeks and one (3%) needed meatoplasty. There was no recurrent chordee. Two (6%) patients underwent meatal retraction, wherein the urethra migrated proximally but still within the glans; only one of these patients required a second procedure [12]. Awad Mohamed *et al.* [13] reported, among their 72 patients, one patient who developed a big fistula (1.3%) in which the urethra was retracted to its primary site due to poor postoperative management and wound infection followed by wound dehiscence and cut-through. Four (5.5%) patients developed meatal stenosis and were treated by urethral dilatation twice weekly for 3 weeks without anaesthesia [13]. Ekinci *et al.* [2], among their 171 patients, reported four (2%) cases of meatal stenosis, four (2%) cases of fistula, four (2%) cases of meatal regression and four (2%) cases of glanular dehiscence. Alkan *et al.* [16] reported, among their 71 patients, three (4%) patients with a slightly glanular urethral meatus and six (8%) patients with a decrease in calibration during urination, which responded to meatal dilatation. No fistula had occurred [16]. Paparel *et al.* [11] reported, among their 26 patients, five (19.2%) who presented with a late meatal stenosis, requiring a secondary meatotomy. This incidence of stenosis is close to that reported in our study. One had a urethral fistula that disappeared spontaneously a few months later. Atala *et al.* [10], among their 73 patients, reported two patients with meatal retraction wherein the urethra migrated proximally but still within the glans. Only one of these patients required a second procedure.

## Conclusion

The technique used in our study comprises meticulous mobilization of the distal urethra, wide glanular dissection and wide lateral mobilization of glanular wings. One layer of sutures is used to approximate the glans over the urethra and a second layer is used to close the glanular skin. This can provide a slit-like orthotopic meatus with conical glans. It should be emphasized that in the presence of hypoplastic distal urethra and/or persistent ventral curvature after penile skin degloving, another technique should be adopted. The technique can be used regardless of the presence of an unhealthy narrow urethral plate, a shallow glanular groove or a flat or small glans.

The majority of our patient had a distal glanular vertical slit-like meatus with a single forward urine stream, straight erection with no curvature or torsion acorn-shaped glans, no fistula and no scar or linear scar in the penile skin. However, the technique requires further studies with a larger number of patients and longer follow-up periods to draw more precise and final conclusions.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

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