

The Meatal Mobilization (MEMO) Technique for distal Primary and Recurrent Hypospadias

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ABSTRACT

Background: Hypospadias is one of the most common congenital anomalies of the male genito-urinary system. Hypospadias repair aims to provide excellent functional and cosmetic results. Urethral mobilization and advancement of the native urethra are considered a useful technique for distal hypospadias.

Aim: To report our results in urethral mobilization and advancement in distal hypospadias management.

Methods: A total of 76 patients with distal hypospadias were treated with meatal mobilization and advancement techniques during the study period between June 2015 and June 2019 in Al-Jadryia private hospital in Baghdad. A description of the technique and postoperative results recorded.

Results: A total of 76 patients included in this study, 69 had primary distal hypospadias, and seven patients previously failed distal hypospadias repair. The mean age at the time of operation was 20 months, and the mean operation time was 70 minutes. The only intraoperative complication was a urethral injury, which occurred in 5 patients. Postoperative hematoma developed in 4 patients, and three patients had a wound infection, and six patients had postoperative edema. However, all of them responded to conservative treatment. Urethrocutaneous fistula developed in 5 patients, the revision was needed in all of them. Meatal stenosis occurred in 4 patients; two of them responded well to gentle urethral dilatation, whereas the remaining 2 required meatotomy under general anesthesia. Meatal retraction, and mild residual chordee, were developed in 2, and 2 cases, respectively, and no further operative intervention was needed in the four patients. In all patients, the catheter was removed on the 5th postoperative day. The overall success rate was (93.4%).

Conclusion Urethral mobilization technique resulted in excellent cosmetic and functional outcomes with a low complication rate. It is suitable for patients with distal hypospadias, including patients requiring redo urethroplasty. It has a low chance of urethrocutaneous fistula, especially in primary cases with low postoperative complications.

Keywords: MEMO, urethral mobilization, distal hypospadias.

INTRODUCTION

Hypospadias is one of the most common congenital anomalies in the male genitourinary system, with an incidence of 1 in 300 male newborns¹. Although the incidence is increasing worldwide^{2,3}. Distal hypospadias represents about 75% of all hypospadias cases⁴. It further classified according to the meatal position into glandular, coronal, and subcoronal types⁵. Surgical reconstruction is the only treatment option for hypospadias⁶. The main goal of hypospadias repair is to provide excellent functional and cosmetic outcomes with a short hospital stay. (7-9) More than 300 surgical procedures for hypospadias repair have been described in the literature¹⁰. There are several surgical techniques for the treatment of distal penile hypospadias. However, none can be used to correct all forms of hypospadias². A technique of urethral advancement without urethral mobilization was first described by Beck in 1898¹¹. Later on, various modifications on urethral advancement were introduced (Various authors subsequently modified this original technique)¹²⁻¹⁹. Based on the procedure described by Beck, the meatal mobilization (MEMO) technique was developed to correct distal hypospadias. Limited urethral mobilization (LUM) urethroplasty and meatal mobilization (MEMO) urethroplasty, are techniques which have been developed on a concept introduced by Beck. Urethral mobilization and meatal advancement with many modifications were found to be a safe procedure and recommended mainly in the management of distal penile hypospadias in distal

hypospadias repair^{20,21}. This research aims to disclose our findings in the management of distal hypospadias with urethral mobilisation and development.

METHODS

Patient and method: A prospective study of 76 patients with distal hypospadias was managed by the meatal mobilization technique over the period from June 2015 to June 2019, Al-Jadryia private hospital in Baghdad. Patients' age at surgery ranged from 5 months to 14 years.

Inclusion criteria: The study was suitable for patients with distal hypospadias and patients with distal hypospadias with previously failed tabularized incised plate urethroplasty (TIP).

Exclusion criteria: Patients with distal hypospadias who were treated by other procedures, patients with midshaft and proximal hypospadias, and patients with distal hypospadias with chordae more than 20 degrees after penile degloving, were excluded from the study.

A first database had been used, including variables of age, full history, including medical history and history of other diseases, type of hypospadias, complications, and follow up period. Complete clinical evaluation and assessment were made by physical examination, including general and local examinations. Preoperative routine investigations were done and written informed consent was taken from each patient's parent or guardian.

Surgical technique: Operations did under general anesthesia with the administration of antibiotics during the

induction of anesthesia. Traction suture 4/0 vicryl was placed through the glans. An 8-10Fr urethral stent was introduced into the bladder according to the age of the patient and appropriate for the meatus. A rubber tourniquet was placed on the root of the penis at the penoscrotal junction to minimize intraoperative bleeding. With a marking pen, the circumferential incision line was delineated encircling the urethral meatus. The incision was made approximately 5 mm to the corona, but continued ventrally several mm to the urethral meat. The penile skin was completely de-gloved to the penoscrotal junction, removing any cutaneous chordea. Then we measured the degree of chordee if it was more than 20 degrees we changed to other surgical procedures (Fig. 1).

Then, a bilateral 6/0 traction suture was applied on the glanular wings, and the 6/0 stay suture was inserted at the tip of the meatus for gentle countertraction. Utilizing sharp dissection using sharp scissors, meatus was freed circumferentially, and the urethra within the corpus spongiosum was dissected through the avascular plane behind the urethra between the corpora cavernosa and corpus spongiosum (Fig. 2). Circumferential mobilization of the urethra continued superiorly to the meatus for a length sufficient to allow the urethra to reach the glans without tension. Mobilization of glanular wings was made to cover the urethra to perform conical glans (Fig. 2). Then, fish mouth like slit was made at the dorsal part of the meatus to increase its width. The urethral meatus was then fixed to the tip of the glans using 6/0 Vicryl interrupted sutures around three-fourths of the dorsal circumference. The two glans wings were approximated in the midline over the urethra with 6-0 polydioxanone absorbable sutures in a transverse mattress manner (Fig. 3). The meatal anastomosis was completed by placing ventral lateral sutures. The penile tourniquet was removed when the glans reconstruction was completed. Circumcision was performed in all cases, and the skin was reapproximated with 5-0 vicryl absorbable sutures (Fig. 4). The urethral stent was secured with a glandular traction suture and left in place for five days, and other traction sutures were removed (Fig. 5). Local Marcaine was used to minimize postoperative pain. A compression dressing was applied. The dressing was changed every two days in an outpatient clinic with the application of local antibiotic ointment.

RESULT

Among the study period, the meatal mobilization technique was used to repair distal hypospadias in 76 Patients. Among them, 38, 21, and 10 patients had coronal, subcoronal, and glanular hypospadias types, respectively. The remaining seven patients were with distal hypospadias but with a previously failed TIP operation. At the time of surgery, the patient's age belonged to (5 months – 14 years). Operative time ranged from 45 minutes to 90 minutes (mean 70 minutes). Follow up period ranged from 6 months to 48 months (mean 24 months). Regarding complications, five patients had a urethral injury during operation and needed suturing by 6/0 vicryl (unfortunately, two of them developed fistula, later on, one developed ischemia of the mobilized urethra with complete disruption of the glans suturing and the remaining two patients

improved without complications). During the follow-up period, four patients had a postoperative hematoma, three patients had wound infection, and six patients had postoperative edema; all these patients were responded to conservative management. The total number of patients with fistula was five including two patients, were mentioned above, and revision was needed in all of them (Two out of 5 fistulae occurred in those patients who were previously operated by TIP procedure). Meatal stenosis has occurred in 4 patients, two of them responded well to gentle urethral dilatation once daily for 4 weeks and the remaining 2 patients needed meatotomy under general anesthesia. Two patients had meatal retraction and no further operative intervention was required because of the satisfactory functional and cosmetic outcome. Two patients had mild residual chordee and no treatment was required. After completion of the follow-up period the overall successful result was found in (71) patients (93.4%). These patients had cosmetically and functionally normal penis with the conical shape glans and meatus in the tip.

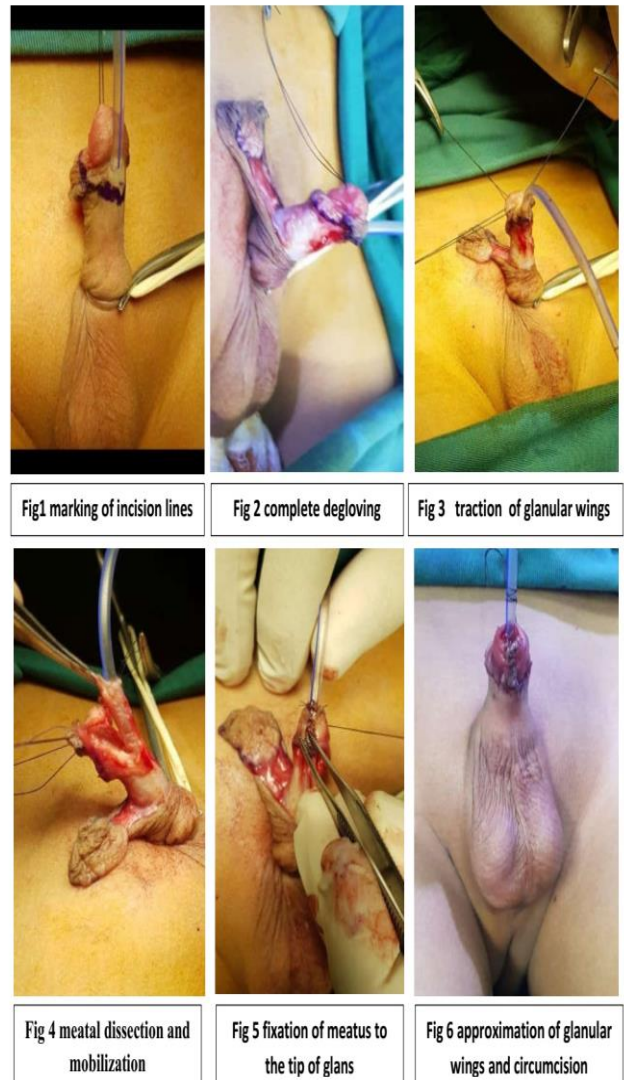


Table 1: Complication of MEMO

Complications	n
Major complications	
Urethral injury	5(6.5%)
Fistula	5(6.5%)
Urethral stricture	0
Minor complications	
Hematoma	4(5.2%)
Edema	6(7.8%)
Wound infection	3(3.9%)
Meatal retraction	2(2.6%)
Meatal stenosis	4(5.2%)
Chordee	2(2.6%)
Torsion	0

DISCUSSION

Urethral mobilization has been practiced in hypospadias repair for more than a century. This method, based on a procedure identified first by Beck¹¹, makes it possible to correct nearly all distal hypospadias types, without creating a tubularized urethra or using a flap. The benefit of urethral growth is to correct hypospadias with no new urethra and no anastomotic suture, which contributes to a lower occurrence of fistulae. The main complication of this procedure was meatal stenosis and the need for a high degree of expertise to dissect the urethra without causing injury²². This study enrolled 76 patients with distal hypospadias treated by meatal mobilization procedure, including seven patients with previously failed hypospadias repair. In this study, the distal hypospadias further divided into glanular 10 patients (13.1%), coronal 38 patients (50%), subcoronal 21 patients (27.6%) and recurrent distal hypospadias 7 patients (9.2%). The number of patients with glandular hypospadias in this study was less than in other studies because most of them Leave without surgery or treated. Recurrent cases were included in some studies^{23,24}. In this study, the mean operative time was 70 minutes, which was comparable to that reported by Seibold et al² and Hashish et al. studies²⁵. In this study, an inadvertent urethral injury occurred in 5 patients (6.5%). Hashish et al²⁵, study included 20 patients in their case series, and they faced one urethral injury (5%). Haider et al²⁶ study included 60 patients in their case series; they also faced one urethral injury (1.6%). In this study, the urethrocutaneous fistula developed in 5 patients (6.5%), which was high compared to other studies. This may be due to the repair of recurrent cases after the failure of the TIP procedure. Koenig et al, (23) study included 83 patients, 5 of them had a previously failed hypospadias operation, the reported fistula rate was 1.2%. The urethrocutaneous fistula reported by Hashish et al²⁵ was 5%. Whereas no urethrocutaneous fistula reported by other authors (19,26-28). In this study 4 out of 76(5.2%) patients developed meatal stenosis which comparable to that percentage reported by other studies. Two of them relieved by frequent dilatation, and others needed meatotomy. Hassan et al. (28) have stated meat stenosis in three out of 30 patients (10%), two of which reacted for 2 weeks to repeat exposure, while one required meatoplasty. Hashish et al²⁵ confirmed that 3 of 20 (15%) patients developed meat stenosis and all of them responded to the everyday dilation, and no further surgery

was required. No case with meatal stenosis was reported in some studies^{2,23,29}. Whereas the incidence documented by other studies ranged from 1- 20%^{26,27,28,30}. Although the high incidence reported in studies were including recurrent cases (24). To decrease the chance of meatal stenosis, we made a dorsal slit in the meatus with a wide dissection of glans wings to cover the urethra without tension. Hassan et al²⁸, made a deep incision in the glans adequate lateral mobilization of with and glanular wings to avoid meatal stenosis. Keramidas and Soutis³¹ and El-Saadi³² claimed that a deep incision into the glans down to the cavernous corpus with the large splitting of the glans is adequate to prevent meat stenosis. Chakraborty et al., (33) mentioned that the trimming of the distal end of the urethra in oblique fashion with wide dissection of glans might decrease postoperative meatal stenosis. Mollaeian et al³⁴ fashioned a distal triangular urethral plate flap to avoid meatal stenosis. In this study, the postoperative hematoma occurred in 4(5.2%) patients, edema in 6 (9.2%) patients, and local wound infection in 3 (3.9%) of patients, all responded well to conservative treatment. These results were similar to those reported by other studies²⁵⁻²⁸. In this study, the meatal retraction occurred in 2 patients (2.6%) of patients; in both of them, the second operation was not required. Atala et al¹⁹ study reported 2 out of 73 patients (2.7%) with meatal retraction; only one of these patients required a second procedure. According to Hassan et al²⁸ meatal retraction developed in 2 out of 30 patients (6.6%), and only one needed a second procedure. Other studies have reported the same rate of meatal retraction. We left the urethral stent for five days to divert urine and to protect the wound by compression dressing. The postoperative holding of the urethral stent for 3 to 7 days reported in various study series^{26-28,33,35}. The overnight holding of urethral stent reported in some study series^{2,19}, whereas other studies recommended the removal of urethral stent immediately after the surgery as they reported that there is no ventral suture line performed²⁵.

CONCLUSION

Urethral mobilization technique results in excellent cosmetic and functional outcomes with a low complication rate. It is suitable for patients with distal hypospadias, including patients requiring redo urethroplasty. It has a low chance of urethrocutaneous fistula, especially in primary cases with low postoperative complications.

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