

Meatal advancement glanular rotation technique; results of

40 patients

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Abstract

Purpose: We describe our technique (Meatal Advancement Glandular Rotation Technique) to allow using MAGPI technique in DPH with good cosmetic and functional results.

Materials and Methods: there is still controversy about using MAGPI technique in repair of DPH. Our modification is to rotate well developed glanular wings around neo-urethra with excision of all the elevations developed after meatal advancement and then suturing the excised edges to the inner mucosa of the meatus (everting the mucosa); which resulted in a conically smooth shape of the glans penis, rounded wide vertical meatus with everted edges.

Results:

Between June 2007 and January 2016, 40 patients were selected to undergo our modified technique. The mean age for children was 4.1 ± 1.2 years, and the mean follow-up after surgery was 25.8 ± 7.9 months. The distance between meatus and the tip of the gland ranged from 1.5 to 2.5 cm Surgery was successful in 32 (80 %) cases. The repair failed in these patients during the first month after surgery. Minor complications occurred in 4 patients (10 %) and included penile edema dispersed urinary stream. all minor complications subsided spontaneously within the 1st month.

There were no cases presented with fistulae or meatal stenosis in the long term follow up (up to 2-3 years).

Conclusions: Our modification of MAGPI technique has excellent functional and cosmetic outcome provided that the urethra is mobile with no curvatures.

Keywords; hypospadias, DPH, functional outcome

Introduction:

Hypospadias can be defined as an abnormal location of the urethral meatus at any site proximal to its normal glandular position, usually associated with a ventral urethral defect (1). Hypospadias is a common congenital anomaly with its incidence is reported to range from 1/250 to 1/300 live births (2) In 1998, Duckett classified hypospadias into anterior (glanular, coronal or sub coronal), middle (Distal penile, mid penile or proximal penile) and posterior (penoscrotal, scrotal or perineal) groups (3).

The current care protocol is to repair the majority of patients with hypospadias at one stage as outpatients (4-7). Several techniques are used for the repair of anterior hypospadias including; MAGPI (Meatal Advancement with Glanuloplasty incorporated) technique (8), TIP (Tabularized incised plate) operation (9), Onlay flaps, Mathieu's meatal based or Duckett's tubularized preputial flaps (10). MAGPI technique is used for glanular, coronal or subcoronal hypospadias patients with mobile urethra. However, there is still a controversy about using MAGPI technique in repair of distal penile hypospadias (DPH) (11).

Our technique (Meatal Advancement Glandular rotation Technique) was developed as a modification to MAGPI technique in distal penile hypospadias to improve the cosmetic and functional results.

Material and methods:

A total of 40 patient (out of 600 child with hypospadias presented to our pediatric clinic) were included in the study. All of them presented with DPH, thick perimeatal skin, and well mobilized urethra. Children with other hypospadias types, moderate or severe penile curvatures, or tuff urethra were excluded. Redo cases were also excluded from the study.

Outcome measures:

Cosmetic and functional outcomes were assessed using a special score. This score is collected from the results of questionnaires with operator, specialized high nurse, pediatrician, parents, and non-related pediatric surgeon (this scoring system will be discussed later on in another work).

Postoperative follow up: all patients were discharged home 6 hours postoperative and come back after 48 hours for catheter and dressing removal. Patients were evaluated after 1 week, 1 month, 3 months, 1 year for the penile size, shape, straightening, and the meatal size, site, shape. Also, urinary stream was evaluated after 3 month and 1 year postoperative.

Preoperative; ethics committee approval and written detailed consent from the parents were obtained.

Operative details;

We start surgery by a traction suture at the glans. Excision of an elliptical part of the urethral plate is done from inside the meatus to the glans apex. The vertical defect is then closed in a transverse fashion (effects a Heineke Miculicz transverse closure of a vertical incision) resulting in flat meatus (pic. 1). A circumferential incision is made about 6-8 mm from the coronal edge dorsally which is dissected to the distal shaft in the plane between the dartos and the bucks fascia. The ventral skin is dissected 2 mm proximal to meatus with the use of dissecting scissor. The ventral edge of the meatus is sutured with 6/0

vicryl suture on each side for ventral traction. The glans wings are dissected and mobilized laterally. The ventral urethra is pulled distally by the traction sutures. Excision of the inner edges of the glans wings in inverted V shape which is then closed at the midline as proximal as we can using mattress sutures including urethral spongiosum. The ventral urethral meatus is then sutured to the closed glans by three stitches (one in the midline and one on each side) using 6-0 Vicryl sutures.

Now, the neomeatus is invaginated between the glans elevations surrounding it. We excise all these elevations completely around the meatus with sharp scissor (pic.2). Suturing the outer part of the excised edges to the edges of the advanced inner urethral mucosa of the meatus is done (pic.2). However, the glans acquires a slight ventral tilt. This was corrected by suturing the inner side of the coronal edge of the glans dorsally to the tunica albugina on the dorsal aspect of the shaft away from neurovascular bundles using 4-0 Vicryl sutures.

The excess dorsal skin is then excised, ensure haemostasis and then closure of the dorsal skin in continuous fashion (pic.3). Blood trickling associated with glandular excision was controlled by sutures and compressive dressing.

Results

Between June 2007 and January 2016, 600 patients presented with hypospadias at our pediatric clinic. A total of 40 patients fulfilled criteria and were included in a prospective nonrandomized cohort study to undergo surgical repair by our modification.

The mean age for children was 4.1 ± 1.2 years, and the mean follow-up after surgery was 25.8 ± 7.9 months. The distance between meatus and the tip of the gland ranged from 1.5 to 2.5 cm.

Surgery was successful in 32 (80 %) cases. The repair failed in these patients during the first month after surgery. All patients had a disrupted suture line, glans dehiscence, meatal retraction, and mild ventral curvature.

Six of them were corrected using Mathieu technique. Two were corrected by dorsal onlay flap.

Minor complications occurred in 4 patients (10 %) and included penile edema dispersed urinary stream. all minor complications subsided spontaneously within the 1st month.

Twenty percent of patients dropped out of the study 3 month after surgery reached 40% by the end of the 1st year

No cases of meatal stenosis, stricture urethra, or acquired urethral diverticulum occurred.

Discussion

This study included a cohort of 40 patients with DPH who underwent repair using meatal advancement glandular rotation technique and showed that this technique has excellent results with 80% success and satisfactory cosmetic and functional outcomes. The mean follow-up after surgery was 25.8 ± 7.9 months.

We think that these satisfactory results are due to considering several modifications when developing this technique.

First; excision of an elliptical part of the urethral plate allows removal of any tissue ridges and creates a wide posterior raw area for anastomosis the posterior urethra to the glans with more fixation.

Second; a piece of skin 2 mm is left proximal to the meatus to allow distal traction and eversion of the ventral urethra on the glans.

Third; glanular wings are dissected and mobilized well on each side with excision of their inner edges to allow closure of the glans in a conical shape proximal to the anterior urethra with good cosmoeses.

Fourth; stitches used in glans closure include the urethral spongiosum and are done in mattress fashion that allow more fixation.

Fifth; ventral urethra is fixed to the closed glans by three stitches that allow more fixation with eversion of the mucosa with vertical slit like meatus.

Sixth; excision of all glans elevations around the neo meatus with suturing the outer part of the excised glanular edges to the urethral mucosa allows more fixations with everted edges and decrease incidence of meatal retraction.

Seventh; eversion of the urethral mucosa anteriorly and posteriorly decreases the incidence of meatal stenosis.

Eighth; suturing the inner side of the coronal edge dorsally to the tunica compensates for the ventral tilt; result in straight penis.

Ninth; dissection of the ventral skin anterior to the original meatus by scissor decreases iatrogenic fistula.

Tenth; we don't use tourniquet that decrease ischemia.

In 1981, Jhon Duckett introduced MAGPI technique aiming at advancing the urethral meatus to the distal glans without urethral tubularization and then refashioning the glans beneath (23). MAGPI operation was designed for the repair of glanular hypospadias and extended to the repair of coronal and subcoronal hypospadias. The advantage of MAGPI is the reduced rate of complications associated with urethral plate tabularization or augmentation. The most common complications for this technique are meatal regression and stenosis. The use of MAGPI for DPH is sometimes associated with glanular chordea or curvature towards the meatus, more depression of the glans at its

center, multiple elevations around the neomeatus with unsatisfactory cosmetic outcome (11, 24-26). All these drawbacks were corrected in our technique.

Many other techniques are being used for the repair of DPH with tubularized incised plate (TIP) is considered the most common. It was popularized in 1994 by Snodgrass (14, 15). However, this operation is associated with high rate of complications (Range: 12% - 33%) including; urethrocutaneous fistula, urethral stricture, and weak urinary stream (16-18). Moreover, it was reported that the urinary stream was estimated to decrease more after TIP operation in the long-term follow up due to fibrosis and abnormal elastic properties of the urethral tube (19-21). Urinary stream in our cases is good as we use the native caliber of the urethra with vertical slit like meatus.

Another modality for treatment of DPH is Mathieu operation which utilizes a ventral penile flap and is considered a popular operation in France with cosmetically accepted outcome. However, the precious blood supply of the ventral flap can affect the outcome in the form of disruption of the suture line and complete failure (22).

Limitations of this study include; single center experience, small number of cases, and relatively short follow up duration. So, more studies on larger groups of patients with multicenter experiences and longer follow up are required.

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Figure legends

Picture 1: (from the left to right)

Male child 3 years with DPH and meatal stenosis.

Excision of an elliptical part of the urethral plate is made from inside the urethral meatus to the tip of the glans.

Vertical defect is closed in a transverse fashion.

The meatus was advanced ventrally but flat in appearance.

Picture 2: (from the left to right)

Dissection of the ventral penile skin using a scissor.

Dissection of the glandular wings laterally.

Excision of the excess glandular tissue around the meatus posteriorly and laterally with sharp scissor.

Appearance of the glans after excision of all elevations around the meatus.

suturing the excised edges to the inner mucosa of the meatus (everting the mucosa)

Picture 3: (from the left to right)

Intraoperative view showing catheter inserted through the neomeatus with cosmetically well and conically shaped glans.

One month postoperative; the child is voiding in a standing position. The urinary stream is forward, compact, single, rifled, forcible and projectile in front of him without supporting his penis.

Table 1: Characteristics of patients in the study

Variable	Summary
Number of patients	40
Mean age of patients (years)	4.1 ± 1.2
Mean follow-up (month)	25.8 ± 7.9
Successful cases	32 (80%)
Minor complications (case)	4 (10%)

Continuous variables are shown as mean ± standard deviation, categorical variables are summarized as number (percentage)

Figure 1:

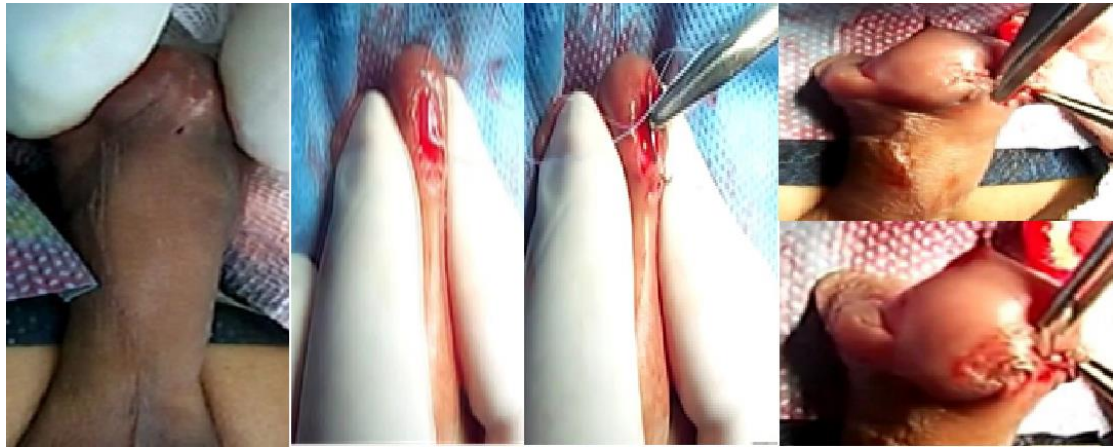


Figure 2

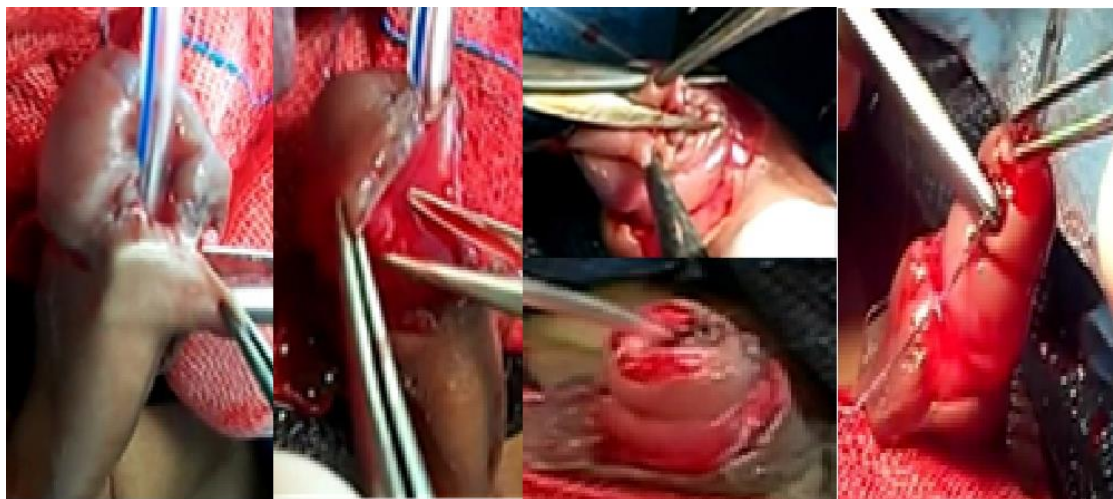


Figure 3

