

New Concept in Urethral Advancement for Anterior Hypospadias

YOUSSEF SALEH HASSEN, M.D.* and ATEF MOHAMED ABDELATEEF, M.D.**

The Departments of Plastic Surgery and Urology**, Faculty of Medicine, Assiut University.*

ABSTRACT

Objectives: We report on our experience with urethral mobilization and advancement as a treatment for anterior hypospadias.

Patients and Methods: From January 2004 to March 2007, 46 children (mean age 4.5 years) of anterior hypospadias without hypoplastic distal urethra or marked chordee, were managed by urethral mobilization and advancement. The dissection began proximally in avascular plane above tunica albuginea covering each corpus cavernosum medially till reaching beneath the corpus spongiosum up to the hypospadiac meatus. Tension free urethral anastomosis was achieved; the ventral glans was incised deeply at interbalanatic groove. The 2 glans wings and ventral glanular mucosal flaps were mobilized laterally. Interrupted sutures were placed through the tunica albuginea of corpus spongiosum to the corpora cavernosa. The mobilized urethra was wrapped by dartos fascia. The urethral stent was removed 24 hours postoperatively.

Results: Follow-up period ranged from 6 to 38 months. Three folds urethral mobilization was sufficient to achieve tension free urethral anastomosis. Slit-like orthotopic meatus at conical shaped glans of straight penis was achieved in all but one sub-coronal case that had mid glans meatal retraction during our early experience. Postoperative urethral fistula was not recorded in any. Satisfactory urinary stream for parents and child was reported in 42/46 within normal range of flowmetric study in all.

Conclusion: Urethral mobilization should begin proximally. Proper 3 folds urethral mobilization, deep interbalanatic incision and wide dissection of the glans can provide slit-like orthotopic meatus with conical glans and straight penis in cases of anterior hypospadias without hypoplastic distal urethra or marked chordee.

INTRODUCTION

In a patient with hypospadias, dystopic meatus can occur at any level; however, the majority (65-70%) is anterior, while about 30% is posterior in location [1]. Successful hypospadias repair should not only provide a functional penis adequate for sexual intercourse, but also provide the ability to void comfortably, and a satisfactory cosmetic result. Children with anterior hypospadias without any associated penile deformity such as chordee may not have any functional handicapping. However,

cosmetic reconstruction is usually required by both parents and children. Advancing the urethra for hypospadias repair was first introduced in 1898 by Beck [2], with no remarkable success. Belman (1977) reported on a technique for hypospadias repair which involved wide urethral mobilization and advancement [3]. Various experiences have been reported for urethral advancement as treatment of hypospadias [4-7].

PATIENTS AND METHODS

Exclusion criteria: Children with hypoplastic distal urethra, severe chordee and other types than anterior hypospadias (mid-penile and proximal hypospadias).

This study was carried upon 46 cases presented by varying degrees of anterior hypospadias (balanitic 10, coronal 22 and sub-coronal 14) were admitted in both Plastic and Urology Department in a period from January 2004 to March 2007. Their ages ranged from 2.5 to 15 years with mean age 4.5 years.

Operative technique:

A 6/0 traction suture was placed at the tip of the glans penis. A urethral stent was introduced into the urethra. The distance between hypospadiac meatus and tip of the glans was measured and recorded. A circumcising incision 5mm proximal to coronary sulcus with U shape extension about 10mm proximal to hypospadiac meatus on the ventral aspect was made (Fig. 1). The penile skin was degloved down to the peno-scrotal junction, releasing any cutaneous chordee. The dissection began proximally in avascular plane between the corpora cavernosa and corpus spongiosum. Dissection was maintained above tunica albuginea covering each corpus cavernosum medially till reaching beneath the corpus spongiosum up to the hypospadiac meatus (Fig. 2). Tension free urethral anastomosis should be achieved; otherwise more proximal mobilization was required. The ventral

glans was incised deeply at interbalanatic groove (Fig. 3). The 2 glans wings and ventral glanular mucosal flaps were mobilized laterally. The urethral meatus was anastomosed to the tip of the glans with interrupted sutures. Few 6-0 absorbable interrupted fixation sutures were placed through the tunica albuginea of corpus spongiosum to the corpora cavernosa (Fig. 4). The dartos fascia of the prepuce was dissected for wrapping the mobilized urethra (Fig. 5). The glanular wings were approximated over the urethra in 2 layers with 6-0 absorbable sutures and circumcision was completed (Fig. 6). The urethral stent was secured with a glanular retention suture, which was removed 24 hours postoperatively.

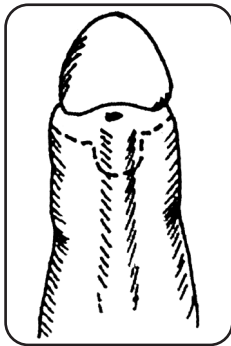


Fig. (1): A circumcising incision 5mm proximal to coronal sulcus with U shape extension about 10mm proximal to hypospadiac meatus.

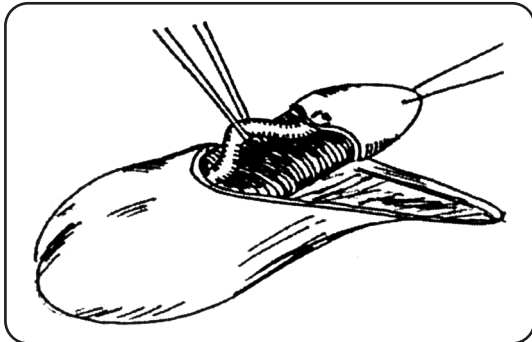


Fig. (2): Proximal dissection between the corpus spongiosum and tunica albuginea covering corpora cavernosa till reaching beneath the corpus spongiosum.

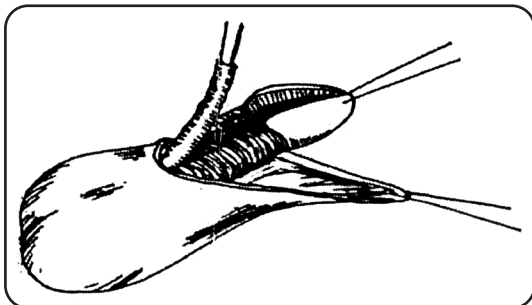


Fig. (3): The urethra was completely mobilized. The glans was incised deeply at interbalanatic groove.

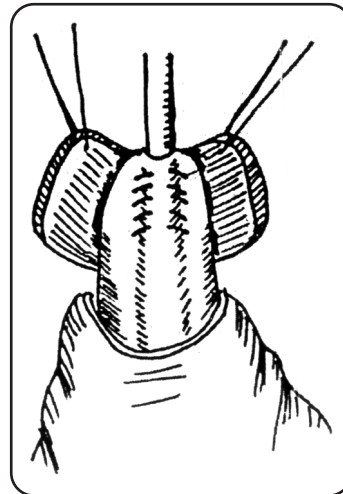


Fig. (4): The 2 glanular wings were mobilized laterally. The urethral meatus was anastomosed to the tip of the glans and few 6-0 interrupted fixation sutures were placed through the tunica albuginea.

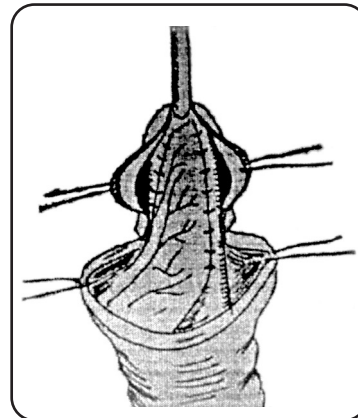


Fig. (5): The mobilized urethra was wrapped by dartos fascia of the prepuce.

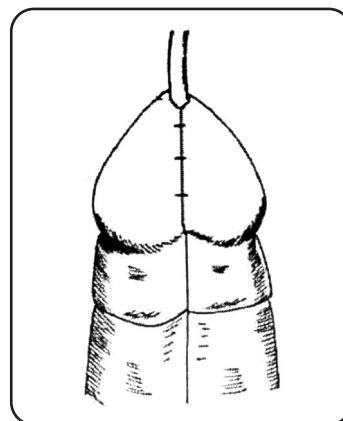


Fig. (6): The 2 glanular wings were approximated over the urethra, and circumcision was completed.

All patients were done under general anesthesia plus caudal block for postoperative pain. Potent analgesic was used in immediate post-operative period. All patients received broad spectrum antibiotic, anti-inflammatory for 7 days.

Case (1)



A- Pre-operative view for coronal hypospadias.



B- Intra-operative dissection of the urethra 3 folds.



C- Intraoperative urethral advancement with closure of glanular wing.



D- Postoperative straight urinary stream.

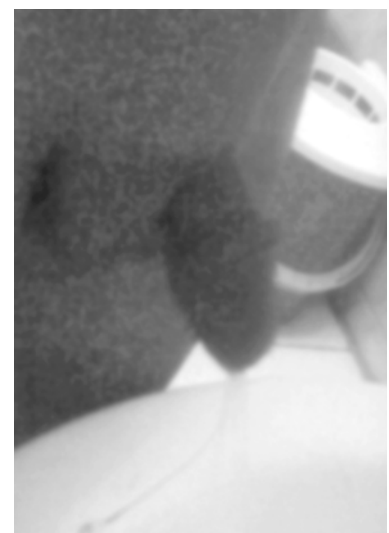
Case (2)



A- Preoperative distal hypospadias.



B- Intra-operative urethral dissection and advancement.



C- Postoperative good micturation with straight stream.

Case (3)



A- Preoperative subcoronal hypospadias.



B- Intra-operative urethral dissection and advancement.



C- Immediate post-operative view.



D- Post-operative full straight urinary stream.

RESULTS

Follow-up period ranged from 6 to 30 months. Three folds urethral mobilization (the distance between the hypospadiac meatus and tip of glans penis) was sufficient to achieve tension free urethral anastomosis in all cases. The extent of advancement of the urethra ranged from 0.6 to 2.1 cm.

Slit-like (elliptical) orthotopic meatus at conical shaped glans of straight penis was achieved in all but 1 sub-coronal case had meatal retraction during our early experience. Postoperative urethral fistula was not recorded in any. Satisfactory urinary stream for parents and child was reported in 42/46 within normal range of flowmetric study [8] in all.

DISCUSSION

Many techniques have been described to correct anterior hypospadias. Despite the satisfactory cosmetic appearance of some techniques using hinged ventral penile skin flap, like Mathieu procedure [9] and its modifications [10,11], they have the drawback of precarious blood supply and breakdown of this repair must occur occasionally [12,13].

Primary drawbacks of original meatal advancement and glanuloplasty (MAGPI) [12] are meatal regression [14] and stenosis [7].

Tabularization techniques like glans approximation procedure (GAP) [15] reported good results in case of deep grooved glans together with adequate breadth of urethral plate.

Tubularized incised plate urethroplasty (TIP) [16] repair gained popularity for correction of anterior hypospadias, however its results depends upon the characters of urethral plate, together with an incidence of, disruption, fistula and meatal stenosis [17].

We believe that U-shaped skin incision and proximal urethral mobilization enhance the dissection through normal tissues. According to our knowledge, we first describe proximal dissection for urethral advancement. Urethral mobilization should begin proximally, where the urethra is completely surrounded by spongiosal tissue, and not distally, where the spongiosal tissues splays away laterally [18]. The used technique brings the urethra deeper inside the glans with wide slit-like (elliptical) orthotopic meatus. We found that 3

folds urethral length mobilization allows tension-free urethral anastomosis in case of anterior hypospadias. Atala et al. [7] described 4-5 folds urethral mobilization to gain tension free urethral anastomosis, this difference may be due to their inclusion of mid shaft hypospadias. The extent of advancement of the urethra within its corpus ranged from 0.6 to 2.1cm, in agreement with other reports where the maximum length for urethral advancement was 1.5 [19] and 2.5cm [20] respectively.

Proper urethral mobilization, deep interbalanitic incision and wide dissection of the glans laterally are essential to avoid complications such as chordee, glanular disruption and meatal retraction or stenosis. One case in our series had meatal retraction, which was performed in the early phase of our series when we were not dissecting the glans laterally. Fine interrupted sutures between tunica albuginea of corpus spongiosum to that of both corpora cavernosa will contribute to urethral stability.

Post-operative urethral fistula was not recorded in our technique, as there is no anastomosis between the urethra and neo urethra, which can be a potential site for leakage and fistula formation. Our cases were limited also to well developed urethra (non hyposplastic), and the proximal dissection in proper avascular plane will preclude iatrogenic urethral injury, in addition to dartos flap wrapping that add more vascularity and protection to the mobilized urethra. Flowmetric results are superior to that reported after TIP repair [17].

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