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Modification of Meatal Advancement and Glanuloplasty for Correction of Distal Hypospadias

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(Submitted May 5, 2003. Accepted for publication September 1, 2003)

Scand J Urol Nephrol 38: 122–124; 2004

Objective: The meatal advancement and glanuloplasty (MAGPI) technique is still successfully used for the repair of distal hypospadias. The technique has been modified considerably since it was first described in 1981. The primary drawbacks of the procedure are the complications of meatal regression and meatal stenosis. The aim of this study was to present a modification of MAGPI for correction of distal hypospadias.
Material and Methods: Ten cases with distal hypospadias were operated on using our modified MAGPI procedure. The modification involves excision of a pull-out, tag-shaped piece of glanular tissue through the vertical incision in the meatoplasty section of the original operation. By means of this excision, burying of the meatus into the glans was eased without inducing extra mobilization of the glans wings. As less glans tissue was left at the dorsal urethra the urethral meatus could be replaced in the center of the glans and better anatomic reconstruction could be attained.
Results: After 1–3 years of follow-up, all the operated cases showed functionally and cosmetically satisfactory results. The cosmetic appearance achieved with our modified technique was better than that obtained with the classical MAGPI procedure.
Conclusions: Using our MAGPI modification, the urethra was localized deeper in the glans and an elliptical (slit-like), wide meatus was obtained, the cosmetic appearance of which was more acceptable than that achieved with classical MAGPI.

Key words: glanuloplasty, hypospadias, meatoplasty.

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Hypospadias occurs in 1/300 male births, with the meatus being located distally in nearly 65% of cases (1). The aim of hypospadias surgery is to obtain the best result, both functionally and cosmetically. Cosmetic appearance is paramount, particularly in cases of distal hypospadias. In 1981, Duckett (2) devised meatal advancement and glanuloplasty (MAGPI), a simple approach to glanular hypospadias. The technique has become internationally accepted and is commonly used in hypospadias surgery. Unfortunately, attempts to apply the MAGPI procedure to cases having a more proximal meatus or a patulous, fibrotic or hypoplastic meatus have resulted in some degree of dissatisfaction (3). In general, primary criticisms of the MAGPI procedure are the occurrence of meatal regression and meatal stenosis. These problems have led to many modifications of the technique.

In this study, we propose a new modification to facilitate urethral advancement and to form a slit-like, wide meatus, thus avoiding some of the complications of the original MAGPI procedure.

MATERIAL AND METHODS

Ten patients with distal glanular hypospadias aged 2–12 years (mean age 5.5 years) were operated on. All the patients were selected using the selection criteria for the classical MAGPI procedure. These include the absence of ventral chordee, thick and pliable parameatal skin, a splayed type of glans with a deep groove and a non-stenotic orifice. We used a urethral stent in all our patients for 48 h to avoid urinary obstruction. Adhesive drape (IV 3000; Smith and Nephew, UK) was used for dressing. At the start of the operation the urethral meatus was dilated and adrenaline solution (diluted 1:100 000) was administered via an insulin syringe into the glanular tissue. Then, a vertical incision was made beginning at the urethral meatus and extending distally to the apex of the glans. After the incision was deepened, a tag of glanular tissue was excised by cutting with iris scissors and pulling the tissue with a fine-toothed forceps (Figs 1 and 2). Thus, an adequate cavity was formed in the glans, where the vertical incision was made. Meatal advancement of the dorsal urethral wall was accom-

 ISSN 0036–5599
DOI 10.1080/00365590310020042

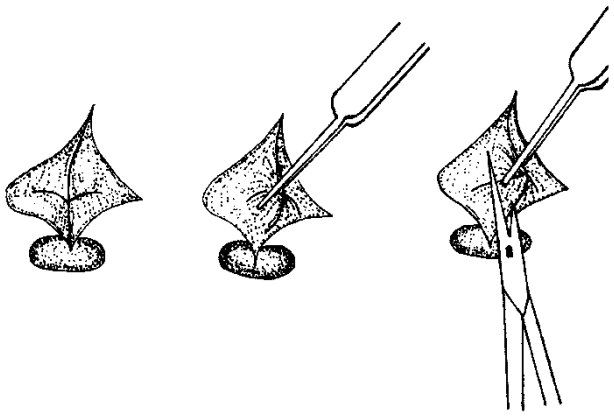

Fig. 1. Excision of a pull-out, tag-shaped piece of glanular tissue using iris scissors.

Fig. 2. Excision of glanular tissue from the vertical incision site during the operation.

plished in a Heineke–Mikulicz (vertical incision and horizontal closure) fashion. The ventral meatal edge was elevated forward and the glans wings were rotated medially, reapproximating the normal conical glans shape. The operative procedure was continued using the same steps as in the classical MAGPI procedure. All the patients were examined in the outpatient department on the 21st day, in the third month and at the end of 1 year postoperatively. The cosmetic appearance of the glans and the ejection of urine and urine calibre during voiding were noted.

RESULTS

We did not encounter any complications, such as urethral fistula, meatal retraction or meatal stenosis, in this series of 10 patients. In addition, no bougienage application was required in any of our patients. The flat glans and triangular-shaped meatus characteristic of classical MAGPI did not develop in any of the patients in the present series. They all had good cosmetic and functional results, with a slit-like meatus, normal caliber and normal urine ejection. The meatal appearance (Fig. 3a) and urine ejection (Fig. 3b) during voiding are shown for the same patient 1 year postoperatively. The patients' parents all declared that they were totally satisfied with the results attained using the modified technique. As pediatric surgeons, the end results also satisfied us more than those obtained with classical MAGPI.

DISCUSSION

Following the introduction of MAGPI by Duckett (2) in 1981, this procedure has been successfully used by many surgeons (4–6). However, many reports were published indicating complications and unsatisfactory results with the MAGPI procedure, particularly in the long term (7, 8). The primary criticisms of the MAGPI procedure concern meatal regression and meatal stenosis. In order to prevent these complications,

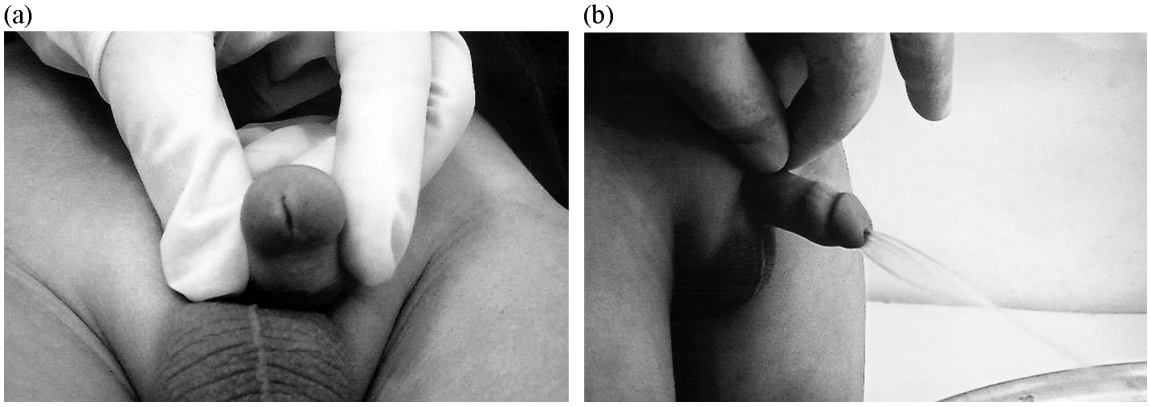

Fig. 3. (a) Cosmetically satisfactory appearance of the glans and the slit-like meatus. (b) Ejection of urine during voiding 1 year postoperatively.

many authors reported modifications of the procedure (9, 10).

Arap et al. (9) proposed a method of urethral extension for the application of MAGPI in the case of a more proximal meatus. Zaontz (11) described a glans approximation procedure involving a horseshoe-shaped incision around the meatus. These modifications and others, including both urethroplasty and glanuloplasty (9–12), are examples in which the aim is to form a urethral tube to prevent retraction of the urethra. Other authors have reported modifications, including the use of glanular incision lines (W-, V- or X-shaped) (13–16) for urethral advancement or to lessen the meatal tension (T-incision) (10).

Among many others, Duckett and Snyder (1, 17) have also described a modification of the MAGPI procedure. They suggest excision of the ridge of tissue in the glanular groove if it is too thick so that a transverse wedge can be removed to advance the dorsal urethra further into the glans (1, 18). They also propose that if the glanular groove is quite wide, with a prominent lip on each side, transverse excision of these lips is needed to create a vertical neomeatus and prevent folding of the meatal lips in the form of lateral dog's ears (1). Our modified technique involved excision of a pull-out, tag-shaped piece of glanular tissue via the vertical incision of the original MAGPI procedure. The advantage of our modification is that it eases the embedding of the urethra into the glans without inducing over-mobilization. With less glanular tissue left in the distal part of the urethral meatus, it was seen to be more convenient to place the urethra in the middle of the glanular tissue, gaining adequate space for a wide meatus. Using this modification, the operation could be performed in cases with shallow urethral grooves. During excision of spongious tissue from the glans, adrenaline was injected into the glanular tissue to prevent bleeding. As edema could develop during the procedure, a urethral stent was used to prevent obstruction for a period of 48 h. To prevent meatal stenosis, Duckett and Baskin (18) advise a similar excision, placing the neourethra in the apex of the glans using the glans tunnel technique of the transverse preputial island fleb procedure. In the present study, we adopted the same glanular excision used in the original MAGPI operation.

CONCLUSION

In our MAGPI modification, the urethra was placed deep into the glans. An elliptical (slit-like) and wide meatus was obtained, and the cosmetic aspect appeared more acceptable. Thus, we believe that our modification could be applied successfully in children with shallow glanular grooves.

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