

Meatal advancement and glanuloplasty (MAGPI) and modified MAGPI experience in 104 patients

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Summary

In this study the results of one stage hypospadias surgery using either a meatal advancement and glanuloplasty (MAGPI) or modified MAGPI were analyzed. 104 children underwent an one stage hypospadias repair over a 5 year period. Eighty two (78.8 %) children who had glanular or coronal hypospadias were repaired by MAGPI and seven (6.7 %) children who had a subcoronal hypospadias were repaired by a modified MAGPI. In 15 patients (14.4 %) the repairs were salvage procedures. There were excellent results in 94 % of the cases with a 6 % complication rate. Our results supports the view that MAGPI and a modified MAGPI procedures produce excellent results when applied to selected cases.

Key words: Hypospadias

months to 13 years (average 7.5 years). Eighty two children (78.8 %) who had glanular or coronal hypospadias were repaired by MAGPI and seven children (6.7 %) who had subcoronal hypospadias were repaired by modified MAGPI. In 15 cases (14.4 %), the MAGPI or modified MAGPI procedure was used as a salvage (rescue) procedure for complications following distal hypospadias repair.

In this group, the first operations were meatal advancement in 10, MAGPI in 2, and Mathieu in 3. All had undergone surgery by other urologist or pediatric surgeon. Of the 15 cases, meatal regression was evident in 12; 6 had a minor degree (glanular 4, coronal 2) and 6 had more marked regression of the meatus proximal to the corona. Of these patients three had presented with coronal fistulae (Table I).

The initial step in the MAGPI procedure is the correction of any initial meatal stenosis; and the advancement of the dorsal urethral wall is accomplished by Heineke-Mikulicz vertical incision and horizontal closure. An artificial erection is used to check for residual chordee. Finally, glandular approximation is carried out bringing the edges of the glans penis together in the midline. This manoeuvre creates a conical glans around and proximal to the advanced meatus. A thin plastic infant feeding tube (4F) was left in the urethra for 24 hours, after which both dressing and catheter were removed and the patients discharged.

A MAGPI procedure was performed on the 6 boys with minor degrees of meatal regression and a modified MAGPI (Arap) procedure performed on 6 patients with more marked regression. Three patients with coronal urethrocutaneous fistulae have been repaired successfully by first incising the bridge bet-

Introduction

Distal forms of hypospadias usually cause little in the way of functional disability either in childhood or in later life (8). Surgical correction of the more distal forms of hypospadias, therefore, must provide not only excellent cosmetic and functional results but must also be associated with virtually no morbidity for the child (3,4,5). This report presents one surgeon's experience in 104 consecutive children who were treated with the Meatal Advancement Glanuloplasty Incorporated (MAGPI) or modified MAGPI (Arap Procedure) techniques as described by Duckett and Arap respectively (1,4).

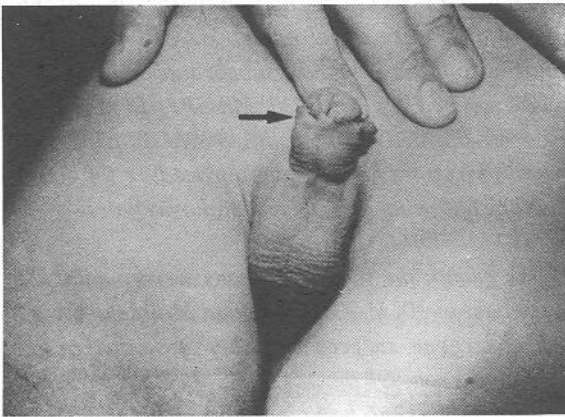
Materials and Methods

Between December 1988 and October 1993, 104 boys who underwent one stage hypospadias repair were studied. The patients' age ranged from 10

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Table I. Meatal position and operative procedures in 104 patients who were treated with MAGPI or modified MAGPI

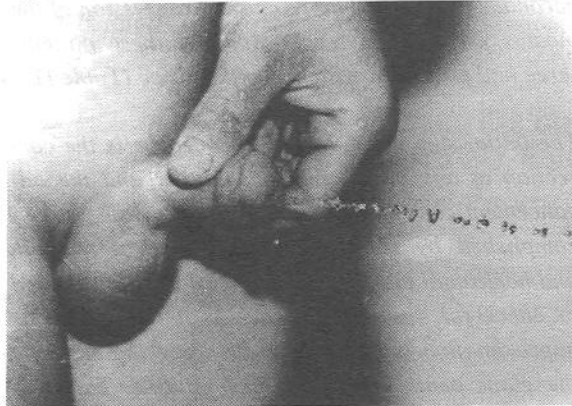
Meatal position	No	Operation	
		MAGPI	Modified MAGPI
Glanular	30	30	-
Coronal	52	52	-
Subcoronal	7	-	7
Hypospadias cripple			
Minor meatal regression	6	6	-
Marked meatal regression	6	-	6
Urethrocutaneous fistula	3	-	3
Total	104	88	16



a



b



c

Figure 1 a. Retracted urethral meatus, with small fistula (arrow), b. Following modified MAGPI procedure, c. When voiding on a single urinary stream.

between the meatus and the fistula and then closing the resultant defects as described by Arap (Figure 1a, b,c) (1).

Results

All patients were observed for at least 6 months following their surgical repair. 98 of the 104 patients had a satisfactory cosmetic result as judged by their parents and the surgeon. In all the urethral meatus

was at the tip of the penis and all were voiding with a single urinary stream (Figure 1). Only 6 patients developed complications. Four (3.8 %) were fistula and two (1.9 %) were meatal retraction.

Discussion

The reported incidence of hypospadias is approximately 1:125 male live births, of whom 70 % have a glanular, coronal or subcoronal meatus (2,3,13). Approximately 50 % of the anterior variants, which is a third of all cases, are suitable for the MAGPI procedure (6). In this series, 104 of 260 hypospadias (40 %) were treated with the MAGPI or modified MAGPI procedure.

Many operative procedures are available to correct distal hypospadias, including the Mathieu, Mustarde, Devine-Horton flip-flap and King techniques

which require the construction of a neourethra and a formal glanuloplasty with mobilization of glans wings (2,10,14,15). The MAGPI procedure avoids a sutured urethroplasty and thus reduces the risk of a fistula (5,6). There were only four fistulae in this series. It provides a reliable, reproducible method to reconfigure the glans and meatus without urinary diversion and with minimal morbidity (3,4). Inappropriate application of the MAGPI procedure to unsuitable cases probably causes most of the poor results reported by some authors (7,9).

The ventral distal paramental skin must be thick and pliable to be lifted off the underlying urethra for distal advancement. The meatus must be sufficiently distal and small to permit the glans tissue to be brought to the ventral midline and to support the advanced ventral wall of the meatus. Thin or rigid paramental skin, or a meatus that is too proximal or too wide, as is commonly seen in the megameatus intact prepuce variant, will not permit a proper execution of the MAGPI operation and thus, an unsatisfactory result can be predicted (6). We considered all of the mentioned criteria when we were selecting cases for MAGPI procedures.

Other authors have described their experience with the MAGPI procedure. Mac Millan et al reviewed 44 MAGPI procedures using photography of the urinary stream and uroflowmetry (12). An excellent cosmetic result was noted in all except one case. Duckett and Snyder reported 1000 cases where the MAGPI procedure was used (6). There were 5 (0.45 %) urethrocutaneous fistulas, 7 (0.6 %) meatal retractions and 1 (0.09 %) persistent ventral curvature. Ozen and Whitaker experienced a 6 % incidence of meatal retraction in 67 cases with an excellent result in 91 % of cases (16).

Issa and Gearhart described 8 cases with subsequent meatal retraction, of which 5 were attributed to technical failure and 3 to poor case selection (9). We achieved 98 (94.23 %) excellent result in 104 cases. Complications developed in 6 patients, four of them (3.8 %) were fistulae and two (1.9 %) meatal retraction. Modifications of the MAGPI for distinct indications have been developed. Arap et al devised a method for urethral extension in cases with a meatus is too proximal for a standard MAGPI (1.6). In this

series, the Arap procedure was carried out in seven cases with a subcoronal hypospadias and in six cases as a rescue procedure.

In our series, there were two meatal regression with MAGPI which was treated with MAGPI repair again. Some fistulae will close spontaneously, and a period of observations is recommended before closure is attempted. MAGPI or modified MAGPI techniques are used as a salvage procedure for complications following distal hypospadias repair. Scherz et al used the modified MAGPI (Arap procedure) to repair a coronal urethrocutaneous fistula after MAGPI (17). In our previous study, we presented 13 patients, who developed complications after hypospadias repair and were treated with MAGPI or modified MAGPI (11).

In conclusion, we believe that the MAGPI procedure is a good choice for the glanular and coronal type hypospadias and minimally retracted meatus after a failed meatal advancement or MAGPI procedure. However the Modified MAGPI procedure is a better choice for a more marked retracted meatus or urethrocutaneous fistula after a failed meatal advancement or Mathieu procedure.

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