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Mathieu technique with incision of the urethral plate versus standard tubularised incised-plate urethroplasty in primary repair of distal hypospadias: A prospective randomised study

Mostafa Khalil, Tarek Gharib *, Waleed El-shaer, Ahmed Sebaey, Basheer Elmohamady, Khalid Elgamal

Department of Urology, Faculty of Medicine, Benha University, Benha, Egypt

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KEYWORDS

Mathieu;
Tubularised;
Incised-plate distal;
Hypospadias

ABBREVIATIONS

IP, incised plate;
TIP, tubularised incised-plate

Abstract ***Objective:*** To compare outcomes of the Mathieu incised-plate (Mathieu-IP) technique vs the standard tubularised incised-plate (TIP) technique for primary management of distal hypospadias.

Patients and methods: Between April 2012 and August 2015, 66 patients (aged 15–60 months) with primary distal hypospadias were randomly allocated to two groups. Group 1 included 34 patients who underwent Mathieu-IP repair and Group 2 included 32 patients managed using the TIP technique for primary management of distal hypospadias. Postoperatively, all patients were examined weekly up to 1 month and then at 3 and 6 months. Perioperative data, complications and outcomes of both procedures were statistically analysed and compared.

Results: There were no statistically significant differences in patient demographics between the groups at baseline. There was no statistically significant difference in the mean (SD) operative time between Groups 1 and 2, at 95 (7.6) and 91.2 (8.1) min, respectively. There was no statistically significant difference in the shape of the urine stream at micturition or the neomeatus between the groups postoperatively. The rate of postoperative fistula was significantly higher in Group 2 (TIP) compared to

* Corresponding author at: Department of Urology, Faculty of Medicine, Benha University, Benha, Egypt.
E-mail address: tarekgh78@yahoo.com (T. Gharib).

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Group 1 (Mathieu-IP), at 18.7% vs 2.9% ($P = 0.004$). There was no postoperative meatal stenosis in Group 1, which did occur in five patients (15.6%) in Group 2 ($P = 0.002$).

Conclusion: The Mathieu-IP technique appeared to be better than the standard TIP technique with regard to postoperative fistula formation and meatal stenosis, and with acceptable cosmesis.

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Introduction

About 80% of patients with hypospadias have their orifices in the coronal and subcoronal positions [1]. Many surgical repair techniques have been practiced by many surgeons for correction of hypospadias anomaly. There are two methods that have been widely used, perimeatal-based flap (Mathieu) and tubularised incised-plate (TIP) urethroplasty [2]. The major disadvantage of Mathieu technique is that the horizontal, rounded meatus is less acceptable than the slit-like meatus of the TIP technique. In the last two decades the Mathieu procedure has become less popular than TIP and this may be due to the simplicity and the good cosmetic slit-like final appearance of the meatus of the TIP technique [3]. The drawbacks of TIP urethroplasty are the relatively high incidence of urethrocutaneous fistula (0–33%) and also meatal stenosis that necessitate regular dilatation; these complications are more challenging with narrow urethral plates and flat shallow glans [4,5]. A modification of the classic Mathieu technique, by adding incision of the urethral plate including the native hypospadias orifice, enhance the benefits of using this technique in hypospadias with a narrow original meatus and improving cosmesis [6,7].

In the present prospective randomised study, we assessed the benefits of the Mathieu incised-plate (Mathieu-IP) technique in improving outcomes and cosmesis in comparison with the standard TIP technique.

Patients and methods

The study was conducted between April 2012 and April 2015 on patients with primary distal hypospadias (coronal, sub-coronal, distal penile), after approval of the Local Ethics Committee of Benha Faculty of Medicine and obtaining informed written consents from the parents of the children.

The details of study flow are shown in Fig. 1. In all, 77 patients with distal hypospadias (coronal, subcoronal, distal penile) presented to the outpatient clinic and were eligible to be enrolled. We excluded nine patients for the following reasons: presence of severe chordee in three, previous hypospadias surgery in five, and a poorly developed urethral plate in one. The remaining 68 patients were randomly divided using the sealed-envelope method into two groups. Group 1, included 34 patients who were managed by the Mathieu procedure plus incision of the urethral plate (Mathieu-IP); and Group 2, included 34 patients who underwent TIP urethroplasty (Snodgrass procedure). All patients in both groups completed the procedure (see Fig. 2).

The postoperative functional assessment and cosmetic evaluation was carried out by medical personnel other than the surgeons and by the parents at the follow-up visits and included: the site of the new meatus; calibre and force of the stream; and the presence of complications in the form of urethral cutaneous fistula, meatal stenosis, glandular dehiscence, haematoma, infection, and disruption of the neourethra [8]. Also the shape of the meatus, whether slit-like or rounded, was assessed by both the parents and medical personnel.

Two patients in Group 2 (TIP) were lost to follow-up, so the final number for analysis and comparison was 32 patients, whilst all 34 patients in Group 1 (Mathieu-IP) completed follow-up.

Technique of Mathieu-IP

Under general anaesthesia, a 5-0 polyglactin 910 (Vicryl®, Ethicon, Somerville, NJ, USA) traction suture was placed on the dorsal part of the glans. The distance between the tip of the glans and the site of the hypospadias opening was measured. A suitable 6-F nelaton catheter was used as a tourniquet when needed. A 'U'-shaped incision was created according to the distance measured beforehand. The width of the base end of the flap should be wider than the tip. Two lateral incisions were made parallel to the original urethral plate and deepened in the glanular part to form the glanular wings. A midline incision of the urethral plate was made extending from within the native meatus to the tip of the glans just beyond the pre-planned meatus site. Urethroplasty was completed by suturing the perimeatal-based skin flap with the edges of the urethral plate over a suitable urethral catheter using 6-0 polyglactin 910 suture in a running subcuticular manner until the tip of the glans. A dartos flap was harvested to cover the two suture lines. Then the glanular wings were closed symmetrically

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