Meatal Based Flap with Plate Incision Covered by Dartos Fascia Flap for Distal Penile Hypospadias

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ABSTRACT

A number of surgical procedures have been described to correct the distal penile hypospadias. The meatal based (Mathieu) Flap is popularly used to supplement the urethral plate with ventral shaft or preputial skin. A criticism of this repair is that the resultant meatus is horizontally oriented and rounded which is functional but cosmetically less desirable than normal. The Snodgrass technique is versatile, easy to do and has a good cosmetic outcome, with a vertically orientated meatus. A criticism of this repair is that frequencies of occurrences meatal stenosis and urethral stricture most of them need regular dilatation. So my idea is to do meatal based (Mathieu) Flap with incision of urethral plate and covering by fascial flap aiming to solve the criticism of both techniques. A total of 60 cases of distal penile hypospadias treated that technique and evaluated as regards the quality of the urinary stream and parents’ satisfaction with function and cosmetic appearance and complication rate specially fistula and meatal stenosis. With 6 months follow-up. The age of the patients range from 1 year to 23 years. In all patients I use a urethral stent to travel the suture only not reach to bladder for 7 days. Postoperative edema was noticed in 6 (10%) patients who improve within few days. Postoperative infection was noticed in 1 (1.6%) patient the infection is mild and did not affect the repair. Cosmetically: Normal looking circumcised penis with good function (straight penis, urinary stream, near normal looking slit like meatus) with this repair. No (wound dehiscence, fistula, meatal stenosis, stricture urethra, stream abnormality, or penile torsion detected in any patients through follow-up period. As regards to operative time which estimated from the time of sterilization to the end of dressing between 60 to 90 minutes. In this study it was concluded that (in my hand) that technique is versatile, easy to do and has a good cosmetic outcome, with a vertically orientated meatus, as in a normal circumcised penis with no or less complication So this procedure, which benefits from the advantages of both the Mathieu and Snodgrass procedures.

INTRODUCTION

Hypospadias surgery is challenging. To date more a numbers of surgical techniques with accompanying variation have been proposed for repair of hypospadias. Such repair should be simple, easily learned, applicable to the majority of cases, completed on one stage and resulting in good function and cosmetic result with low complication rate. To date these repair not described [1].

In 1994, Snodgrass described a technique with a low complication rate for correction of distal hypospadias by tubularization of the urethral plate, combined with a deep longitudinal incision of the groove to create a vertical meatus. The advantage of this procedure is that it provides a generously mobile plate to form the neourethra with a vertical slit-like meatus [2]. Tubularized incised urethral plate technique is simple and provides good cosmetic results [3]. Brekalo et al., reported that, the Snodgrass technique is suitable for primary as well as after an unsuccessful urethral reconstruction [4]. However, the relatively high rates of meatal stenosis and/or urethrocutaneous fistula (0-33%) and the need for regular urethral dilation have always been a great concern with this procedure. These complications would be potentially more prominent in patients with a flat and narrow urethral plate [5,6,7].

Elbakry reported that regular calibration of the urethra is an integral part of Snodgrass technique for prevention of meatal stenosis [5].

Anani treat 58 patients of distal penile hypospadias by Snodgrass technique with resultant of 6 (10.3%) complicated by meatal stenosis treat by periodic urethral dilatation for three months with application of topical 0.05% betamethasone cream twice daily [8].

Urethrocutaneous fistula is the most common complication of Snodgrass technique with highest reported rate of fistula was 20% [5].

The meatal based flap, first described in 1932, for the reconstruction of distal hypospadias using parameatal-based penile non-hairy skin, and since then it has remained one of the most reliable procedures in this context [9]. With complication rates
ranged from less than 3% to 21%. However, meatal-based flap repair yields a horizontal rounded urethral opening, which is cosmetically less acceptable than the normal vertical slit-like meatus \[9,10\].

In hypospadias surgery, new techniques and modifications of previously used techniques are continuously being introduced to decrease the rate of complications, and to achieve better functional and cosmetic results.

The aim of this study is to combine the meatal based flap with distal urethral plate incision and cover by Dartos fascia for repair of distal penile hypospadias to improve the cosmetic outcome and decrease the complication rate.

**PATIENTS AND METHODS**

From August 2010 to January 2015, I reported 60 cases of distal penile hypospadias who presented to Plastic, Reconstructive and Burn Surgery Department Al-Azhar University Hospitals. Those who had previous repair were excluded from the study. Age ranged between 1 year to 23 years. Majority of patients were within 1 to 2 years range, 13 cases have a family history of similar condition. Presurgical hormonal treatment was not given to any of our patients.

Routine laboratory investigation was done to all cases and hospital admission on 12 hours before the day of operation. Details history and medical examination was done for all patients followed by local examination to detect the position, shape and size of meatus shape of the glans presence of choree or rotation, skin of the prepuce and associated anomalies.

**Surgical technique:**

All patients were operated under general anesthesis with and 4X – loupe magnification. A tourniquet was applied at the root of the penis in the form of a soft elastic rubber band to maintain a bloodless field; the tourniquet was left till urethroplasty was completed. An artificial erection was done to diagnose penile choree. A stay suture was placed through the corona for traction. We use urethral stent from nilton type was passed according to penile size to travel the suture only not reach to bladder.

The urethral plate was then incised in midline from the hypospadiac meatus distally as a first step of Snodgrass technique and separated from the glans wings with two parallel longitudinal incisions; these incisions were made very deep up to the tips of the corpora cavernosa to enable better mobility of wings. Design of meatal based (Mathieu) Flap to supplement the urethral plate with ventral shaft to form the tube, Polyglycolic acid interrupted sutures was used for repair. followed by deepithelization of the preputeal skin of both inner and outer layer; the deepithelized preputeal skin (pre-puteal fascia) is in continuity with darts fascia to cover the suture line and act as a third layer, the glans wings werew approximated in one layer over the fascial flap without tension with interrupted suture. Performance of artificial erection, then closure of penile skin. Circumcision was not performed in all those patients tell reconstruction has been proved.

All patients were maintained on antibiotic prophylaxis and analgesic. Hospital stay was 24 to 48 hours for all patients. Then patients discharge from hospital and outpatient follow-up; first dressing after 5 days, Urethral stent was removed after 7 days. The patients were followed weekly for one month then monthly for three months then after six month. The operative time was calculated from the time of sterilization till the dressing finish.

The items of assessment include; urinary stream, shape of meatus, presence of postoperative complication (maetal stenosis or structure urethra), and cosmetic appearance. With the follow-up period 6 month.

**RESULTS**

A total of 60 cases were studied with distal penile hypospadias underwent repair by that technique.

Postoperative edema was noticed in 6 (10%) patients who improve within few days. Postoperative infection was noticed in 1 (1.6%) patient the infection is mild and did not affect the repair. This patient has postoperative edema also.

**Cosmetically:** Normal looking circumcised penis with good function (straight penis, urinary stream, near normal looking slit like meatus) with this repair.

No (wound dehiscence, fistula, meatal stenosis, stricture urethra, stream abnormality, or penile torsion detected in any patients through follow-up period.

As regards to operative time which estimated from the time of sterilization to the end of dressing between 60 to 90 minutes.
Fig. (1): (A) Preoperative distal penile hypospadias 21 years old (B) Incision of the urethral plate (C,D) Mathieu flap after elevation and suture (E) Dartos fascia flap cover the suture line (F,G) After repair.

Fig. (2): (A) Preoperative patient 23y distal penile hypospadias (B,C,D) Intraoperative demonstration of dartos fascia flap to cover the suture line.
Fig. (3): (A) Preoperative distal penile hypospadias 1.5 years old (B) Incision of the urethral plate (C,D) Mathieu flap after elevation and suture (E) dartos fascia flap cover the suture line (F,G) Post operative and micturition through the urethral stent (H) Urethral meatus after 6 month.
Fig. (4): (A) Preoperative distal penile hypospadias 2 years old (B) incision of the urethral plate (C,D) Mathieu flap after elevation and suture (E) after repair (F) dressing (G) micturition after one month (H) Urethral meatus after 6 month.
DISCUSSION

We strongly believe that hypospadias surgical correction should not be taken lightly by any surgeons; as first hypospadias surgery is the best chance which the child has. Once the first hypospadias surgery has a complication, more surgeries are needed and still the result may not be optimal.

Hypospadias is a result of incomplete formation of the urethra during the 10 to 14 weeks of gestational life. Hypospadias is one of the most common congenital anomaly with the majority of the cases are of the distal variety. The aim of Hypospadias reconstruction is to attain a normal function and accepted cosmetic appearance. Over 300 urethroplasties and their modifications have been described and new editions continually appear in literature [1].

The meatal-based flap urethroplasty is commonly used for the primary correction of distal hypospadias [9]. TIP urethroplasty has gained widespread acceptance for urethroplasty of both distal and proximal hypospadias [2,3]. Complications are common after hypospadias repair, ranging from fistulae to complete loss of the neourethra, requiring total reconstruction. The most frequent complications after hypospadias repair are urethrococutaneous fistulae and meatal stenosis, which have been reported in up to 21% of patients [1].

The natural urethral plate configuration might play an important role in the development of meatal complications after the Snodgrass procedure. Narrow and flattened urethral plates are more susceptible to meatal stenosis [6].

In contrast, these features are not involved in the Mathieu procedure. In fact, neourethra creation throughout the Mathieu procedure is independent of urethral plate characteristics. Using this technique, an acceptable meatal caliber could be achieved. Nevertheless, meatal-based flap repair creates a horizontal and rounded meatus, which is cosmetically less acceptable than a normal vertical slit-like meatus [9].

In the current study, the incised urethral plate step was added to Mathieu techniques to facilitate closure and glanuloplasty. Few other modifications were added to the Mathieu technique including less lateral position of the incision at the glans as the granular part of the urethra is formed by both the perimeatal flap as well as the incision of the plate, this will facilitate closure of the granular wings, and eliminate the incidence of granular dehiscence. Also deepithelization of the preputial skin of both inner and outer layer; the deepithelized preputial skin (preputial fascia) is in continuity with dartos fascia to cover the suture line and act as a third layer.

The current modification maximizes the functional and aesthetic results by adding the TIP principles to the standard Mathieu procedure appear to be a helpful measure to reshape the urethral meatus in a slit pyramidal shape and give a better cosmetic result. On the other hand, it seems to decrease the incidence of meatal stenosis and fistula formation.

Our results conform well to those of El Ganainy et al., who found that hypospadias repair using a perimeatal-based skin flap combined with an incision of the urethral plate reduces complication rates and offers good cosmetic results [11]. Also with the result of Kiss et al. who found same results [12]. We also agree with Aminsharifi et al. [15], and Alsharabaini and Almarmhy, [17] who stated that combining plate incision with the Mathieu procedure would be quite helpful to prevent or reduce the risk of meatal stenosis, urethrococutaneous fistula and the cosmetic problems of hypospadias surgery.

Many surgeons found postoperative urethrococutaneous fistula with the use of Mathieu procedure combined with an incision of the urethral plate; [11,12,16] I think because of use of dartos flap covering the suture line acting as a third layer before skin closure are the reason of no fistula in these study.

As regards to operative time which estimated from the time of sterilization to the end of dressing between 60 to 90 minutes. These result relatively near to the result obtained by many surgeons [13,14] either he do Mathieu flap alone or snodgrass. Technique alone, so these not need more time.

Conclusion:

There is no single universally applicable technique for hypospadias repair, but with expert hand the rate of complication decreased.

In this study it was concluded that (in my hand) use of Maetal based flap with urethral plate incision and covered by Dartos fascia flap for repair of distal penile hypospadias is a feasible technique that does not necessitate the acquisition of new skills, with minimal effect on operative time, easy to do and has a good cosmetic outcome, with a vertically orientated meatus, as in a normal circumcised penis with no or less complication specially meatal stenosis or fistula. So this procedure, which benefits from the advantages of both the Mathieu and Snodgrass procedures.
REFERENCES