

Dartos Fascio-Cutaneous Flap for Augmentation Glanuloplasty in Hypospadias TIP Urethroplasty Repair

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likely explanation for the worldwide increase in incidence within the last three decades [1,2].

Minor cases of hypospadias, in which the meatus is located near to the tip of the glans, may not require surgical repair and may simply be managed with observation, Fig. (1). Very mild hypospadias may have few functional implications. The condition can affect child's ability to void standing that may cause psychological problems because of voiding like females. It might also affect their ability to have satisfactory erection later on. Most parents choose to have surgery for their kids for the above mentioned causes and also for the apparent aesthetic deformity [3].

The goal of hypospadias surgery is to end up with a penis that is functionally and aesthetically normal. Whether these goals will be met with satisfactorily, depends largely on the original anatomy, the tissues available for reconstruction and the method used for repair [4].

A recent worldwide survey between pediatric urologists examining their trends in hypospadias repair, showed that meatal advancement and glanuloplasty (MAGPI) procedure to be the most popular procedure for glanular hypospadias with good appearance of the phallus and the glans. In this survey, the Tubularized Incised Plate urethroplasty (TIP) procedure, introduced by Snodgrass 1994, was found to be the technique of choice in distal forms of hypospadias with good urethral plate and adequate glanular and ventral tissue. The TIP urethroplasty, although feasible, is not widely used for proximal types of hypospadias. A two-stage technique is currently more popular, especially when substitution urethroplasty is required [5].

and in more severe cases penile chordee. Its incidence is ~1 in 250 male newborns, although it seems to be increasing. The etiology of hypospadias remains unknown, with environmental exposure in the form of endocrine disruptors, being the most

Many refinements and modifications have been addressed to the TIP procedure to reduce its incidence of complications. The main advantages of the TIP urethroplasty is being technically easy,

gives a normal looking vertical slit-like meatus (which is not achieved in other procedures), better outcome and less incidence of complications [6,7].

The most commonly recorded complications with hypospadias surgery are poor cosmeses, fistulas, persistent chordee, urethral stricture, meatal stenosis, retrusive or proximal meatus, or glanular dehiscence [1,2].

In this study, we aimed at presenting our experience in repair of distal types of hypospadias (distal penile and coronal types) using TIP urethroplasty with our new modification on this well established technique. We deemed to overcome the problem of glanular dehiscence or retrusive meatus which we consider as a procedure failure.

PATIENTS AND METHODS

A total of 27 male children, their ages ranged between 12 months to 6 year old with hypospadias were included in this study from January 2013 to June 2015 in Plastic Surgery Unit, Department of General Surgery, Zagazig University. Only distal penile and coronal types of hypospadias with a relatively narrow urethral plate (<8mm) were included. Three of them were recurrent sub-coronal hypospadias. They were previously operated by another surgeon using Mathieu technique and they were not circumcised. All children underwent TIP urethroplasty described by Snodgrass WT. More proximal types of hypospadias with moderate to severe chordee were excluded from this work. Table (1) shows age distribution and types of hypospadias operated.

Patients in this study underwent basic routine investigations e.g. total blood count, serum urea, creatinine and urinalysis. Preoperative pediatric consultation was done for all patients to exclude any other congenital anomalies and assess fitness for anesthesia. A written consent was also obtained for every child before proceeding into surgery.

Surgery was done under general anesthesia along with caudal block. Surgical chemoprophylaxis (third generation cephalosporin, Cefotaxime sodium, 100mg/Kg/day) was started one hour before surgery and continued for the next two days postoperatively in a divided IV doses.

A stay suture was placed in the glans to aid in traction on the phallus. Eight to 10 French Nelaton's catheter was placed on the basis of patient age and size of phallus (as a stent). Soft rubber tourniquet (piece of sterile gloves applied at the base of penis and released every 45 minutes) was used for better control of bleeding. Using magnifying loupe of

2.5X, a U-shaped incision was made, extending along the edges of the urethral plate up to the glans and to the healthy skin 2mm proximal to the meatus. Degloving of the penile skin was done down to the penile root. Then an incision was added in midline of urethral plate from native meatus up to the site of the neo-meatus. The urethral plate was tubularized over the catheter using 6-0 absorbable suture with running sub-epithelial stitches.

Coverage of the neo-urethral tube was made using vascularized subcutaneous (Dartos) flap harvested from the dorsal prepuce. A skin paddle was added at the central part of the distal end of the flap. This skin paddle was fashioned in a longitudinal direction and its dimensions were about 0.5 (width) X 1.5cm (length) with its distal end tapered towards the neo-meatus to preserve its slit-like appearance. Glanular wings were sutured to the edges of the skin paddle of the flap using 5/0 absorbable suture. Redrapping of penile skin was done after excising the excess prepuce skin and careful hemostasis using a bipolar diathermy. A light compressive dressing was then applied (Photos 1-7, shows the operative steps).

Post-operative pain management was done using intramuscular injection of Pethidine (1mg/kg/dose) initially then oral Paracetamol was used. Dressing was opened on the 5th postoperative day. Fucidin cream was applied after the dressing was opened regularly. Nelaton's catheter was removed on the 5th postoperative day also. Patients were instructed about the follow-up, weekly during the first postoperative month then monthly for another 11 months to see the repair status, urinary stream and any other complication (a total of one year follow-up for every child).

RESULTS

Overall, twenty seven patients were included and operated upon in this study as a case series study. There was no mortality and postoperative recovery period was uneventful for all patients. Successful hypospadias repair was obtained in 25 cases (92.6%). All harvested flaps (27 Dartos flaps with skin paddle) survived well without ischemia or congestion.

Only 2 patients showed postoperative complications related to the repair procedure (Table 2). One patient (3.7%) showed urethro-cutaneous fistula and the other one (3.7%) with meatal stenosis. Fistula was managed surgically in a second session while stenosis responded well to repeated dilatation. None of our cases showed wound dehiscence and all of them reported good cosmetic appearance (as mentioned by their relatives).

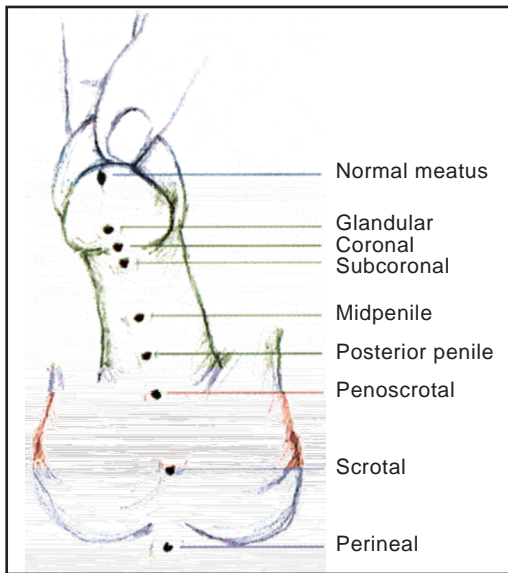


Fig. (1): Different types of hypospadias [3].

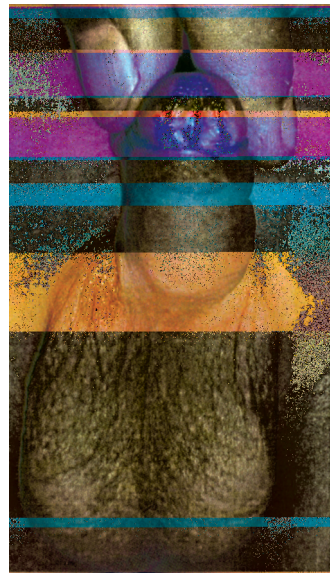


Photo (1): Coronal hypospadias, preoperative marking.

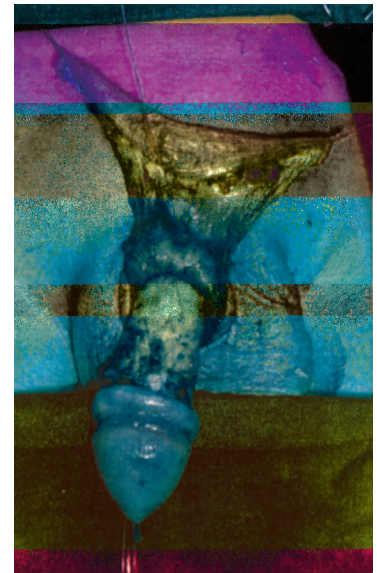


Photo (2): Penis degloved and dartosmyo-cutaneous flap harvested.



Photo (3): The flap transferred to the ventral aspect of the penis and skin paddle prepared from prepuccial skin.

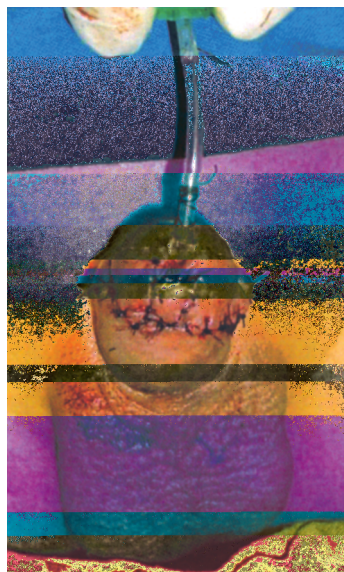


Photo (4): Procedure completed (ventral aspect).

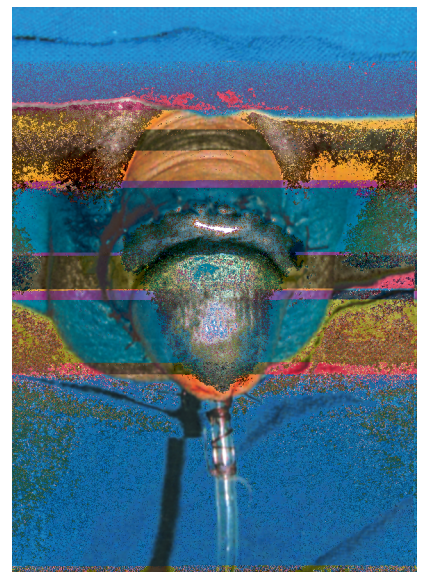


Photo (5): Procedure completed (dorsal aspect).



Photo (6): Two weeks post-operatively.

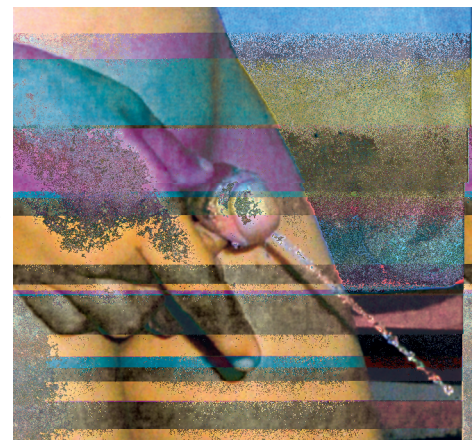


Photo (7): Three months post-operatively.

Table (1): Age of patients and types of hypospadias in this study.

Item	No.	4%
<i>Age:</i>		
1-2 years	15	55.6
2-4 years	8	29.6
4-6 years	4	14.8
<i>Type:</i>		
Coronal	10	37.1
Sub-coronal	6	22.2
Distal penile	8	29.6
Recurrent Sub-coronal	3	11.1

Table (2): Postoperative complications in the operated cases.

Type of Hypospadias	No.	Urethral Fistulas	Meatal Stenosis	Glanular Dehiscence	Bad Cosmoses
Coronal	10	0	0	0	0
Sub-coronal	6	0	0	0	0
Distal penile	8	1	0	0	0
Rec. Sub-Coronal	3	0	1	0	0
Total	27	1	1	0	0

DISCUSSION

Hypospadias continues to challenge today's reconstructive surgeons just as it was since Thierchsh and Duplay reported their first repairs in the latter part of the nineteenth century. Since then, over 300 urethroplasties and their modifications have been described and new additions continually appear in the literature [8].

Rich et al., introduced the principle of incising the urethral plate in the midline to improve the cosmetics of a hypospadias repair in 1989. Five years later, Snodgrass used this principle and extended the incision of the urethral plate from the meatus to the tip of the glans. It has gained popularity so that most surgeons today prefer doing TIP urethroplasty rather than other procedure for distal hypospadias repair [9,10].

Despite the wide acceptance of Snodgrass technique for repairing distal types of hypospadias, still complications do occur. Many modifications on the original technique had been introduced to improve the outcome and reduce the incidence of complications [7,11-13].

Most of the effort was targeting the problem of fistula formation and how to reduce its incidence [15-17]. Of course, this was also one of the goals of the current study. But, the modification added to the TIP urethroplasty in this work is primarily

attacking the problem of glanular dehiscence. This glanular dehiscence mostly comes, as we believe, from suturing the glanular wings under tension over the neo-urethral tube and the covering Dartos fascial flap.

Many reports, including that made by Snodgrass WT [17] himself, mentioned the occurrence of glanular dehiscence in a rate even equal to that of urethra-cutaneous fistula. Riccabona et al. [18] reported three cases of glanular dehiscence in their series that included 228 cases.

In another report published by Snodgrass et al. [17] complications developed in 19 cases (4%), including 9 fistulae, 9 glans dehiscences and only 1 delayed meatal stenosis. They mentioned that these complications could not be attributed to meatus location, urethral plate configuration or incision, suture materials or methods for urethroplasty and glanuloplasty, or to whether or not a Dartos flap layer was used.

In their modification, Wishart and Mitcalfe [11] believed that dissection of the divergent spongiosal tissue from the corpora facilitates the development of an anatomic plane, which can be followed-up into the glans. This allows an easy and accurate dissection right to the tips of the corpora cavernosa and results in excellent glans mobility and preservation of blood supply. They named it "burrowing technique". Glanular dehiscence occurred in the first group in 12/98 cases while urethra-cutaneous fistula occurred in 9/98 cases (first group, TIP repair only). Meanwhile, the modification they added reduced the incidence of dehiscence to 8/95 cases and fistula to 6/95 cases (second group, TIP + burrowing technique). They mentioned that this difference was statistically non-significant.

In another report by Nezami et al. [19] they utilized modified Mathieu technique for both hypospadias repair and glanular augmentation. With a Double Faced Mathieu Flap (DFMF), they obtained 97% success rate in hypospadias repair with no incidence of glanular dehiscence.

Using modified double face onlay island prepuce skin flap with augmented glanuloplasty for hypospadias repair as described by El Dahshoury et al. [20] yielded also very accepted cosmetic result with very low complication rate (only 0.5% glanular disruption and 3.29% overall complications).

The last two reports were successful in reducing the rate of postoperative complications, especially glanular dehiscence, and achieved glanular augmentation with two different methods. But, neither

of them utilized TIP urethroplasty in the repair procedure.

In our study, by using the standard TIP urethroplasty with addition of skin paddle to the Dartos fascial flap, we obtained a nearly similar outcome with an incidence of glanular dehiscence of 0 cases while only 1 patient suffered from urethrocutaneous fistula (3.7%) and another one attained meatal stenosis. Also, we were able to operate three recurrent cases with this technique successfully. This is mostly due to tension-free glanular closure and a third layer of vascularized skin is added over the urethral tube that makes the neo-urethra heals better.

Conclusion and Recommendation:

The Tubularized Incised Plate (TIP) urethroplasty has revolutionized the management of distal types of hypospadias. Reliability of the procedure was confirmed by the high success rate and the low rate of complications. But, still some issues about refinement of the technique, improving its final outcome and reducing the rate of complications are evolving.

In this study, we presented our experience with TIP urethroplasty with the addition of small skin paddle in the region of the future glans. We found that this modification had reduced remarkably the incidence of post-operative glanular dehiscence and fistula formation. Although the number of cases was not too big (only 27 cases), the idea of adding a third vascularized covering layer yielded a very much less incidence of complications, meanwhile, keeping the well-known advantages of the original technique.

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