

Tubularized Incised Plate Urethroplasty for Hypospadias Reoperations: Is it a Reliable Technique?

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Abstract

Objectives: To provide our experience with redo hypospadias procedure using tubularized incised plate urethroplasty operation.

Methods: A retrospective review of 32 patients (Mean age: 4.5 years, range: 3 - 10 years) who had undergone a redo tubularized incised plate urethroplasty operation was performed.

Results: The overall complication rate was 22% (7 cases). Three patients (9.3%) had urethral fistula, four had meatal stenosis (12.5%), and no cases of wound dehiscence or stenosis of the neourethra. The incidence of complications of tubularized incised plate urethroplasty reoperation after failed repairs of meatal advancement and glanuloplasty procedure (10 cases), meatal based flap (12 cases), and tubularized incised plate urethroplasty (10 cases) were 31%, 37% and 32% respectively. The ultimate success rate of tubularized incised plate urethroplasty reoperation was 100% after repair of fistula and meatal stenosis by simple fistula closure and meatoplasty procedure. Near about 90% of the patients had an excellent cosmetic outcome with a vertically oriented slit like meatus and conical glanular configuration.

Conclusion: Tubularized incised plate urethroplasty is a good and reliable alternative procedure for hypospadias reoperations. Many factors including type of initial repair, the integrity of the urethral plate, technical aspects of Snodgrass performance and stenting option have a significant effect on the outcome.

Keywords: Tubularized Incised Plate Urethroplasty; Reoperations; Hypospadias

Introduction

Snodgrass modification of the Thiersch-Duplay technique has proved to be an extremely useful and reliable method of hypospadias repair [1]. Because of the excellent results obtained with Snodgrass technique its use is extended to all types of hypospadias from penoscrotal to glanular types [2]. Failure rates in primary hypospadias repairs vary from 5% - 20% depending on site of hypospadias, type of procedure and quality of available tissues for repair [3].

The tubularized incised plate urethroplasty (TIP) has gained widespread acceptance for primary and secondary hypospadias repairs. The key point in deciding its use as a secondary hypospadias operation is the quality and suitability of the urethral plate. Another challenge is lack of healthy or adequate amount of local tissue to create flaps for both replacement and/or coverage of the defective urethra and, resurfacing the penile shaft [4].

Aim of the Study

The aim of this study is to report our experience in using the TIP urethroplasty in re-operative hypospadias repairs and detect the various factors predicting its outcome.

Patients and Methods

The medical records of 32 patients who had undergone TIP urethroplasty reoperation at pediatric surgery department, Madinah Munawarrah, KSA between February 2012 and December 2017 were analyzed retrospectively. These patients were admitted for hypospadias complications (six from them were operated on for primary hypospadias repair at our institution). We classified our patients by the type of their initial hypospadias repair: meatal advancement and glanuloplasty (n = 10 patients), 'meatal-based flap procedure (n = 12 patients) and tubularized incised plate urethroplasty (TIP) (n = 10 patients). The interval from the most recent previous surgery till the time of tubularized incised plate urethroplasty reoperation ranged from 5 to 18 months (Mean: 11 months). Table 1 shows the indications of redo- hypospadias surgery in each group of cases and their numbers.

Technique

TIP urethroplasty was performed by one surgical team. After deciding to proceed with a secondary tubularized incised plate urethroplasty (TIP) procedure, the previously reconstructed neourethra, including the regions with fistulas or stenotic segment, is incised entirely starting from the intact portion of the neourethra towards the glans. The penis is then degloved (Figure 1). The urethral plate is separated from the glans by longitudinal parallel incisions on either side of the urethral plate. Intraoperatively, the level of meatus was midshaft in two patients, distal penile in 10 patients, subcoronal in 12 patients and coronal in 8. The urethral plate is deeply incised in the midline and tubularization is achieved with a single continuous 6/0 Vicryl suture, line over 8 - 10 Fr catheters. A tunica vaginalis flap is used to cover the neourethra if a well vascularized de-epithelialized skin flap is not available. The meatus is secured to the glans, the coronal margins of glanular wings are approximated by a 6/0 Vicryl suture and the skin is closed (Figure 2). All patients were admitted to the hospital for 7 days, were discharged after removal of catheter and ensure passage of good urinary stream. The follow-up patients range between 6 months and 1 year.

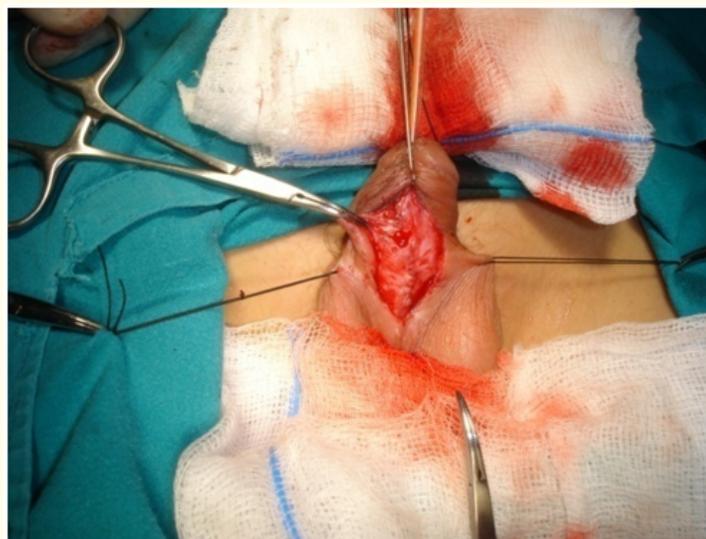


Figure 1: Creation of new urethral tube around catheter size 8.



Figure 2: A dartos flap is used as a second layer.



Figure 3: The repair is completed.

Results

The type of primary hypospadias repair and complications encountered after tubularized incised plate urethroplasty reoperation are summarized in table 1. The mean age at the time of secondary hypospadias repair was 4.5 (range: 3 - 10) years. The incidence of complications of tubularized incised plate urethroplasty reoperation after failed meatal advancement and glanuloplasty, meatal based flap procedure, and tubularized incised plate urethroplasty operations were 31%, 37%, and 32% respectively.

| Initial hypospadias repair | Site of meatus before reoperation and number of cases | Number of cases of fistula needs TIP redo |
|--|--|---|
| Meatal advancement and glanuloplasty (n: 4) | Coronal (n: 8) Subcoronal (n: 2) | N: 0 |
| Meatal based flap (n: 14) | Subcoronal (n: 4) Distal penile (n: 6) Midshaft (n: 2) | N: 8 |
| Tubularized incised plate urethroplasty (n: 6) | Subcoronal (n: 6) Distal penile (n: 4) | N: 8 |

Table 1: Indications of redo-Hypospadias surgery in each category of cases.

| Initial hypospadias repair | Complications | Incidence of complication (n:6) (18.25%) |
|---|----------------------------------|--|
| Meatal advancement and glanuloplasty (n:10) | Fistula: 0 Meatal stenosis: 1 | 10% |
| Meatal based flap (n:12) | Fistula: 2 Meatal stenosis: 2 | 12.5% |
| Tubularized incised plate (n:10) | Fistula: 1 Meatal stenosis: 1 | 10% |

Table 2: Incidence of complications in relation to previous repair.

The overall complication rate was 18.25% (n: 6). Three patients (9.37%) had fistula and four had meatal stenosis (12.5%). Simple fistula closure was performed in two patients eight months postoperatively. Two patients underwent meatoplasty procedure for meatal stenosis and the other two cases respond to regular dilatations for 2 to 3 months postoperatively. Table 2 demonstrates the type of primary hypospadias repair and complications after tubularized incised plate urethroplasty hypospadias reoperation.

Discussion

Management of hypospadias repairs complications still a significant surgical challenge. Compromised tissue vascularity and deficient penile skin and preputial tissues create a difficult setting to reconstruct a viable, patent neourethra [5].

Re-operative hypospadias complication rates are higher than primary repair, because of the altered vascular supply of tissue flaps, scarring and limited hairless skin. Re-operative repair rates by using the Mathieu and Onlay techniques reportedly give higher complication rates, at 24% and 14% respectively [6].

Tubularized incised plate (TIP) urethroplasty provides a reliable approach for hypospadias reoperations. The successful use of tubularized incised plate urethroplasty for re-operative hypospadias repair is supported by many reports and the complication rate varies between 0% and 26% [7].

In our series the re-operative tubularized incised plate urethroplasty has the least complication rate (25%), if the first failed hypospadias repair was a meatal advancement and glanuloplasty procedure. This can be explained by the integrity of the urethral plate in these cases. Subsequently, the difference in outcomes of the re-operative tubularized incised plate urethroplasty in relationship to the type of the original procedure was significant.

It was previously reported that the incidence of complications of tubularized incised plate urethroplasty hypospadias reoperation in patients with prior incised urethral plates versus those without incision was 22% and 23% [8,9]. In our series we agree with that view although Mehmet E., *et al.* [10] and Ekinci S., *et al.* [18]. They mentioned that a previous incision of the urethral plate increases the complication rate of tubularized incised plate urethroplasty hypospadias reoperation as compared to an unincised urethral plate.

Although there is a generous vascularization of the urethral plate, the vascular integrity of the urethral plate can be disturbed by initially failed hypospadias repairs. Therefore the type of previous surgical intervention is an important factor that needs to be taken into consideration with respect to the successful outcome of tubularized incised plate urethroplasty hypospadias operations [8].

Many technical points during the performance of Snodgrass urethroplasty have paramount significance on the outcome of the procedure. Snodgrass., *et al.* [1] did not sew the glans to the new meatus but on their final reviews they had mentioned that the meatus should be secured to the glans at 5 and 7 o'clock to improve cosmetic result and we agree to this concept to decrease meatal stenosis postoperatively. Another concept is to take three stitches at 4,6,8 o'clock after getting a high rate of meatal stenosis in the initial study of Mehmet., *et al.* [10].

Meatal regression can occur if the depth of the incision in the glanular portion of the urethral plate is not adequate for adequate mobilization and tubularization of urethral plate. It is documented that if the midline incision is deepened beyond the limit of the urethral plate to improve tubularization of the urethral plate and conical configuration of glans, some bleeding occurs, and possibility of stenosis or dehiscence increases [11]. Therefore, the level of the first stitch of neourethral tube is better to be at the middle glanular level in these reoperations.

The use of the dorsal prepuce needs extensive dissection and may impair the blood supply of the skin and causes postoperative penile torsion. To avoid these problems, a covering layer from dartos tissue is modified. In the later technique, when the ventral skin is deficient, the size of the flap may be inadequate to cover the repair [8]. A new technique is to raise a lateral dartos ventral flap and cover the neourethra [5]. The last technique is associated with a low fistula rate (14.3%) and agree with our result (9.37%). This lateral dartos flap has a good choice especially in patients who underwent circumcision prior to urethroplasty because the preputial flap is not an option in these cases. Some limitation to this technique is shortness of the flap that can be solved by another flap from the other side and the two flaps can then be sutured together [12]. In cases like this some authors advise the use of preputial flaps as a covering layer with good results, if parts of prepuce still available. This idea is supported by their good results from the primary repair [19,20].

There are controversies around the penile skin degloving to be complete till the penoscrotal area or limited to area around the meatus. Selami S and Warren S [13] advised limited degloving of the penile skin so as to limit the need of a large covering layer of the neourethra and limit the use of TIP urethroplasty to those cases without severe penile curvature. On the other hand, Hammouda H., *et al.* [14] Supported our view provide in doing complete degloving of the penile skin to provide full erection and prevent postoperative torsion.

We recommend to stent all cases of Snodgrass redo urethroplasty especially in patients with a poorly developed urethral plate or if there is some concern regarding the viability of the covering flap. Also, the stent keeps the dorsal midline incision stretched open and limits the chance that it may heal primarily and thereby lose the benefit of the dorsal incision.

However Borer., *et al.* [15], Tural., *et al.* [16] and Pfistermuller KL., *et al.* [21] did not stent most of his repairs, and no case of urethrocutaneous fistula, urethral stricture or meatal stenosis occurred. From our experience, we think that the use of the stenting catheter shouldn't exceed 5 days postoperatively to avoid the problems of catheter blockage, bladder irritation and long hospital stay.

The overall complication rate for our secondary tubularized incised plate urethroplasty (TIP) hypospadias repair is 18.25% including fistula and meatal stenosis. The ultimate success rate of tubularized incised plate urethroplasty reoperation was 100% after repair of

fistula and meatal stenosis by simple fistula closure and meatoplasty procedure. Near about 90% of the patients had an excellent cosmetic outcome with a vertically oriented slit like meatus and conical glanular configuration.

Snodgrass tubularized incised plate urethroplasty can get a very good results if the above- mentioned technical points are followed, but we think that multiple prior midline urethral plate incisions more than twice are contradiction for tubularized incised plate urethroplasty reoperations. Buccal mucosa urethroplasty can be used for neourethral reconstruction in patients who had failed repairs after tubularized incised plate urethroplasty hypospadias reoperation or had severe types of hypospadias originally [12,17,22].

Conclusion

Tubularized incised, plate urethroplasty (TIP) is a safe and reliable alternative technique for hypospadias reoperations putting in consideration its use in cases with no scars in the urethral plate. Another factors like the duration of catheter use and urinary infections have effects on the outcome.

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