

# Tubularized incised plate technique (tips) for recurrent hypospadias: A local experience

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## Abstract

*Background: Tubularized incised-plate (TIP) repair has been well described for the use in salvage hypospadias repairs with good results.*

*Aim: To evaluate our local experience of TIP repair (Snodgrass method) in the management of recurrent hypospadias.*

*Patients and methods: This prospective, descriptive study was conducted over a period of 5 years from December 2003 to December 2008. The study included 30 patients, all of them had previously undergone hypospadias repair, and the indication for surgery was complete failure of the previous repair. Classic TIP repair was performed although tissues for barrier layers between the neourethra and skin closures were not as readily available.*

*Results: Secondary TIP repair was successful in 29 patients (96%) while one case (4%) showed a complete failure. Postoperative follow-up was 2.1 years with a range of 2- 8.2 years.*

*Conclusion: Our local experience coincide with data of the literature that TIP is an excellent option in treatment of recurrent hypospadias when the primary techniques results are unsatisfactory.*

*Key words: Recurrent hypospadias, TIP, salvage hypospadias.*

## Introduction:

Although modern hypospadias repairs have low complication rates, inevitably there are occasional failures that require reoperation. Primary hypospadias repairs are associated with failure rates of 5-20% depending upon the type of procedure performed, location of original meatus and quality of tissue available for the initial repair.<sup>1-6</sup>

The principles of reoperation remain identical to those of the primary operation. The challenges of performing a secondary hypospadias repair include lack of healthy or adequate amount of local tissue to create flaps for both replacement and coverage of the defective urethra and, resurfacing the penile shaft.<sup>7</sup>

These secondary procedures are often more difficult than the original surgery because there is less skin available to create flaps, and the vascularity of previously operated tissues may

be suboptimal, resulting in further complications.<sup>2,s</sup> Potential advantages of tubularized incised plate (TIP) urethroplasty in these circumstances include creation of the neourethra with no need for skin flaps, and the opportunity to achieve good cosmetic results despite previous surgery.<sup>5,6,8-10</sup>

Our study aimed to evaluate our local experience with tubularized incised-plate (TIP) urethroplasty in the management of recurrent hypospadias.

## Patients and methods:

This prospective, descriptive study was conducted over a period of 5 years from December 2004 to December 2008 with a follow-up period of 2 years or more post surgery. The study included 30 patients, all of them had previously undergone different types of hypospadias repair, and the indication for surgery was complete failure of the previous

repair. All patients were subjected to a thorough history taking stressing upon the parietal consanguinity, associated congenital anomalies and clinical examination with a special emphasis on the number(s) and type(s) of the previous original primary operations if available.

Thorough local examination to assess the state of the urethral plate, preputial skin if present, site of hypospadias, presence of chordee and the scrotum for a possible scrotal transposition. TIP was performed with a surgical technique similar to the primary TIP repair,<sup>12</sup> except that tissues for barrier layers between the neourethra and skin closures were not as readily available.

Follow-up was performed through outpatients' clinic visits. These visits were arranged to be in the first week post surgery, followed by a session every 2 weeks in the first month then monthly for the period of at least two years period post surgery.

Functional results were measured via urethral calibration after 2 months of surgery and uroflowmetry, while cosmetic results were evaluated by genital examination and family satisfaction about the function and appearance of the penis. These measurements were performed weekly in the 1<sup>st</sup> month then every 2 weeks in the next months. After the second month, assessment of the neourethra by urethral calibration via a urethral catheter was performed in every visit. Patients of meatal stenosis were treated via urethral dilatation while patients with fistula were treated with fistula repair after failure of spontaneous closure.

The urinary flow pattern, maximum (Q (max)) and average flow rate (Q (ave)) were measured; the results were expressed as percentiles and compared to the Toguri values from normal children. The Q (max) and Q (ave) were considered normal if they were in >25th percentile, equivocally obstructed in the 5-25th percentile and obstructed if <5th percentile. The flow pattern was classified as bell ring shape, plateau or intermittent. ■■

#### Results:

A total of 30 patients suffering of recurrent hypospadias were enrolled in the study. Their

preoperative characteristics data are shown in Table(1).

The most commonly reported type of previous repair was MAGPI in 6 patients (20%). One patient who had been subjected to TIPS presented after 1 year of the previous repair. The rest of patients presented after a mean duration of  $4.9 \pm 3.1$  years from the previous repair Table(2).

On preoperative assessment of the status of urethral plate, the presence or absence of foreskin because of circumcision results are shown in Table(3). Only one patient in our series has shown complete failure of the procedure. This patient presented with disturbed urethral plate which was markedly scarred. A statistically significant difference was noted between patients with disturbed urethral plate and patients with undisturbed urethral plate regarding reported complications Table(3).

Postoperative urethral calibration was equal or more than 8 fr, in cases of successful repair without meatal stenosis according to patient's age; 8 to 10 fr were used on those above 3 years till 10 years, 10-12 fr from 10 to 15 years and 12-14 fr for 15 years or more.

Uroflowmetry results showed that the flow pattern was normal bell-shaped for all of the patients, except 1, with Q (max) below the 25th percentile according to the Toguri nomogram. He had a plateau flow pattern and was found to have an asymptomatic meatal stenosis, which improved with urethral dilatation.

Considering meatal stenosis and fistulae rate, and a functional neourethra with a cosmetically nonnal slit-like meatus our success rate was 86.7%.

Twenty six patients showed no postoperative complications and had a slit like meatus and a forward directed urinary stream without branching with their parent's satisfaction with the repair results.

Our results also showed no significant association between the outcome of the operation and meatal location, previous repair and the presence of chordee. It was estimated that the younger the age of the patients and the shorter the duration from the previous repair the better the outcome of the operation Table(4).

Table (1): Preoperative patient characteristics.

Characteristics		Number (n=30)	Percentages (100%)
Age (years)	Mean±SD	7.5±3.9	
	Range	3-18	
Consanguinity	Positive	8	26.7%
	Negative	22	73.3%
Chordee	With chordee	10	33.3%
	Without chordee	20	66.7%
Meatal location	Coronal	7	23.4%
	Distal penile	10	33.3%
	Mid shaft	10	33.3%
	Proximal	2	6.7%
	Penoscrotal	1	3.3%
History of other anomalies	Congenital inguinal hernia	1	3.3%
	Undescended testis	1	3.3%

Table (2): Distribution of the studied patients according to the type of previous repair.

Type of previous repair	N(%)	Duration from the last repair (years)
MAGPI	6 (20%)	3.4 ± 1.5
TIPS	1 (3.3%)	1
Mathieu	3 (10%)	1.2 ± 0.8
Unknown repair	20 (66.7%)	5.6±2.8

Table (3): Distribution of the studied patients according to the preoperative state of the urethral plate, and complications according to the state of urethral plate.

	With disturbed urethral plate	With undisturbed urethral plate	Total	p-value
Distribution	17 (56.7%)	13 (43.3%)	30 (100%)	0.57 (NS)
Complete failure cases	1 (5.9%)	0 (0.0%)	1 (3.3%)	
Success cases	16 (94.1%)	13 (100.0%)	29 (96.7%)	
Total	17	13	30 (100%)	p >0.05
Meatal stenosis	1 (5.9%)	1 (7.6%)	2 (6.7%)	
Fistula rate	1 (5.9%)	1 (7.6%)	2 (6.7%)	
Both	2 (17.6%)	2 (15.2%)	4 (13.3%)	

NS: No significant difference.

Table (4): Relation between outcome of the operation and patient's characteristics.

		Highly affected	Affected	Unsatisfactory	p-value
Age		4.5 ± 1.7	9.1 ± 2.1	18±0	0.001*
Meatal location	Coronal	7 (100%)	0(0%)	0 (0%)	0.6 (NS)
	Distal penile	6 (66.7%)	3 (33.3%)	0 (0%)	
	Mid shaft	5 (45.5%)	5 (45.5%)	1 (9.0%)	
	Proximal	1 (50%)	1 (50%)	0 (0%)	
	Penoscrotal	1 (100%)	0(0%)	0 (0%)	
	MAGPI	6 (100%)	0(0%)	0 (0%)	
Previous repair	TIPS	1 (100%)	0(0%)	0 (0%)	0.4 (NS)
	Mathieu	2 (66.7%)	1 (33.3%)	0 (0%)	
	Unknown repair	12(60%)	7(35%)	1 (5%)	
Chordee	With chordee	6 (50%)	5 (41.7%)	1 (8.3%)	0.2
	Without chordee	13 (72.2%)	5 (27.8%)	0 (0%)	
Duration from previous repair (years)		2.3 ± 1.4	4.1 ± 1.9	6±0	0.001*

\*Statistically significant difference (p-value < 0.05)

NS: No statistically significant difference (p-value > 0.05)

#### Discussion:

In modern hypospadias surgery, achieving normal anatomy and aesthetically satisfactory penile appearance has become as important as functional results.<sup>13,14</sup>

TIP repair for hypospadias has gained more popularity as an easy single stage hypospadias repair technique with many literatures supporting its good results not only in primary hypospadias repair but also for treating those with previously failed or unsatisfactory hypospadias repair.<sup>1-3,5,6,8-10,15-17</sup>

In this local study, TIP was performed on 30 patients whose age ranged from 3 to 18 years as the hypospadias repair age is still high in our country especially in rural areas with poorer resources.

This data coincides with others who reported series of more advanced age that the eldest hypospadias patient was 20 years old. The advanced age brings about psychological problems in addition to those of erection and infection especially in those older than 15 years of age.<sup>13,17</sup>

Some other reported data<sup>18</sup> coincided with us where the highest age of repaired hypospadias was also 18 years, contrary to a

report by Snodgrass,<sup>19</sup> who in 1994 reported that TIPS was performed in 16 boys with primary hypospadias with age from 6 months to 11 years. However, the same author in another study<sup>20</sup> reported a maximum age of 15 years for reoperation in hypospadias repair.

We observed that no patients less than 3 years were involved. This may be due to fear of Egyptian parents of another repair failure.

The hereditary factors were clearly confirmed in our study as there were 8 boys with positive history of consanguinity and 1 of them had a family history of hypospadias in his elder brother.

In our series, 10 patients with penoscrotal, proximal and midshaft hypospadias had mild type chordee that resolved with penile degloving and dissection of the ventral dartos.

It was reported in a published study that involved 15 patients that 3 patients required dorsal plication to correct the ventral curvature.<sup>21</sup> Most of our patients were previously performed by general surgeons; they included 7 patients with coronal, 10 with distal penile, 10 with mid shaft, 2 with proximal, and 1 with peno-scrotal recurrent hypospadias. Out of those, 6 had a previously

failed MAGPI repair; one patient had failed TIP repair, 3 with failed Mathieu repair, and 20 patients presented after unknown failed repair. This may be due to deficient files' system and most parents were unaware by the complications of surgical repair regarding the possibility of reoperation.

This data can be compared to other published report involving 15 patients where the meatus at reoperation was subcoronal or on the distal shaft in all but one boy, who had a midshaft hypospadias, all had previously undergone one attempt at hypospadias repair, except for one patient presenting after two failed MGPI procedure.<sup>21</sup>

We calibrated the neourethra with 8 fr catheter or more according to patient's age; on the first postoperative follow-up visit. During the follow-up period the calibration increased to be 10 fr or more according to patient's age and the penile size. Our results were similar to those of others<sup>19</sup> who reported a neourethral calibration to be 10 fr or more. Yet, our 2 patients with meatal stenosis did improve by regular dilatation during the follow up visit throughout 24 weeks of follow-up.

Fistulae were reported in 2 of our patients (6.7%) who were surgically repaired. It has been hypothesized that fistulae after TIP reoperation may be partly attributable to the relative lack of tissues available for coverage over the neourethra suture line.<sup>21</sup> Other authors noted that four of the five boys who developed fistulae in their series had no barrier layer interposed over the urethra, and recommended mobilization of a dartos or tunica vaginalis flap to reduce fistulae's incidence.<sup>17</sup> Another report described the creation of a dartos flap from subcoronal shaft skin with only one fistula among 13 patients.<sup>22</sup> We used dartos flaps from several locations, but that the fistulae occurred when adjacent tissues were sutured over the neourethra probably illustrating the need for a flap to be developed which can be secured over the urethra by laterally based sutures; otherwise sutures from the neourethra, barrier layer and skin closures may overlap.

That patient who suffered dehiscence and complete breakdown had previously undergone partial excision of urethral plate during unknown procedure for midshaft hypospadias,

gross inspection showed supple tissues extending from a coronal meatus that were incised and tubularized.

Contraindications to TIP urethroplasty for hypospadias reoperations may therefore include previous resection of the urethral plate, or obvious scarring of the plate after previous surgery. We were reluctant to incise skin that has been used to replace the urethral plate, expecting re-epithelialization to occur, although, it was previously published to succeed in six reoperations with satisfactory results.<sup>23</sup>

It is unclear how many midline incisions can be made into the urethral plate with a reasonable expectation of a successful urethroplasty. There was only one patient who had undergone more than one previous operation, the TIP repair resulted in a neourethra with no meatal stenosis or stricture.

Other options for a one-stage reoperation include skinflaps and grafts. However, previous surgery often limits the availability of skin for urethroplasty, and even one operation can impair the blood supply to skin increasing the risk of complications, including strictures and meatal stenosis. Accordingly, complication rates for secondary flip-flaps, onlay and tubularized flaps range from 14% to 56% in large series.<sup>24</sup> Others have similarly concluded that these risks are too high and instead advocate onlay or tubularized buccal grafts.<sup>25</sup> Unfortunately, one-stage buccal repairs in which the ventral urethra is reconstructed with a graft still rely upon the variable blood supply of previously operated dartos and skin layers, and so, not surprisingly, complications occur in over half the patients.<sup>26</sup>

We showed no significant association between the outcome of the operation and meatal location, previous repair and the presence of chordee. It was estimated that the younger the age of the patients and the shorter the duration since the previous repair the better may be the outcome of the operation.

In conclusion, for recurrent hypospadias, TIP is an excellent treatment option with some restrictions of its use in patients with disturbed urethral plate with an apparent scarring of the plate as it may give an excellent cosmetic appearance of the penis. It should be considered

as the first re-operation option when the primary techniques results are unsatisfactory

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