Proximal Hypospadias: Is Still There a Place for Two Stage Urethroplasty?

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Background/Purpose: Great advances have been made in surgery of hypospadias repair. Proximal hypospadias remains the greatest challenge; despite many innovations and much progress, surgery may fail. The aim of this study was to evaluate the role of two-stage urethroplasty in proximal hypospadias repair.

Materials & Methods: From January 2003 to January 2008, 25 patients with proximal hypospadias underwent surgical repair at Tanta University Hospital. One Stage urethroplasty was done in 13 cases (8 primary and 5 salvage) while two stage urethroplasty was used for 12 cases (9 primary and 3 failed repair). Patients with mild and moderate chordee were repaired by tubularized incised plate (TIP) urethroplasty, while others with severe chordee were selected for two stage urethroplasty (modified Thiersch Duplay, Ulaanbaatar and Bracka's technique). The second stage of urethroplasty was done at least 6 months after the first stage.

Results: Seventeen patients (68%) had normal meatal position, normal glanular anatomy, well-defined coronal sulcus, normal cylindrical shaft and voided from the tip with very good cosmetic and functional results, five patients (20%) developed urethrocutaneous fistula (2 associated with meatal stenosis responded to periodic dilatation and the fistula healed over time, while 3 needed surgical intervention). Three patients (12%) suffered from narrow stream due to meatal stenosis and they responded well to periodic dilation and were normal during the remaining period of follow up.

Conclusion: Although the role of two-stage urethroplasty in repair of proximal hypospadias is being eroded by the increasing use of TIP urethroplasty, it will continue to be an important part in the surgical treatment mainly for severe, previous failed repair and hypospadias cripples.

Index Word: tubularized incised plate, two stage, urethroplasty.

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INTRODUCTION

Great advances have been made in surgery for the correction of hypospadias.

Proximal hypospadias remains the greatest challenge, but despite many innovations and much progress, surgery can fail. Many authorities have introduced single stage techniques, which have the purported advantage of correcting the defect with minimal hospitalization and family inconvenience. However, the wider published experience with these approaches would suggest that the ideal single stage procedure has to be devised. A substantial number of children undergoing a single-stage procedure will have to undergo further surgery. A small but irreducible number of patients will be rendered hypospadias cripples.

A number of these children will be dissatisfied as adults because of cosmetic or functional deficiencies. A
two-stage approach for correction of proximal hypospadias and severe chordee remains the most credible and reliable solution for many of these patients. Pediatric surgeons should maintain familiarity with these techniques and continue to advocate them for a select group of patients. 4-5

The role of two-stage repair in primary proximal surgery is being further eroded by the increasing use of the TIP for more proximal deformities, although the indications and limitation of the TIP in these more challenging cases are still being explored and determined. 6-7. The objective of this study was to enlarge the scope of the TIP urethroplasty in proximal hypospadias whether primary or failed repair and to evaluate the role of two-stage urethroplasty in repair of proximal hypospadias.

PATIENTS AND METHODS

Twenty five patients of proximal hypospadias underwent repair from January 2003 to January 2008 at Tanta University Hospital. The operative method chosen for hypospadias repair was determined by the state of urethral plate, degree of chordee, shape of the glans, the size of phallus and whether the case is primary or previous failed repair.

Patients with mild and moderate chordee (13cases) were selected for extended TIP (Snodgrass operation) one stage repair (8primary and 5 failed previous repairs); and those with severe chordee and scarred urethral plate (12cases) were selected for two stage repair.

Demographic data, type of hypospadias, previous surgical history and final outcome of hypospadias surgery were recorded. Preoperative and postoperative photographs were taken in all patients. The parents are given information about the diagnosis, treatment plan, risks, complications and long term follow up plan.

Urinary catheters were maintained for 7 to 10 days post operatively, and the meatus was evaluated 7 days after removal of the catheter, calibrated and reexamined serially to maintain its caliber. Patients were followed up at two weeks, three months, six months and one year interval postoperatively.

Our protocol for repair of proximal hypospadias :-

I- Primary repair (17 cases)

A- If the urethral plate is reasonable in quality and the ventral curvature can be corrected without transecting the urethral plate (preservation of urethral plate after release of chordee) :- Single stage extended TIP urethroplasty with incision of the urethral plate from the native urethra up to the mid of the glans (8 cases Fig 1).

B- If the phallus is small with poorly defined, short and tethered urethral plate or the plate may contribute to a high curvature and should be transected:

Two - stage urethroplasty (9 cases)

1- Modified Thiersch - Duplay (Byar's technique) (7 cases Fig 2) First stage: release of chordee and transfer of preputial skin to the ventral aspect of the penis. Second stage: after at least 6 months: tubularization of the transposed preputial skin to complete the repair.

2- Ulaanbaatar technique (2 cases Fig 3)

In small sized glans, the urethra is tubularized and tunneled through the normal glans and so fresh overlapping suture lines are avoided in the glans.

II- Salvage urethroplasty (failed previous repair, 8 cases)

A- If the previous operation preserved the urethral plate: TIP urethroplasty was done (5 cases fig 4).

B- Previous multiple failure with scarred and distorted urethral plate with deficient penile skin for repair: Bracka's two - stage urethroplasty (3 cases fig 5).

First stage: is preparatory stage for neourethral reconstruction and involved correction of chordee, glans split to create a gutter which is lined by buccal mucosal graft. Second stage: tubularization of the grafted buccal mucosa after at least 6 months.
(a) incision of urethral plate
(b) TIP urethroplasty up to mid of glans
(c) early postoperative
(d) late postoperative

Fig. (1): primary one stage TIP urethroplasty

(a) small phallus with ill-defined urethral plate and severe chordee
(b) complete degloving of the penis and release of chordee
(c) starting to transfer of preputal skin to ventral aspect of penis
(d) complete the first stage urethroplasty

Fig.2(a) first stage Thiersch Duplay urethroplasty

(a) a year after first stage
(b) starting tubularization
(c) early postoperative
(d) late postoperative

Fig. 2(b) Second stage Thiersch Duplay urethroplasty

(a) starting to tubularize the urethra
(b) starting tunneling of the urethra through the glans
(c) the urethra is tunneled through the glans
(d) postoperative result

Fig (3) Ulaanbaatar technique
RESULTS

Twenty-five patients with proximal hypospadias operated between January 2003 and January 2008 were evaluated in this study. The age of the patients varied from 18 months to 29 years (mean age was 7 years and 9 months).

Types of repair, degree of chordee and complications are shown in Table 1. Thirteen patients (52%) underwent one stage TIP repair (8 as primary and 5 as salvage) while two-stage repair was done in 12 patients (48%) 7 with modified Thiersch Duplay repair 2 with Ulaanbaatar technique and 3 with Bracka’s two-staged repair.

Chordee were present in 20 patients (80%) and were categorized as mild (visible only on erection) in 3 cases, moderate (demonstrable without erection) in 5 cases and severe (bent penis bringing tip of glans onto ventral surface in 12 cases.

Seventeen patients had normal meatal position, normal glanular anatomy, well-defined coronal sulcus, normal cylindrical junctions and voided from
the tip with very good cosmetic and functional results.

Five patients (20%) developed urethrocutaneous fistula (2 after TIP, 2 after modified Thiersch Duplay repair and one after Brecka’s technique), 2 of these cases were associated with meatal stenosis and responded to periodic dilatation and the fistula healed over time, one was a pinpoint fistula and closed with a purse-string while 2 underwent simple closure.

Three patients (12%) suffered from narrow stream due to meatal stenosis. The peak time of appearance was the immediate period after catheter removal and they responded well to periodic dilatation and were normal during the remaining period of follow up. One patient had minor spraying of stream and 2 adult patients milked the urethra after voiding and to ejaculate. No patient had residual chordee.

Table (1): Type of repair and complications

<table>
<thead>
<tr>
<th>Type of repair</th>
<th>Type</th>
<th>Degree of chordee</th>
<th>Urethral plate</th>
<th>Complications</th>
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<tr>
<td></td>
<td>Iry</td>
<td>Recurrent</td>
<td>Mild</td>
<td>Moderate</td>
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<tr>
<td>TIP (n=13)</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Modified Thiersch-Duplay (n=7)</td>
<td>7</td>
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<td>7</td>
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<tr>
<td>Bracka’s two-stage repair (n=3)</td>
<td></td>
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<td>3</td>
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<td>Ulaanbaatar (n=2)</td>
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<td></td>
<td>2</td>
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<td>Total (25)</td>
<td>17</td>
<td>8</td>
<td>3</td>
<td>5</td>
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DISCUSSION

Surgical repair of hypospadias has remained one of the most tasking problems for reconstructive surgeons, urologists and pediatric surgeons because of high complication rate. the very fact that there are about 250 different operations to manage this tricky problem indicating that no single operation is favored by all surgeons of the world because no single technique provides uniformly good results. 8-9

One stage repair is naturally favored as it decreases operative trauma, allows use of virgin, unscarred skin, decreases number of hospitalization and thus in turn is economical. But certain surgeons remain unhappy with limitations and drawbacks of one stage repair and continue to practice two stage repair.10 11

Snodgrass et al 12 carried out sub epithelial biopsies of urethral plate in 17 patients and found no histological evidence of fibrous bands, and concluding thereby that there is no requirement of violating the integrity of urethral plate.

In this study, urethral plate could be preserved in 13 cases (52%) where TIP Urethroplasty was used as the plate was well developed and ventral curvature can be corrected without transecting the plate. There have been many reports on the satisfactory outcomes of TIP in repairing primary proximal hypospadias. TIP also has a high success rate in dealing with failed hypospadias cases with preserved urethral plate 13-14-15-16-17 . Its advantage included: simplicity of the operative technique, low complication rate and reliable creation of a normal appearing glanular meatus18-19-20-21 .

Borere et al 22 used TIP to treat primary and failed hypospadias cases with success rates of 95% and 76% respectively .In this study TIP was used in 13 cases : 8 as primary and 5 previous failed repair .

Two-stage repair for proximal hypospadias continue to be used despite allegations by some that they represent a step backwards 23-24 . A review of the recent literatures suggested that these repairs achieve excellent cosmetic and functional results 25 26. Byar's preputal flaps are the most popular staged operation for primary proximal hypospadias surgery. Once the decision is made to transect and excise the urethral plate, a proximal stoma is created from the native urethra and the prepuce is divided longitudinally, with each resulting strip brought ventrally. These are rejoined and extended from the proximal meatus to the glans tip. Approximately 6 months later, this transposed preputal skin is tubularized to complete the repair 27, 28.

In this study the principle of Byar's technique (modified Thirsch - Duplay) was used as primary repair in 7 cases (28%) with proximal hypospadias but in the first stage was preferred not to bisect the dorsal foreskin and rotate the flap ventrally, but rather to place a button hole in the penile shaft skin through which the glans is placed. This transferred the prepuce ventrally without having a midline suture line on the ventral penile shaft. The tissue that is then tubularized into a urethra in the second stage was for the most part virgin and unscarred.

Perhaps the most important and least controversial role for two-stage repair today is in re-operative or salvage surgery as the urethral plate has become scarred or has previously been replaced by grafts or flaps 29-30. The Bracka's two - stage graft repair remains an ideal and versatile solution when a full circumference urethroplasty is required. It is particularly appropriate for severe primary hypospadias associated with a poor plate and marked chordee and to replace a scarred urethra in re-operative salvage 31, 32. Buccal mucosa is currently the most widely used alternative to inner prepuce 33. Bracka's two-stage urethroplasty was used in this study in 3 cases (12%) with previous multiple failure with scarred and distorted urethral plate with deficient penile skin so buccal mucosa was used for repair. Ulaanbaatar's technique provides an alternative approach to the formation of the glans urethra in severe hypospadias without the risks associated with a single stage procedure, but with the benefit of enabling a tunneling of the urethra through the glans, thus facilitating a favorable cosmetic outcome 34.

In this study 2 cases (8%) with primary proximal hypospadias with severe chordee and small sized glans, the principle of Ulaanbaatar's technique was used as the urethra was tubularized and tunneled through the normal glans.

Reinforcement interposition layer is mandatory for reduction of fistulae in hypospadias surgery. The mechanism of action of the interposition layer is multifactorial: acting as a mechanical barrier, preventing suture line superimposition and providing
mechanical support. To improve the surgical success rate in this study it was critical to use the denuded skin, dartos or buck's fascia or tunica vaginalis to protect the neourethra as a second interposition layer according to each case.

**CONCLUSION**

TIP urethroplasty is a very reliable technique with excellent cosmetic results and acceptable complication rate for the treatment of proximal hypospadias either primary or salvage.

- Two – stage repair has proved to be a reliable and reproducible technique with a low complication rate in severe cases of proximal hypospadias and in previous failed repair.
- Struggling to push the one stage repair beyond its natural limits result in a compromised outcome, which then need subsequent revision and there by negates the one stage advantage and sometimes results in a hypospadias cripple.

**REFERENCES**

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