

Original Research Article

Single stage repair of hypospadias with tabularized incised plate urethroplasty with partial degloving

Hrair Haik Kegham*, Alaa Muneer Shakir, Ali Abdulqader Ameen

Department of Urology, Al Karama Teaching Hospital, Baghdad, Iraq

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*Correspondence:

Dr. Hrair Haik Kegham,

E-mail: hrairkegham@yahoo.com

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ABSTRACT

Background: To evaluate tabularized incised plate (TIP) repair for hypospadias which is considered as the gold standard surgery by most surgeons at time being. The study discusses patients' selection, complications, and the outcome.

Methods: Between April 2014 and April 2016, 42 boys, 2.5-10 years old (mean 5 ± 1.6), underwent tabularized incised-plate (TIP) urethroplasty for primary hypospadias. The hypospadias defects included 16 distal (coronal or sub coronal), 15 distal penile and 11 mid shaft defects (5 of them were associated with mild chordae). With 3-6 months (mean 4 ± 1.2) follow-up by history, examination and investigation. We considered the operations were successful in patients without any complications after 3 months from the surgery.

Results: The success rate was 36 patients (86.7%), complications rate were 6 patients (14.3%). In early complications, we reported 3 patients had wound infection followed by wound dehiscence of glansplasty, and 2 patients had dehiscence of the glansplasty without infection, in late complications we reported one case of meatal stenosis with urethrocutaneous fistula, no cases of urethral stricture or diverticulae were reported.

Conclusions: Single-stage repair of distal and midshaft penile hypospadias using tabularized incised-plate urethroplasty with partial degloving is a simple procedure; creates a normal appearing glandular meatus with functional neourethra in normal appearing circumcised penis, with high success and low complication rate in expert hands.

Keywords: Hypospadias, Iraq, Repair, Single-stage

INTRODUCTION

Hypospadias is diagnosed by physical examination. Typically, preputial development is asymmetrical, with a dorsal "hood" and ventral deficiency that exposes the glans and proximal meatus other abnormal ventral findings potentially include downward glans tilt, deviation of the median penile raphe, ventral curvature (VC), scrotal encroachment onto the penile shaft, midline scrotal cleft, and penoscrotal transposition.¹

The word (Hypospadias) is Greek; hypo = under, and spadias = to tear off.² Hypospadias in the male is evidence of feminization. Patients with penoscrotal and

perineal openings should be considered to have potential intersex problems requiring appropriate evaluation. Hypospadias new-borns should not be circumcised, because the preputial skin may be useful for future reconstruction.³

Hypospadias is estimated to occur in every 300 live male birth and even more frequent in some parts of the world. It causes a great concern because of the aesthetic deformity and because both parents and the patient profess insecurity about the sexual potential of the child.⁴ Techniques today make it possible to offer a single operation before the age of memory recall, so that the child can grow to adulthood without feeling inferior in

any way regarding his sexuality.⁴ The goals of hypospadias managements are:

- The relief of chordae for a sexually adequate penis
- Placement of urethral opening at the tip of the glans penis and to restore normal urination with least complications including hematoma, infection, flap necrosis, meatal stenosis, fistula, stricture, and diverticulum.^{5,6}

Associated anomalies

The most common associated anomalies with hypospadias are undescended testis and inguinal hernia. The most significant upper urinary tract anomalies associated with hypospadias are:

- Uretropelvic junction obstruction
- Vesicoureteric reflux
- Renal agenesis
- Wilm's tumor
- Pelvic kidney, crossed renal ectopia, or horse shoe kidney.⁷

Incidence and epidemiology

The incidence of hypospadias has been calculated as 1 in 300 male live-birth. Overall incidence of hypospadias populations (0.7%). Familial tendencies indicate some polygenic factors. Fathers of (8%) of patients have hypospadias; (14%) of male siblings are affected. The higher incidence (8.5 times higher) in monozygotic twins may be explained by the demand of two fetuses on the placental production of HCG in the first trimester.⁸

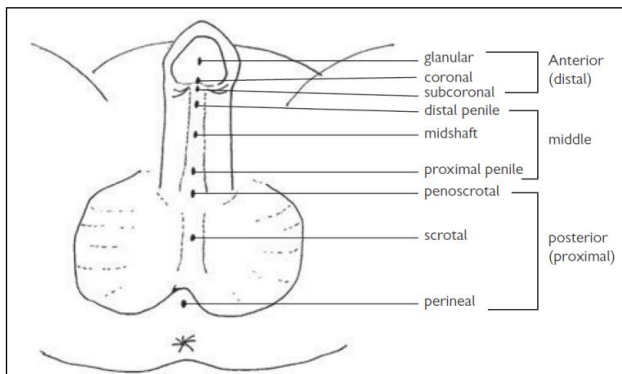


Figure 1: classification of hypospadias (adapted from oxford handbook of urology).⁹

The more, proximal the meatus, the more likely it is that ventral curvature (chordae) will occur (Figure 1).

The most common classification of hypospadias is Browne classification which is based on the location of the meatus into: glandular, distal penile, proximal penile, penoscrotal and perineal (Figure 1), but the meatus may be close to the tip of the glans yet have significant

curvature so that authors, therefore, prefer a classification based not on the original site but on the new location after orthoplasty.⁸ The more, proximal the meatus, the more likely it is that ventral curvature (chordae) will occur.⁸ Aims of hypospadias repair are as follow:

- Complete straightening of the penis
- Urethral meatus brought to the tip of the glans
- Normal voiding patterns
- Normal penile appearance
- Normal erection
- Relief of psychological disturbance

Results of hypospadias surgery can be analysed by both subjective and objective criteria. Objective criteria include functional status as measured by uroflow. Subjective criteria are more difficult to define, but certainly include cosmesis, sexual function, psychosocial adjustment and body image. Treatment of hypospadias:

Multi-staged repair

In the past, only multiple -stage repairs of hypospadias were made because surgeons believed that chordae were caused by growing tissue that could recur after resection. But it has been proved, however, that the tissue causing chordae is static, and does not recur if it is adequately excised.⁸

One-stage repair

One-stage repair offered as a better but not easier way to repair of hypospadias. Successful one-stage operations require more attention to detail and more delicate surgical technique than multiple -stage procedures. It is preferable to multiple-stage repair because:

- They reduce hospitalization
- Minimal physical and mental trauma
- Allows completion of the repair before the age of memory recall
- Using a skin that is unscarred from previous surgery with normal blood supply.

The only disadvantage of this technique is inadequate chordae release, which can be avoided by proper using of artificial erection technique.

Tabularized incised -plate urethroplasty (TIP)

TIP has become a preferred method for repairing hypospadias since its introduction in 1994. Given its versatility to correct different meatal variants, the simplicity of the operative technique. Low complication rate and a reliable creation of a normal -appearing glandular meatus in the patients. The procedure has subsequently been applied to boys in proximal hypospadias. Preserving the urethral plate and its use for urethroplasty was the result of two clinical observations:

- a) The plate is not the cause of ventral curvature so the resection of these tissues often does not correct bending.¹¹
- b) Incorporation of the plate into the urethral reconstruction may reduce complication.¹⁰
- Healing of the incision in the dorsal urethral plate during TIP urethroplasty occurs by re-epithelialization with normal tissue ingrowth. In contrast, the sutured closure heals with desmoplastic and inflammatory response.¹²
- The incision of the plate always extends through the surface epithelial and subepithelial connective tissue to near the underlying corpora cavernosa. This incision reliably widens the plate to the extent that the final neourethra diameter is always >10 F and usually > 12 F.
- Regular-calibration is unnecessary to prevent meatal stenosis or neourethral strictures in patients after TIP repair.¹³

The aim of this study is to evaluate tabularized incised plate (TIP) repair for hypospadias which is considered as the gold standard surgery by most surgeons at time being. The study discusses patients' selection, complications, and the outcome.

Table 1: Complications of hypospadias surgery.

Early complications	Late complications
Wound infection	Fistula
Poor wound healing	Stricture
Edema	Diverticulae
Acute bleeding and hematoma	Residual chordae
	Meatal stenosis
	BXO

METHODS

Between April 2014 and April 2016, 42 boys, 2.5-10 years old (mean 5 ± 1.6), underwent tabularized incised-plate (TIP) with partial degloving for primary hypospadias. The hypospadias defects included 16 distal (coronal or sub coronal), 15 distal penile and 11 mid shaft defects (three of them were associated with mild chordae).

Preoperative

Preoperative testosterone was not given to any of these children. Preoperative investigation was included:

- Hematological evaluation: Hb, PCV, bleeding time, PT, PTT
- Urinalysis
- Abdominal ultrasonography.

Operative

All cases were repaired with broad spectrum antibiotic cover under general anesthesia in Al-Karama teaching hospital.

Procedure

The surgical procedure began with the placement of 4-0 silk glans traction suture and insertion of an 8 Foley's catheter (10 Foley's catheter for boys older than 5 years).

A U-shaped incision was made around the hypospadias meatus extending out to the glans tip (the width of this incision was predetermined by identifying the convergence of the mucosal collar onto the glans ventrally and attempting to approximate the urethral plate over the catheter). Partial degloving of the penile shaft was performed circumferentially. In each case with chordee, degloving of the penis completely corrected the chordee, as evidenced by visual inspection and artificial erection using normal saline. The entire urethral plate incised from the hypospadiac meatus distally. This incision extends into the submucosal tissues, dividing the urethral plate into two strips. Continuous 5-0 monocril sutures are used to close the urethral plate over the Foley's catheter with the knots placed outside. The dorsal surface of the plate was not sutured.

The entire neourethra is covered with vascularized subcutaneous tissue (dartos) dissected from the dorsal prepuce and shaft skin and rotated ventrally. The glanular wings are further mobilized laterally for subsequent tension free closure. The wings are closed in the midline with interrupted 5-0 monocril sutures in 2 layers. The ventral subcoronal prepuce is re-approximated to complete the mucosal collar. The dorsal prepuce is split longitudinally which allows ventral midline skin closure to simulate the median raphe. Excess skin is excised so that the result is a normal appearing, circumcised penis. Partially concealing dressing was done.

Postoperative

All patients were stented for a mean duration of 6 days (range 5-7 days). Change of dressing was done when the stent was removed. The length of in-patient stay was 1-day range (0-2 days)

Follow -Up

Our follow-up was by history, physical examination, and investigations:

- History: The parents were asked if they had noticed any abnormality in the caliber and direction of the urinary stream, evidence of fistula and chordee and whether they were satisfied with the overall general appearance.

- Examination: all patients were examined regularly at the time of change of dressing and removal of the stents, then one week later, then monthly, by inspection for any evidence of meatal stenosis, urethrocutaneous fistula, residual chordee and overall general appearance.
- Investigation: Urethral calibration was made easily with 8Fr catheter 3 months after the operation, and uroflowmetry was done for older cooperative children.

The duration of follow up was 3-6 months (mean 4 ± 1.2 months).

RESULTS

Table 2: Incidence of complications.

Complication	No. of cases	%
Haematoma	0	0
Wound Infection + dehiscence	3/42	7.1%
Dehiscence alone	2/42	4.7%
Meatal stenosis + fistula	1/42	2.4%
Urethral stricture	0	0
Urethral diverticulum	0	0
Residual chordae	0	0
B.O.X	0	0
Total	6/42	14.3%

36 out of 42 patients had successful operation without any complication. We got a success rate of 86.7% and complication rate of 14.3% (6 out of 42 patients). The complications of the operation were divided into early and late complications:

- The early was only 3 patients who had coronal hypospadias developed postoperative infection followed by wound dehiscence that repaired surgically 6 months later, and 2 patients developed dehiscence of glansplasty without pre-existing infection.
- One patient who had also coronal hypospadias had developed meatal stenosis followed by urethrocutaneous fistula. It was treated by meatotomy and urinary diversion (Foley's catheter) for another two weeks, and the patient treated surgically later.
- The parents of all patients with successful operation were satisfied with the overall glanular appearance and they did not give any evidence of residual chordee or any abnormality in the caliber of the urinary stream.
- The examination revealed a conical glans, slit meatus, circumferential mucosal collar and a straight phallus.

Study considered the operation successful, when there were neither subjective nor objective complications 3 months after the surgery.

Table 3: Complications according to the type of hypospadias.

Complication	Coronal	Distal penile	Mid shaft
Hematoma	0	0	0
Infection+ dehiscence	3	0	0
Dehiscence alone	0	2	0
Meatal stenosis + fistula	0	0	1
Urethral stricture	0	0	0
Diverticulum	0	0	0
Residual chordae	0	0	0
B.O.X	0	0	0

DISCUSSION

Repair of hypospadias usually depends on the severity of the defect and on the experience of the surgeon. Single stage repair is now preferable because of short hospitalization, can be performed as an out-patient procedure, less physically and mentally traumatizing to the patients and their families. All patients were managed at the time of their first presentation.

Patient selection included those with coronal, sub coronal, distal and midshaft penile hypospadias, excluding those with failed previous repairs. The key step in the procedure (TIP) is the incision of the urethral plate which extends into the submucosal tissue, dividing the urethral plate into two strips, this incision widens and deepens the plate to enable tabularization without additional skin flaps.

In the present study, the most important complication was dehiscence of the glans may be because of infection, other cause may be technical error or ventral pressure of the catheter at suture line. The urethrocutaneous fistula, which occurred in those patients in whom the neourethra were covered with second layer (vascularized subcutaneous tissue) with jeopardized vascularity is another important complication, especially when the ventral skin sutured in the midline was in line with the anastomosis overlying that of the neourethra.

Meatal stenosis most often indicates a technical error, including failure to deeply incise the plate and /or tabularization of the urethral plate too far distally. The results of present study were comparable to other studies, such as the one carried out by Guaralinick et al, with a comparable rate of complications.¹⁴

CONCLUSION

Single stage repair of distal and proximal hypospadias using tabularized incised plate (TIP) urethroplasty as a simple operative technique has low complication rate with a reliable creation of a normal appearing glandular meatus and a functional neourethra, in a penis that appears to have been only circumcised and produces

cosmetic results superior to those of other previously popular techniques.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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