

TUBULARIZED INCISED PLATE URETHROPLASTY FOR THE REPAIR OF DISTAL HYPOSPADIAS: A SIMPLE VERSATILE TECHNIQUE

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Abstract

Objective: To observe the outcomes of tubularized incised plate urethroplasty in the primary management of distal hypospadias

Materials and Methods: Total 70 patients of age group 2 to 10 years with distal hypospadias were selected for this study from January 2008 to December 2015. They were treated with tubularized incised plate urethroplasty. All patients were followed up immediately and at 4th, 8th and 12th weeks after operation.

Results: The satisfactory cosmetic and functional outcomes were observed in 58 patients (82.85%). Urethrocuteaneous fistula developed in 10 patients (14.70%) patients and 6 patients (8.82%) were found to develop meatal stenosis. Two patients (2.94%) developed stricture urethra. Overall complications occurred in 20 patients (29.41%).

Conclusions: This study demonstrates that tubularized incised plate urethroplasty had excellent cosmetic and functional outcomes and fewer complications in the primary management of distal hypospadias.

Key words: tubularized incised plate urethroplasty, primary repair, distal hypospadias.

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Introduction:

Hypospadias is a congenital abnormality in which the urethral meatus is positioned either along the ventral shaft of the penis or on the scrotum or perineum instead of being located at the tip of the penis. About 70% of all cases of hypospadias are distal penile variety [1]. Modern standards for all distal hypospadias repair should include both a good functional and cosmetic reconstruction, in a suitable one stage procedure [2]. Over the years, more than 200 techniques have been described [3]. It is not surprising it represents a spectrum of disease for which no single method of repair is applicable. In 1994, Snodgrass described tabularized incised plate urethroplasty for the correction of distal hypospadias [4]. This study was conducted to observe the outcomes of tubularized incised plate urethroplasty in the primary management of distal hypospadias.

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Materials and Methods:

This study was conducted in the department of Urology, National Institute of Kidney Diseases & Urology and some private hospitals in Dhaka city from January 2008 to December 2015. Total 70 patients of age group 2 to 10 years with distal hypospadias were selected for the study. They were treated by the tubularized incised plate urethroplasty. All patients were evaluated by taking detailed history, physical examinations and investigations like urine analysis, blood biochemistries, chest skiagram, bleeding time (BT) & clotting time (CT) and ultrasonography of KUB region to identify type of hypospadias and to exclude the associated congenital anomaly and co-morbid diseases.

Surgical technique:

All patients underwent surgery under general anaesthesia. The surgical procedure began with the placement traction suture on glans with 5-0 prolene and insertion of a 6 Fr catheter or feeding tube (8Fr to 10 Fr

catheters for boys older than 5 years). A circumferential incision was made 5 to 7 mm proximal to the coronal margin and 2 mm proximal to the hypospadiac meatus to deglove the penis for the correction of chordee. An artificial erection test was performed and if needed penis was straightened by Nesbit plications. A tourniquet was placed at the root of the penis to minimize the bleeding. The lateral margins of the urethral plate were separated from the glans by parallel longitudinal incisions approximately 7 to 9 mm apart, creating glanular wings. Gentle traction along the edges of the urethral plate delineated its midline which was incised from the hypospadiac meatus distal to the end of plate. This was the key step of the tubularized incised plate urethroplasty (Snodgrass procedure), which widens the plate and allows tubularization without additional skin flaps.

The incision typically extends through the mucosal and sub-mucosal tissues of the urethral plate down to the corporal bodies, as described by Snodgrass dividing the plate into 2 epithelial strips which was closed ventrally over a 6 Fr stent (8Fr to 10 Fr stent for boys

older than 5 years). In both cases tension free water tight tubularization was performed over a 6 Fr catheter or feeding tube (8Fr to 10 Fr for boys older than 5 years), using running suture with 6-0/7-0 polygalactin in 2 layers. Closure of the 1st layer was done with efforts made to invert the epithelium completely. The 2nd layer incorporates carefully preserved periurethral vascularized tissue. The vascularized dorsal dartos flap was transposed ventrally to cover entire new urethra. The new urethral meatus was then approximated with the glans by a few interrupted sutures.

Finally, the bared penile shaft was covered with the mobilized skin by 4-0/5-0 absorbable suture. Pressure dressing was applied over the wound to prevent haematoma. The urethral stent was kept indwelling for 10-14 days and removed thereafter. All patients received post operative analgesics, antibiotics, sedatives and anti-cholinergic drugs. When recovery was uneventful, patients were usually discharged on the 4th to 5th post operative day. Subsequent follow-up was done in outpatient department.

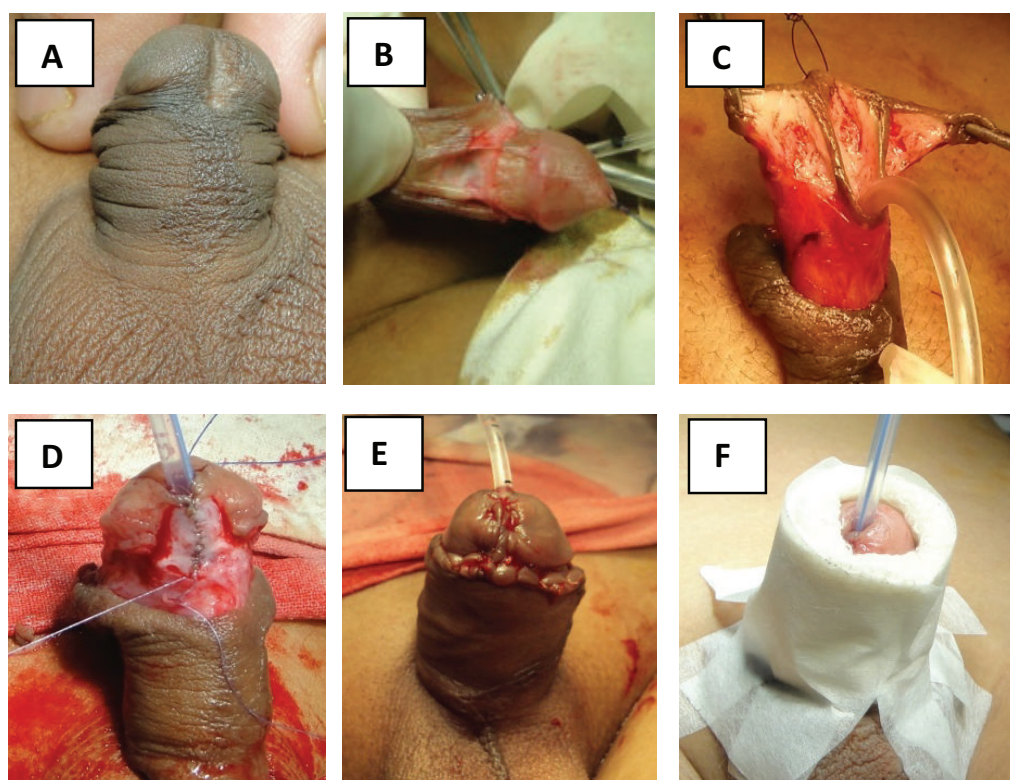


Fig.-1: Tubularized Incised Plate Urethroplasty

A- Sub coronal hypospadias, **B-**Circumferential incision just below the corona, **C-** Incision of the urethral plate from hypospadiac meatus to tip of the penis, **D-**Tubularization of urethral plate, **E-**Completion of the glanuloplasty, **F-**Dressing applied.

Results and Observation:

Total 70 patients were prepared for final data analysis. Distribution of age was between 2 to 10 years. 52 patients (74.28%) presented with sub-coronal variety of hypospadias and 18 patients (25.72%) presented with distal penile variety of hypospadias. 55 patients (78.57%) presented with mild chordee and 15 patients (21.43%) presented with no chordee. The mean (\pm SD) duration of operation time was 78.68 \pm 9.07 minutes (Range: 60-100 minutes). Cosmetic appearance of glans was conical and neo-meatus was slit like and accepted in all patients.

Neo-meatus encroached in ventral glanular surface in 4 patients (5.71%) and were unsatisfactory to the parents. Neo-meatal location was satisfactory in other 66 patients (94.29%). 8 patients (11.42%) had narrow and deflected urinary stream but rest of the patients (88.78%) had satisfactory straight urinary stream. So, satisfactory cosmetic and functional outcome was observed in 58 patients (82.85%)(Table I).

Table-I
Satisfactory cosmetic and functional outcome

Satisfactory Outcome	(n=70) No (%)	Calculated value	P value
Present	58(82.85%)	5.681	0.027
Absent	12(17.15%)		

Immediate postoperative follow-up during hospital stay showed wound dehiscence in 2 patient (2.85%) and urethro-cutaneous fistula developed in 6 patients (8.57%) (Table-II).

Table-II
Immediate postoperative complications

Complications	(n=70) No (%)	Calculated value	P value
Wound dehiscence	2(2.94)	1.018	0.90
Urethrocutaneous fistula	6(8.82)	1.043	0.724

Four patients (5.71%) were found to develop urethrocutaneous fistula at 4th week after surgery but no urethrocutaneous fistula was observed in the subsequent follow-up. Six patients (8.577%) were found to develop meatal stenosis at subsequent follow-up. Two patients (2.85%) were found to develop urethral stricture at 8th week but no urethral stricture was present at scheduled follow up.

Table-III
Late postoperative complications

Complications	(n=70)			Total
	4 th week	8 th week	12 th week	
Urethrocutaneous fistula	4	0	0	4
Meatal stenosis	0	4	2	6
Urethral stricture	0	2	0	2

Two patients who developed wound dehiscence at immediate postoperative period, healed by conservative treatment and advised for re-operation after 6 months. Six patients who developed meatal stenosis were advised to do regular dilatation. Four of them responded well but meatal stenosis persisted in two patients till last follow- up and was advised for meatoplasty. Two patients who developed urethral stricture also advised for regular dilatation but one patient persists in till last follow-up and was advised for re-operation.

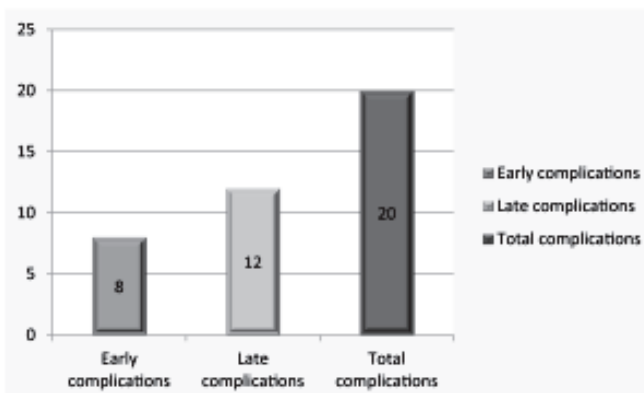


Fig 2 *Early complications, late complications and total complications of tubularized incised plate urethroplasty*

It is shown that overall complications occurred in 20 patients (28.57%).

Discussion

The surgical objectives of modern hypospadiology should include complete straightening of the penis, creating a hairless, smooth urethra of uniform caliber with the position of the meatus at the tip of the glans, normalization of voiding and erection, and normal appearance of the penis with a minimum of complications. Regardless of the severity of the malformation, urologists strive to meet such demands. As a result, over 200 described operative procedures or

modifications have emerged to manage boys with hypospadias, but no single procedure has been considered a panacea for all types of hypospadias, and it has remained one of the most challenging problems in urological surgery. The tubularized incised plate (TIP) urethroplasty or Snodgrass procedure has gained worldwide acceptance for distal hypospadias repair due to its low complication rate, good cosmetic result, and technical simplicity [5]. Tubularized incised plate urethroplasty (TIP) is based on the principle of closure of the urethral plate ventrally in the midline, over a urethral stent, after having made a deep sagittal release incision on the midline of the urethral plate. A potential advantage of the repair is the formation of a vertical slit like neo-meatus with good urethral caliber and tension free closure [6]. Snodgrass procedure claimed better results in terms of complications like meatal stenosis and urethrocutaneous fistula as it has the added advantage of preservation of the urethral plate without any insult to its vascularity [7].

The mean (\pm SD) duration of operation time was 78.68 \pm 9.07 minutes (range: 60-100 minutes) in this study. Other authors reported that the mean duration of their surgery was 57.4 (range 45-75) minutes in TIP urethroplasty [8, 9]. In this study, feeding tube or small size catheter were used as a stent and diversion of urine and kept for 10-14 days. One patient lost the feeding tube accidentally on 5th postoperative day but he recovered without any complication.

Cosmetic appearance of glans was conical and neo-meatus was slit like in present study. Neo-meatus encroached in ventral glanular surface in 4 patients (5.71%) and were unsatisfactory to the parents. Neo-meatal location was satisfactory in other 66 patients (94.29%). 8 patients (11.42%) had narrow and deflected urinary stream but rest of the patients (88.78%) had satisfactory straight urinary stream. So, satisfactory cosmetic and functional outcome was observed in 58 patients (82.85%). In 2003, Sinha et al. reported that good cosmetic results were obtained in 42 out of 45 (93.3%) patients and functional outcomes as judged by urinary stream was good in 41(93.3%) patients [8]. In 2005, Singh et al. reported that excellent cosmetic results were seen in 44 (84.6%) patients and good functional results were seen in 46 (88.8%) patients in their series of Snodgrass procedure for distal hypospadias [10]. In this study cosmetic and functional outcome was significant difference.

Two patients (2.9%) developed wound dehiscence this study. Wound was healed on subsequent follow-up by regular dressing and appropriate antibiotics and parents were asked for re-operation after 6 months of first surgery. Other studies showed that wound dehiscence were observed 2.2%, 1.9% and 3% in Snodgrass procedure in distal hypospadias repair [11-13].

Urethrocutaneous fistula developed in 10 patients (14.70%). This result is comparable with published report in literatures the fistula rate was 2-14%, 9.6% and 16% in TIP urethroplasty [14, 15].

Six patients (8.82%) were found to develop meatal stenosis. Patients who developed meatal stenosis were advised to do regular dilatation. Two of them responded well but meatal stenosis persisted in one patient till last follow-up and was advised for meatoplasty. Above results are compatible with other literatures where meatal stenosis was found 9%, 6.86% in TIP urethroplasty [14, 16].

Two patients (2.85%) developed urethral stricture. They were also advised for regular dilatation but one patient persists in till last follow-up and was advised for re-operation. Ghali reported similar result of 3% stricture in TIP urethroplasty [17].

In this study it is shown that overall complications occurred in 20 patients (29.41%) those were treated by tubularized incised plate urethroplasty. In the literatures similar result of the overall complication rate was 12-33% in TIP urethroplasty procedure [15, 17].

This study demonstrates that tubularized incised plate urethroplasty had excellent cosmetic and functional outcomes and fewer complications.

Conclusion:

The goal of modern hypospadias surgery is a functional neo-urethra that appears to be normally circumcised penis. Tubularized incised plate urethroplasty is a widely applicable technique for distal hypospadias repair. This study has low complication rate and excellent cosmetic results superior to other urethroplasty. However, large series of comparative study is a must for the true assessment of outcome.

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