

Is Regular Dilatation Necessary to Prevent Meatal Stenosis after Tubularized Incised-Plate Urethroplasty in Hypospadias Repair?

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Abstract

Background: Meatal and urethral dilatation is usually done after Tubularised Incised Plate (TIP) Urethroplasty. Urethral injury is a common complication of meatal and urethral dilatation which causes bleeding from urethra, creating a false passage and urethral perforation. Regular dilatation of urethra is painful both physically and psychologically for the child and the parents. So, our aim of this study was to justify the necessity of urethral and meatal dilatation after TIP urethroplasty to prevent meatal stenosis.

Materials and Methods: Our study was a prospective, randomized, comparative study which was done in Dhaka Shishu (Children) Hospital from July 2017 to June 2020. Total 60 respondents were participated in this study after maintaining inclusion criteria. During our study period Primary mid and distal penile hypospadias patient, admitted in Dhaka Shishu Hospital where TIP urethroplasty was indicated were included. Group A was designate non dilatation group and Group B was designate to regular urethral dilatation group after TIP urethroplasty. Meatal stenosis formation were compared between two groups. Informed written consents were taken from legal guardians. Data were analyzed by SPSS Program.

Results: There was no significant difference in age and weight between groups. In Group B, 10% (3) respondents developed meatal stenosis and In Group A 6.66% (2) respondents developed meatal stenosis.

Conclusion: Formation of meatal stenosis in between two groups after TIP urethroplasty was not significant.

Keywords: TIP; Hypospadias; Dilatation; Meatal Stenosis

Introduction

Hypospadias is derived from the two Greek word, "hypo" and 'Spadon'. Hypo means under and Spadon means fissure [1]. Hypospadias is a birth defect in boys where the urethral opening present on ventral aspect of penis instead of at tip of penis, its usual location [2]. It is a common congenital anomalies of male baby affecting approximately 1 in 125 live male births [3].

Hypospadiac penis classically associated with three anomalies: 1. Ectopic urethral opening located between the glans and the base of the penis, 2. Chordee, a ventral curvature of the penis, and 3. a hooded foreskin with a lack of skin on the ventrum [4].

Hypospadias can be classified into anterior, middle and posterior groups according to the location of the urethral meatus after releasing of chordee. Anterior group comprises glanular, coronal, distal penile and Middle group comprises Mid penile shaft [5]. Anterior and middle group of hypospadias are included in our study.

The part of hypospadias surgery included orthoplasty, urethroplasty, meatoplasty and glanuloplasty, scrotoplasty, and skin cover [2]. Cosmetic appearance and normal voiding through the tip of the glans indicate the success of operation [2,6].

To achieve the goal of surgery various surgical techniques were introduced. More than 300 procedures were described in literature which reflect the wide spectrum of the anomaly and inform that treatment has not yet been perfected [2,7].

Almost all cases of urethroplasty, formation of fistula, meatal stenosis and then wound dehiscence that surgeon are worried about. The other complications are residual chordee and diverticulum [8].

In 1994 Warren Snodgrass described Tubularized incised plate (TIP) urethroplasty and its excellent outcome. In this method, to make a neourethra a longitudinal incision on the urethral plate (UP) then tubularization done. Then put a flap on it to minimize the rate of complication. The important think of this technique is to create a relaxing incision in the urethral plate and use dartos flap to cover the neourethra [9,10].

At first TIP urethroplasty was used in cases of distal hypospadias, due to its success a variety of proximal forms were also demonstrated later [11-13]. This operative procedure has been popular day by day in the world.

The midline incision of TIP urethroplasty usually heals by re-epithelization with no neourethral stricture or meatal stenosis [14]. A stent is used in classical TIP urethroplasty to divert urine flow and to prevent meatal stenosis. There are some complication related to stenting like urethral injury, urethral perforation, formation of a false passage more over it is psychological and physical trauma for patient. AJ Lorenzo, *et al.* in 2002 reported that there is no significant meatal stenosis rate between stenting and non-stenting group in hypospadias repair [14].

So, we want to investigate the role of regular dilatation both meatal and urethral after TIP urethroplasty to prevent meatal stenosis.

Materials and Methods

Our study is a Prospective, randomized comparative study which was done on Dhaka Shishu (Children) Hospital from July 2017 to June 2020. Patient with mid and distal penile hypospadias with inclusion criteria were study subject. By random sampling patients were allocated in two groups. Informed written consent was taken. In group-A 30 patients included were TIP urethroplasty done without regular urethral dilatation and in group – B 30 patients included where TIP urethroplasty done with regular urethral dilatation.

Selection criteria

All patients admitted in Dhaka Shishu Hospital during the study period with primary distal and mid penile hypospadias, from 1 to 18 years of age, where TIP urethroplasty was indicated were included. Previous history of hypospadias surgery, circumcised patient and Chordee more than 30° were excluded.

Operative technique

An informed written consent was taken from the legal guardian before procedure. All operation were done under general anaesthesia with caudal epidural block. A 4/0 plain catgut was used to fix the glans with traction suture. A circumferential incision was given 2 mm proximal to the hypospadiac orifice and then penis was partially degloved. Two parallel longitudinal incisions were made from rest of the glans to separate lateral borders of urethral plate and glanular wings were dissected. A midline incision was made in urethral plate from the hypospadiac meatus to 2 mm proximal to the tip of the glans. Then incised urethral plate was tubularized over a stent with 6/0 vicryl by subcuticular and interrupted suturing. Glans also approximated with 6/0 vicryl. The stent was kept in place for 7 days.

Post-operative follow up and care

In the post-operative ward patients were routinely observed for hemorrhage, urinary retention and Control of pain, hemorrhage and urinary retention were routinely observed in post-operative follow-up. Per rectal Diclofenac Sodium suppositories or Paracetamol suppositories, Injection Pethidine and caudal anaesthesia are used to maintain post-operative analgesia. After operation to discharge following points are noted: any fever, bleeding, stent blockage, control of pain and other complaints. On 5th post-operative day dressing was checked and healing pattern, wound infection, wound dehiscence were noted. On 7th post-operative day stent was removed in both group. Meatal stenosis, urinary stream and direction were noted during urine voiding.

Meatus, size and shape of the glans, persistent chordee and urinary problem were evaluated on 14th POD following urethroplasty during 1st follow-up visit. The urethra and meatus of a boy under 1 year should accept a BMI feeding tube 6 Fr, between 1 to 3 years below 8 Fr, 4 to less than 11 years 8 Fr and 11 to 12 years of age 10 Fr. [15].

Then upto 6 months after urethroplasty monthly follow up was given. Meatal size, meatal and urethral dilatations by introducing appropriate size BMI feeding tube according to age were checked on each follow up visit. To see any neourethral stricture a urethrogram was done 3 month after urethroplasty. Regular meatal and urethral dilatation is not done in Group A but in Group B, on 14th POD meatal and urethral dilatations was started with appropriate size BMI feeding tube according to age with local anaesthetic gel. Dilatations was done two times daily and kept the tube in urethra for five minutes for each attempt.

In Group A, meatal stenosis was thought when BMI feeding tube was passed too tightly or failed to pass according to age and advised for regular meatal dilatation. The dilatation schedule was initially two times daily for first 3 months then once daily for next 1 month, twice a week for next 1 month, once a week for next 1 month, total 6 months.

Data analysis

A preformed proforma was used to collect data. was used to perform Statistical analysis performed by using SPSS 25.0 (Statistical Software Package for Social Sciences, SPSS Inc, Chicago, IL, USA) software system. Statistical analysis were expressed in Text and tables as Mean \pm SD (Standard deviation) were used to express statistical analysis. Pearson Chi Square test was used to compare between 2 groups for qualitative data. P value of < 0.05 indicate level of significance. Unpaired t-test was done for quantitative data and P value of < .05 was level of significance.

Ethical consideration

Legal guardians of all the patients were explained about our study and informed about the different treatment procedure, known effects and side effects, expected outcomes and possible complications. Our study did not involve any additional investigation and did not impose any extra economic burden upon the parents. Our study protocol was approved by Bangladesh Institute of Child Health (BICH) thesis committee.

Results

Quantitative data are expressed as Mean ± SD. Results of the study can be expressed by the following table 1.

Variables	Group A (Non-dilatation)	Group B (Dilatation)	P value
Age distribution	55.2 ± 32.9 months	53.15 ± 31.12 months	> .05
Weight	17.18 ± 8.42 kg	16.89 ± 8.17 kg	> .05
Meatal stenosis	2	3	> .05

Table 1: Showing outcome of the study (n = 60).

Type of hypospadias

Total patients (n)= 60

Types of hypospadias	Number of patient
Glanular	3
Coronal	29
Distal penile	19
Mid penile	9

Table 2: Type of hypospadias among the study subjects.

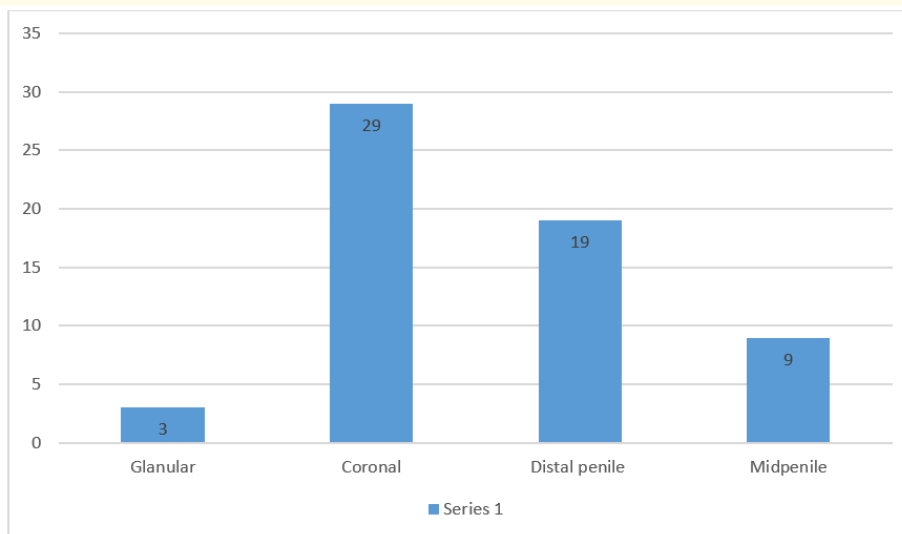


Figure 1: Bar diagram showing frequency of hypospadias.

Age distribution (n = 60)

Age (Months)	Group A (n = 30)	Group B (n = 30)	P value
Range	23 - 144 months	18 - 132 months	
Mean ± SD	55.2 ± 32.9 months	53.15 ± 31.12 months	> .05

Table 3: Age distribution of the study groups.

In group-A, age range was 23 months to 144 months and in group-B age range was 18 months to 132 months. Mean ages of group-A and group-B were 55.2 ± 32.9 months and 53.15± 31.12 months. There was no significant difference between the mean ages of both group were not significant different as P value was >.05. Unpaired t-test. P < .05 = Significant.

Weight (n = 60)

Weight (kg)	Group A (n = 30)	Group B (n = 30)	P value
Range	10.1 - 48.0 kg	9.4 - 44.9 kg	
Mean ± SD	17.18 ± 8.42 kg	16.89 ± 8.17 kg	> .05

Table 4: Comparison of weight of the participants between two groups.

Weight range of group-A was 10.1 - 48.0 kg and group-B was 9.4 - 44.9 kg. The mean weight of group-A and group-B were 17.18 ± 8.42 kg and 16.89 ± 8.08 kg. There was no significant difference between the mean ages of both group as P value was >.05. Unpaired t-test. P < .05 = Significant.

Meatal stenosis

Meatal stenosis	Group A (n = 30)	Group B (n = 30)	P value
Yes	2 (6.6%)	3 (10%)	> 0.05
No	28 (93.4%)	27 (90%)	

Table 5: Occurrence of meatal stenosis among the patients.

Post-operative meatal stenosis was diagnosed at the time of follow up and treated by gentle meatal calibration with age appropriate PVC BMI feeding tube. In group A 2 patients developed meatal stenosis and in group B 3 patients developed meatal stenosis. Here test statistic is less than critical value; So, P >0.05. Result is not statistically significant.

Discussion

Urethroplasty procedure for hypospadias repair are developing continuously and no single procedure is considered as a perfect. Urethral fold failed to fuse in hypospadias and tubularization of the urethral plate with no skin grafts have been described as a surgical technique [16].

The tubularized incised plate urethroplasty technique provides a narrow urethral plate wide enough for easy tubularization and form a vertically orientated and cosmetically normal neomeatus [9].

In TIP urethroplasty, urethral plate is divided into two epithelial strips in the midline ventrally to form the floor of the neo-urethra while the roof is formed by the incised raw area [11].

The technique revived the principle of Denis Browne. In this technique the urethral plate forms the roof of the neourethra and the epithelial growth edges forms the floor of the plate.

This is a prospective comparative study which was done in the Division of Pediatric Surgery, Dhaka Shishu (children) Hospital, Dhaka during the period of July 2017 to June 2020.

60 patients with anterior and mid penile hypospadias were included in our study. Systematic randomized sampling technique was used before operation to form study sample volume. These 60 patients were divided into 2 groups, Group-A: non dilatation and Group B: regular dilatation group. Group-A included 30 patients without regular urethral dilatation after TIP urethroplasty and in group-B included 30 patients with regular ureteral dilatation after TIP urethroplasty.

In this study, Post-surgical complications and outcome of follow-up between the two groups were compared. In our study patient's age range were from 18 to 144 months with mean age 53.93 months. Mean age of Group - A and Group B respectively were 55.2 ± 32.9 months and 53.15 ± 31.12 months. The result was not significant (P value $> .05$) between the mean ages. To minimize the emotional effect an ideal age of urethroplasty operation between 6 to 18 months [17].

American Academy of Pediatrics also supports timing of urethroplasty before 18 months of age [18]. In our study mean age of urethroplasty is higher in both group than the mentioned reference.

Weight range of Group-A was 10.1 - 48.0 kg and group-B was 9.4 - 44.9 kg. The mean weight of group-A and group B were 17.18 ± 8.42 kg and 16.89 ± 8.17 kg. There was no significant difference between the mean ages of two groups.

After preoperative evaluation hypospadias was corrected with TIP urethroplasty in all 60 patients. Thirty patients of Group A were not dilate meatus and urethra regularly, dilatation done only in follow-up visits and in 30 patients of Group B were regularly dilated meatus and urethra upto 6 months. As per reference of Murphy 2005 age appropriate BMI feeding tube was kept in situ for 7 days in all patients. Daily follow up was given on all patients after urethroplasty till discharge from the hospital and after discharge at 2nd weeks, 1st, 2nd, 3rd, 4th, 5th and 6th month follow-up given following operations.

In this study meatal stenosis was the striking complication. Maximum meatal stenosis was detected at the time of 1st post discharge follow up on 2nd week. After detecting meatal stenosis meatotomy done. In Group A 2 (66.6%) patient develop meatal stenosis and in Group B 3 (10%) patients develop meatal stenosis. The result is similar with the result of Elserbiny., *et al.* 2004 and Redwan., *et al.* 2013 [19,26].

Dilatation started on 1st Post discharge follow up at 2nd week. The meatus of a boy accepted between 1 to 3 years of age less than 8 Fr, 4 - 10 years 8 Fr and 11 - 12 years 10 Fr [15]. Meatal stenosis developed in 10% [21], 13.3% [25] and 5.71% [24] patients in other studies at Dhaka Shishu hospital. Snodgrass in his study showed.18% meatal stenosis and Lorenzo., *et al.* in 2002 showed only 3% meatal stenosis.

In group A, 2 patients and in group B, 1 patient developed post-operative wound infection. All the wound infections were treated appropriately with culture sensitive antibiotics and regular dressing. Probably apparently prolonged operation time and midline suture in TIP urethroplasty is the cause of high wound infection rate.

Conclusion

Dilatation of the meatus and neourethra are unnecessary after TIP urethroplasty to prevent meatal stenosis. The follow-up of two group of patients was done and shows that there is no difference in meatal stenosis formation between regular dilatation and without dilatation after TIP urethroplasty in the treatment of distal and mid penile hypospadias.

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