

UDK 616.66-007.26-08+616.643-089.884:614.21-053.2(323)

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# Using prepuccial mucous to cover neourethra in TIP urethroplasty: 4 years experience in a tertiary paediatric hospital of Bangladesh

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**Background.** Hypospadias has a wide spectrum of penile abnormality requiring surgical correction. Most of the cases are of anterior variety and the surgical technique depends on constructing a neo urethra. Snodgrass or Tubularized Incised Plate (TIP) urethroplasty is one of the most popular techniques of urethroplasty which depends on the existing healthy, adequate and intact urethral plate. Different tissues have been described to cover the neourethra as second layer in literature. In this study we modified the TIP urethroplasty by covering the neourethra with 2 layers of pedicled prepuccial mucosa or Dartos flap.

**Objective.** To see the outcome of modified Snodgrass or TIP urethroplasty in anterior mid and proximal penile hypospadias.

**Materials and method.** Total 88 patients were operated by modified Snodgrass technique or modified TIP urethroplasty from January 2012 to July 2016. Coronal, subcoronal, distal penile, mid penile and proximal penile hypospadias were included in the study. Every patient underwent modified TIP urethroplasty and outcomes were assessed.

**Results.** The mean age of the patients were  $28.34 \pm 14.98$  months, ranges from 6.5 to 65 months. 9 (10.2%) patients of our series develop urethrocuteaneous fistula, 5 (5.68%) patients develop meatal stenosis and 1 (1.1%) patient developed neourethral stricture.

**Conclusion.** TIP urethroplasty is a versatile method to correct penile hypospadias. Covering of the neourethra with prepuccial mucosa secure the neourethral anastomosis.

The author declares that there is no conflict of interest.

**Key words:** Hypospadias, TIP urethroplasty, Prepuccial mucosa.

**Використання слизової препуціального відділу для покриття неоуретри за уретропластики із застосуванням тубуляризації розсіченої уретральної пластинки: 4-річний досвід роботи у педіатричній лікарні третинного рівня у Бангладеш**

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Гіпоспадія являє собою широкий спектр аномалій статевого члена, що потребують хірургічної корекції. Більшість випадків належать до переднього відділу уретри, і хірургічна техніка залежить від її будови. Тубуляризація розсіченої уретральної пластинки Warren Snodgrass – один із найпопулярніших методів уретропластики, що залежить від наявності здорової, адекватної та непошкодженої уретральної пластинки. У літературі описані різні тканини, що покривають неоуретру в якості другого шару. В цьому дослідженні ми модифікували уретропластику з використанням тубуляризації розсіченої уретральної пластинки, покривши неоуретру двома шарами слизової оболонки препуціального відділу на судинній ніжці або клапотом.

**Мета.** Оцінити результати модифікованої уретропластики з використанням тубуляризації розсіченої уретральної пластинки Warren Snodgrass при передній середній та проксимальній гіпоспадії статевого члена.

**Матеріали і методи.** З січня 2012 р. по липень 2016 р. 88 пацієнтів були прооперовані з використанням модифікованої техніки Snodgrass або модифікованої уретропластики з використанням тубуляризації розсіченої уретральної пластинки. У дослідження були включені гіпоспадія коронарного, субкоронарного, дистального, середнього та проксимального відділів статевого члена. Кожному пацієнту була проведена модифікована уретропластика з тубуляризацією розсіченої уретральної пластинки.

**Результати.** Середній вік пацієнтів –  $28,34 \pm 14,98$  місяців і коливався від 6,5 до 65 місяців. У 9 (10,2%) пацієнтів розвився уретральний розріз і нориця, у 5 (5,68%) дітей – стеноз внутрішнього каналу та у 1 (1,1%) пацієнта – стриктура неоуретри.

**Висновки.** Уретропластика з використанням тубуляризації розсіченої уретральної пластинки – це універсальний метод корекції гіпоспадії статевого члена. Покриття неоуретри слизовою оболонкою препуціального відділу фіксує неоуретральний анастомоз.

Дослідження було ухвалено комітетом з етики дитячої лікарні Dhaka Shishu. Крім того, до операції батьки були проінформовані про процедуру та можливі ускладнення для отримання інформованої згоди.

Автори заявляють про відсутність конфлікту інтересів.

**Ключові слова:** гіпоспадія, уретропластика з тубуляризацією розсіченої уретральної пластинки, препуціальна слизова оболонка.

## Использование слизистой препуциального отдела для покрытия неоуретры при уретропластике с использованием тубуляризации рассечённой уретральной пластинки: 4-летний опыт работы в педиатрической больнице третичного уровня в Бангладеш

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Гипоспадия представляет собой широкий спектр аномалий полового члена, требующих хирургической коррекции. Большинство случаев относятся к переднему отделу уретры, и хирургическая техника зависит от ее строения. Тубуляризация рассечённой уретральной пластинки Warren Snodgrass – один из самых популярных методов уретропластики, который зависит от наличия здоровой, адекватной и неповрежденной уретральной пластинки. В литературе описаны различные ткани, покрывающие неоуретру в качестве второго слоя. В этом исследовании мы модифицировали уретропластику с использованием тубуляризации рассечённой уретральной пластинки, покрыв неоуретру двумя слоями слизистой оболочки препуциального отдела на сосудистой ножке или лоскутом.

**Цель.** Оценить результаты модифицированной уретропластики с использованием тубуляризации рассечённой уретральной пластинки Warren Snodgrass при передней средней и проксимальной гипоспадии полового члена.

**Материалы и методы.** С января 2012 г. по июль 2016 г. 88 пациентов были прооперированы с использованием модифицированной техники Snodgrass или модифицированной уретропластики с использованием тубуляризации рассечённой уретральной пластинки. В исследование были включены гипоспадия коронарного, субкоронарного, дистального, среднего и проксимального отделов полового члена. Каждому пациенту была проведена модифицированная уретропластика с тубуляризацией рассечённой уретральной пластинки, и были оценены ее результаты.

**Результаты.** Средний возраст пациентов составил 28,34±14,98 месяцев, и колеблется от 6,5 до 65 месяцев. У 9 (10,2%) пациентов развился уретральный разрез и свищ, у 5 (5,68%) детей – стеноз внутреннего канала и у 1 (1,1%) пациента – стриктура неоуретры.

**Выводы.** Уретропластика с использованием тубуляризации рассечённой уретральной пластинки – это универсальный метод коррекции гипоспадии полового члена. Покрытие неоуретры слизистой оболочкой препуциального отдела фиксирует неоуретральный анастомоз.

Исследование было одобрено комитетом по этике детской больницы Dhaka Shishu. Кроме того, до операции родители были проинформированы о процедуре и возможных осложнениях для получения информированного согласия.

Авторы заявляют об отсутствии конфликта интересов.

**Ключевые слова:** гипоспадия, уретропластика с тубуляризацией рассечённой уретральной пластинки, препуциальная слизистая оболочка.

## Introduction

Hypospadias may be defined as an arrest in normal development of urethra foreskin, and ventral surface of penis [1]. It occurs 1 in 125 live male births [2,3]. This results in a wide range of abnormalities where the urethral opening is situated anywhere along the ventral shaft of the penis from glans penis to perineum. Most of the cases are distal or anterior variety with an incidence of 75% [4]. Objectives of hypospadias surgery are orthoplasty (Penile straightening), urethroplasty, meatoplasty and glanduloplasty, scrotoplasty and skin coverage [1]. Excellent cosmetic appearance and voiding straight forward in standing position from the tip of the glans determines the success of the operation [1,4]. More than 300 procedures has been described in literature [5] with a lot of modifications.

Warren T. Snodgrass in 1994 described a newer procedure for hypospadias repair with combination of longitudinally incised the urethral plate and tubularized it around a soft silicon catheter [7]. Snodgrass urethroplasty has become the method of choice day by day worldwide to treat distal hypospadias [6].

Constructing neourethra is the most difficult part of Snodgrass method. Striking complication of Snodgrass or TIP urethroplasty is urethrocutaneous fistula. As there is a little amount of tissue is available for reconstruction, so covering the neourethra is still a matter of concern. Hence we thought that covering the neourethra with separated prepuccial mucosa like ventral parking of the skin might reduce the formation of urethrocutaneous fistula.

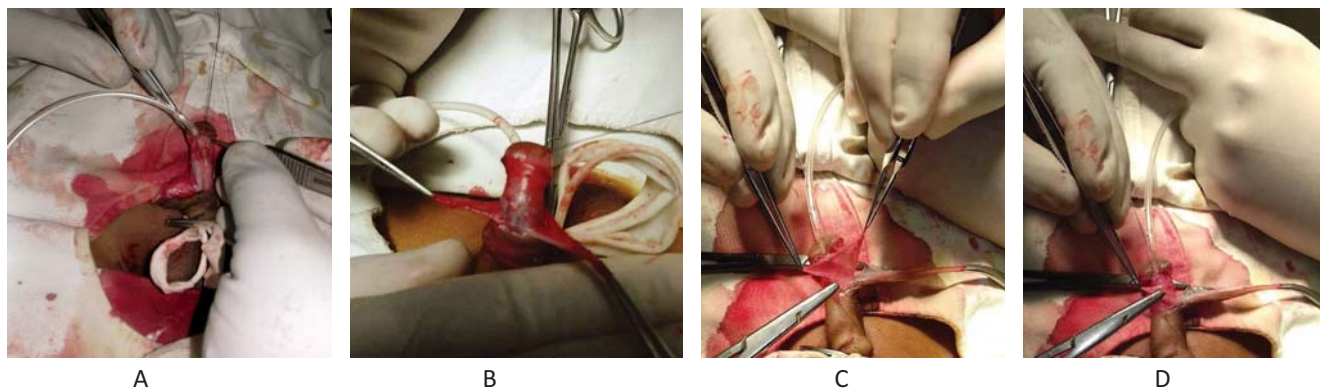
**Objective.** To see the outcome of modified Snodgrass or TIP urethroplasty in anterior mid and proximal penile hypospadias.

## Materials and Methods

It was an observational study conducted in the division of paediatric surgery, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh. We have operated 88 patients from January 2012 to July 2016. Patients aged from 6 months to 10 years were included in the study. Urethrocutaneous fistula formation, Neo urethral stricture, operation time, Post operative meatal stenosis were taken as outcome variables.

This study was approved by the ethical committee of Dhaka Shishu (Children) Hospital. More over prior to operation parents were briefed about the procedure and probable complication to obtain informed consent.

All the patients were operated under caudal block. Prepuccial skin was released from the glans. Incision lines were outlined and marked with sterile marker. A suitable sized silicon BMI feeding tube 6 to 8 Fr was introduced through the hypospadiac opening. A 'U' shaped incision is made extending along the edges of the urethral plate from the tip of the glans to 2–3 mm proximal to hypospadiac meatus. A circumferential incision 5–7 mm proximal to the coronal margin is extended from each edge of urethral plate and the penile shaft. Penile skin was degloved up to the base of the penis to correct chordee. An artificial erection test is performed. If chordee still present then corrected by



**Fig.** Stages of the operation. A – Completion of urethroplasty; B – 2 flaps created from prepuce mucosa; C & D – Fixation of flaps one after another over neourethra

placing a single plicating inverted suture at 12 o'clock position by 6/0 polypropylene opposite the point of maximum curvature to preserve the urethral plate. A longitudinal relaxing incision is made on the urethral plate at the midline from the hypospadiac meatus to 2 mm proximal to tip of the glans with tenotomy scissors and deepened up to corpus cavernosum. Counter traction on urethral plate facilitates better dissection and better mobilization of urethral plate. Then tubularization of neourethra was done around an age appropriate BMI feeding tube by using a running 6/0 polyglactin suture. This closure begins at the meatus and continues proximally.

Vascularised pedicled flap was elevated from inner surface of dorsal prepuce up to the base of penis divided longitudinally up to corona and mobilized ventrally over neourethra. Two flaps were fixed on neourethra one over another with multiple 6/0 vicryl suture. It is an intermediate barrier layer between neourethra and surface skin layer. The redundant dorsal skin was transferred for resurfacing closure (Fig.).

Skin was closed with 6/0 polyglactine suture. The dorsal hooded skin is incised midline to the level of sub-coronal collar of the inner prepuce. If required then rest of the skin is transferred ventrally and closed with 6/0 polyglactine. Sandwich dressing was applied in all patients and was placed onto anterior abdominal wall. Diversion was continued for 5 days in all patients. Oxybutynine was used in all patients to prevent bladder spasm along with diclofenac sodium [19]. Single shot per operative ceftriaxone followed by oral cefixime for 7 to 10 days was used in every patient.

## Results

Results were compiled and presented with tables 1, 2. Statistical analysis was done by SPSS 20 version. Chi square test was done for qualitative data. Quantitative variables were expressed as mean  $\pm$  SD.

**Table 1**

Demographic variation of the patient

| Serial | Type of Hypospadias   | No. of patient | Total (N) |
|--------|-----------------------|----------------|-----------|
| 1      | Coronal               | 23             | 88        |
| 2      | Sub coronal           | 36             |           |
| 3      | Distal penile shaft   | 20             |           |
| 4      | Proximal penile shaft | 9              |           |

**Table 2**

Outcome of the study

| Serial | Variable                 | Result                   |
|--------|--------------------------|--------------------------|
| 1      | Age (Mean $\pm$ SD)      | 28.34 $\pm$ 14.98 months |
| 2      | Neourethral stricture    | 1 (1.1%)                 |
| 3      | Urethrocutaneous fistula | 9 (10.2%)                |
| 4      | Meatal stenosis          | 5 (5.68%)                |
| 5      | Operation time           | 72.97 $\pm$ 10.01 min    |

## Discussion

This prospective observational study was conducted under division of Paediatric Surgery, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh From January 2012 to December 2017. Total 88 patients were operated by modified Snodgrass or TIP method and outcomes were observed.

Since its first description in 1994 by Warren T. Snodgrass, TIP urethroplasty becomes the most popular technique for repair of primary hypospadias [8–10]. The key factor in TIP urethroplasty is the midline incision of urethral plate to widen the urethral plate for tubularization in a tension free manner.

As several study showed most common complication of TIP urethroplasty were urethrocutaneous fistula, meatal stenosis [11], so we focused on this two complication with another important complication that is post operative persistent chordee.

In our study 9 patients (10.2%) developed urethrocutaneous fistula among 88 patients. Several study showed that rate of urethrocutaneous fistula varies from 0 to 10%. In our series the rate of urethrocutaneous fistula is same as other reported studies [6–11]. In his review



## Оригінальні дослідження. Урологія та гінекологія

study in 2005 W.T. Snodgrass used prepuccial mucous flap to cover the neourethra as like button hole technique [12] but we used to cover neourethra by prepuccial mucous flap as like ventral parking of the skin one over another. It created 2 layers of covering over neourethra. Though it does not reduces the urethrocutaneous fistula significantly but we think that this prepuccial mucous flap ensure protection of the neourethral suture line. Anjan Kumar et al. 2012 showed less fistula rate in tunica flap compared with dartos flap but it was statistically non significant [18].

Meatal stenosis was the area of attention after urethrocutaneous fistula as there is dilemma about dilatation [13–17]. None of our cases were under regular dilatation. Patients were asked to follow up on 15th POD to check meatal size. If needed we calibrated the neomeatus with nozzle of ophthalmologic ointment. 5 patients (5.68%) in our series developed meatal stenosis. This result is as similar as other reported studies [6–11].

We had post operative neo urethral stricture in 1 patient (1.1%). It was managed by multiple dilatation followed by optical internal urethrotomy. Rate of post operative stricture in our study is near similar in comparison to other studies.

## Conclusion

Prepuccial mucous or penile dartos can be a good alternative of tunica vaginalis flap to cover neourethra as it is easy to harvest and scrotum remains untouched.

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Article received: Apr 20, 2020. Accepted for publication: Sep 06, 2020.