



*Original Contribution*

**OUR EXPERIENCE IN DISTAL HIPOSPADIAS AND TIP URETHROPLASTY**

**Kr. Kalinova\*, K.Georgiev**

Department of Pediatric Surgery, University Hospital, Trakia University, Stara Zagora, Bulgaria

**ABSTRACT**

**PURPOSE:** We began performing the Snodgrass procedure in 2012 /tabularized incised plate urethroplasty, described by Orkiszewski in 1987/ and improved and popularized by Warren Snodgrass in 1994 (1).

**METHODS:** Snodgrass TIP urethroplasty was performed between January 2013- January 2020 for distal hypospadias in 12 boys aged 8 months to 12 years were included, with data on the demography of the patients, type of hypospadias, extent of urethral plate incision, type of flap, used to cover the urethroplasty, the surgical outcome and follow-up for meatal stenosis.

**RESULTS:** We reviewed the boys with hypospadias repair of Snodgrass TIP urethroplasty, who is performed between January 2013-January 2020 in the Pediatric Surgery Department of University hospital–Stara Zagora. Cases of proximal hypospadias with severe chordae and those who had undergone previous urethroplasty were excluded.

**CONCLUSION:** On the basis of our experience we feel that the Snodgrass considered not only for primary but also for reoperative repair of distal hypospadias.

**Key words:** hypospadias, TIP urethroplasty

**INTRODUCTION**

Hypospadias is a congenital anomaly that engages the urethra and penis. It is a common defect, affecting about 0.4-8 per 1000 newborn boys. The external urethral orifice is located at a different level along the lower (ventral) part of the penis. The surgical intervention aims to build a new urethra up to the tip of the penis, correcting any possible curvature of the penis (1-2).

The correction is surgically, usually when the infant is between 6 and 24 months. It may require endocrine management as well, especially for the most severe forms and for patients with other genital malformations.

Hypospadias causes not only functional problems but also psychological problems for patients and their parents. Many techniques have been described for repairing hypospadias, but none was considered the standard method.

In 1994, Snodgrass described tabularized incised plate (TIP) urethroplasty for distal

penile hypospadias repair. It was subsequently also applied to proximal hypospadias, with encouraging results (3, 4). The longitudinal split of the urethral plate described by Snodgrass represents significant progress in urethral plate-preserving surgery, permitting tension-free tabularization of the urethral plate to form a neourethra of adequate size.

**MATERIAL AND METHODS**

We reviewed the boys with hypospadias repair of Snodgrass TIP urethroplasty, who is performed between January 2013- January 2020 in the Pediatric surgery department of University hospital –Stara Zagora. Cases of proximal hypospadias with severe chordae and those who had undergone previous urethroplasty were excluded. Distal hypospadias in 12 boys aged 8 months to 12 years were included, with data on the demography of the patients, type of hypospadias, extent of urethral plate incision, type of flap used to cover the urethroplasty, the surgical outcome and follow-up for meatal stenosis.

All operations were performed with the patient in the supine position under general anesthesia. The retrospective analysis reviews the medical records of boys in our Department of Pediatric

\*Correspondence to: *Krasimira Kalinova, Clinic of Pediatric surgery, University Hospital-Stara Zagora, 2 "Gen.Stoletov" str., 6003 Stara Zagora, E-mail: krasimirakalinova@abv.bg*

surgery, if they have glans dehiscence, fistula and stenosis of urethral meatus as a result of failed distal hypospadias repair, primary surgery versus reoperation, patient age at the time of the time of the repair and type of complication. Neourethra was covered with tunica dartos in nine boys with Snodgrass procedures, two boys did not have coverage of neourethra and one boy did not have information in Mathieu procedures in the Department of Pediatric surgery, University hospital-Stara Zagora for the last seven years.

Reoperative as primary Snodgrass operative technique consisted of preparation, incisions, tabularization, subcutaneous flap coverage of neourethra and skin closure (3). A traction suture was placed in the glans just beyond the

anticipated dorsal lip of the neomeatus. A circumscribing skin incision is made 2 mm proximal to the meatus and the shaft skin is degloved to the penoscrotal junction.

### RESULTS

For the period of January 2013- January 2020, we performed 12 boys (mean age 4.6 years, 8 months -12 years) with secondary hypospadias repairs. Six patients have primary distal hypospadias who have been operated on by four pediatric surgeons needed reoperations, because of the failure of tabularized incised plate urethroplasty (Snodgrass), Mathieu in two boys and Thiersch-Duplay in one. (**Figure 1** and **Figure 2**) Two of them had more than one operation in the same area.

## "Snodgrass" Tubularized incised plate urethroplasty

- Procedure-

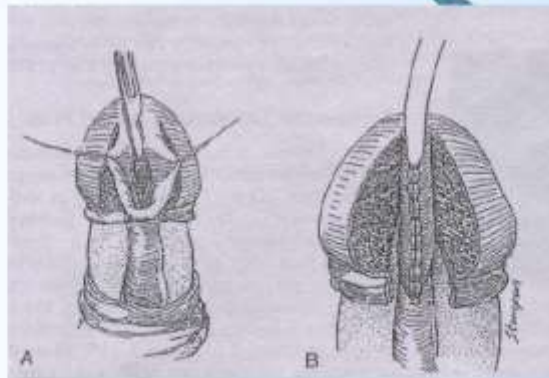


Figure 1. TIP ( no 1)

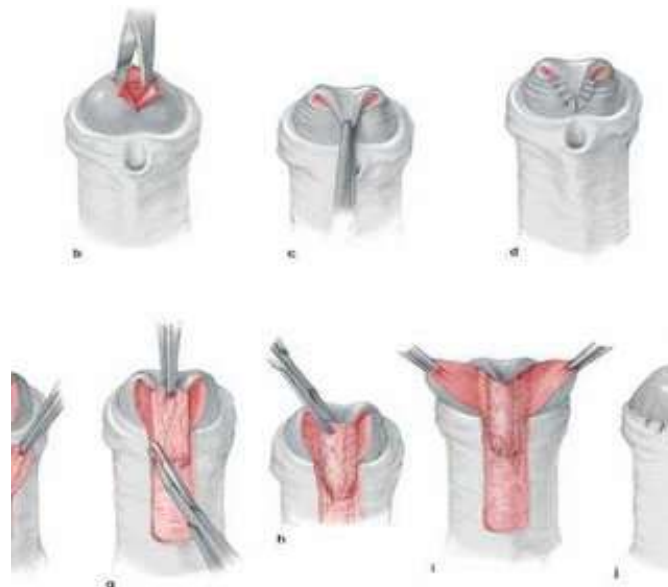


Figure 2. Mathieu procedure (no 1)

All patients received a penile block after the induction of general anesthesia and supplementary painkiller suppository paracetamol at the end of the procedure. As patients were previously circumcised, lateral and/or ventral penile shaft skin was mobilized as the source of a subcutaneous tissue flap and for penile shaft skin coverage. It was necessary in three boys with coronal and sub coronal fistulas to incise a longitudinally transverses skin bridge between the granular neomeatus and the fistula site for the purpose of a better appreciation of the extent of the presenting defect and more proper performance of the reoperative repair.

The urethral plate is separated from the glans wings by mirror image inclusions among their junction. A tourniquet was placed at the base of the penis providing better visualization of the operative field. The glans wings are mobilized avoiding damage the margins of the urethral plate. A relaxing incision is made in the midline from within the meatus to the end of the plate.

A 6-0 polyglactin is preferred to tabularize the urethra. In operative procedure neourethra was covered with tunica dartos in all the patients, the size of urethral stent ranged from 6 to 8 Fr and removed on postoperative day 8-10. The Snodgrass TIP urethroplasty for failed previous hypospadias repair had some differences from primary repair. The interval from the last surgery to TIP was 8 months to 5 years (5-8).

In the intraoperative assessment of the incised plate reveals a good urethral plate regardless of a previous midline incision. It is followed by the placement of the stay sutures, tourniquet, and stent in neourethra, suprapubic derivation and marking of the planned incision lines.

The mean range follow was 24 (6-48) months. Functional and cosmetic results were excellent with Snodgrass repair with a normal looking meatus, slightly round in one and one patient has a small urethrocutaneous fistula and meatal stenosis.

## DISCUSSION

The etiology of hypospadias can be explained by genetic susceptibility along with environmental exposure during genital development (8 to 18 weeks of gestation). Both of these transforming factors have been implicated in tissue remodelling and may be

critical not only in causing hypospadias, but also in the healing process or lack thereof following surgical repair (4, 6).

The correction of proximal hypospadias is surgically, usually when the infant is between 6 and 24 months. It may require endocrine management as well, especially for the most severe forms and for patients with other genital malformations. The severity of hypospadias can vary from minor to severe depending on where the urethral opening is located and often requires surgery (Snodgrass et al., 2011) (5). Some children despite what appears to be a well-performed operation, have unexpected complications. Wound healing was uneventful but probably some unidentified factors that may have a role during the healing process exist.

Snodgrass surgery (**Figure 1**): A feature of the method is the longitudinal section of an unusually located opening to the head and sewn with a lid around the catheter of the required size. At the same time, there remains an uncovered portion of the urethra that gradually epilates. The technique is suitable for correction of hypospadias of any kind, recommended for stem and scrotal stem forms (1-6).

A primitive rag on Matthew's feet (**Figure 2**): During the operation, two parallel incisions are made on both sides of the urethra, the length from the head to the cavernous bodies. The resulting lid is connected to the urethral plate, and the parts of the head are connected together. The technology is demonstrated in a qualitative pathology with minimal deformation of the trunk and a sufficiently developed scrotoid well. It refers to simultaneous operations (1, 9).

Snodgrass also suggests that anatomical and/or host factors (wound healing) are more important than patient age, type of suture and preoperative testosterone use in the development of this postoperative complication (7-9). TIP urethroplasty is one of the several established, successfully used, methods for the primary hypospadias repair. These principles include generous vascularity of the urethral plate, relative simplicity of the technique, consistent availability of tissue necessary to complete the repair and excellent cosmetic results. But as an option for secondary hypospadias repair TIP may be considered only when the urethral plate has

been preserved and appears grossly supple despite previous surgery (7, 8).

Complete glans dehiscence or a huge urethral fistula is a discouraging complication after TIP hypospadias surgery. Glance dehiscence (meatal regression or retraction), defined as loss of glans wings approximation after hypospadias repair, results in a spectrum of postoperative outcomes ranging from an enlarged granular meatus (if the most distal stitch fails) to a sub coronal meatus (when the glans wings completely separate). Meatal stenosis in our patients was managed by regular dilatation, with meatoplasty required in only one case (9).

Although the urethral plate is not completely normal in hypospadias, it is plentiful supplied by urethral and deep dorsal arteries that furnish the corpus spongiosum and glans penis, respectively. This factor is very important to the success of the technique. The urethral plate is incised in the midline as part of this method but longitudinal incision does not interrupt or significantly change the dual blood supply to the two mobilized and tabularized urethral plate strips (5-8).

In our study we had eight boys after fall hypospadias repair with very breadth urethral plate which permitted us to perform secondary TIP. There were more patients with primary failed Snodgrass than Mathieu technic urethrocutaneous fistula and proximal urethral strictures were seen more frequently in the second group in Mathieu repair (5 ).The explanation is that we very rarely perform other techniques than TIP for distal hypospadias repair. Thiersch-Duplay urethroplasty filled in one patient probably because that simple tabularization leads to a reduced urethral plate and significantly decreased flow as proved by Leslie B at all(8 ) in a rabbit model. It was not seen after midline incision of the urethral plate with or without dorsal inlay grafting (10). Early postoperative complications include the period during which the patient is under active hospital care. Some of the most common early postoperative complications are infection, bleeding, edema, cramps, catheter clogging, wound suppuration, and skin necrosis. Characteristically, they may be a prerequisite for the development of late postoperative complications (8, 9, 10).

Late postoperative complications are those that occur after active hospital monitoring. The

most common in this group are fistulas of the newly formed neourethra, stenosis of the metatarsus, stricture of the urethra, persistent chords postoperatively, diverticula of the urethra, and dysuria complaints in patients after the completed neo-urethra. In patients with more pronounced deviation, the Nesbit technique is used, in which plating of the tunic of the albuginea on the opposite side of the most pronounced distortion is performed (9, 10).

The reasons we applied Snodgrass procedure again in patients with failed hypospadias repair are based on the experience we had in the previous period as well recommendation by Snodgrass in 2010. We used only absorptive 6-0 sutures for glans which changed to 6/0 and 7/0 polyglactin. We incise the urethral plate deeply near the corpora without UP tabularization too far distally. The neourethra is not to be tabularized past 3-4 mm proximal to the end of the plate without fixation of the glans to the neourethra. She is created and sutured over the silicone stent, which is left in situ for 10 days. The metal dilator is used for one month after surgery.

## CONCLUSION

- On the basis of our experience we feel that the Snodgrass considered not only for primary but also for reoperative repair of distal hypospadias.
- The principles included generous vascularity of the urethral plate, relative simplicity of the technique, and consistent availability of tissue necessary. Hypospadias repair, no matter if the urethral plate had previously been incised.
- The Snodgrass procedure is a good alternative for the treatment of previously failed
- TIP" can also be made in a failed Mathieu's or Only valve, but the opposite is not possible.
- "TIP" is as good as Mathieu's and on lay's procedure with the slight advantage of being used in surgery and cosmetics.

## REFERENCES

1. Snodgrass TW, Bush N, Cost N. Tabularized incised plate hypospadias repair for distal hypospadias. *J Ped. Urol*; 6: 408-13, 2010
2. Snodgrass W, Bush N. Is distal hypospadias repair mostly a cosmetic operation? *J Pediatric Urol*.14 :339-340. 2018

- KALINOVA KR., et al.
3. Snodgrass W, Bush NC. Persistent or recurrent ventral curvature after failed proximal hypospadias repair. *J Pediatric Urol.* 15:344, 2019
  4. Garcia-González M, Casal-Beloy I, Somoza Argibay I, Dargallo Carbonell T. Comparative analysis of the treatment of mid-shaft and distal hypospadias according to Snodgrass surgical repair and Mathieu technique. *Arch Esp Urol.* 72:443-450, 2019
  5. Aguilera-Pujabet M, Gander R, Royo GF, López M, Asensio M. Is the Mathieu urethroplasty a useful technique for urethrocutaneous fistula repair after hypospadias surgery? *Cir Pediatr.*, 17:176-181, 2018
  6. Bush NC, Snodgrass W. Pre-incision urethral plate width does not impact short-term Tubularized Incised Plate urethroplasty outcomes. *J Pediatr Urol.* 13:625-7, 2017
  7. Marte A, Pintozzi L. Tubularized proximally-incised plate in distal/mishit hypospadias repair. *Pediatr Med Chir. Jun* 23; 39:151-3, 2017
  8. Hadidi AT. History of hypospadias: Lost in translation. *J Pediatric Surgery* Feb; 52:211-217, 2017
  9. Al-Hunayan A.A., E.O. Kehinde, M.A. Elsalam, R.S. Al-Mukhtar. Tubularized incised plate urethroplasty: modification and outcome *Int Urol Nephrol*, 35: 47-52, 2003
  - 10.8 El-Kassaby A.W., A.M. Al-Kandari, T. El-Zayat, A.A. Shokeir .Modified tubularized incised plate urethroplasty for hypospadias repair: a long-term results of 764 patients *J Urol*, 71: 611-615, 2008
  11. Snodgrass W., M. Koyle, G. Manzoni, R. Hurwitz, A. Caldamone, R. Ehrlich .Tubularized incised plate repair for proximal hypospadias. *J Urol*, 159:2129-213, 1998
  12. Licevik M.E., G. Tireli, S. Sander. Tubularized incised plate urethroplasty: 5 years' experience. *Eur J Urol*, 46: 655-659, 2004