

# Outcome of Snodgrass versus Snodgraft Urethroplasty in Distal Hypospadias

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**Abstract:** ***Background:** Hypospadias is one of the most common congenital anomalies of the male genitourinary system. Snodgrass operation is a quiet popular technique used to repair distal and mid shaft defects. However, it carries increased risk of many complications such as meatal stenosis. Snodgraft repair using an inner preputial free graft is a proposed technique aiming to reduce the risk of complications. **Method:** The study included 40 cases of distal hypospadias that were admitted to the Pediatric Surgery unit, S. N. Medical College and Hospital, Agra during the period from 2020 to 2022. Cases were divided into 2 groups; Group A: The Snodgraft Group (20 cases) and Group B: The Snodgrass group (20 cases). **Observation:** Postoperative urethrocutaneous fistula occurred in 2 patients (10%) in group A and 3 patients (15%) in group B. Meatal stenosis developed in 1 case (5%) in Group A versus 2 cases (10%) in Group B. 18 cases (90%) in group A had good and excellent cosmesis whereas in group B had 14 cases (70%). **Conclusion:** Snodgraft operation is more technically challenging and requires longer operative time than the original Snodgrass operation, so its indication should be tailored according to the patient's condition. Snodgraft method of repair seems to be promising with better cosmetic and functional results. In spite of having encouraging results we feel this is a learning phase and time will prove its superiority over other methods after long term follow up in more number of cases.*

**Keywords:** Distal hypospadias, Snodgrass repair, Snodgraft repair, Meatal stenosis

## 1. Introduction

Hypospadias is a developmental abnormality of anterior urethra and penis in which urethral opening is located in the ventral aspect of penis proximal to the tip of glans to any where up to perineum.<sup>1</sup>

The goals of treating Hypospadias are:

- 1) To create a straight penis by repairing any chordee (orthoplasty)
- 2) To create a urethra with its meatus at the tip of the penis (urethroplasty)
- 3) To reform the glans into a more natural clinical configuration (glanuloplasty).
- 4) To achieve cosmetically acceptable penile skin coverage.
- 5) To create a normal appearing scrotum.

The resulting penis should be suitable for future sexual intercourse, should enable the patient to void standing, and should present an acceptable cosmetic appearance. A modification of the Thiersch - Duplay technique was described by Snodgrass<sup>2</sup> the Tubularized incised plate (TIP) urethroplasty. Tubularized incised plate urethroplasty repair was first introduced in 1994 and it has revolutionized the management of hypospadias. It has many advantages such as better cosmesis, meatus at the tip of the penis and straight phallus. It is considered as procedure of choice in management of distal hypospadias by many surgeons (Zain, 2017)<sup>3</sup>. Rationale of the technique is to perform an incision in the urethral plate to permit tension-free tubularization of the neourethra that later on undergoes healing (Keays and Dave, 2017)<sup>4</sup>. However, the mechanism of healing of the incised plate is still debatable and many authors believe that

it heals by epithelial creeping, which theoretically increases the incidence of complications because of healing by primary intention if allowed to contract (Salah et al., 2019)<sup>5</sup>. Kolon and Gonzales published a new technique of one-stage urethroplasty with a dorsal onlay graft using inner preputial skin (GTIP) in 2000 (Abbas, 2018)<sup>6</sup>. They predicted the effectiveness of GTIP because the neourethra is not left with a large denuded surface that allows for possible scar formation. With insertion of a free preputial graft, the urethral plate could be preserved in an attempt to improve healing of the neourethra after TIP urethroplasty (Kishk et al., 2018)<sup>7</sup>.

The aim of this study is to compare the outcome of Snodgrass versus Snodgraft technique in distal hypospadias repair.

## 2. Material and Methods

This is a prospective randomised study conducted from 2020 to 2022 in all patients of distal hypospadias who were admitted and operated in the pediatric surgery unit in S. N. Medical College, Agra.

### Inclusion Criteria

Patients with glanular, coronal, sub coronal and distal shaft hypospadias without chordee were included.

### Exclusion Criteria

Patients with posterior (proximal) hypospadias and those with severe chordee were excluded.

Starting with the standard history, physical examination, investigation and assessing anesthetic fitness, we repaired

the defect with standard surgical procedures and evaluated the results of each of the procedure performed. Patients were divided into 2 groups according to type of technique used.

Group A (sample Size - 20): In these patients, hypospadias repair was done with tubularised incised plate urethroplasty with inner free prepuccial onlay graft (Snodgrass).

Group B (sample Size - 20): In these patients, hypospadias repair was done with tubularised incised plate urethroplasty without prepuccial graft (Snodgrass).

In all patients, urethroplasty was done on a 7 french catheter which was kept for 7 - 10 days after surgery.

### Snodgrass (TIP) urethroplasty technique

A longitudinal midline incision of the urethral plate from the tip of the penis to the level of hypospadiac meatus. The depth of the urethral plate incision depends primarily on the configuration of the glans and the glanular groove. The urethral plate is then tubularized over a No.7 Fr catheter.

Second layer coverage of the neourethra with a wellvascularized subcutaneous (dartos) tissue flap, harvested from the dorsal preputial and shaft skin. For more proximal repairs, a tunica vaginalis flap may be used for this purpose. The glans wings are then approximated without tension.

### Snodgrass urethroplasty technique

The same steps of Snodgrass technique were applied to each case in addition to the following; by harvesting a small free graft from the inner preputial skin with removal of excess fatty tissue. The main principle in harvesting a graft was to cover the entire incised area of the urethral plate by adequately measuring the size of the graft. Therefore, the length and width of the graft was affected by every change in the depth of the midline incision, urethral plate configuration and meatal location. The graft was fixed to medial edges and the base of the incised plate with interrupted 6/0 polyglactin suture.

### Follow Up

All patients had been followed weekly for first month then every 3 month for 2 years.

## 3. Observations

**Table 1:** Incidence of Early complications

Complication	Group A		Group B	
	NO.	%	NO.	%
Pericatheter leak	2	10	2	10
Post operative oedema	2	10	2	10
Fistula	2	10	3	15
Diverticulum	0	0	1	5
Infection/wound healing by secondary Intention	1	5	1	5
Total	7	35	9	45
mean±sd	2.4±2.3		4±2.41	
p - value	0.7			

The most common complications were post operative oedema and fistula formation. On comparing the number of

fistula formation in group A and B statistically not significant (p=0.7).

**Table 2:** Incidence of Delayed Complications

Complication	Group A	Group B
Meatal stenosis	1	2
Proximal stricture	0	2
mean±sd	0.05±0.22	0.25±0.22
p - value	0.27	

The delayed complications like meatal stenosis and proximal stricture were detected during postoperative urethral calibrations and were treated by repeated dilatation.

**Table 3:** Cosmetic Result

	Group A		Group B	
	No.	%	No.	%
Bad	0	0	2	10
Fair	2	10	4	20
Good	4	20	9	45
Excellent	14	70	5	25
mean±sd	5±5.48		5±2.74	
p - value	0.1			

The cosmetic results were much better in group A with 14 out of 20 (70%) having excellent cosmetic results while in group B, 5 out of 20 cases (25%) had excellent cosmetic result, which was significant at p<0.1.

## 4. Discussion

The results of the two groups were compared in terms of complications and cosmetic outcome; and analyzed statistically.

### Early Complications

Pericatheter leak was almost similar in both the groups (2 cases in group A and 2 cases in group B). Postoperative oedema is observed during the time of first dressing (5th postoperative day) was similar in both groups 2 cases in each. Fistula formation was observed in 2 cases in group A (10%) and 3 cases in group B (15%). Out of these, one fistula in group A healed spontaneously so 1 out of 20 cases (5%) required operative closure in group A and 3 out of 20 cases (15%) required operative closure in group B. One case in group B had diverticulum formation and 1 case had infection which healed by secondary intention. Weiner JS et al found that no diverticulum developed after onlay repair whereas 12% of the tubularized repairs in their series of 132 patients developed diverticulum. The overall complication rates were 36% for tubularized and 31% for onlay repairs and fistula sites were 17% and 14% respectively. Castanon M et al (2000) <sup>9</sup> compared the results of tubularized island flap urethroplasty and the onlay technique in posterior hypospadias. They also found fistula formation to be the most frequent complication without any significant difference between the 2 groups (21.4% for Duckett technique and 18.4% for onlay repair, p>0.5). However, they found that the anastomotic stricture was much more common in the tubularized flap group (7.14% vs 2.63%; p<0.05). Moreover, a mega urethra was found only in the Duckett technique group (4.7%).<sup>10</sup>

**Delayed Complications:**

Mild meatal stenosis is seen in one patient in group A and no patient have proximal stricture. In group B, 2 patients had proximal stricture formation and 2 patients had meatal stenosis. Ghali AMA<sup>11</sup> treated strictures by dilatation (3/15), optical urethrotomy (6/15) resection anastomosis (2/15), patch urethroplasty (2/15) and complete reconstruction (2/15). In our series, only dilatation sufficed to treat the strictures.

**Cosmetic Result**

In group A, 18 patients have good or excellent results (90%) while in group B, 14 patients have good or excellent results (70%). The cosmetic result was evaluated depending upon

- 1) Wound healing by primary intention or by infection
- 2) Meatus at tip
- 3) Glans shape
- 4) Supple penile skin

They are divided into bad, fair, good and excellent groups. The cosmetic results were much better in group A with 14 out of 20 (70%) having excellent cosmetic results while in group B, 5 out of 20 cases (25%) have excellent cosmetic result: on comparison,  $z=2.453$  which is significant at  $p<0.05$ . Hinderer UT (2000)<sup>12</sup> also emphasized the importance of a normal aesthetic appearance, resembling a circumcised penis, and with the meatus at the tip of the glans.

**5. Conclusion**

Tubularized incised plate urethroplasty is associated with high incidence of stricture formation. We have tried to modify the technique by using it as inner preputial onlay graft method thus avoiding the formation of stricture. This method of repair seems to be promising with better cosmetic and functional result. In spite of having encouraging results we feel this is a learning phase and time will prove its superiority over other methods after long term follow up in more number of cases.

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