e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(1); 1273-1277

Original Research Article

Study of Hypospadias Repair the Role of Waterproofing Layer by Asopa Single Stage and Snodgrass Technique: A Comparative Analysis

Mrityunjay Kumar Rai[1], Kamal Nayan Raghav[2], Sunil Kumar Ranjan[3], Khursheed Alam[4], Ashok Kumar[5]

[1]Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India

[2]Senior Resident, Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India

[3]Associate Professor and HOD, Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India

[4]Assistant Professor, Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India

[5]Assistant Professor, Department of Surgery, Government Medical College and Hospital, Bettiah, West Champaran, Bihar, India

Received: 01-10-2025 / Revised: 15-11-2025 / Accepted: 21-12-2025

Corresponding author: Dr. Kamal Nayan Raghav

Conflict of interest: Nil

Abstract

Background: One of the most prevalent congenital genital abnormalities for which early surgery is recommended is hypopadias. The surgical approach is gradually evolving, frequently by reiterating therapy approaches that were employed decades ago. In fact, one-stage operations historically took the role of two-stage procedures, but two-stage procedures are becoming more popular these days. Aim of this study is to the comparative result of hypospadias repair by dividing the patients in two groups Asopa single stage and snodgrass technique and evaluate the complication rates between these two groups especially in reference to incidence of urethrocutaneous fistula.

Methods: From March 2025 to August 2025, a prospective study was conducted in the Department of Surgery at the Govt. Medical College and Hospital in Bettiah, West Champaran, Bihar, with 36 cases complaining of hypospadias, or the position of the urethral meatus on the underside of the penis.

Result: In the present study, most of our cases (83.33%) were of less than 8 years of age. Most common type was middle hypospadias (50%), followed by proximal (27.77%) and distal (22.22%). Chordee was present in 66.66% of our cases.11.11% cases had penile torsion in pre-operative period. Asopa technique was used in cases with significant chordee and Snodgrass technique used in cases without significant chordee. Urethral plate was well formed and grooved in 66.66% cases, shallow in 27.77% cases and distorted in 5.55% cases. Waterproofing of neourethra was done in 55.55% cases, 44.44% cases were without Water proofing layer. Without Water proofing group had better cosmetic results (87.5%) than with water proofing (70%) but more chances of metal stenosis and skin flap necrosis that leads to urethrocutaneous fistula formation. So Waterproofing decrease the chances of metal stenosis and skin flap necrosis with poor cosmetic results.

Keywords: Hypospadias, Asopa single stage, Snodgrass technique, Urethrocutaneus fistula.

DOI: 10.25258/ijcpr.18.1.214

Introduction

This problem has consistently tested the imagination and inventiveness of surgeons since the first effort to repair hypopadias by the Alexandrian surgeons Heliodorus and Antyllus in the first century A.D. Achieving glans, meatus, and phallus that look both functionally and aesthetically normal is the aim of contemporary hypopadias correction. The correction of hypopadias is more likely to have problems.[1,2] Despite its apparent simplicity and appeal, one-stage repair has drawbacks and a high likelihood of complications. Additionally troubling are the long-term outcomes. [3] In terms of psychology, the final product's quality is more important than the quantity of procedures used to generate it because of its unparalleled adaptability, simplicity, and superior outcomes. Hypospadias in males is an association of three anomalies of penis: An

abnormal ventral opening of urethral meatus from ventral aspect of glans penis to the perineum, ventral curvature of penis (chordee) and distribution of fore skin dorsal hood. Not every situation involves the presence of the second or third characters. The incidence of cryptorchidism is roughly 1 in 250 male neonates and is typically linked to meatal stenosis. In hypopadias surgery, the waterproofing layer between the skin and urethra is known to play a crucial role in preventing fistula complications. This has been done with a variety of tissues.[4]

In order to cover the neourethra, the traditional Bracka's repair [5] mobilizes Buck's fascial layer from the dorsal prepuce to the ventral side. The degree of functional handicap experienced by the patient varies according to the severity of hypopadias. The hypospadiac meatus may divert the urine stream ventrally, although generally speaking, it does not substantially impede the flow. The stream flows straight down or backward when the meatus is more proximal, which causes urination; ad modum feminarum; psychological issues; and, sexually, the dystopic meatus can impact fertility by making it harder to release semen.

Waterproofing, hypopadias repair with a waterproofing layer, and hypopadias repair without a waterproofing layer are the two categories into which we split the patients. We employed two methods in our study: Snodgrass for the distal and mid-penile region and Asopa for the more proximal area. Complication was noted, and the outcome was compared. Follow-up was done three and six months after the 10- to 16-day hospital stay.

Material and Method

The study was conducted from March 2025 to August 2025. Each patients name, age, height, weight, and address were noted when they were hospitalized, two to three days before to surgery.

Table 1 displays the patient's age at presentation. Distal, mid, and proximal penile meatus positions were used to categorize hypopadias. Five patients have proximal penile hypopadias, four have distal penile hypopadias, and nine have mid-penile hypopadias.

Twelve of the eighteen patients had a large chordee, six did not, eleven had a well-formed urethral plate, five had a shallow one, and two had a deformed one. Two surgical techniques were used: Asopa for proximal hypospadias and Snodgrass for distal and mid-penile hypospadias. Tourniquets are used to achieve intraoperative hemostasis. For both, a urethral catheter and Polygalactin 6-0 suture material were utilized. The tunica vaginalis pedicle was waterproofed using dorsal and ventral flaps. Adhesive tape and sufratullae were used to secure the penis to the front abdominal wall. Therefore, in 50% of cases, we employed the Asopa approach, and in 50% of cases, Snodgrass. In 55.55% of patients, the neourethra was waterproofed.

Results

36 patients with hypopadias were admitted for the current investigation. The majority of our cases (83.33%) included children under the age of eight.

Table 1: Age at Presentation

Age	No. of patients	Percentage
1-4	12	33.33%
4-6	10	27.77%
6-8	8	22.22%
8-15	6	16.66%

Most common type was middle hypospadias (50%), followed by proximal (27.77%) and distal (22.22%). Position of meatus in hypospadias in our study is shown in table no (2).

Table 2: Type of Hypospadias

Position of meatus	No. of patients	Percentage
Distal penile	8	22.2%
Mid penile	18	50.0%
Proximal penile	10	27.77%

Chordee was present in 66.66% of our cases. 11.11% cases had penile torsion in pre-operative period.

Table 3: Operative Technique

Operative Techniques	With waterproofing	Without waterproofing	Total
Asopa Techniques	6	12	18 (50%)
Snodgrass Techniques	7	2	9 (50%)
Total	10 (55.55%)	8 (44.44%)	18

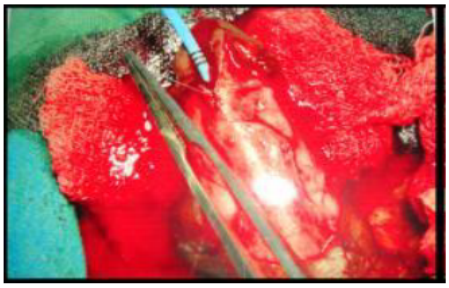

Figure 1: Tabularization of Urethral Plate

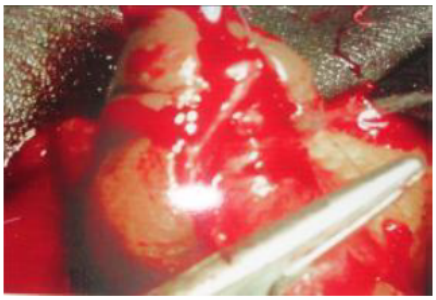

Figure 2: Water Proofing of Neourethra Using Dorsal Dartos Flap

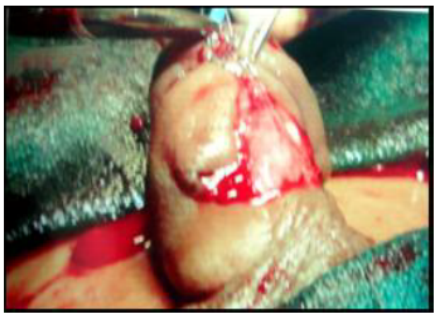

Figure 3: Skin Coverage

Asopa technique was used in cases with significant chordee and Snodgrass technique used in cases without significant chordee.

Operative technique used shown in table no 3.urethral plate was well formed and grooved in 66.66% cases, shallow in 27.77% cases and distorted in 5.55% cases. We used Asopa technique in 50% cases and Snodgrass n 50% cases depending upon position of metal opening.

Waterproofing of neourethra was done in 55.55% cases, 44.44% cases were without Waterproofing layer.

Table 4: Cosmetic appearance

Cosmetic appearance	With waterproofing	Without waterproofing
Satisfactory	7	7
Poor	3	1

Figure 4: Final Appearance of Penis

Without waterproofing group had better cosmetic result (87.5%) than with Waterproofing (70%) but more chances of meatal stenosis and skin flap necrosis that leads to urethrocutaneous fistula formation. So Waterproofing decreases the chances of metal stenosis and skin flap necrosis with poor cosmetic results. Cosmetic result and urethrocutaneous fistula shown in table no-4 and 5.Penile edema was noted in early post-operative period in all cases.

It disappears in 8thpost op day. Metal stenosis was found in without Waterproofing group. The incidence was 16.6 % (6 out of 36 cases).

Table 5: Cosmetic appearance

Urethro cutaneous fistula	With waterproofing	Without waterproofing
Snodgrass Technique	0	2
Asopa Technique	0	4

Waterproofing with well vascularized pedicle flap prevent from metal stenosis. Narrow stream of urinary flow was noted in 4 cases, 2 from each group corresponding to metal stenosis, 6 cases had double stream corresponding to urethrocutaneous fistula. The complication rate in our study was higher as reported in literature. Meticulous technique, gentle tissue handling, fine dissection and minimal tissue insult are crucial in hypospadias surgery. Moreover the study is too limited and no of patient too small, to draw any definitive conclusion regarding the success and failure of these procedure. But our study shows that Waterproofing layer play important role in prevention of urethrocutaneous fistula So, Waterproofing layer in hypospadias repair prevent complications.

Discussion

Two interconnected trends have emerged in the surgical care of hypopadias in recent years: first, a preference for single rather than staged correction, and second, methods meant to provide both functionally and aesthetically pleasing outcomes. [7] Repairing hypopadias is more likely to result in complications. The most frequent side effect following surgery for hypopadias is urethrocutaneous fistula. One known risk factor for the development of fistulas is opposing suture lines.[8] Many methods have been developed to address this issue, and efforts to find the best one are currently ongoing.

Placing an intervening layer of tissue between the neourethra and the epidermis is the most popular procedure among these.[9] For this reason, a variety of tissues have been used, and this process is appropriately referred to as waterproofing. The subcutaneous tissue, the scrotal muscles, the tunica vaginalis, and the Dartos fascia are all used in typical waterproofing treatments.[13] As in typical Bracka's repair, deepithelized skin and Buck's fascia from the dorsal prepuce.[5]

Each of these methods has intrinsic drawbacks, such as the need for separate incisions, extensive dissection, the possibility of skin necrosis, longer operating times, and higher rates of morbidity. To waterproof the neourethra, we employed the tunica vaginalis flap, ventral dartos flap, and dorsal dartos flap. The majority of the 36 patients in our study (33.33%) presented between the ages of 1 and 4, while 27.77% did so between the ages of 4 and 6. While 16.66% of patients presented between the ages of 8 and 15, 22.22% of patients were between the ages of 6 and 8.

Because this age group was examined by pediatricians and recommended at this time for suitable surgery, this is the reason why the most prevalent age of presentation was between one and four years old. The prevalence of mid-penile hypopadias was 50% in our study, proximal hypopadias was 27.77%, and distal hypopadias was 22.2%. Improvements in pediatric anesthesia and microsurgery enable the surgeon to treat hypopadias in far younger patients without posing a greater danger.

A better knowledge of how different psychosocial factors interact in children with hypopadias led to the recommendation that surgery be performed to repair the condition at a younger age. These consist of body image, genital awareness, sexual orientation, and separation anxiety.[2] In an examination of these factors, Schultz and colleagues recommended repair between the ages of 8 and 14 months.[15]

Repairing hypopadias is now advised for children aged three to twelve months. The penis at this age is thought to be big enough to succeed on par with those between the ages of two and five, which was once common.[8] Additionally, surgery at this time comes before the best possible parental-child attachment and genital awareness (18 months). Early correction also reduces parental shame and anxiety.[2] Of the 18 hypospadias instances in our investigation, the majority (83.33%) involved patients under the age of eight.

71.11% of the 509 patients in the study by Asopa et al. (1998) were under the age of ten. These results are consistent with what we have seen. According to Duckett (1996), 20% of his patients had posterior hypopadias, 30% had middle hypopadias, and 50% had anterior (distal) hypopadias. Whereas

Standoli reported 80% anterior, 14% middle, and 6% posterior hypospadias, Tuskewinsky reported 70% anterior, 16% middle, and 14% posterior meatus. In our study group, anterior hypopadias accounted for 22.22% of instances, middle hypopadias for 50%, and posterior hypopadias for 27.77%. Because patients with granular and coronal hypopadias were not included in our study, the actual incidence of each kind of hypopadias is not shown.

Conclusion

36 cases of hypopadias were studied prospectively; in cases with considerable chordee, we used the Asopa technique; in cases without significant chordee, we used the Snotgrass approach. 55.55% of neourethras were waterproofed, while 44.44% lacked a waterproofing coating. According to this study, waterproofing lowers the risk of urethrocutaneous fistula, improving surgical outcomes.

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