THE ROLE OF WATERPROOFING LAYER IN SINGLE STAGE HYPOSPADIAS REPAIR: A PROSPECTIVE STUDY

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ABSTRACT: AIM: To study the comparative result of hypospadias repair by dividing the patients in two groups (a) hypospadias repair with waterproofing layer by one of the technique of hypospadias repair.(b) hypospadias repair without waterproofing, and evaluate the complication rates between these two groups especially in reference to incidence of urethrocutaneous fistula. **MATERIAL AND METHODS:** A prospective study done in the regional institute of surgery and pediatrics, M.L.B. Medical College, Jhansi during 2010 to 2013 with complain of location of urethral meatus on undersurface of penis i.e. hypospadias on 18 cases. **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, Water proofing layer, Single stage repair, Urethrocutaneus fistula.

INTRODUCTION: Since first attempt for hypospadias repair by Alexandrian Surgeons Heliodorus and Antyllus during first century A D, the imagination and creativity of surgeons has continuously being challenged by this problem.¹ The goal of modern hypospadias repair is to achieve functionally, as well as cosmetically normal looking glans, meatus and phallus.² Hypospadias repair is more prone for complications. One stage repair seems ideal and attractive but carries its own limitation and high complication rates. The long term results are also disappointing.³

The quality of the end result is of greater relevance psychologically than the number of operations with which it is achieved considering the unrivalled versatility, applicability, simplicity and excellent results.

Hypospadias in males is an association of three anomalies of penis:

1. An abnormal ventral opening of urethral meatus from ventral aspect of glans penis to the perineum.
2. An abnormal ventral curvature of penis (chordee).
3. An abnormal distribution of fore skin dorsal hood.

Second and third characters are not present in all cases. It is usually associated with meatal stenosis and also with cryptorchidism incidence is approximately 1 in 250 male newborns. The role of

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waterproofing layer between urethra and skin is well established in prevention of fistula complication in hypospadias surgery. Various tissues has been used for this purpose.⁴

The conventional Bracka's repair utilizes Buck's fascial layer from the dorsal prepuce and its mobilization to the ventral surface to cover the neourethra. Depending upon the severity of hypospadias, the patient experiences varying degree of functional disability. Although, as a rule, the hypospadiac meatus does not significantly obstruct the flow of urine, the stream may be deflected ventrally.

When the meatus is more proximal, the stream flow straight downward or backward resulting in urination; ad modum feminarum; psychological problem and by causing difficulty in semen delivery⁶sexually the dystopic meatus may cause can affect fertility.

We divide the patient into two groups based on Waterproofing, hypospadias repair with water proofing layer and hypospadias repair without water proofing layer. In our study we used two technique, Asopa technique for more proximal and Snodgrass for distal and mid penile. Note was made for complication and compare the result. Hospital stay was 10-16 days and Follow up done 3month and 6 month.

MATERIAL AND METHOD: The period of study was 2010 to 2013. Every child was admitted 2-3 days before surgery, his name, age, height, weight, address were recorded. Age of patient at presentation is shown in table 1. The hypospadias was classified according to position of meatus distal penile, mid penile, proximal penile. 9 patient have mid penile hypospadias and 4 have distal penile and 5 have proximal penile hypospadias.

Out of 18 patient 12 have significant chordee and 6 were without chordee, 11 patients have well-formed urethral plate while 5 patients had shallow and 2 had distorted urethral plate. Two operative technique was adopted Snodgrass for distal and mid penile hypospadias and Asopa for proximal hypospadias.

Intraoperative hemostasis achieved by applying tourniquet. The suture material used Polygalactin 6-0, urethral catheter was used for both. Waterproofing was done by tunica vaginalis pedicle wrap by dorsal and ventral flap. Penis was anchored to the anterior abdominal wall by using adhesive tape and dressing with sufratullae. So we used Asopa technique in 50% cases and Snodgrass in 50% cases. Waterproofing of neourethra was done in 55.55% cases.

RESULTS: In the present study, 18 patients were admitted with hypospadias. Most of our cases (83.33) were of less than 8 year of age.

Age	No. of patients	%
1-4	6	33.33%
4-6	5	27.77%
6-8	4	22.22%
8-15	3	16.66%

Table 1: Age at Presentation

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).

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Position of meatus	No. of patients	%
Distal penile	4	22.2%
Mid penile	9	50%
Proximal penile	5	27.77%

Table 2: Type of Hypospadias

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

Operative Technique	With waterproofing	Without waterproofing	Total
Asopa technique	3	6	9 (50%)
Snodgrass	7	2	9 (50%)
Total	10 (55.55%)	8(44.44%)	18

Table 3: Operative Technique

TUBULARIZATION OF URETHRAL PLATE

**WATER PROFFING OF NEOURETHRA
USING DORSAL DARTOS FLAP**

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

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used Asopa technique in 50% cases and Snodgrass in 50% cases depending upon position of metal opening. Waterproofing of neourethra was done in 55.55% cases, 44.44% cases were without Waterproofing layer.

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

Table 4: Cosmetic appearance

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 meatal 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 8th post op day. Meatal stenosis was found in without Waterproofing group. The incidence was 16.6 % (3 out of 18 cases).

Urethro cutaneous fistula	With water proofing	Without waterproofing
Snodgrass	0	1
Asopa technique	0	2

Table 5: Urethro Cutaneous Fistula

Waterproofing with well vascularized pedicle flap prevent from meatal stenosis. Narrow stream of urinary flow was noted in 2 cases, 1 from each group corresponding to meatal stenosis, 3 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.

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DISCUSSION: In recent years the surgical management of hypospadias has been characterized by two interrelated trends, firstly towards single rather than staged repair and secondly towards procedures intended to give cosmetic as well as functionally satisfactory results.⁷

Hypospadias repair is more prone for complication. Urethrocutaneous fistula is the most common complication after hypospadias surgery. Opposing suture lines are well recognized risk factor in fistula formation⁸. Numerous techniques have been devised to counteract this problem and pursuit for an ideal one is still going on.

Among these techniques, the most common maneuver is to place some intervening layer of tissue between neourethra and the skin⁹ Various tissues have been incorporated for this purpose and this has been rightly named as waterproofing. The common waterproofing techniques utilize subcutaneous tissue,¹⁰ Dartos fascia,¹¹ Dartos muscle from scrotum,¹² tunica vaginalis from the scrotum,¹³ Deepithelized skin¹⁴ and Buck's fascia from the dorsal prepuce, as in standard Bracka's repair.⁵

All these techniques carry their inherent disadvantage including, separate incisions, excessive dissection, risk of skin necrosis, extra operating time and increased morbidity. We used dorsal dartos flap, ventral dartos flap and tunica vaginalis flap for Waterproofing of neourethra. In our study of 18 patients, commonest age of presentation was 1-4 years (33.33%) while the percentage of presentation between 4-6 year was 27.77%. The percentage of patients between 6-8 years was 22.22% while age of presentation between 8-15 years was 16.66%.

The reason that most common age of presentation was 1-4 years is because this age group was seen by pediatrician and referred at this time considered it for appropriate surgery. In our study mid penile hypospadias was commonest 50%, proximal penile 27.77% and distal penile 22.2%. Refinement in microsurgery and pediatric anesthesia allow the surgeon to do hypospadias repair on much younger child without increased risk.

The surgery for hypospadias repair was recommended at younger age and this recommendation stems from an improved understanding of the interplay of various psychological factors in child with hypospadias. These include sexual orientation, genital awareness, body image and separation anxiety.² Schultz and co-worker in an analysis of these factor advised repair between 8 to 14 months of age.¹⁵

These days hypospadias repair is recommended 3 to 12 month of age. It is believed that penis at this age is of sufficient size to achieve success equal to that at 2 to 5 years, which was previously popular.⁸ Moreover surgery during this period precedes the formation of optimal parental child bonding and genital awareness (18 month). Parental anxiety and guilt are also lessened with earlier correction.² In our study 18 cases of hypospadias most of (83.33%) the patient were less than 8 years of age.

Asopa et al (1998) reported a study of 509 patients; in their study 71.11% cases were below 10 years of age. These findings are similar to our observations. Duckett (1996) reported that 50% of his patients were of anterior (distal), 30% of middle and 20% of posterior hypospadias. Tuskewinsky reported 70% anterior, 16% middle and 14% posterior meatus while Standoli reported 80% anterior, 14% middle and 6% posterior hypospadias.

In our study group 22.22% cases were of anterior, 50% of middle and 27.77% of posterior hypospadias. Patient with coronal and granular hypospadias were excluded from our study, that's why our study does not show true incidence of type of hypospadias.

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CONCLUSION: We performed a prospective study of 18 cases of hypospadias; we use Asopa technique in cases with significant chordee and Snotgrass technique in cases without significant chordee. Waterproofing of neourethra was done in 55.55% cases and 44.44% cases were without Waterproofing layer. Based on this study Waterproofing improve the result of surgery by reducing the chances of urethrocutaneous fistula but poor cosmesis.

REFERENCES:

1. J Patrick Murphy. Hypospadias. In: Paediatric Surgery. Editors. Ashcraft, Murphy, Sharp, Sigalet and Snyder. W. B Saunders Co. Philadelphia, 3rd Ed. 2000, 58; 763-782.
2. Alan B Retik, Michael Keating and James Mandell. Complications of Hypospadias repair. Urol Clin North Am. May 1988, Vol. 15, No. 2: 223-236.
3. G C Moirand J H Stevenson. A modified Bretteville technique for hypospadias. Br J Plast Surg. 1996, 49; 223-27.
4. J G Borer and Alan B Retik. Current trends in Hypospadias repair. Urol Clin North Am. February 1999, 26; 1: 15-37.
5. A Bracka. A versatile two stage Hypospadias repair. Br J Plast Surg. 1995, 48; 345-52.
6. Duckett J W, Baskin L S. Hypospadias. In: O Neil J A Rowe M I, Grossfield J L, et al, ede pediatric surgery. 5th ed. St. Louis: Mosby year book, 1998; 1761-81.
7. Rickwood AMK, Anderson PAM, one stage hypospadias repair; Experience of 36 cases.Br J Urol. 1991; 67: 424-48.
8. I Eardley and R H Whitaker. Surgery for Hypospadias fistula. Br J Urol. 1992, 69; 306-10.
9. A M Shanberg, K Sanderson and B Duel. Re-operative hypspadias repair using the Snodgrass incised plate urethroplasty. Br J Urol International, 2001; 87: 544-7.
10. J Oswald, I Korner and M Riccabona. Comparison of perimeatal –based flap (Mathieu) and the tabularized incised-plate urethroplasty (Snodgrass) in primary distal hypospadias Br J Urol International, 2000; 85: 725-727.
11. V T Joseph. Concepts in the surgical technique of one-stage Hypospadias correction. Br J Urol, 1995; 76: 504-9.
12. J P Blandy, M Singh and G C Tresidder. Urethroplasty by scrotal flap for long urethral strictures. Br J Urol, 1968; 40: 261-7.
13. Z. Kirkali. Tunica Vaginalis: an aid in Hypospadias surgery. Br. J. Urol 1990, 65, 530-2.
14. U Khan, R Zic and J Boorman. Waterproofing in Hypospadias: A refinement of the two-stage reconstruction. Br J Plast Surg, 2001; 54: 528-31.
15. Schultz JR, Klykylo WM, Wacksman J .Timing of elective hypospadias repair in children. Pediatric 1983; 71: 342.

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