



LIMITED URETHRAL MOBILIZATION (LUM) AND MODIFIED TUBULARIZED INCISED PLATE (TIP) URETHROPLASTY IN DISTAL PENILE HYPOSPADIAS REPAIR; A COMPARATIVE STUDY

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ABSTRACT

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 neo urethra like Snodgrass method but Limited urethral mobilization (LUM) technique depends on the natural elasticity of the urethra instead of constructing neourethra.

Objective: To compare the outcome of Limited urethral mobilization (LUM) technique and modified Snodgrass method in distal penile hypospadias correction.

Materials and method: Total 103 patients were divided into two groups by non randomized convenient sampling technique. 68 patients were in Group A and operated by LUM technique. Group B included 35 patients and operated by modified Snodgrass method. Post operative complication like urethrocutaneous fistula, persistent chordee and meatal stenosis for both groups were compared.

Results: The mean age of the patients were 46.60 ± 31.15 months, ranges from 8 to 126 months. 1 patient in Group A developed urethrocutaneous fistula on the other hand 5 patients developed urethrocutaneous fistula. 3 patients in Group A developed meatal stenosis and 3 patients developed persistent chordee. On the other hand 2 patients in Group B developed meatal stenosis and 1 patient developed persistent chordee.

Conclusion: LUM technique is effective and useful in selective cases of distal penile hypospadias where penile length is adequate. Instead of forming neourethra LUM technique depends on the elasticity of natural urethra.

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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; the urethral opening can be anywhere along the ventral shaft of the penis, within the scrotum, or even in the perineum but the majority are distal or anterior variety with an incidence of 75%⁽⁴⁾. There are five basic objectives of hypospadias surgery which include Orthoplasty (Penile straightening), urethroplasty, meatoplasty and glanduloplasty, scrotoplasty and skin coverage⁽¹⁾. The success of the operation is determined by excellent cosmetic appearance and voiding straight forward in standing position from the tip of the glans^(1,4). More than 300 procedures has been described in literature⁽⁵⁾.

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

versatile method to correct distal penile and mid penile hypospadias⁽⁶⁾.

In contrast to Snodgrass method Urethral mobilization technique is quite older. In 1917 Beck first introduced urethral mobilization technique to treat distal hypospadias⁽⁷⁾. As this procedure needs massive dissection of the urethra; it minimizes the vascularity of the urethra, therefore a high meatal stenosis rate was observed. But the procedure introduced by Beck was rectified and revived in course of time by Koff *et al* 1994⁽⁸⁾ Anthony Atala⁽⁹⁾.

Neo urethra formation is the most difficult part of Snodgrass method. After many more modification and meticulous surgical skill still U C fistula and meatal stenosis rate is high. Like other hypospadias Surgeon of the world it draws our attention too. On this back ground we thought to compare Limited urethral mobilization (LUM) with modified Snodgrass urethroplasty to treat distal penile hypospadias.

MATERIALS AND METHODS

This was a prospective comparative study conducted in the department of paediatric surgery, Dhaka Shishu (Children)

Hospital, Dhaka, Bangladesh. We have operated 103 cases from January 2012 to July 2016. Patients aged from 6 months to 10 years were included in the study. Patients refused to include in the study or with other life threatening associated congenital anomalies were excluded from the study. No redo cases were included in our study. Among 103 cases 68 patients were operated by LUM technique and assigned as Group A. Other 35 patients were operated by Snodgrass or TIP urethroplasty and assigned as Group B. Patients were allocated in group A and group B by non randomized convenient sampling technique. Urethrocuteaneous fistula formation, Persistent chordee, Post operative meatal stenosis and wound infection 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.

After anaesthetic induction antiseptic wash and aseptic draping done. Then tip of the glans to hypospadiac opening distance was. Incision lines were outlined and marked with sterile marker. Existing chordee if present was corrected. A suitable sized silicon tube (BMI feeding tube 6 to 8 Fr) was introduced through the hypospadiac opening. The meatus was circumscribed and the urethra proximal to the meatus was mobilized circumferentially upto a distance sufficient to allow the urethra to reach the tip of the glans. The length of mobilized urethra was measured and recorded. If there was a thin transparent urethra, we lengthened the mobilization as this thin portion would be excised after repositioning and securing the urethra within the glans wings. The ventral glans was incised deeply in corpora cavernosa as like Y-V gladuloplasty. A tension free urethro glandular anastomosis was established with 6-8 interrupted suture with 6/0 vicryl. Skin coverage was done. An urethral catheter (BMI feeding tube 6-8 Fr) was left in situ for 5 days. On 5th post operative day diversion was removed and patient was discharged after voiding.

In Snodgrass procedure a 'U' shaped incision is made extending along the edges along 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 is degloved. After degloving the phallus, an artificial erection test is performed to test for chordee, and if any corrected by 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 plat at the midline from the hypospadiac meatus to tip of the glans. The urethral plate is then tabularized using a running 6/0 polyglactin suture. This closure begins at the meatus and continues proximally. Thus creation of the meatus precedes neourethral tubularization. Then periurethral Buck's fascia is used as a second layer to provide another layer of coverage. We separated the prepucial mucosa and covered the neourethra as like ventral parking of the skin as third layer. The redundant dorsal skin is transferred for resurfacing the closure. A 6/8 Fr soft silicone feeding tube is left indwelling for at least 7 days and gauge or mexif dressing is applied.

RESULTS

Results were compiled and presented with table and charts. Statistical analysis was done by SPSS 20 version. Chi square

test was done for qualitative data. Quantitative variables were expressed as mean ± SD.

Mean ± SD age of the entire study population were 46.60 ± 31.15 months, group A was 47.82± 31.72 months and for group B it was 44.23± 30.33 months. Regarding group A, 1 patient developed urethrocutaneous fistula, 3 patients developed meatal stenosis and 3 patients developed post operative persistant chordee. On the other hand regarding group B, 5 patients developed urethrocutaneous fistula, 2 patients developed meatal stenosis and 1 patient developed post operative persistant chordee.

Table 1 Age distribution among study subjects

Age (Months)	Total study populations (n=103)	Group A /LUM (n=68)	Group B/ Modified TIP (n=35)
Mean ± SD	46.60 ± 31.15 months	47.82± 31.72 months	44.23± 30.33 months
Range	8-126 months	8-126 months	8-113 months

Table II Type of hypospadias among the study subjects

Total study subjects (n=103)	Group A /LUM (n=68)	Group B/ Modified TIP (n=35)
Glandular-19 (18.4%)	Glandular- 12 (17.6%)	Glandular-7 (20%)
Coronal-24 (23.3%)	Coronal-15 (22.1%)	Coronal-9 (25.7%)
Subcoronal-39 (37.9%)	Subcoronal-26 (38.2%)	Subcoronal-13 (37.1%)
Distal Penile-21 (20.4%)	Distal Penile-15 (22.1%)	Distal Penile-6 (17.1%)

Pie chart showing types of hypospadias among the study subjects:

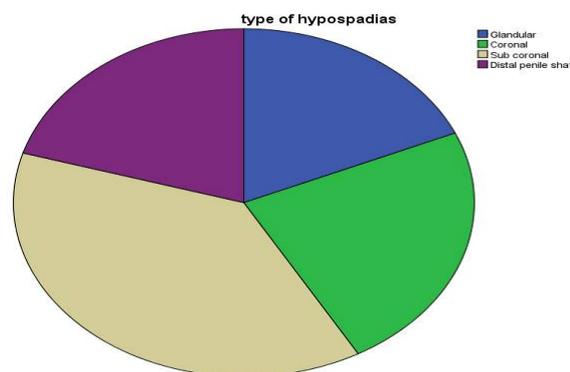


Table III Showing complications in both group

Variables	Group A (n=68)	Group B (n=35)	P Value
Meatal stenosis	3	2	.771
Persisted chordee	3	1	.699
U C fistula	1	5	.003
Wound infection	2	2	.49

DISCUSSION

Urethral advancement for hypospadias repair was first introduced in 1898 by Beck (7). Utilization of Beck's technique was not consistently successful because of high rate of post operative fistula and chordee due to inadequate mobilization of the urethra (9). After that numerous technique has been used for urethral advancement (10, 11, 12, 13, 14). Koff *et al* modified the technique which brought satisfactory result (8). In 1999 Türken *et al.*, reported successful results in patients who were operated on with limited urethral mobilization (LUM) and eccentric circummeatal-based skin flap technique. This technique was based on the mobilization of the urethra with an eccentric circummeatal-based skin flap and glanular reconstruction by repositioning of the mobilized urethra in the glanular bed (4, 14).

Our technique did not comprise skin flap use; and instead meticulous mobilization of the distal urethra was performed as there is a fine network between the urethral branch of the internal pudendal artery and terminal branches of the dorsal penile artery, which creates an important vasculature for the urethra⁽¹⁵⁾. Thus, the fear of devascularization due to urethral mobilization seems to be unfounded⁽¹²⁾. In the present series 1 (1.47%) patient in group A developed urethrocutaneous fistula, on the other hand 5 (14.29%) patients in group B developed urethrocutaneous fistula. P value was .003, that is there is significant difference between two groups. Result is near similar to the result of other published study^(5, 9, 16). Snodgrass *et al.* in 2010 showed 1.6% fistula rate in their study. Probably single experienced surgeon was the cause behind their low fistula rate and it made us review our TIP procedure.

Meatal stenosis were observed in 3 (4.41%) patients of group A. Where as 2 (5.71%) patients in group B developed meatal stenosis. P value was .771 which indicate that statistically there is no significant difference between this 2 groups. Snodgrass showed. 18% meatal stenosis in his study. We observe that mean age of Snodgrass study was 17 months where as in our study it was 47 months. Probably this was the striking cause behind the high meatal stenosis in our study. Mean distance between tip of the glans and ectopic meatus was 8.05 ± 2.23 mm and the mean length of mobilized urethra was 26.62 ± 4.23 mm. Ratio between these two was 3.45. Whereas the patients who developed post operative persistent chordee this ratio was 3.22. This is similar to other reported study⁽¹⁶⁾. This indicate that inadequate mobilization of urethra leads to post operative persistent chordee and where penile length is inadequate, its better to avoid LUM or use of dorsal placating suture can solve this problem.

CONCLUSION

We conclude that in selective cases where penile length and peri meatal spongiosal support is adequate LUM can be a very good alternative to Snodgrass method which is the most versatile method of urethroplasty for distal penile hypospadias.

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