Original Article

Repair in Distal Hypospadias

Comparison of Outcome Complications between Snodgrass Technique and Mathieu's Repair in Distal Hypospadias Repair

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ABSTRACT

Objective: To compare the outcome of complications between Snodgrass technique and Mathieu's repair in distal hypospadias repair.

Study Design: Randomized controlled Study.

Place and Duration of Study: This study was conducted at the Department of Pediatric Surgery, Bahawal Victoria Hospital, in collaboration with plastic surgery department and pathology department, Quaid-e-Azam Medical College Bahawalpur, from January 2019 to December 2020 over the period of 2 years.

Materials and Methods: Total 148 patients with sub-coronal and distal penile hypospadias having age 2-8 years were selected. Snodgrass technique was performed for Group A patients while Mathieu's repair was done for Group B patients. Post-operative complications were compared between the two groups.

Results: Mean age of the patients was 5.07 ± 1.73 years, mean age of patients of study group A was 4.96 ± 1.66 years and group B was 5.19 ± 1.78 years. In 6 (8.11%) patients of study group A and 21 (28.38%) patients of study group B, meatal stenosis was noted and difference of frequency of meatal stenosis between the both groups was statistically significant with p- value of 0.001. Total 5 (6.76%) patients of study group while 15 (20.27%) patients of study group B found with urethral stricture and the difference was statistically significant with p-value of 0.016. Urethrocutaneous fistula was found in 2 (2.70%) patients of study group A and in 9 (12.16%) patients of study group B. Difference of frequency of Urethrocutaneous fistula between the both groups was statistically significant with p-value of 0.028. Complete repair disruption was noted in 7 (9.46%) patients and 17 (22.97%) patients respectively in study group A and study group B and difference was statistically significant with p value 0.026.

Conclusion: Our study has revealed that TIP urethroplasty has an edge on Mathieu's urethroplasty, so we recommend the TIPurethroplasty in all primary and distal cases of hypospadias. TIP repair is associated with excellent cosmetics and few manageable complications. It offers a safe and reliable modality for primary repair of distal penile hypospadias. Cosmetic appearance of the external urethralmeatus is highly satisfactory with tubularized incised plate urethroplasty.

Key Words: Hypospadias, Snodgrass, Mathieu's repair, and urethro-cutaneous fistula

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INTRODUCTION

Hypospadias is an abnormality of anterior urethral and penile development in which the urethral opening is ectopically located on the ventrum of the penis proximal to the tip of the glans penis, which, in this condition, is splayed open.[1] It is one of the common congenital anomalies occurring in approximately 1 of 200- 300 live male births.[2] Hypospadias are classified as Distal or Anterior, middle and proximal or posterior which constitute 71%, 16% and 13% respectively.[4] In urology, surgical management of hypospadias are most controversial.[4] For urethral reconstruction, about 200 methods have been reported and they continues as modification of modifications.[5] The surgical goal in patients with hypospadias is to construct a straight penis with meatus as close to normal site as possible to allow a forward directed stream and normal coitus.[6] The common hypospadias repair techniques are Glanuloplasty, Snodgrass, Meatal Advancement and glanuloplasty (MAGPl), Mathieu, Mustarde and Thiersh-Duplay. Of these techniques, widely practice

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techniques are Snodgrass technique and Mathieu's technique.[7]

In different studies, post-operative complications of hypospadias repair like formation of urethro-cutaneous Fistula reported in 5-24% patients followed by meatal stenosis in 1.1-22.7% patients, stricture formation 0-10% patients and repair dehiscence in 1.3-6% patients.[1,5,8]

As Snodgrass and mathieu's repair are the commonly used technique for distal hypospadias repair in the worldwide but there is still a question mark on the superiority of anyone of these and more research should be required on this topic in terms of complication rate in randomized controlled trials. So, we will conduct this study between Snodgrass (tubularized incised plate urethroplasty) and Mathieu's repair to evaluate the better technique in distal hypospadias repair in terms of complication rate. Then based on these results, the better technique among these could be routinely implicated in our general practice for these particular patients in order to reduce the morbidity of our population.

MATERIALS AND METHODS

This randomized controlled trial was conducted at Department of Pediatric Surgery, Plastic surgery department, Bahawal Victoria Hospital, and Pathology department QAMC, Bahawalpur from January 2019 to December 2020 over the period of 2 years. Total 148 patients with sub coronal and distal penile hypospadias having age 2-8 years were selected.

Patients with middle and proximal hypospadias, patients with Glanular and Coronal hypospadias, patients with H/O failed repair, patients having hypospadias with chordee, patients with diseases which affect healing process i.e. Diabetes Mellitus (assessed on history) and patients' guardians not willing to be included in the study were excluded from the study.

An approval was taken from institutional review committee before conducting the study. Written consent was taken from each patient's parents.

All the selected patients were randomly divided into two equal groups i.e. group A and group B. Blood samples of 5ml was taken in EDTA tube from each patient to perform complete endocrinal profile including FSH, LH and Testosterone. The samples were performed in Pathology Department QAMC, on fully automated hormone analyzer Access-2(Beckmann coulters).

Snodgrass technique was performed for Group A patients while Mathieu's repair was done for Group B patients.

Patients were frequently visited post-operatively and followed fortnightly for presence of any complication (repair disruption, urethrocutaneous fistula, meatal stenosis and urethra stricture). The final outcome was noted at the end of the 3 months postoperatively. Samples for hormonal profile were also taken postoperatively.

All the findings along with demographic profile of the patients were noted on pre-designed proforma.

The collected information was analyzed by computer software SPSS version 20.0. Mean and standard deviation was calculated for age. Frequency and percentage was calculated for site of hypospadias, urethrocutaneous fistula, repair disruption, meatal stenosis and urethral stricture. Both groups were compared for presence of any difference among the urethra-cutaneous fistula, repair disruption, meatal stenosis and urethra stricture (present/absent). Chi Square test was used to compare the frequency of complications and p-value ≤ 0.05 was considered as significant. Effect modifiers like age and site of hypospadias was controlled through stratification and post-stratification chi square test was applied to see their effect on outcome. P-value ≤ 0.05 was considered as significant.

RESULTS

Mean age of the patients was 5.07 ± 1.73 years, mean age of patients of study group A was 4.96 ± 1.66 years and group B was 5.19 ± 1.78 years. Table 1 showing comparison of complications between the two study groups. In 6 (8.11%) patients of study group A and 21 (28.38%) patients of study group B, meatal stenosis was noted and difference of frequency of meatal stenosis between the both groups was statistically significant with p value 0.001. Total 5 (6.76%) patients of study group A while 15 (20.27%) patients of study group B found with urethral stricture and the difference was statistically significant with p value 0.016. Urethrocutaneous fistula was found in 2 (2.70%) patients of study group A and in 9 (12.16%) patients of study group B. Difference of frequency of Urethrocutaneous fistula between the both groups was statistically significant with p value 0.028. Complete repair disruption was noted in 7 (9.46%) patients and 17 (22.97%) patients respectively in study group A and study group B and difference was statistically significant with p value 0.026. Patients were divided into two age groups i.e. age group 2-4 years and age group 5-8 years. Among patients of age group 2-4 years, there is no patient of meatal stenosis in study group A while meatal stenosis was seen in 9 (32.14%) patients of study group B. Difference of meatal stenosis among study group A and B was statistically significant with p value 0.000. Urethral stricture was seen in 2 (2.70%) patients and 5 (17.86%) patients of study group A and B but difference was not statistically significant with p value 0.13. Urethrocutaneous fistula was observed in 1 (2.94%) patients of study group A while in 3 (10.71%) patients of study group B. But difference was insignificant with p value 0.21. Complete repair disruption was noted in 4 (11.76%)

patients and 8 (28.57%) patients respectively in study group A and B. Difference was statistically insignificant with p value 0.096. (Table 2)

In age group 5-8 years, meatal stenosis was seen in 6 (15%) patients and 12 (26.09%) patients respectively in study group A and B. Difference of meatal stenosis between both groups was statistically insignificant with p value 0.207. Urethral stricture was noted in 3 (7.5%) patients of study group A and in 10 (21.74%) patients of study group B. Difference was statistically insignificant with p value 0.066. Urethrocutaneous fistula was found in 1 (2.5%) patient and in 6 (13.04%) patients of study group A and B. Difference of frequency of urethra-cutaneous fistula between both groups was statistically insignificant with p value 0.075. Complete repair disruption was seen in 3 (7.5%) patients and 9 (19.57%) patients of study group A and B, but difference was statistically insignificant with p value 0.107. (Table 3)

Out of 48 patients of study group A and 47 patients of study group B, meatal stenosis was noted in 5(10.42%) patients and 13 (27.66%) patients of group A and B respectively. Difference was statistically significant with p value 0.032. Urethral stricture was noted in 4 (8.33%) patients of study group A and 11 (23.40%) patients of study group B. Difference of frequency of urethral stricture between both groups was statistically significant with p value 0.04. Urethrocutaneous fistula was observed in 2 (4.17%) patients and 4 (8.51%) patients but the difference was statistically insignificant with p value 0.38. Complete repair disruption found in 3 (6.25%) patients of study group A while in 13 (27.66%) patients of study group B. Difference was statistically significant with p value 0.005. (Table 4)

Table No.1: Comparison of complications between the two groups

Group	Complications		Total	P. Value
	Yes (%)	No (%)		
Meatal stenosis				
A	6 (8.11)	68 (91.89)	74	0.001
B	21 (28.38)	53 (71.62)	74	
Urethral stricture				
A	5 (6.76)	69 (93.24	74	0.016
B	15 (20.27)	59 (79.73)	74	
Urethrocutaneous fistula				
A	2 (2.70)	72 (97.30)	74	0.028
B	9 (12.16)	65 (87.84)	74	
Complete repair disruption				
A	7 (9.46)	67 (90.54)	74	0.026
B	17 (22.97)	57 (77.03)	74	

Total 26 patients of study group A and 27 patients of study group B found with distal penile site of hypospadias. Meatal stenosis was found in 1 (3.85%) patients of study group A while in 8 (29.63%) patients of study group B. Difference of frequency of meatal stenosis between both groups was statistically significant with p value 0.012. Urethral stricture was observed in 1 (3.85%) patients and 4 (14.81%) patients of study group A and B respectively. But the difference was not statistically significant with p value 0.17. Levels of LH and FSH done were significantly raised, but testosterone levels were low pre-operatively.

Table No. 2: Comparison of complications between the two groups for age group 2-4 years

Group	Complications		Total	P. Value
	Yes (%)	No (%)		
Meatal stenosis				
A	0 (0)	34 (100)	34 (45.95)	0.000
B	9 (32.14)	19 (67.86)	28 (37.84)	
Urethral stricture				
A	2 (2.70)	32 (94.12)	34 (45.94)	0.13
B	5 (17.86)	23 (82.14)	28 (37.84)	
Urethrocutaneous fistula				
A	1 (2.94)	33 (97.06)	34 (45.95)	0.21
B	3 (10.71)	25 (89.29)	28 (37.84)	
Complete repair disruption				
A	4 (11.76)	30 (88.24)	34 (45.94)	0.096
B	8 (28.57)	20 (71.43)	28 (37.84)	

Table No.3: Comparison of complications between the two groups for age group 5-8 years

Group	Complications		Total	P. Value
	Yes (%)	No (%)		
Meatal stenosis				
A	6 (15)	34 (85)	40 (54.05)	0.207
B	12 (26.09)	34 (73.91)	46 (62.16)	
Urethral stricture				
A	3 (7.5)	37 (92.5)	40 (54.05)	0.066
B	10 (21.74)	36 (78.26)	46 (62.16)	
Urethrocutaneous fistula				
A	1 (2.5)	39 (97.5)	40 (54.05)	0.075
B	6 (13.04)	40 (86.96)	46 (62.16)	
Complete repair disruption				
A	3 (7.5)	37 (92.5)	40 (54.05)	0.107
B	9 (19.57)	37 (80.43)	46 (62.16)	

Table No.4: Comparison of outcome between groups at the end of three months for sub-coronal site of hypospadias

Group	Complications		Total	P. Value
	Yes (%)	No (%)		
Meatal stenosis				
A	5 (10.42)	43 (89.58)	48 (64.86)	0.032
B	13 (27.66)	34 (72.34)	47 (63.51)	
Urethral stricture				
A	4 (8.33)	44 (91.67)	48 (64.86)	0.04
B	11 (23.40)	36 (76.60)	47 (63.51)	
Urethrocutaneous fistula				
A	2 (4.17)	46 (95.83)	48 (64.86)	0.38
B	4 (8.51)	43 (91.49)	47 (63.51)	
Complete repair disruption				
A	3 (6.25)	45 (93.75)	48 (64.86)	0.005
B	13 (27.66)	34 (72.34)	47 (63.51)	

Table No.5: Comparison of outcome between groups at the end of three months for distal penile site of hypospadias

Group	Complications		Total	P. Value
	Yes (%)	No (%)		
Meatal stenosis				
A	1 (3.85)	25 (96.15)	26 (35.14)	0.012
B	8 (29.63)	19 (70.37)	27 (36.49)	
Urethral stricture				
A	1 (3.85)	25 (96.15)	26 (35.14)	0.17
B	4 (14.81)	23 (85.19)	27 (36.49)	
Urethrocutaneous fistula				
A	0 (0)	26 (100)	26 (35.14)	0.021
B	5 (18.52)	22 (81.48)	27 (36.49)	
Complete repair disruption				
A	4 (15.38)	22 (84.62)	26 (35.14)	0.95
B	4 (14.81)	23 (85.19)	27 (36.49)	

DISCUSSION

The purpose of present study was to compare the complications between Snodgrass technique and Mathieu's repair in distal hypospadias repair. The mean age (5.07±1.73 years) of the patients in our study was more as compared to the age reported by other authors.[9-10] This may be due to lack of awareness and education on the part of parents and delayed referral from rural health care centers. In our study there were 64.2% cases were sub-coronal site of hypospadias and 35.8% were distal penile hypospadias. The position of meatus in our study was consistent with that reported by, Bath et al., and Sugarman et al.[11-12]

In our study, over all post-operative complication rate was found significantly low in the group A, where Snodgrass technique was performed. As evident in our series, the urethrocutaneous fistula and meatal stenosis rate was more in Mathieu's group as compared to that of Snodgrass group. One explanation for this is the need for two suture lines in case of only flap technique on either side which might be jeopardizing the vascular supply of the flap. In a study by Hakim et al, Mathieu technique results with and without urethral stenting were compared in 336 cases of anterior hypospadias. No significant difference was seen in fistula formation (2.63% vs. 2.7%) and total surgical complications rate (2.63% vs. 3.6%) between these two groups.[13] In the study by Imamoglu et al, 56 patients were operated on using Snodgrass technique and 54 patients were operated on using Mathieu technique .They concluded that if the urethral plate is intact, Snodgrass technique will be preferable and if not, Mathieu technique will be much better.[14] In the study by Oswald J et al, total 60 patients were operated, 30 by Snodgrass technique and 30 by Mathieu technique and results were compared regarding fistula formation, appearance, and duration of surgery in patients with anterior hypospadias. They concluded that Snodgrass technique is accompanied by better results and more natural meatal appearance.[15] In yet another study[16] both the procedures were combined to avoid the risk of devascularisation of the neo-urethral flap**.**

CONCLUSION

Our study has revealed that TIP urethroplasty has an edge on Mathieu's urethroplasty, so we recommend the TIPurethroplasty in all primary and distal cases of hypospadias. TIP repair is associated with excellent cosmetics and few manageable complications. It offers a safe and reliable modality for primary repair of distal penile hypospadias. Cosmetic appearance of the external urethralmeatus is highly satisfactory with tubularized incised plate urethroplasty.

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