IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 6 Ser.8 (June. 2022), PP 59-64
www.iosrjournals.org

Tubularized Incised-Plate Urethroplasty (Snodgrass) is More Appropriate for Distal Hypospadias in Terms of Complications, Cosmesis of the Meatus & Glans: A Comparative Study.

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Abstract

Introduction:*Hypospadias is a congenital condition characterized by tissue hypoplasia of the ventral aspect of the penis, with incidence of one (0.3%) in 300 males. There is an increase incidence in those with first-degree relatives having hypospadias to about 13 times more than those without family history.*

Aim of the study: *To find out that Snodgrass is the more appropriate treatment for distal penile hypospadias by comparing two surgical techniques.*

Methods: *This is a prospective comparative case-control study, the study was carried out in the Department of Pediatric Surgery, Dhaka Shishu Hospital (DSH), Dhaka. This prospective study has been carried out from 1" February 2002 to 30 April 2003 for a total period of 15 months. A total number of 30 patients with distal penile hypospadias admitted to Dhaka Shishu Hospital from the outpatient department were selected for this study.*

Result:*A total of 30 patients were selected for clinical study, of which 15 patients belonging to group A (study group) were treated surgically by SNODGRASS technique and another 15 patients belonging to group B (control group) were surgically treated by MATHIEU technique. Postoperative infections rate was 6.66 percent (1 patient) and 13.33 percent (2 patients) for patients in group A Group B respectively. Subsequently, one patient in group A developed a fistula and 2 patients in group B developed complete dehiscence. Pus was sent for culture and sensitivity and was treated accordingly with antibiotics. Glanular dehiscence developed 1 (6.66%) in group A and 2 (13.33%) in group B. In addition, 2 patients (13.33%) developed complete dehiscence & 1 patient (6.66%) developed meatal stenosis in group B.*

Conclusion:*Though the study was conducted on a small number of patients, significant difference in outcome in this study, Snodgrass can be said to be a preferred technique over Mathieu. Thus we can recommend the tabularized incised-plate urethroplasty (Snodgrass) as the primary treatment for children with distal penile hypospadias and it can be practised in other centres in this country to include a large number of patients.*

Keywords: *Tubularized, Incised-Plate Urethroplasty, Snodgrass, Appropriate, Distal Hypospadias, Meatus & Glans*

Date of Submission: 14-06-2022 Date of Acceptance: 29-06-2022

I. Introduction

The term hypospadias is derived from the Greek & refers to a rent (Spadon) on the ventrum of the penis. [1] Hypospadias may be defined as hypoplasia of the ventral radius of the penis. [2] It is one of the commonest congenital abnormalities of the male genitalia occurring in approximately 0.8-8.2 per 1000 live male births or 1 in every 300 male children. [3] Three associated anomalies are classically found in the hypospadias penis. (1) In an ectopic opening of the urethral meatus, there is a missing segment of a urethral tube of variable length that is replaced by a urethral plate extending from the ectopic meatus up to the glans cap. (2) a ventral curvature of the penis (Chordee) & (3) a hooded foreskin with a marked excess of skin on the dorsum of the penis & a lack of skin on the ventrum. The chordee & the hooded foreskin is not constant, hypospadiac meatus may be found under a normally formed prepuce; Chordee may be isolated without an ectopic urethral opening but is often associated with hypoplasia of the corpus spongiosum. [2] The most common anomalies associated with hypospadias other than chordee & hooded foreskin, are undescended tests & inguinal hernia. A 9.3 per cent of patients with hypospadias had an undescended testis Several decades ago surgical repair of hypospadias was considered technically difficult & the results were often far from optimal. [4] Despite extensive advances in surgical technique, the use of fine suture materials, delicate instruments, proper tissue handling, and advances in anesthesia, hypospadias patient faces a lot of postoperative complications. More than 300 types of urethroplasties have been described in the literature and new techniques & modifications continually appear which confirms that it is difficult surgery with many complications and frequently inadequate cosmetic and functional results. Because of the wide variation in the anatomic presentation of hypospadias no single method of urethroplasty applies to all cases. [5] Hypospadias is a common pediatric urological problem we usually encounter. Very few works have been done on hypospadias in Bangladesh. The problem requires to be studied more for its further development in our country. Thus, we at Dhaka Shishu Hospital with its full-fledged pediatric urologic unit started hypospadias surgery in the last 10 years. We face a lot of post-operative complications varying from urethrocutaneous fistula to total disruption. To overcome the problems, we changed our surgical technique but still, the result is not satisfactory. Surgical repair aims to provide a normal-looking straight penis with a vertically oriented meatal opening at the tip of the glans. We are trying to work up to the state-of-the-art position in this challenging field of hypospadias surgery. Of patients with hypospadias, ≈ 80% have a meatus in a coronal & sub-coronal position. [6] The perimeatal-based flap urethroplasty (Mathieu-technique) is commonly used for the correction of distal hypospadias. Mathieu in 1932 described a very clever flip-flap procedure to reconstruct distal hypospadias using penile non-hairy skin. His procedure is still in use & remains one of the most reliable. [2] The most frequent complications after hypospadias repair are urethrocutaneous fistula & meatal stenosis. Furthermore, metal-based flap repair creates a horizontal & rounded meatus which is cosmetically less acceptable than a normal vertical slit-like meatus. [7] The pediatric urologist Warren Snodgrass (1994) described a newer procedure for distal hypospadias repair with a combination of incising the urethral plate & a metal-based flap with a low complication rate & better cosmetic outcome. In the Snodgrass procedure,the resultant neourethra has a normal diameter & uniform caliber. The meatus is vertically oriented & located at the tip of the glans which is cosmetically more acceptable.

II. Objectives

To find out that Snodgrass is the more appropriate treatment for distal penile hypospadias by comparing two surgical techniques.

III. Methodology & Materials

This is a prospective comparative case-control study, the study was carried out in the Department of Pediatric Surgery, Dhaka Shishu Hospital (DSH), Dhaka.This prospective study has been carried out from 1" February 2002 to 30 April 2003 for a total period of 15 months.A total number of 30 patients with distal penile hypospadias admitted to Dhaka Shishu Hospital from the outpatient department were selected for this study.Patients after the admission who fulfilled the inclusion criteria of the study were entitled to the study. Necessary information regarding the study was taken from the attendants. Written informed consents were taken from the guardians for this study.Grouping of the patients.Selected 30 patients were alternatively grouped as follows:

Group A: Included 15 cases, who were subjected to repair of hypospadias by SNODGRASS Technique.

Group B: Included 15 cases, who were subjected to repair of hypospadias by MATHIEU technique- as a control.

- **Inclusion criteria**:
- All the cases were randomly selected.
- Patients with distal hypospadias (Coronal, sub-coronal & distal penile), admitted to the Department of Pediatric Surgery, DSH, from 1" February 2002 to 30" April 2003, were included in the study.

- Age: 6 months to 12 years.
- No history of theprevious operation on the external genital organ.

- **Exclusion criteria**:
- Age below 6 months & over 12 years.
- Patient hasa history the previous operationson the external genital organ.
- Hypospadias with ambiguous genitalia.
- Patient having hypospadias with other major surgical problem for which he is admitted but hypospadias with local anomaly was included i.e. Associated ARM, Myelomeningocele. Bilateral Wilms' Tumor etc.
- Patients in whom surgery could not be done due to other medical problems such as Bleeding disorders, Diabetes Mellitus (DM), Malignant diseases etc.

Informed consent was obtained from parents in the consent form (appendix-II) after the parents were duly informed about the treatment procedure, expected results and possible complications. In each case, detailed information about the patient was collected from the patients' parents or accompanying guardians or the patients in the older age group. All this information was gathered systematically and put into the protocol of the questionnaire (Appendix-1). These included name, age, sex, address, socioeconomic condition, antenatal, natal and post-natal history, family history, consanguinity and immunization history etc. All data were presented in a suitable table or graph according to their affinity. A description of each table and graph was given to understand them clearly. All statistical analysis was performed using the statistical package for social science (SPSS) program, and Windows. Continuous parameters were expressed as mean ±SD and categorical parameters as frequency and percentage. Comparisons between groups (continuous parameters) were made by Student's t-test. Categorical parameters compared by Chi-Square test. The significance of the results as determined by a 95.0% confidence interval and a value of $P<0.05$ was considered to be statistically significant.

IV. Result

This prospective study was performed between February 2002 to April 2003 in Dhaka Shishu Hospital, Dhaka. A totalof 30 patients were selected for clinical study, of which 15 patients belonging to group A (study group) were treated surgically by SNODGRASS technique and another 15 patients belonging to group B (control group) were surgically treated by MATHIEU technique. All these 30 patients were followed up for a minimum of 3 months and a maximum of up to 12 months. (Average follow-up was 7.5 months). In the present series, the following observations were noted. Both the study and control groups were comparable in age distribution. The mean age of the study group was 5.4 years (ranging. From 1.0-9.5 years). The mean age of the control group was 5.57 years (range 75-9.5 years). There was no significant difference in both groups in the distribution of age (Table-1). In our study, we considered the socioeconomic conditions of the hypospadias patients and the highest percentage of patients belonged to poor families, constituting several3.33 percent and 60 percent in group A (study group) and group B (control group), respectively (Table-2). In our study, 66.66 percent (10 patients) and 60.00 percent (9 patients) presented with chordee in group A and Group B, respectively; and meatal stenosis was present in 53.33 percent (8 patients) in group A and 46.66 percent (7 patients) in group B. Distribution regarding chordee and meatal stenosis has been shown in Table-3). Postoperative function and cosmetic evaluation revealed that in group A (study group) 80.00 percent (12 patients) and 26.66 percent (4 patients) in group B (control group) had no complications and achieved an excellent result. Complications were summarized in table-4. A urethrocutaneous fistula was developed in 2 (13.33%) patients in group A and 6 (40%) patients in group B. Postoperative infections rate was 6.66 percent (1 patient) and 13.33 percent (2 patients) for patients in group A Group B respectively. Subsequently, one patient in group A developed a fistula and 2 patients in group B developed complete dehiscence. Pus was sent for culture and sensitivity and was treated accordingly with antibiotics. Glanular dehiscence developed 1 (6.66%) in group A and 2 (13.33%) in group B. In addition, 2 patients (13.33%) developed complete dehiscence & 1 patient (6.66%) developed meatal stenosis in group B.

Table-1: Age variation at the time of presentation of study group and control group of patients.

Age group (Years)	Study group (N=15)		Control group (N=15)	
	N	%	N	%
<2	2	13.33	1	6.67
2-4	5	33.33	6	40.00
4-6	4	26.67	2	13.33
6-8	3	20.00	4	26.67

8-10	1	6.67	2	13.33

Table-2: Socioeconomic conditions of study group and control group of patients.

Condition	Study group (N=15)		Control group (N=15)	
	N	%	N	%
Poor	8	53.33	9	60.00
Average'	6	40.00	5	33.33
Rich	1	6.67	1	6.67

Table-3: Presence of chordee and meatal stenosis in the study group and control group of patients.

Variables	Study group (N=15)		Control group (N=15)	
	N	%	N	%
Chordee	10	66.67	9	60.00
Meatal Stenosis	8	53.33	7	46.67

Table-4: Complication after surgical method in the study group and control group of patients.

Complication	Study group (N=15)		Control group (N=15)	
	N	%	N	%
Infection	1	6.67	2	13.33
Urethrocutaneous fistula	2	13.33	6	40.00
Sloughed flaps/complete dehiscence	0	0.00	2	13.33
Glanular dehiscence	1	6.67	2	13.33
Meatal stenosis	0	0.00	1	6.67
Total	4	26.67	13	87.06

V. Discussion

This prospective study has been carried out in Dhaka Shishu Hospital, Dhaka, during the period of Feb. 2002 –to April 2003. Thirty patients were taken as a sample volume. These patients were alternatively grouped into two groups: group A included 15 patients who were subjected to urethroplasty by Snodgrass technique and group B included 15 patients where Mathieu urethroplasty was done. In this study, surgical complications & cosmetic outcomes between the two groups were compared. In the study group (group A), the average age of the patients was 5.4 years (range 1.0-9.5 years) and in the control group (group B), the average age was 5.57 years (range 75 9.5 years). We found that most of the patients presented to the hospital at 2 to 4 years of age. Both the study and control group are in comparison in age distribution, which was comparable to other studies. [8, 9] No conclusive data have been sorted out on the timing of the presentation of the hypospadias patients. Schultz and colleagues (1983) pointed out that an ideal time for hypospadias repair might be age 6 to 18 months to minimize the emotional effect of this traumatic insult. [10] Patients from well-to-do socioeconomic backgrounds seek earlier advice about any congenital anomaly in their children. Our observation is that parents of this group of anomaly usually like to treat the problem before the boys go to school. In this study, children from poor families constituted 53.33% and 60% in group A and group B respectively, one of the highest sufferers followed by the middle class 36.66% and the least was in the rich class 6.66%. In our study, the majority of the hypospadias patient belongs to the village (56.66% on an average) where the monthly income is less than Taka 5000/-. A similar frequency (59.38%) of poor socioeconomic conditions was reported by Masud (1998) & (60%) by Shadrul (2000). [8, 9] In our study, one patient has been detected as arrived from a consanguineous family (3.33%). Although genetic factors in the etiology of hypospadias are certainly indicated by the higher incidence of the anomaly in the first-degree relatives of hypospadias patients. [11] In our small series (n=30) none of the patients had any family history of hypospadias among their maternal or paternal relatives. In this study, chordee was present in 66.66% (n=15) and 60.00% (n=15) in groups A and B respectively. The chordee was composed of only skin. Retik (1994) mentioned in a study that 100 per cent of scrotal or perineal hypospadias have severe chordee. [12] In another series, chordee was present in 86.46 per centof patients with hypospadias; 93.33% with hypospadias. [8, 9] The abnormal location of the meatus and the tendency toward meatal stenosis result in a ventrally deflected and splayed stream in the hypospadias anomaly. Mild to moderate or severe forms of meatal stenosis may be associated with any variety of hypospadias. The size of the meatus and the quality of the surrounding supportive tissue as well as the configuration of the glans are quite variable and ultimately determine the surgical procedure. In our observation, 50% of patients had meatal stenosis ranging from mild to moderate stenosis. Seven to thirteen percentof hernia and undescended testes are associated with hypospadias, with a higher incidence when the meatus is more proximal in location. [4] In our observation, all patients (n=30)

were suffering from an anterior variety of hypospadias & none of the total patients (n-30) had any associated hernia or undescended testes. The operative procedure performed on our patients for group A (study group) was the Snodgrass procedure and the Mathieu technique for group B (control group). For all cases, we followed the principles of plastic surgery regarding fine instruments and fine suture materials along with precise and delicate tissue handling. All patients were operated upon under general anaesthesia with caudal epidural bupivacaine. Skin hooks were used to prevent over-handling of the tissues. We preferred 6/0 polyglycolic acid (Dexon) or Polyglactin (vicryl) suture material with a continuous running suture for constructing the neourethra and chromic fine 5/0 catgut suture for the skin. Hemostasis was maintained by tourniquet for 20 to 30 minutes and by using low-current diathermy. The urinary diversion was provided using placing a feeding tube (6 Fr. 7 Fr & 8 Fr, etc.) in the neourethra and sutured to the glans. A compression dressing was applied with MEFIX or HYPOFIX to provide immobilization with prevention of hematoma & edema. In our series, postoperative analgesia was maintained with per rectal diclofenac suppositories and paracetamol and also by the effect of caudal anaesthesia. In some cases, injection of pethidine was used through the intramuscular route. The postoperative hospital stay was 7-14 days. In this series, there were no complications or complaints in 80% of patients in group A, and 26.66% of patients in group B and achieving an excellent result. Urethrocutaneous fistula was developed in only two (13.33%) patients in group A, whereas 6 (40%) patients in group B. Postoperative infection developed in 1 (6.66%) cases and 2 (13.33%) cases in group A and group B respectively. Glanular dehiscence developed in 1 (6.66%) patients in group A & 2 (13.33%)patients in group B. Besides, 2 cases (13.33%) developed sloughed flaps or Complete wound dehiscence & one case (6.66%) developed meatal stenosis in group B. Complications are common after hypospadias surgery. Urethrocutaneous fistula is the commonest complication. In our series,urethrocutaneous fistula tops the list of various complications, 40% in Mathieu & 13.33% in Snodgrass urethroplasty. There is no specific data on complications ofthe Snodgrass procedure in our country. But in one series in our country,urethrocutaneous fistula was found 34.38% of the complications. [8] In another series of this country is 33.33%; in our study (Snodgrass Tecnicque) the urethrocutaneous fistula rate is much less (only 13.33%) than in these studies. [9] In this study, a small no. of cases was involved. For a definite conclusion, a large number of cases are required and the same surgeon should operate. By comparing the surgical outcome of hypospadias management of the two groups the outcome of group-A (study group) is significant over group B (control group), as evidenced by P-value is <0.01. This study demonstrates that the Snodgrass procedure shows fewer complications (20%) & cosmetically more acceptable meatus & glans than Mathieu urethroplasty (73.33%).

Limitations of the study:
The study was conducted in a single hospital with small sample size. So, the results may not represent the whole community.

VI. Conclusion And Recommendations

Though the study was conducted on a small number of patients, significant difference in outcome in this study, Snodgrass can be said to be a preferred technique over Mathieu. Thus we can recommend the tabularized incised-plate urethroplasty (Snodgrass) as the primary treatment for children with distal penile hypospadias and it can be practised in other centresin this country to include a large number of patients.

Funding: *No funding sources*
Conflict of interest: *None declared*
Ethical approval: *The study was approved by the Institutional Ethics Committee.*

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Dr. Humayun Kabir Khan, et. al. "Tubularized Incised-Plate Urethroplasty (Snodgrass) is More Appropriate for Distal Hypospadias in Terms of Complications, Cosmesis of the Meatus & Glans: A Comparative Study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(06), 2022, pp. 59-64.