

CORRELATION OF GLANS-URETHRAL MEATUS-SHAFT SCORING SYSTEM OF HYPOSPADIAS WITH POST-OPERATIVE COMPLICATIONS

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Abstract

Hypospadias is amongst one of the most common congenital urinary anomalies. The goal to repair the hypospadias includes reconstructing a functionally and visually normal phallus with meatus at the tip. Glans-Urethral Meatus-Shaft (GMS) hypospadias classification is used for the preoperatively scoring of the severity of hypospadias. GMS Score includes Glans (G), meatus (M), and penile shaft (S) and has high reliability amongst different observers. Each one of these three components are scored numerically as 1-4. These values are summed to calculate the total GMS score. The lowest value is 3 (mild/distal hypospadias) and the highest value is 12 (proximal hypospadias). Total 34 cases were enrolled in study. The mean level of glans score was 2.12 ± 0.94 , Urethral meatus was 2.21 ± 0.97 , and shaft score was found to be 1.79 ± 0.729 . The mean GSM score was found to be 6.12 ± 2.07 . Among the total children, 55.9% (19) had the mild grade of GSM score, 41.2% (14) had moderate and 2.9% (1) had the severe grade of GSM score. The surgeries performed were Tabularized incised plate (TIP) in 2.9% (1), TIP with dartos flap in 67.6% (23) and TIP with flap in 29.4% (10). Currently, no widely accepted pre-operative scoring system exists to predict the outcome of urethroplasty. In patients with GSM score of moderate to severe grade, a higher incidence of postoperative complications is found. This preoperative GMS classification may facilitate better clinical decision-making, surgical planning, and parental counseling. The current study aims to correlate the GMS score with the outcome of primary hypospadias repair.

Keywords: *hypospadias, GMS Score, urethroplasty*

Introduction

Hypospadias is amongst one of the most common congenital urinary anomalies. The goal of surgery includes reconstructing a functionally and visually normal-like penis with meatus at the tip. The meatal position is frequently used to describe hypospadias; however, categorizing hypospadias as distal versus proximal does not account for all elements of the hypospadias complex. Other features of this anomaly, such as

the degree of chordee, glans size, urethral plate quality also impact the success of the repair [1], [2]. Merriman et al described the Glans-Urethral Meatus-Shaft (GMS) hypospadias classification as a technique of preoperatively scoring of the severity of hypospadias. This scale provides a qualitative scoring of the severity of hypospadias, depending on characteristic features of the glans (G), meatus (M), and penile shaft (S) and has high inter-observer reliability. Each of the three components is scored

numerically on a scale of 1-4. These values are summed to calculate the total GMS score. The lowest possible score is 3 (mild hypospadias) and the highest score is 12 (severe hypospadias) [3], [4]. Currently, no widely accepted pre-operative scoring system exists to predict the outcome of urethroplasty. The current study aims to correlate the GMS score with the outcome of primary hypospadias repair.

Materials and Methods

This study has been conducted in the Department of General Surgery and allied specialty, Subharti Medical College, Meerut, UP,

India. This is a prospective observational study conducted over 2 years from October 2019 to August 2021. The total number of cases enrolled was 34. The study aimed to find out the GMS score and correlate it with outcomes of urethroplasty. Inclusion criteria were: 1) All the patients with primary hypospadias 2) Patients willing to be part of the study. Exclusion criteria included were: 1) Patients undergoing re-do surgery 2) Associated with co-morbidities like undescended testes and other genitourinary diseases.

A careful history and physical examination were done. Glans-urethral meatus-shaft (GMS) score was calculated in the pre-operative room and was assigned as described (Table 1).

G (Glans score)

1. Above average glans size; healthy urethral plate; deeply grooved
2. Average size glans; adequate urethral plate; grooved
3. Small glans; urethral plate narrows with some fibrosis
4. Very small glans; urethral plate indistinct; very narrow or flat

M (Urethral meatus score)

1. Glandular
2. Coronal sulcus
3. Distal or mid-shaft
4. Proximal shaft, penoscrotal or perineal

S (Shaft score)

1. No chordee
2. Mild (<30 degree) chordee
3. Moderate (30-60 degree) chordee
4. Severe (>60 degree) chordee

Table 1 – GMS Score classification

The minimum score was 3 and the maximum score 12. We divided the patients into three groups based on the total GMS score calculated by adding three G, M, and S scores as follows:

- Group A (mild): score 3-6
- Group B (moderate): score 7-9
- Group C (severe): score 10 or more

In the postoperative period, the dressing was removed after 5 days and the nasogastric tube used as a pre-urethral catheter was kept for 8-10 days. All patients were monitored for any complications during the stay in hospital and during a subsequent follow-up period of 12 months and it was recorded on a proforma. The type of surgery and associated complications like urethrocutaneous fistula, urethral stricture, dehiscence of glans and the meatal stenosis were

noted and assessed. The data were summarized as frequency, percentage, means, standard deviation and presented using the tables. The mean difference between the continuous data was analyzed using the student's t-test, multiple categories with ANOVA study. The difference between the categorical data was analyzed using the chi-square test. A p-value of <0.05 was considered statistically significant and analysis is performed using SPSS v21 operating on Windows 10.

Results

This study was conducted at the department of general surgery among patients with primary hypospadias. A total of 34 patients fulfilling the

inclusion criteria were included in this study. The mean age of the patients was found to be 6.68 ± 3.7 (1-13) yrs. of age. The mean level of glans score was 2.12 ± 0.94 , Urethral meatus was

2.21 ± 0.97 , and shaft score was found to be 1.79 ± 0.729 . The mean GSM score was found to be 6.12 ± 2.07 (Table 2).

	N	Minimum	Maximum	Mean	SD
Glans score	34	1	4	2.12	0.946
Urethral Meatus	34	1	4	2.12	0.987
Shaft score	34	1	3		1.79
GMS score	34	3	10	6.12	2.071

Table 2 – Showing the mean of various scores in the study subjects

Among the total children, 55.9% (19) had the mild grade of GSM score, 41.2% (14) had moderate and 2.9% (1) had the severe grade of GSM score (Table 3). The surgeries performed were Tabularized incised plate (TIP) in 2.9% (1), TIP with dartos flap in 67.6% (23) and TIP with flap in 29.4% (10). At the 1st month of follow-up, the patients were monitored for urine stream, fistula, strictures, diverticulum, residual chordee,

meatal stenosis weekly for the 1st month and at the 5th month, 9th month, and 12th month. There was the presence of wound dehiscence in 5.8% (2) patients, stricture and residual chordee in 2.9% (1) patients, and fistula in 11.76% (4) patients. At the end of 1-year follow-up, only 1 patient (2.9%) out of 34 had a poor urine stream, the rest have a good urinary stream.

GSM Score group	Frequency	Percent
3-6 (mild)	19	55.9
7-9 (moderate)	14	41.2
10 and more (severe)	1	2.9
Total	34	100.0

Table 3 – Showing the distribution of grade of GSM score in the study

At the end of 1 year of follow up 4 patients (11.76%) out of 34 had urethrocutenous fistula formation. At the end of 1 year of follow-up, 1 patient (2.9%) out of 34 were seen with residual chordee. The complications were treated by fistula repair after 6 months of surgery in 4

patients, meatal stenosis treated with serial dilatation in 1 patient, Meatoplasty in 1 patient. Patients treated for the complications were with GSM score of moderate (6 patients) to severe (1 patient) (Table 4).

Complications treated	GSM Score group		
	3-6 (mild)	7-9 (moderate)	10 and more (severe)
Fistula repair after 6 months of surgery	0	4	0
Meatal stenosis treated with serial dilatation	0	1	0
Meatoplasty done after 2 months of surgery	0	0	1
Serial dilatation was done	0	1	0

Table 4 – Showing the distribution of complications treated in the patients with various GSM score

Discussions

The position of the urethral opening is the most reliable and reproducible way to classify the hypospadias, and in most of the studies, patients are grouped according to meatal position (i.e. distal, mid, and proximal). However, other

factors may have an equal impact on surgical outcomes as the position of the urethral meatus had. There is no commonly accepted way for standardizing the severity of the hypospadias [5-7].

Jonathan et al (2012) created a GSM score to standardize the classification of the hypospadias

severity in response to the need for a consistently acknowledged classification. The criteria were defined based on the anatomical aspects of hypospadias that were thought to have the greatest impact on complication rates as well as the functional and aesthetic outcomes of surgical treatment. This classification scheme was created to be simple to use, reproducible, objective, and directly reflecting the risk of a surgical complication. According to the findings of their investigation, the GMS scoring method has good inter-observer reliability [8], [9].

The mean level of the GSM score in our study is 2.12 ± 0.946 while in the study done by Masood O. et al, the mean GMS Score was 4.78 ± 0.96 [10].

In our study, the repair was done by TIP in 2.9%, TIP with dartos flap in 67.6%, and TIP with flap 29.4% cases. Immediate complications were monitored for wound dehiscence, hematoma, Fistula, stricture, diverticulum, residual chordee, and meatal stenosis. There was the presence of wound dehiscence, stricture, and residual chordee in 2.9% of patients and fistula in 11.76% of patients. A study done by Abdullah Al-Debeiky in which TIP was done in 33% of patients had a 10% incidence of urethrocuteaneous fistula [11].

At the follow-up, the patients were monitored for urine stream, fistula, strictures, diverticulum, residual chordee, meatal stenosis for 1st month, 5th month, 9th month, and 12th month. In our study, in the 1st week, 1 patient (2.9%) had average urine stream, 1(2.9%) patient had urethral stricture, 2 (5.8%) patients had residual chordee and 1(2.9%) patient had meatal stenosis. In the 4th week, 3 (8.8%) patients had meatal stenosis. A study was done by Masood O. et al who had 15.6% meatal stenosis cases [10]. In the 5th month, 2(5.9%) patients had poor urine stream. In the 9th month, 1(2.9%) patient had a poor urine stream and in the 12th month, 1 patient (2.9%) had a poor urine stream. At the 5th month of follow up 4 (11.7%) patients had urethrocuteaneous fistula and at the 9th and 12th month of follow-up, 4(11.7%) patients had urethrocuteaneous fistula. At the 5th month of follow up 1 patient (2.9%) had a urethral stricture. At the 9th and 12th months of follow-up, 1 (2.9%) patient had residual chordee. At the 5th, 9th, and 12th months of follow-up, 1 (2.9%) patient had meatal stenosis. Our study is

comparable to a study done by Arlen A.M in which 11.1% of patients had urethrocuteaneous fistula [12]. The study done by Abdullah Al-Debeiky is comparable to our study in which 10% of patients had urethrocuteaneous fistula [11]. Masood O. et al had UC fistula in 7.4% of patients with mild GMS Score, while 46.9% in moderate and 92.9% of severe GMS Score patients [10].

The strength of our study is that we had included all possible complications of hypospadias surgery in the post-op period and a long follow-up of 12 months, including management of complications. The limitation of our study is that a lesser number of cases have been included in the study group (due to the COVID pandemic).

Conclusion

The Glans-Urethral Meatus Shaft (GMS) classification is a method to standardized the classification of severity of hypospadias and it guides in improving the inter-study variations of surgical outcomes. Complications are also related to the correction of the hypospadias. In patients with GSM score of moderate to severe grade, a higher incidence of postoperative complications is found. This preoperative GMS classification may facilitate better clinical decision-making, surgical planning, and parental counseling. A larger study with a longer follow-up time and more extensive statistical analysis is required to identify specific factors that correspond with the probability of a surgical complication.

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