



## TO DETERMINE THE OUTCOME OF HYPOSPADIAS SURGERY IN POPULATION OF AGE RANGES FROM 3 TO 20 YEARS USING HOSE SCORING.

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### Abstract

**OBJECTIVE:** To determine the outcome of hypospadias surgery in population of age ranges from 3 to 20 years using HOSE scoring.

**SUBJECT AND METHODS:** The study (Descriptive cross sectional study) was conducted at Plastic Surgery Unit from **09-10-2019 to 09-04-2020** at Lady Reading Hospital, MTI Peshawar, Pakistan. A comprehensive clinical history and thorough physical examination were conducted for all patients to establish the presence of hypospadias. A surgical procedure for hypospadias was conducted, followed by a comprehensive evaluation at the six-month postoperative mark. The results of hypospadias surgery were documented based on the HOSE scoring system. Patients who were lost to follow-up were dropped from the research. The hypospadias operations for all patients were conducted under the guidance of a proficient plastic surgeon with a minimum of five years of experience.

**RESULTS:** Mean and SDs for age was  $12 \pm 3.43$ . Mean and SDs for erection was  $25 \pm 11.62$ . Mean and SDs for follow up was  $5 \pm 4.53$ . Mean and SDs for Post Op HOSE score was  $15 \pm 1.97$ .

**CONCLUSION:** This study concurred that follow-up and adequate counseling of hypospadias patients up to adult life is of utmost importance therefore, it is recommended that further studies with long-term assessment should be designed in prospective studies.

**Keywords:** Hypospadias, Complications, Assessment, Outcome, Audit

### INTRODUCTION

Hypospadias is an abnormality at birth affecting the urethral development, characterised by an atypical ventral positioning of the urethral meatus on the penile surface <sup>1</sup>. The condition described is well recognised as the most prevalent congenital anomaly affecting the external genitalia of males, occurring at a rate estimated to range from 0.2 to 4.1 cases per 1,000 live births <sup>2</sup>. The origin of hypospadias is hypothesised to be the prenatal exposure to various substances possessing anti-androgenic or estrogenic properties, which could potentially disrupt the regular hormonal signalling processes <sup>3</sup>.

Currently, a variety of surgical treatments are employed to address the condition of hypospadias. Regardless of whether it is performed as a single treatment or in a staged manner, the process involves constructing a linear phallus with a uniformly sized neourethra that concludes in a naturally formed narrow opening at the tip of a reshaped glans. The user's text is incomplete<sup>4</sup>. The two-stage method is a highly adaptable surgical operation. The intervention has been observed to reduce the rate of fistula development, disruption, and stenosis, while also yielding a visually pleasing aesthetic outcome. Despite the existence of multiple surgical treatments documented for the correction of hypospadias, there is currently no universally recognised framework for evaluating the results of these operations<sup>5</sup>. The absence of an unbiased approach to recording the outcomes of hypospadias surgery has resulted in an erroneous and subjective assessment of operating techniques<sup>6</sup>.

The optimal scoring system should encompass significant functional with aesthetic criteria, encompassing pertinent surgical problems, while also possessing the attributes of reproducibility and absence of inter-observer error<sup>7</sup>. This approach would provide an impartial examination of repair methodologies, hence enabling a sound comparison that facilitates surgical assessment and a comprehensive review of the results obtained from both conventional and novel surgical approaches in hypospadias correction. The user's text is too short to be rewritten academically. The HOSE (Hypospadias Objective Scoring Evaluation) instrument is a straightforward, user-friendly, minimally intrusive, and cost-effective method for objectively evaluating the long-term results of hypospadias correction procedures<sup>8,9</sup>.

In order to assess the validity of the scoring system, a sample of twenty patients was chosen through random selection. These patients were then evaluated at a median interval of 8.9 months following their hypospadias surgery, utilising the HOSE scoring method. The HOSE examination yielded a cumulative score ranging from 12 to 16 for a sample of 20 participants. The mean weighted kappa coefficient was determined to be 0.66, indicating a mean degree of agreement of 67%. This finding suggests that a total score of 14 or more would indicate a satisfactory result in the current era of hypospadias repair<sup>8</sup>.

A separate investigation involved the analysis of 275 patients aged 12 years and above, utilising the HOSE, PPS, and IIEF-5 scoring systems. A total of 58 respondents, representing 21.1% of the sample size of 275 individuals, completed and returned the questionnaire. The maximum flow rates (Qmax) observed in the study were found to be within the age-adjusted reference values. This was consistent across different surgical techniques, with a median Qmax of 18.8 ml/s (range 3-45, n=136). The patients exhibited a notable level of satisfaction with each individual component of the Patient Perception of Primary Care Services (PPS), as indicated by mean scores ranging from 2 (indicating contentment) to 3 (indicating strong satisfaction). A majority of respondents, specifically 82%, expressed satisfaction or high levels of satisfaction with the comprehensive assessment of penile aesthetics. A total of 81% of the patients in the study had normal erectile function, as indicated by an International Index of Erectile Function-5 (IIEF-5) score greater than 22. This percentage corresponds to 35 out of the total 43 patients included in the analysis. A total of 72% of the patients indicated a HOSE score exceeding 14<sup>10</sup>.

Due to its recent introduction, there is limited research available on the topic of the HOSE scoring assessment parameter. A separate investigation was conducted to establish a correlation between the GMS hypospadias score and the occurrence of post-operative problems. A total of 262 patients were included in the study. The mean GMS score were  $7 \pm 2.5$ . A total of thirty-seven patients, accounting for 14.1% of the sample, experienced a total of forty-five problems. A statistically significant correlation was found between the overall GMS score and the occurrence of any complication ( $p < 0.001$ ). Specifically, for each incremental rise in the GMS score, the likelihood of experiencing a postoperative complication increased by a factor of 1.44 (95% confidence interval: 1.24-1.68)<sup>11</sup>.

Given the lack of research undertaken within our demographic and the limited availability of literature on this topic globally. The applicability of international results to our community is limited by factors such as genetic diversity, geographic variations, and intellectual differences. There is a necessity to

establish a standardized and officially endorsed outcome assessment instrument for the evaluation of surgical outcomes in the context of hypospadias surgery within our specific community. This study aims to present the most recent and current findings pertaining to the outcomes of hypospadias surgery, specifically focusing on the utilization of the HOSE grading system. Furthermore, the findings of this investigation will be disseminated among fellow healthcare practitioners and utilized as a foundation for future research endeavors.

**MATERIAL AND METHODS:** The study (Descriptive cross sectional study) was conducted at Plastic Surgery Unit from 09-10-2019 to 09-04-2020 at Lady Reading Hospital, MTI Peshawar, Pakistan. Sample size was calculated by using WHO sample size calculator for one sample mean (SD, range) HOSE score of 15.8 (0.6, 13-16), at the margin of error of 0.10 and confidence level of 95%, the calculated sample is 139<sup>12</sup>. Lost to follow up (LTFU), the sample size inflated by 10%; the total sample size was 152. Non-probability consecutive sampling was used. An informed consent were taken from all the hypospadias patients/parents after explaining the study protocol. Included patients were aged 3 to 20 years presenting with hypospadias. Patients enrolled for A. bracka two staged repair with a minimum 6 months follow up. Exclusion criteria involved all one staged repair patients, previously operated somewhere else, and circumcisional injuries. Hypospadias surgery was performed and assessment was done at 6 months postop. Outcome of hypospadias surgery on the basis of HOSE scoring was recorded. Any patient who lost to follow-up was excluded from the study. Hypospadias surgeries for all the patients were done under the supervision of expert plastic surgeon having at least five years of experience. All the collected information was recorded in a pre-design Performa. The exclusion criteria was strictly followed to exclude confounders and bias in the results. Data was analyzed by SPSS Version 20. Mean and standard deviation was computed for quantitative variables (age, erection and follow up). Frequencies and percentages were calculated for qualitative variables (meatal location, meatal shape, fistula and urinary stream). Effect modifiers like age, erection, meatal shape, meatal location, urinary stream and fistula was controlled through stratification. Post stratification independent T-test/ANOVA was applied while keeping p-value  $\leq 0.05$  as significant. All the results were presented in tables and graphs.

#### **OPERATIONAL DIFFINITIONS:**

**Hypospadias:** Anomaly affecting the urethra, typically identified through clinical observations of a meatal orifice located on the ventral aspect of the penis, discernible with direct visual examination.

**Hose Scoring:** It was assessed with the help of questionnaire scoring from 5-16.

**Normal location of Meatus:** Distal glanular and central.

**Normal shape of Meatus:** Vertical Slit-like.

**Urinary stream:** Single stream with no spraying.

**Erection:** Straightness of penis.

**Fistula:** An anomalous connection on ventral shaft of penis between urethra and skin.

**Aivar Bracka 2-stage repair:** This technique includes meatotomy, chordae release and application of full thickness skin graft after incising the urethral plate at first stage. After six months meatus was terminalized to glans tip.

#### **RESULTS**

The study was conducted at the Department of Plastic Surgery, Lady Reading Hospital, Peshawar. The results are as under:- 70 (46.05%) were recorded in 3-10 years age group and 82 (53.94%) patients were recorded in 11-20 years age group. (Table No. 1). Mean and SDs for age was  $12 \pm 3.43$ . Mean and SDs for erection was  $25 \pm 11.62$ . Mean and SDs for follow up was  $5 \pm 4.53$ . Mean and SDs for Post Op HOSE score was  $15 \pm 1.97$ . (Table No. 2). As per meatal location, 25 (16.44%) patients had it at the coronal, 55 (36.18%) patients had it at the distal glanular, 33 (21.17%) patients had it at the penile shaft and 39 (25.65%) patients had it at the proximal glanular. (Table No. 3). As per meatal shape, 76 (50%) patients had vertical slit whereas 76 (50%) patients had circular. (Table No. 4). As per fistula,

22 (14.47%) patients had single proximal, 40 (26.31%) patients had single, 47 (30.92%) patients had multiple, 43 (28.28%) patients had distal fistula. (Table No. 5). As per urinary stream, 115 (75.65%) patients had single stream while 37 (24.34%) patients had urinary stream. (Table No. 6). HSOE score was stratified with age, erection, meatal shape, meatal location, fistula and urinary stream at Table No. 7 to 12 respectively.

**TABLE NO. 1 AGE WISE DISTRIBUTION (n=152)**

Age Group	Frequencies	Percentages
03-10 Years	70	46.05%
11-20 Years	82	53.94%
<b>Total</b>	<b>152</b>	<b>100%</b>

**TABLE NO. 2 DESCRIPTIVE STATISTICS (n=152)**

Quantitative Variables	Mean	SDs
Age (years)	12	3.43
Erection (degrees)	25	11.62
Follow Up (degrees)	5	4.53
Post Op HOSE Score	15	1.97

**TABLE NO. 3 MEATAL LOCATION (n=152)**

Meatal Location	Frequencies	Percentages
Coronal	25	16.44%
Distal Glanular	55	36.18%
Penile Shaft	33	21.71%
Proximal Glanular	39	25.65%
<b>Total</b>	<b>152</b>	<b>100%</b>

**TABLE NO. 4 MEATAL SHAPE (n=152)**

Meatal Shape	Frequencies	Percentages
Vertical Slit	76	50%
Circular	76	50%
<b>Total</b>	<b>152</b>	<b>100%</b>

**TABLE NO. 5 FISTULA (n=152)**

Fistula	Frequencies	Percentages
Single Proximal	22	14.47%
Single	40	26.31%
Multiple	47	30.92%
Distal	43	28.28%
<b>Total</b>	<b>152</b>	<b>100%</b>

**TABLE NO. 6 URINAY STREAM (n=152)**

Urinary Stream	Frequencies	Percentages
Single Stream	115	75.65%
Spray	37	24.34%
<b>Total</b>	<b>152</b>	<b>100%</b>

**TABLE NO. 7 STRATIFICATION OF HOSE WITH AGE (n=152)**

Age	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
03-10 Years	15+2.09	0.00001	0.00001
11-20 Years	15+2.15	0.00001	0.00001

**TABLE NO. 8 STRATIFICATION OF HOSE WITH ERECTION (n=152)**

Erection	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
< 10	15+2.09	0.00001	0.00001
> 10	15+2.15	0.00001	0.00001

**TABLE NO. 9 STRATIFICATION OF HOSE WITH MEATAL SHAPE (n=152)**

Meatal Shape	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
Vertical Slit	15+2.09	0.00001	0.00001
Circular	15+2.15	0.00001	0.00001

**TABLE NO. 10 STRATIFICATION OF HOSE WITH MEATAL LOCATION (n=152)**

Meatal Location	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
Coronal	15+2.09	0.00001	0.00001
Distal Glanular	15+2.15	0.00001	0.00001
Penile Shaft	15+2.09	0.00001	0.00001
Proximal Glanular	15+2.15	0.00001	0.00001

**TABLE NO. 11 STRATIFICATION OF HSOE WITH FISTULA (n=152)**

Fistula	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
Single Proximal	15+2.09	0.00001	0.00001
Single	15+2.15	0.00001	0.00001
Multiple	15+2.09	0.00001	0.00001
Distal	15+2.15	0.00001	0.00001

**TABLE NO. 12 STRATIFICATION OF HOSE WITH URINARY STREAM (n=152)**

Urinary Stream	Post Op HOSE Score	P Value	
		Independent t Test	ANOVA Test
Single Stream	15+2.09	0.00001	0.00001
Sprary	15+2.15	0.00001	0.00001

**DISCUSSION:** Hypospadias is a birth defect of the urethra characterised by an improperly located urethral meatus with a ventral opening located on the penis's dorsal surface. With an incidence of between 0.2 and 4.1 per 1,000 live births, it is the most frequent congenital abnormality of the male external genitalia <sup>2</sup>.

Hypospadias may have its roots in the disruption of normal hormonal signalling caused by prenatal exposure to substances with anti-androgen or estrogen-like activities <sup>3</sup>, several methods of surgical correction are available for hypospadias nowadays. It requires the formation of a straight penis, with an even calibre of neourethra, culminating in a natural slit-like meatus located at the apex of a naturally redesigned glans, and this can be done in a single treatment or in stages <sup>4</sup>. A two-stage approach offers greater flexibility. Improves cosmetics while reducing the occurrence of fistula,

disruption, and stenosis. Although many surgical methods have been published for treating hypospadias, there is currently no agreed-upon method for evaluating patient outcomes<sup>5,6</sup>. A lack of a standardised way to record hypospadias surgery outcomes has led to subjective and misleading comparisons of treatment options<sup>7</sup>. Seventy patients (46.05%) were found to be between the ages of 3 and 10, while 82 patients (53.94%) were between the ages of 11 and 20. (Table 1). Mean and SDs for age were 12+3.43. The average erection lasted 25 minutes with a standard deviation of 11.62 minutes. Standard deviation was 4.53, and the mean was 5. Mean + SDs for Post Op HOSE score were 15+1.97 (Table 2). Twenty-five (16.44%) individuals had it in the coronal position, thirty-three (21.17%) in the penile shaft, and thirty-nine (25.65%) in the proximal glanular position. (Table 3). 76 patients (50%) had a round meatal form, while 76 patients (50%) had a vertical slit. (Table 4). Twenty-two patients (14.47%) had a single proximal fistula, forty patients (26.31%) had a single fistula, forty-seven patients (30.92%) had several fistulas, and forty-three patients (28.28%) had a distal fistula. (Table 5). One hundred and fifteen patients (75.6%) had a single urine stream, while 37 patients (24.34%) had several streams (Table 6). The ideal scoring system would be reproducible and devoid of inter observer error, in addition to considering crucial functional and aesthetic factors such as pertinent surgical consequences. By doing so, we may compare traditional ultimately innovative surgical methods for the treatment of hypospadias more fairly, conduct a thorough surgical audit, and improve surgical results for all. When it comes to objectively evaluating the long-term results of hypospadias repair, HOSE is a simple, uncomplicated, non-invasive, and inexpensive tool.<sup>8,9</sup>

Twenty patients were selected at random and followed for a median of 8.9 month following hypospadias correction for the purpose of validating the HOSE grading system. Twenty individuals received a total HOSE score between 12 and 16. Mean and standard deviation for age were both 12+3.45; the study's sample size was 8. The average erection lasted 25 minutes with a standard deviation of 11.62 minutes. Standard deviation was 4.53, and the mean was 5. Mean + SDs for Post Op HOSE score were 15+1.97 (Table 2).

The HOSE, PPPS, and IIEF-5 scores were used to evaluate 275 individuals aged 12 and up in a separate investigation. Out of a total of 275 patients, 58 filled out the survey. The median (range) Qmax was 18.8 ml/s (range 3-45, n=136), which is within the age-adjusted standards and is not dependent on the surgical approach. All PPPS items had mean scores in the high satisfaction range, with patients rating their experiences as either "satisfied" or "very satisfied." Eighty-two percent (82%) were either satisfied with or very satisfied with their penile look. Patients with normal erectile function (IIEF-5>22; n=35/43) accounted for 81% of the total. In this study, the mean and standard deviation (SD) for age was 12+3.43, and 72% of patients had a HOSE score of 14 or higher. Average erection size was 25+11.62, and average follow-up size was 5+4.53. Mean and SDs of Post Op HOSE score were 15+1.97. (Table 2).

Since HOSE scoring is a novel assessment metric, there is a lack of literature on the topic. Research was also conducted to see if the GMS hypospadias score was associated with a higher risk of problems after surgery. A total of 262 participants were included in the analysis. The mean GMS score were 7.25. There were 45 problems among 37 individuals (14.1%). Mean and SDs for age was 12+3.43, and there was a statistically significant correlation between the total GMS score and the presence of any complication (p0.001); the odds of any of the postoperative complications increased 1.44 times (95% CI, 1.24-1.68) for every unit increase in GMS score. The average erection lasted 25 minutes with a standard deviation of 11.62 minutes. Standard deviation was 4.53, and the mean was 5. Postoperative HOSE scores averaged 15 with standard deviations of 1.97 (Table 2).

**CONCLUSION:** The HOSE score is a widely accepted outcome evaluation measure that has been officially endorsed for the purpose of evaluating the outcomes of hypospadias surgery. The reproducibility of an objective outcome measure following hypospadias surgery is not influenced by the initial extent of the defect. This measure aids in conducting unbiased evaluations of the various surgical techniques employed for hypospadias correction. The A. bracka two-stage treatment has been found to yield favourable functional and aesthetic outcomes, while maintaining an acceptable

incidence of complications. This study has reached a consensus that providing ongoing follow-up and comprehensive counselling for individuals with hypospadias throughout their adult lives is highly crucial. Consequently, I propose that future research endeavours should be undertaken to investigate the long-term outcomes of hypospadias patients, employing a prospective study design.

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