Research Article

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CLARIFYING THE DILEMMAS OF HYPOSPADIAS CLASSIFICATION

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Abstract

Introduction: Hypospadias is a congenital penile anomaly characterized by an abnormal urethral meatus position, penile curvature (chordee), and a ventrally deficient foreskin. Existing classifications often overlook crucial surgical factors such as urethral plate width and chordee severity, leading to inconsistencies in surgical decision-making. A more objective intraoperative classification is essential for accurate evaluation and treatment planning.
Objective: This study aims to determine the most effective hypospadias classification system by analyzing published literature and clinical cases, with a focus on intraoperative assessment.
Materials and Methods: This prospective study analyzed 60 pediatric hypospadias patients treated at the University Clinical Center of Kosovo from February to October 2023. Intraoperative classification was performed via a form based on Prof. Dr. Ahmed Hadidi's system. Additionally, a retrospective review of the relevant literature was conducted to identify the most appropriate classification approach.
Results: Of the 60 patients, 20 (33.3%) had glandular hypospadias, and 40 (66.7%) had distal penile hypospadias preoperatively. A complete foreskin was found in 7 (11.7%) patients, whereas 53 (88.3%) patients had an incomplete foreskin. Chordees were absent in 23 (38.3%), superficial in 31 (51.7%), and deep in 6 (10%) patients. The urethral plate width was <1 cm in 42 (70%) cases and ≥1 cm in 18 (30%) cases. The glans presented included 11 (18.3%) cleft glans, 44 (73.3%) partial cleft glans, and 5 (8.3%) flat glans. Torsion was absent in 52 (86.7%) patients. Scrotal transposition was noted in 2 (3.3%) patients.
Conclusions: A comprehensive classification incorporating all anatomical elements enhances surgical decision-making and standardizes anomaly descriptions for global communication. Anterior hypospadias (subcoronal and glandular) is the most common type and is often associated with incomplete foreskin and chordee, reinforcing the need for precise classification.

INTRODUCTION

Hypospadias is known as a congenital anomaly of the penis, manifested by the opening of the external meatus of the urethra in the most distal parts of the penis. (Baskin, 2001) Hypospadias is also characterized by an abnormally arranged foreskin with a "hood" located dorsally, not foreskin ventrally, and a penile curvature known as a "chordee". (Halaseh & Ashour, 2022)

Before surgical intervention, there are many dilemmas regarding the classification of hypospadias to determine the most appropriate operative method for specific cases. Kaufmann first described the fourth-grade system in 1886. In Smith's classification, the first degree is located at the meatus from the corona (the raised edge at the junction of the glans penis and the shaft) to the distal shaft, the second degree is from the distal shaft to the penoscrotal junction (the transition point between the penile shaft and the scrotum), and the third degree is from the penoscrotal

junction to the perineum (Smith 1938). Browne in 1938 described a more detailed classification on the basis of the location of the meatus. In 1996, Ducket described classification after the release of the curvature into the anterior, middle, and posterior hypospadias. The major division is in the proximal and distal hypospadias (Figure 1). Many authors propose preoperative classifications, but key surgical elements often remain unseen until surgery. Previous classifications overlooked crucial factors such as urethral plate size, chordee severity, and other determinants of surgical technique, leading to confusion over time. Therefore, intraoperative evaluation is essential for a more objective assessment of hypospadias. After the detailed analysis, we decided to base it on the intraoperative classification of hypospadias provided by Hadidi (Figure 2). (Orkiszewski, 2012)

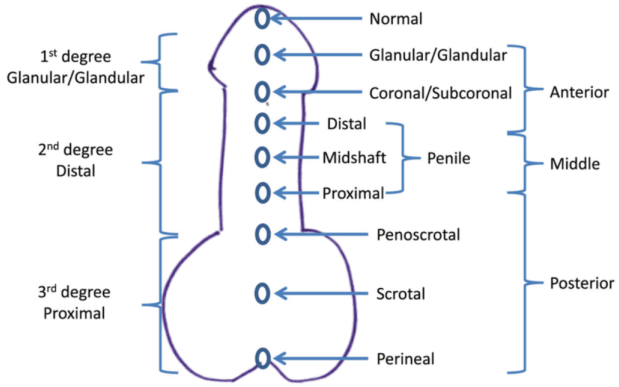


Figure 1. Illustration of the classification of hypospadias depending on the position of the urethral meatus.

OBJECTIVE

This paper aims to explain the most effective hypospadias classification by analyzing published literature and our clinical cases, with a focus on intraoperative classification. This approach enhances objective judgment and uncovers key details of the anomaly.

MATERIAL AND METHODS

This research is prospective, and a total of 60 pediatric patients with hypospadias treated at the pediatric surgery clinic of the University Clinical Center of Kosovo between February and October 2023 were studied.

Patient data were collected consecutively. The research included pediatric surgery patients (>1 year) who had undergone surgical repair of hypospadias and who had not undergone previous penile surgery. Patients with glanular, subcoronal, distal penile, and midshaft penile hypospadias were selected only. Proximal, REDO (patients who have previously undergone surgical intervention), cripple and severe cases were excluded. We also performed a retrospective review of articles published in PubMed and other scientific articles to analyze and select a more appropriate form of classification.

We collected data in the OR by filling out sheets of the classification (Figure 2) by certain surgeons during surgery. These collected data were analyzed with statistical programs such as Statistica 7.1 for Windows and SPSS 23 and are presented with relevant tables and graphs. Finally, the chi-square test was calculated for the level of reliability 95% $p<0.05$ and 99.7% $p<0.01$.

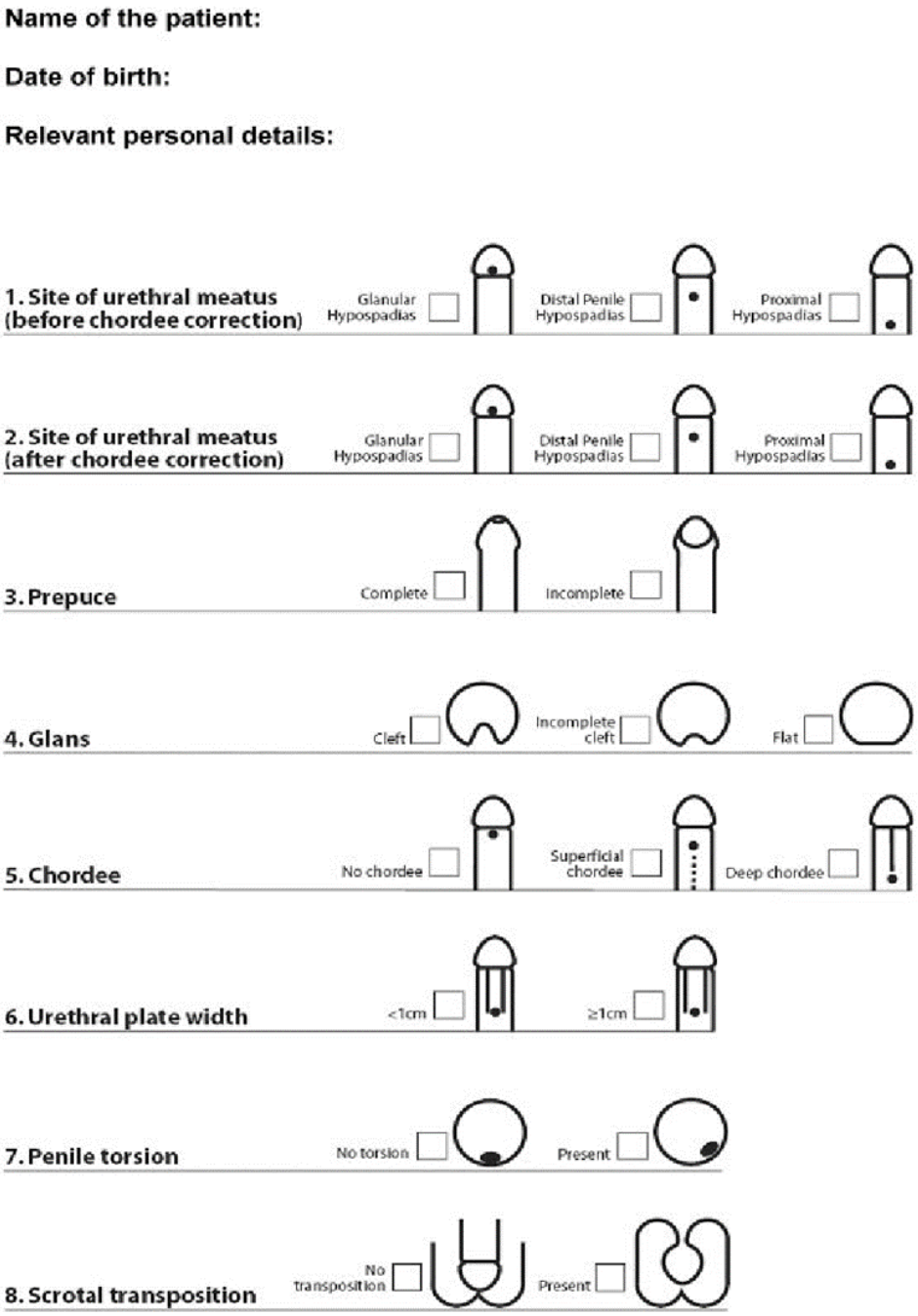


Figure 2. Form sheet of classification of hypospadias during surgery.

RESULTS

This research analyzed 60 pediatric patients with hypospadias treated at the pediatric surgery clinic of the University Clinical Center of Kosovo.

Twenty or 33.33% of the analyzed patients had glandular hypospadias, whereas 40 or 66.67% had distal penile hypospadias before the intervention.

After cord correction, 19 or 95% of the 20 patients with glandular hypospadias before surgical intervention experienced glandular hypospadias, whereas 1 or 5% progressed to distal penile hypospadias.

Among the 40 patients with distal penile hypospadias before cord correction, only 6 or 15% had glandular hypospadias after surgical correction, whereas 34 or 85% had distal penile hypospadias after cord correction.

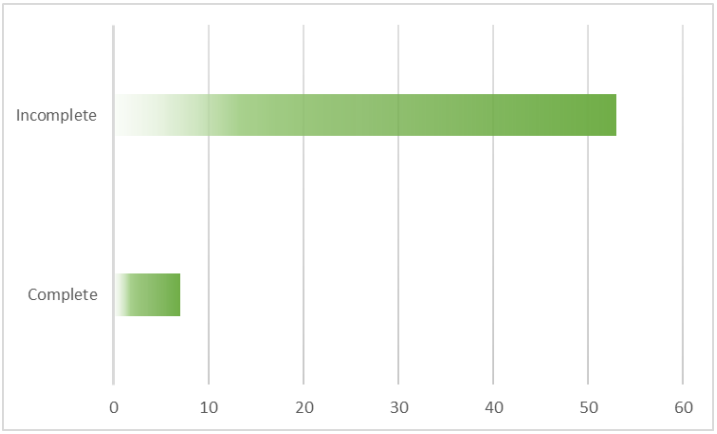
In terms of the distribution of patients during the crosstabulation concerning the location of the urethral meatus (before chordal correction) and the site of the urethral meatus (after chordal correction), there was a significant difference, with a reliability level of 99.7%, $p<0.01$.

Table 1.

The table presents the frequency and percentage of patients with hypospadias before and after chord correction

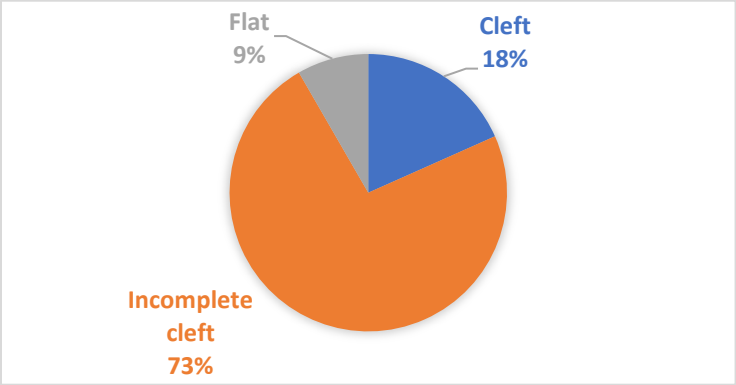
Before cord correction/After cord correction	Glandular Hypospadias		Distal Penile Hypospadias	
	Frequency	Percentage	Frequency	Percentage
Glandular Hypospadias	19	95%	1	5%
Distal Penile Hypospadias	6	15%	34	85%
Total	25	41.66666667%	35	58.33333333%

Among a total of 60 patients, 7 (11.7%) had complete findings, and 53 (88.3%) had incomplete findings of the skin.



Graph 1. The graph shows the data on the prepuce.

Among the 60 analyzed patients, 11 (18.3%) had cleft glans, 44 (73.3%) had partial cleft glans, and 5 (8.3%) had flat glans.



Graph 2. The graph shows in percentage the data on the state of the glans of the studied cases.

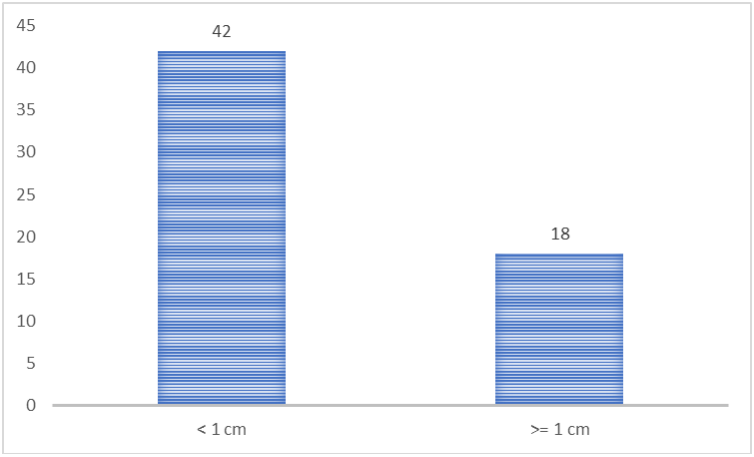
Among the 60 cases studied, 23, or 38.33%, were without a chordee; 31, or 51.67%, had a superficial chordee; and 6, or 10%, had a deep chordee.

Table 2.

The table shows the frequency and percentage of cases based on the chordee

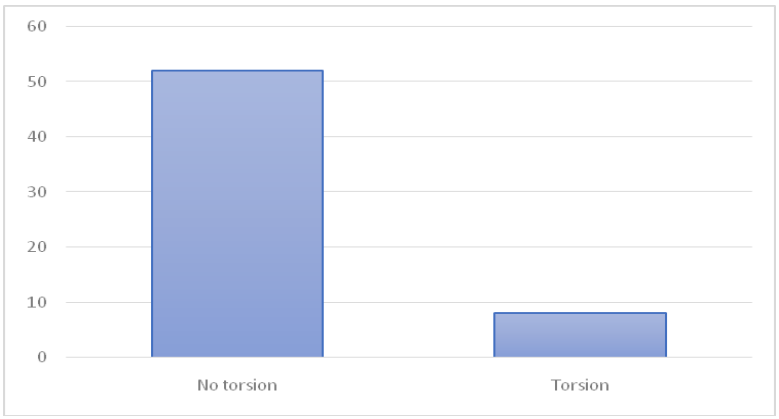
Chordee	Frequency	Valid Percentage	Cumulative Percentage
No Chordee	23	38.33333333	38%
Superficial Chordee	31	51.66666667	90%
Deep Chordee	6	10	100%
Total	60	100	

In this study, the width of the urethral plate was also examined, where in 42 or 70% of the analyzed cases, it was smaller than 1 cm, whereas in 18 or 30% of the cases, it was greater than or equal to 1 cm.



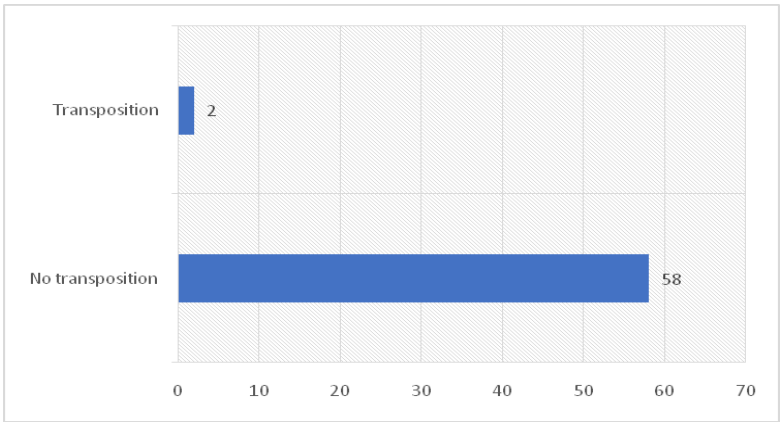
Graph 3. The graph shows the number of cases in which the width of the urethral plate was smaller than 1 cm and larger than or equal to 1 cm.

After 60 pediatric patients with hypospadias treated at the pediatric surgery clinic of the University Clinical Center of Kosovo were analyzed, 52, or 86.67%, had no torsion, whereas 8, or 13.33%, had torsion.



Graph 4. The graph shows the number of cases with and without torsion of the penis.

Among the studied cases, 58, or 96.67%, did not have transposition of the scrotum, whereas 2, or 3.33%, had transposition of the scrotum.



Graph 5. The graph shows the number of cases with and without transposition of the scrotum.

DISCUSSIONS

Hypospadias are usually classified according to the position or location of the abnormal urethral meatus. One of the most commonly used classifications is as follows:

- Anterior/minor (subcoronal and glandular)
- Middle/penile (distal penis, proximal penis, and midshaft)
- Posterior (scrotal, penoscrotal and perineal)

In general, in almost 50% of cases, hypospadias is anterior, 20% of cases have a middle location, and the rest are posterior hypospadias. (Donaire & Mendez, 2025)

Another form of classification created by Prof. Dr. Ahmed Hadidi (Hadidi, 2004), which is also based on the abnormal location of the urethral meatus, is as follows:

- Glanular hypospadias (from the tip of the glans to the corona of the glans)
- Distal penile hypospadias (from the corona of the glans to the proximal penile part of the penis)
- Proximal hypospadias (from the proximal penile part of the penis to the scrotal or perineal part)

This type of classification, which is an intraoperative classification of hypospadias, was also used in this research.

In approximately 70% of cases, the urethral meatus is positioned distally, and this form represents a milder form of the disease. The remaining 30% of cases are located nearby, are considered more complicated, and require further evaluation. (Halaseh et al. 2022)

In this study, of the 60 patients analyzed, approximately 33.33% had glandular hypospadias, 66.67% had distal hypospadias, and there were no cases of proximal hypospadias, which corresponds to the aforementioned data.

Another key feature of hypospadias is an incompletely formed foreskin. The foreskin forms on the back of the head of the penis, but it does not completely join the front. It has been established that only a small percentage (approximately 5%) have hypospadias with a completely formed foreskin. (The Children's Hospital of Philadelphia, n.d.)

Similar findings were also presented in our research, where over 88% of hypospadias patients had incomplete foreskins and the remaining 12% had complete foreskins.

Chordee is another congenital condition that is often observed in severe cases of hypospadias. (Shukla et al. 2004)

In our study, 37 of the 60 studied cases, or 61.67%, had chordee (31 with superficial chordee and 6 with deep chordee), whereas the remaining 23 or 38.33% did not have chordee.

Hypospadias is also often associated with penile torsion. It is considered to occur more often in patients with anterior hypospadias (32.8%). (Bhat et al. 2015; Zeid& Soliman, 2010). In general, in our study, most hypospadias cases were not accompanied by penile torsion, since of all the cases reviewed, only 13% had penile torsion, whereas the remaining hypospadias cases did not have penile torsion.

Another criterion that was taken into account during the study of patients with hypospadias was the transposition of the scrotum, which is known as a rare abnormality of the external genitalia. (Arena et al. 2005) Similarly, in our study, approximately 97% of the analyzed cases did not have transposition of the scrotum, and only approximately 3% of them presented with it.

CONCLUSION

Adequate classification of hypospadias, by analyzing all the anatomical elements of the anomaly, allows us to have a clear view of the appropriate decision-making process for surgical treatment. This type of classification allows us to standardize the detailed description of the anomaly, facilitating more precise communication between penile surgeons around the globe.

By analyzing 60 pediatric cases of hypospadias treated at the pediatric surgery clinic of the University Clinical Center of Kosovo and other comparative studies (mentioned below in the references), we can also conclude that the most common type of hypospadias is anterior hypospadias (subcoronal and glandular).

These types of hypospadias, in addition to the displacement of the urethral meatus, are generally characterized by an incompletely formed foreskin and a penile curvature, also known as chordee.

Over 73% of the patients had incomplete clefts, and approximately 70% of the studied patients had a width of the urethral plate smaller than 1 cm.

These characteristics and others are the basis of the most accurate and detailed classification of hypospadias.

Notably, in this study, there were no cases of proximal hypospadias, and no significant number of cases of hypospadias accompanied by torsion of the penis or transposition of the scrotum were observed.

Conflicts of interest
There are no conflicts of interest.

Data availability
All the data of the patients are available in the patients' charts in the Department of Pediatric Surgery, University Clinical Center of Kosova.

Informed consent
All the patients (their legal guardians) were informed about the type of study, and it was made clear that participation was voluntary and that they could withdraw at any time.

Ethical Approval
This study was approved by the Ethical Committee of Kosovo's Doctor Chamber.

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Figure 1. Best pediatric hypospadias repair doctors, cost in Bangalore [Internet]. Dr. Koushik. 2024. Available from: https://www.drkoushikpedsurgeon.com/hypospadias/

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