MODERN MEDICINE AND PRACTICE
https://inovatus.es/index.php/ejmmp

EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE
Vol. 4 No. 9 (Sep - 2024) EJMMP ISSN: 2795-921X

URINARY TRACT ANOMALIES IN PATIENTS WITH HYPOSPADIAS

Jasim almayali
Pediatric Urologist, Department of Urology, University of Kufa, Najaf, Iraq

Hemin Saeed Ahmed
Urologist, Erbil Directorate of Health, Ministry of Health, Erbil, Iraq

Abstract: Background: Hypospadias is one of the most common male genital birth defects. Some evidence indicated the co-occurrence of hypospadias with other urinary tract anomalies.

Aim: to investigate the prevalence and frequency of genitourinary anomalies in boys with different types hypospadias.

Patients and methods: This is a cross-sectional study which included 66 boys with hypospadias, mean age 4.67±3.18 years who are attending the Pediatrics urology clinic at Baghdad medical city and Najaf teaching hospital, during the period from January 2023 to June 2024. Demographic and clinical characteristics were recorded including age, meatal location, the presence and severity of chordee, family history of hypospadias, and the presence and type of urinary tract anomaly.

Results: Out of 66 included boys, 27 (40.91%) were found to have some kind of urinary tract anomalies. Undescended testis was the most frequent anomaly accounting for 12 boys (44.44%). Inguinal hernia was reported in 3 boys (11.11%), hydrocele in one boy, vesico-ureter reflex in 3 boys (11.11%), ureteropelvic junction (UPJ) obstruction 2 boys (7.41%), single kidney 2 boys (7.41%), ectopic/fused kidney was found in 2 boys (7.41%) and duplex kidney in 2 cases (7.41%). proximal hypospadias was far more frequent in boys with anomalies than those without anomalies (48.15% vs. 23.08%) with a significant difference.

Conclusions: About 40% of boys with hypospadias are presented with some kind of urinary tract anomalies. These anomalies were significantly associated with the proximal hypospadias.

Keywords: Hypospadias, urinary tract anomalies, meatus.

Introduction

One of the most prevalent urogenital abnormalities in male newborns is hypospadias. After the undescended testis, it is the second most frequent congenital defect in boys [1]. It is described as a mix of the following: an aberrant ventral curvature of the penis, known as the "chordee," an improper distribution of the foreskin with a "hood" present dorsally and deficient foreskin ventrally [2, 3]. Additionally, the urethral entrance on the ventral side of the penis is displaced. The urethral opening is shifted down the ventral side of the penis as a result of inadequate closure of the penile tissues during development [4].

Depending on the preoperative meatal location, hypospadias is frequently categorized as anterior, penile, or posterior. According to Duckett's classification, which is the most widely used, around 70% of hypospadias

are classified as mild to moderate because they are glanular or distally placed on the penis, whereas the remaining hypospadias are more severe and complex [5].

It is believed that a mix of hereditary abnormalities and environmental variables that impact the development of male external genitalia is the etiology of hypospadias [6,7]. Numerous reports to date have shown that patients with hypospadias have a higher frequency of related abnormalities. Genital, urinary tract, and extra urinary abnormalities can be separated out of these; the last category includes changes to the cardiothoracic and craniofacial structures [8].

The purpose of the present paper is to present the description of a multi-center study presenting information about the co-occurrence of hypospadias and genitourinary anomalies.

Patients and methods

Design and settings

This is a cross-sectional study which included 66 boys with hypospadias, mean age 4.67±3.18 years who are attending the Pediatrics Urology clinic at Baghdad medical city and Najaf Teaching Hospital, during the period from January 2023 to June 2024. Exclusions from the study included boys with other congenital anomalies, such as anorectal malformation, congenital asymmetry, such as hemi hypertrophy, patients with real genital ambiguity, meatal stenosis, and patients with secondary vesicoureteric reflux (VUR) to identify individuals with simple hypospadias.

A detailed research description was presented to each eligible study participant whose parent gave their agreement, and those who gave written consent were enrolled in the study.

Data collection

All boys were underwent detailed history and physical examination. Demographic and clinical characteristics were recorded in preformed questionnaire including age, meatal location, the presence and severity of chordee, family history of hypospadias, and the presence and type of genitourinary anomaly confirmed by imaging studies if indicated accordingly (Ultrasound, IVU , diuretic renography , Ct-Scan or MRI).

Statistical analysis

The data was tabulated and analyzed using the SPSS (statistical package for social science) version 25 computer program. Descriptive analysis was performed for numerical data using the mean and standard deviation, whereas for categorical data, they were calculated using frequency and distribution. The study employed a student t-test to compare continuous variables between boys with and without anomalies, while Chi square/Fischer exact test was used to compare categorical variables. A p-value of 0.05 was deemed statistically significant.

Results

The mean age of the boys was 4.67±3.18 years (range: 0.1-13 years). Distal hypospadias including glanular, coronal, subcoronal, penile shaft was reported in 44 boys (66.67%), while proximal hypospadias including penoscrotal, scrotal and perineal was accounting for 22 boys (33.33%). Thirty-two boys (48.48%) had no chordee, while severe chordee was reported in 18 boys (27.27%). Family history of hypospadias was found in 4 boys (6.1%) as shown in table 1.

Table 1: Demographic and characteristics of the patients (No= 66)

Variables	Value
Age, years	
Mean±SD	4.67±3.18
Range	0.1-13.0
Meatal location	
Distal (penile, subcoronal, coronal, glanular)	44(66.67%)
Proximal (penoscrotal, scrotal and perineal)	22(33.33%)
Chordee	
None	32(48.48%)
Mild <30	10(15.15%)
Moderate 30-60	6(9.09%)
Severe > 60	18(27.27%)
Family history	
No	62(93.94%)
Yes	4(6.1%)

SD: standard deviation.

Figure 1 shows the details location of hypospadias. Penile hypospadias was the most common location reported in 24 boys (36.36%), followed by penoscrotal and perineal (33.33%), subcoronal (18.18%) and coronal (9.09%).

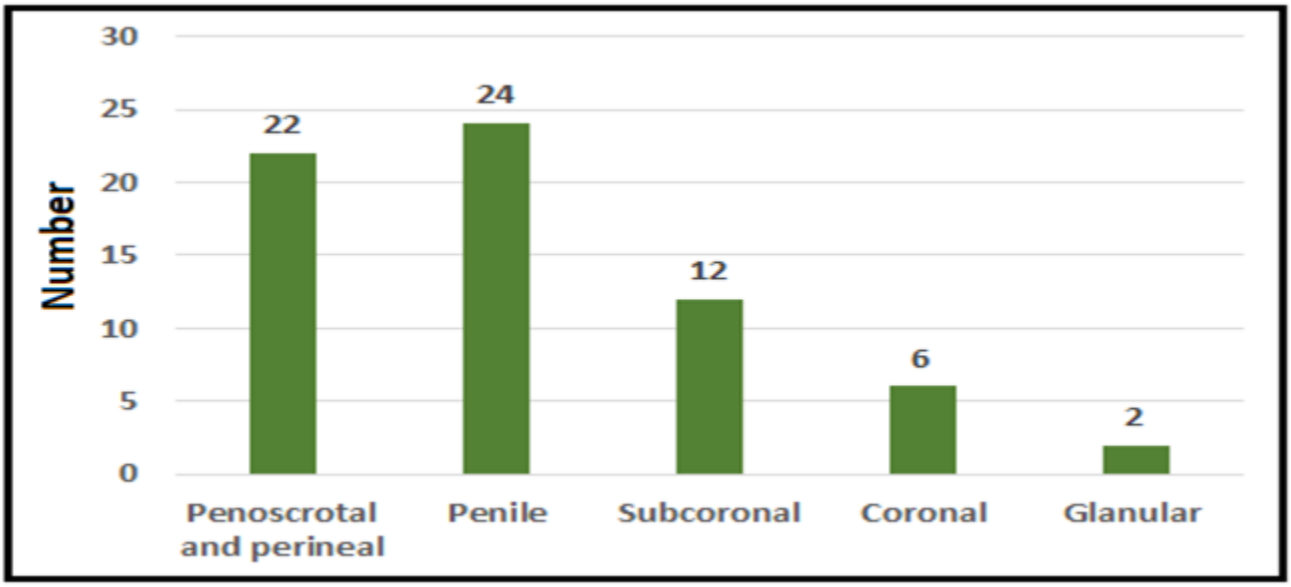


Figure 1: Location of hypospadias

Out of 66 included boys, 27 (40.91%) were found to have some kind of genitourinary anomalies. The other 39 boys (59.09%) were free from these anomalies (Figure 2).

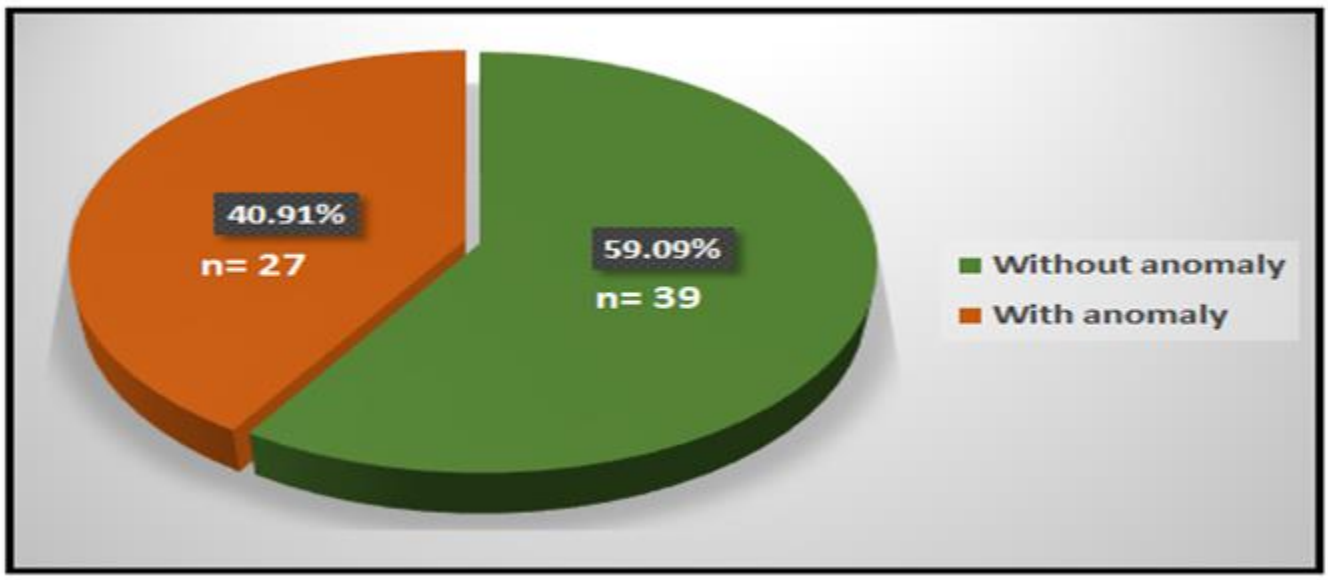


Figure 2: The frequency of Genitourinary anomalies in boys with hypospadias.

Undescended testis was the most frequent anomaly accounting for 12 boys (44.44%). Inguinal hernia was reported in 3 boys (11.11%), hydrocele in one boy, vesico-ureter reflex in 3 boys (11.11%), UPJ obstruction 2 boys (7.41%), single kidney 2 boys (7.41%), ectopic/fused kidney was found in 2 boys (7.41%) and duplex kidney in 2 cases (7.41%) as illustrated in table 2.

Table 2: Type of genitourinary anomalies in boys with hypospadias (n=27)

Anomalies	Number	Percentage
Undescended testis	12	44.44%
Inguinal hernia	3	11.11%
vesico-ureter reflex	3	11.11%
UPJ obstruction	2	7.41%
Single kidney	2	7.41%
Ectopic/fused kidney	2	7.41%
Duplex kidney	2	7.41%
Hydrocele	1	3.7%

UPJ: Ureteropelvic junction

Boys with and without anomalies were comparable in terms of age, chordee, and family history of hypospadias with no significant differences. However, proximal hypospadias was far more frequent in boys with anomalies than those without anomalies (48.15% vs. 23.08%) with a significant difference (Table 3), in another term The percentage of genitourinary anomalies were by far higher in patient with proximal hypospadias {13 out of 22 boys (59.09%)} than in patient with distal hypospadias{14 out of 44 boys(31.81%) }.

Table 3: Association of anomalies with demographic and clinical characteristics

Variables	Without anomalies (n=39)	With anomalies (n=27)	p-value
Age, years Mean±SD Range	 5.14±3.29 0.1-13.0	 3.98±2.93 0.25-12.0	0.146

Hypospadias location Proximal Distal	 9(23.08%) 30(76.92%)	 13(48.15%) 14(51.85%)	**0.034**
Chordee None Mild Moderate Severe	 20(51.28%) 4(10.26%) 2(5.13%) 13(33.33%)	 9(33.33%) 1(3.7%) 1(3.7%) 16(59.26%)	0.205
Family history No Yes	 37(94.87%) 2(5.13%)	 25(92.59%) 2(7.41%)	0.703

Discussion

In the present study, the age of the studied boys ranges from 1-13 years (4.67±3.18 years) which make most of those boys presented at an older age compared to the other studies [9-11], but in close proximity to other recent study on 240 hypospadias patients, with a median age of 5,6 years [12]. This late presentation may be due to various factors, such as socioeconomic problems, or difficulties in accessing regional hospitals that cover these health issues. Among different cases of hypospadias, penile, subcoronal, coronal, glanular types were more prevalent (66.67%) and the proximal type was in the minority of boys in this study. This was almost in agreement with other study from Tanzania [13], and Nigeria Only 4 out of 66 boys (6.1%) with hypospadias have positive family history in the current study [14]. Hypospadias is associated with familial clustering; first-, second-, or third-degree relatives are impacted in 6.1% of instances. For anterior and middle forms, familial occurrence appears to be more common than for posterior kinds. A male afflicted boy's sibling has a 9–17% probability of having hypospadias. With an estimated heritability of 57–77%, hypospadias is equally passed down from the maternal and paternal sides of the family [15]. In contrast to the current study, Ahmed from Pakistan reported 38% positive family history [16]. In the present study, out of 66 cases of hypospadias, 40.91% were found to have some kind of genitourinary anomalies. Studies shows that up to 40% of hypospadias patients have associated urinary system anomalies [17]. Another study stated that the incidence of upper urinary tract anomalies was 22% independent of the severity of the hypospadias [18]. Among the genitourinary anomalies that accompanies hypospadias in the present series in descending manner was the undescended testis in 44.44% boys, inguinal hernia and vesico-ureter reflex in 11.11% of boys for each, UPJ obstruction, single kidney, ectopic/fused kidney, and duplex kidney in 7.41% of boys for each, and hydrocele in boy (3.7%) In their study, Ahmad et al. [16] reported the frequency of common urinary tract anomalies among 88 children was 37% had inguinal hernia, 15% had ambiguous genitalia, and 30% children had undescended testes. Kahuruta et al. [13] denoted an associated anomalies occurred in 9.6% of all the patients with clinically apparent congenital urethra anomalies. Of the associated anomalies, 8.5% had undescended testis, 1.1% and 1.1% micro-penis. Another study from Iran showed the associated anomalies with hypospadias were an undescended testis in 37.5% of cases followed by ambiguous genitalia (22.2%) and 15% of cases having inguinal hernia [19]. The sole related defect, according to Tanzanian researchers Nyongole and Magaya [20], is an undescended testis, which is present in 3.2% of patients with hypospadias. Scrotal malformations were discovered in 63.3% of the 240 boys in a recent study who had hypospadias; the incidence of scrotal anomalies was higher in patients with severe hypospadias (75%) than in mild cases. Severe hypospadias was connected with a more severe penoscrotal transposition and a major partial form of bifid scrotum in patients [21]. The current study showed that boys with anomalies had a higher prevalence of proximal hypospadias (48.15% vs. 23.08%) than boys without anomalies. Even while most patients with hypospadias present as an isolated abnormality, there are instances in which it coexists with other genitourinary malformations, such as inguinal hernias and cryptorchidism, which are particularly linked to proximal hypospadias. Furthermore, a small proportion of

patients with distal hypospadias may exhibit additional genitourinary abnormalities, such as crossed renal ectopia, renal agenesis, pelvic or horseshoe kidney, ureteropelvic junction obstruction, vesicoureteral reflux, and renal agenesis [22]. These abnormalities are most frequently observed in cases of proximal hypospadias.

Conclusion

these data indicate the high prevalence of urinary tract anomalies in boys with hypospadias. proximal hypospadias was significantly associated with the presence of anomalies and The percentage of genitourinary anomalies were by far higher in patients with proximal hypospadias than in patients with distal hypospadias (59.09% vs. 31.81%).

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