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Original Article

Prevalence of Penile Abnormalities in Prepubertal Children

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Abstract

Background: Hypospadias, Penile chordee, Micropenis, Hidden penis, Ambigous genitalia, Apenia, and Unspecified genital or penile anomalies are examples of common congenital penile anomalies [CPA] in children. The study's objective was to determine the frequency of penile anomalies in young children.

Methods: A study involving 1000 kids was conducted in Al-Azher University hospitals' outstudied case clinics.

Results: Five percent of the children under study have anomalies of the penile. 82% concealed penis and 12% hypospadias are the most common congenital abnormalities. Each of the following has one case found; There was a statistically significant relationship between the existence of penile malformations and the age of the investigated children for chordae, hypospadias, and chordae and micropenis, with the mean age of patients with anomalies being 4.76 years. Body mass index [kg/m^2] was not shown to have a statistically significant correlation, although the following factors did have a statistically significant association with penile anomalies: among cases with urban residence, socioeconomic status is associated with greater penile abnormalities.

Conclusion: Penile abnormalities in youngsters are frequently found. There are several plausible justifications for them. According to our estimation of the prevalence of penile problems in Egyptian children, hidden penis and hypospadias are the two most typical penile abnormalities. It can be interesting to conduct further research on the use of both traditional in vitro fertilisation [IVF] and ICSI [intracytoplasmatic sperm injection], as it has been discovered that concealed penis and hypospadias are more common in children born after ICSI.

Keywords: Prevalence; Penile abnormalities; Prepubertal Children.

INTRODUCTION

Hypospadias, Penile chordee, Penile curvature, Penile torsion, Epispadias, Micropenis, Hidden penis, Ambigous genitalia, Apenia, and Unspecified genital or penile anomalies are common forms of Congenital penile anomalies [CPA] in children [1]. The medial borders of endodermal urethral folds fuse to form penile urethra [2]. At this time of the external genitalia development, it is widely opened to effects of the maternal drug use and environmentally chemical disruptors. According to epidemiologic studies, the prevalence of CPA, particularly hypospadias, is rising. There is a worldwide rise in incidences in last 3 decades [3].

Many studies have attempted to find risk factors. The most frequently questioned and statistically significant are of the order: Vascular [low birth weight, prematurity, preeclampsia and placental insufficiency, twinning] [3]. Endocrine, especially endocrine disruptors [3] via dysregulation of lipid, carbohydrate and hormonal [4], especially drugs taken before [invitro fertilization [IVF]] and during pregnancy as clomiphene, follicle stimulating hormone [FSH], progesterone, diethylstilbestrol [DES] [5] and anti-inflammatory drugs non-steroidal fabrics [NSAIDs] [6]. Environmental [7] [smoking, alcoholism, presence of pesticides in water]. Genetic [8], as shown by family history.

Whatever their frequency and severity, these anomalies should retain the practitioner's attention because of their possible psychological impact. Each of them mainly affects one of the three building blocks of the penis: the sheath, the ureter and the erectile bodies [9].

AIM OF THE WORK

The purpose of the study was to determine the prevalence of penile anomalies in young children.

METHODS

A study involving 1000 kids was conducted in Al-Azher University hospitals' outstudied case clinics.

Inclusion Criteria: Age: up to 12 years.

Exclusion Criteria: preterm babies and patients with isolated scrotal or testicular abnormalities or mixed penis and testicular anomalies.

METHODS

History: History of present illness, past medical history: Major medical illnesses and major surgical illnesses-list operations & dates, pregnancy and birth history, family history, social history, socioeconomic status: socioeconomic status scale for health research in Egypt and any disease or medication

General examination: Vital signs [heart rate, respiratory rate, temperature & blood pressure], **general & body mass index [BMI]:** Physical examinations in the standing and lying positions were carried out. **Local genital examination:** External genitalia, hernias and Hydrocoeles, cryptorchidism **penile examination**

Inspection: Hypospadias, Penile chordee, penile curvature, penile torsion, Epispadias, Micropenis, Hidden penis, Ambigous genitalia, Apenia.

Palpation: The penile parameters were measured with a plastic tape measure [baseline & extended penile length, penile circumference]. Using a Prader orchidometer, testicular volumes were measured at room temperature [mL]. Pubo-penile junction [pubic ramus] of penis and tip of glans on dorsal surface were used to measure stretched penile length. With the penis at its fullest extension, prepubic fat pad was pushed all way to the bone while remaining flaccid. The middle of the shaft was used to gauge penile circumference. Linear distance along dorsal side of penis that runs from pubic skin level to tip of glans in flaccid condition was used to estimate baseline penile length. Medical records were consulted to determine the patient's age, height, weight, and medical history.

Anterior urethral meatus: Check position of external urethral meatus the male external urethral orifice is normally located in midline at tip of glans. If it on ventral aspect of penis hypospadius is present if on dorsal surface of penis, it is termed Epispadias.

Data management and Statistical Analysis: Using the statistical programme of special science SPSS [SPSS Inc. Chicago, IL, U.S.A.], all data were gathered, tabulated, and statistically analysed as follows: editing, programming

Entering data on a computer, for both parametric and non-parametric data, quantitative data were expressed as mean, SD, median, and range, respectively. Frequencies and relative percentages were used to express qualitative data. Using Shapiro-test, Wilk's the distribution of the data was checked for normality. The following suitable statistical tests of significance were used while handling the data: The difference in quantitative variables in two groups was calculated using independent t-tests and the Mann Whitney test. To compare 2 dependent groups of normally distributed variables, paired t-test was employed. Variations among qualitative variables was assessed using chi square test [2] and fisher exact. All statistical comparisons were two-tailed, with p-values 0.05 denoting a significant difference, p-value 0.001 denoting a highly significant difference, & p-value > 0.05 denoting no difference at all.

RESULTS

The present study is cross sectional study that is carried out on 1000 pre-pubertal children to evaluate the prevalence of penile abnormalities collected from the outpatient clinics of Al-Azher University hospitals. Mean age of the studied cases is 8.34 years ranging from 1 to 12 years with 89.8% are urban residence, 80.4% are middle socioeconomic status, 12.2% low and 7.4% high socioeconomic status. Among studied children; 82.1% are normal weight, 9% underweight and 8.9% are overweight and obese [Table 1].

Five percent of the children under study have anomalies of the penile. In addition, 82% concealed penis and 12% hypospadias are the most common congenital abnormalities.

Each of the following has one case found; Hypospadias, chordae, chordae, and micropenis [Table 2].

The age of the children who were the subject of the study and the existence of penile malformations were statistically related, with the mean age of patients with anomalies being 4.76 years. A statistically significant association was found between penile anomalies and residence, socioeconomic status, and cases with urban residence [76%], low socioeconomic status [48%] and overweight & obese [20.0%], while there was no statistically significant association between the presence of penile anomalies and body mass index [kg/m2] of the studied infants [Table 3].

Age of the investigated children and the existence of hypospadius did not have a statistically significant relationship. Hypospadius anomaly was found in cases with urban residence [51.2%], low socio-economic status [53.5%]. There was a statistically significant association between the presence of hypospadius and the following factors: residence, socio-economic status, and body mass index [kg/m^2] [Table 4]. There was no statistically significant relation among presence of hidden penis and all socio-demographic characteristics of the studied cases with lower mean age of cases with hidden penis 4.86 years, 70.7% are urban residence, 39% low and socioeconomic and 17% overweight and obese [Table 5].

Table [1]: Sociodemographic characteristics of the studied sample

		N=1000	%
Age/years	[Mean ± SD] [Range]	8.34±1.86 [1-12]	
Residence	Rural	102	10.2
	Urban	898	89.8
Socioeconomic status	Low	122	12.2
	Middle	804	80.4
	High	74	7.4
BMI [kg/m2]	Underweight	81	8.1
	Normal	809	80.9
	Overweight & obese	110	11.0

Table [2]: Penile anomalies distribution among studied sample

	N=1000	% From all studied sample	% From detected genital anomalies
Total penile anomalies	50	5.0	100.0
Hypospadius	6	0.6	12.0
Hidden penis	41	4.1	82.0
Chordae	1	0.1	2.0
Hypospadias and chordae	1	0.1	2.0
Micropenis	1	0.1	2.0

Table [3]: Relation between socio-demographic, body mass index & prevalence of penile anomalies among studied sample

Risk factors		Total number=1000	Penile anomalies		Test	
			Absent n=950	Present n=50		P
Age/years	**Mean±SD**	1000	8.52±1.63	4.76±2.31	15.55	<0.001*
Residence [n<%]	Rural	102	90[9.5]	12[24]	10.94	<0.001*
	Urban	898	860[90.5]	38[76]		
Socioeconomic status	Low	122	98[10.3]	24[48.0]	63.90	<0.001*
	Middle	804	782[82.3]	22[44.0]		
	High	74	70[7.4]	4[8.0]		
BMI categories	Underweight	81	79[8.3]	2[4.0]	5.12	0.08
	Normal	809	771[81.2]	38[76.0]		
	Overweight & obese	110	100[8.2]	10[20.0]		

Table [4]: Relation between socio-demographic, body mass index and presence of hypospadias among studied sample

Risk factors		Total number=1000	Hypospadius		Test of significance	
			Absent n=994	**Present n=6**		**p**
Age/years	Mean±SD	1000	8.37±1.79	2.17±1.17	8.44	<0.001*
Residence	Rural	102	102[10.3]	0	0.686	0.408
	Urban	898	892[89.7]	6[100]		
Socioeconomic status	Low	122	117[11.8]	5[83.3]	28.53	<0.001*
	Middle	804	803[80.8]	1[16.7]		
	High	74	74[7.4]	0		
BMI [mean±SD]	Underweight	81	81[8.1]	0	3.38	0.185
	Normal	809	805[80.9]	4[66.7]		
	Overweight & obese	110	108[10.8]	2[33.3]		

Table [5]: Relation between socio-demographic, body mass index and presence of hidden penis among studied sample

	Risk factors	Total number	Hidden penis		Test	p
		1000	Absent n=959	Present n=41		
Age/years	**Mean±SD**	1000	8.49±1.70	4.68±1.56	14.06	<0.001*
Residence	**Rural**	102	90[9.4]	12[29.3]	p<0.001*	<0.001*
	Urban	898	869[90.6]	29[70.7]		
Socioeconomic status	**Low**	122	106[11.1]	16[39]	30.06	<0.001*
	Middle	804	783[81.6]	21[51.2]		
	High	74	70[7.3]	4[9.8]		
BMI	**Underweight**	81	79[8.4]	2[4.8]	2.02	0.363
	Normal	809	777[83.4]	32[78.0]		
	Overweight & obese	110	103[10.7]	7[17.0]		

DISCUSSION

Penile anomalies are frequently observed in clinical settings. Although these lesions are commonly reported to urologists, general physicians and surgeons are frequently the ones who unintentionally find them while performing a physical examination **[10].** The most frequent birth malformations in male newborns are hypospadias and other penile deformities. It is challenging to determine the prevalence of penile anomalies.

Results vary depending on the patient's age, gender, racial or ethnic background, geography, concomitant conditions, and socioeconomic position. Prevalence rates are additionally influenced by the study's context [based on the population/community, hospital/clinic, or other environment], the study's design [retrospective vs. prospective], and the diagnostic evaluation method [clinical, laboratory, or through imaging investigations]. Epidemiological studies are crucial because they help with proper diagnosis, raising awareness, promoting preventative measures and educational practises, and accelerating treatment. They could also be used to inform future study on pathogenesis, aetiology, & risk factors of these diseases as well as intra- & inter-country comparisons, temporal differences among varies years old, & research on these diseases' risk factors **[10].**

Mean age of the studied cases is 8.34 years ranging from 1 to 12 years with 89.8% being urban residence, 80.4% are middle socioeconomic status, 12.2% are low and 7.4% are high socioeconomic status. Among studied children, 82.1% are normal weight, 9% are underweight and 8.9% are overweight and obese.

According to our study, 5% of men have penile anomalies. Among congenital malformations, concealed penis [82%] and hypospadias [12%] are the most common. Each of the following conditions—chordae, hypospadias, chordae, and micropenis—has one case found. **Elliott *et al.*** **[11]**. 5,974,154 male babies were examined to determine the prevalence of hypospadias and penile abnormalities in the state of California. Of those, 30,170 penile malformations were found, yielding a prevalence of one penile anomaly for every 198 male births overall. Of those, 11,347 were found to have hypospadias at birth.

At 75.6%, hypospadias was the most common ailment, followed by chordee [9.4percent], micropenis [2.6percent], epispadias [1.46percent], & hidden penis [0.4 percent]. Ten percent or so of penile abnormalities had an unknown code. **Saleh *et al.*** **[12]** reported the frequency of genital malformations in male infants from Upper Egypt was 8.8percent, & it was shown that the prevalence was significantly greater in rural regions. Researchers evaluated the prevalence & patterns of genital anomalies between male infants in Upper Egypt. The most frequent genital abnormality discovered in male babies was hydrocele, which was followed by cryptorchidism and hypospadias. **Gaspari *et al.*** **[13]** reported the incidences of cryptorchidism, among all male neonates born at full term, hypospadias and micropenis were prevalent. They found 56 cases of genital deformity [2.07%], comprising 18 micropenis, 15 hypospadias, and 23 cryptorchidism [0.85, 0.55, and 0.55, respectively] [0.66 percent]. All cases demonstrated normal or subnormal testosterone production, and neither an androgen receptor nor a 5a-reductase gene mutation were found.

More than 92 percent of these infants were contaminated with EDCs as a result of their mothers' regular home use of pesticides [like DDT] and other EDCs. With 80.36 percent of mothers and 58.63 percent of fathers reporting paid or unpaid work involving the use of pesticides and other EDCs before, during, or just after pregnancy for the mothers, and with around the time of fertilisation for the fathers, the majority of these under virilized male newborns displayed additional EDC contamination. Investigations investigating the potential for parental pesticide exposure and subsequent prenatal contamination should be routinely performed on all XY infants with micropenis or other external genital abnormalities.

Our investigation demonstrated a statistically significant relationship between the age of the children who were the subject of the study and the existence of penile malformations, with a mean age of cases with anomalies of 4.76 years. A statistically significant correlation was found between penile anomalies and the following parameters: residence, socio-economic status, and body mass index [kg/m^2], with greater penile malformations among those with urban residency [76%], poor socio-economic level [48%] and overweight and obese [20%]. **Nelson *et al.*** **[13]** A statistically significant increase in congenital penile abnormalities was shown by an analysis of almost four million male births. The likelihood of congenital penile anomalies was also shown to be highest in Caucasian males, with lower rates found in African-American and Hispanic children [16 percent and 42 percent decrease respectively].

In research, there is no statistically significant relation among presence of hypospadius & age of the studied children. A statistically significant association was detected between presence of hypospadius & the following parameters: residence, socio-economic status and body mass index [kg/m^2] with hypospadius anomaly is detected among cases with urban residence [51.2%], low socio-economic status [53.5%] and underweight [37.2%]. Up to 0.8 percent of live male infants in the US are affected with hypospadias, and 87 percent of those cases are glandular or coronal, **Borer and Retik** [14]. In 36890 live boys, **Ghirri *et al.*** [15] 234 cases of hypospadias were found, translating to a prevalence rate of 6.34 per 1000 male infants. Compared to full-term babies, preterm babies [gestational age 37 weeks] had a higher prevalence of

hypospadias [6.34 per 1000 live births compared to 2.53 per 1000 live births]. Solitary hypospadias has a wide range of causes [genetic, endocrine and environmental factors]. In a sample of preterm infants, SGA neonates had a higher prevalence of hypospadias [19.08 per 1000 live births] than AGA neonates [3.83 per 1000 live births]. frequency of hypospadias was unrelated to maternal age or multiple gestations. Hypospadias' incidence has not increased, according to **Fisch *et al.*** [16]. **Romero *et al.*** [10] discovered hypospadias in 0.6% of males over the age of 40; none of these cases were linked to meatal stenosis and were all observed on glans penis or coronal sulcus. **Matsuo *et al.*** [17] detected buried penis in 20 of 547 [3.7%] newborn babies that were born full-term. Twelve of the 20 newborns with buried penis who were diagnosed between 1 and seven days of age still had them at one month, while eight were lost to follow-up. Twelve newborns underwent follow-up for varying amounts of time; by the time they were 3–4 years old, 10 had either improved or outgrown the problem. At 4-5 years old, the surviving 2 infants still had buried penis. In Japanese neonates, the prevalence of congenital buried penis ranges from 2 to 5 percent at 1 to seven days of birth to 0.3 percent at four to five years old. This survey has some restrictions, despite the fact that a single examiner in a medium-sized study of researches strengthens it. We didn't regularly do a biopsy or other types of laboratory examinations to verify clinical diagnosis of lesions found. Although this method is frequently employed & therapeutically advised for the majority of problems because a complementary examination won't change a patient's course of treatment, it is insufficient for research because it could lead to false positive or negative bias. Additionally, illnesses that have already received treatment [such as a history of circumcision] or are in clinical remission were not included in our research's prevalence of anomalies [e.g. history of herpes virus infection].

Conclusion: Penile abnormalities in youngsters are frequently found. There are many possible justifications for them, such as viral, inflammatory, traumatic, congenital, or idiopathic conditions. The most common penile abnormalities, according to our estimation of the incidence of penile disorders in Egyptian children, are concealed penis and hypospadias. Since concealed penis and hypospadias have been found to happen more commonly in children born after ICSI, It may be interesting to conduct further research on the use of ICSI [intracytoplasmatic sperm injection] and standard in vitro fertilisation [IVF].

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