

Prevalence of Inguinal Hernias and Genital Abnormalities among Elementary-School Boys

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Abstract

Background: Penoscrotal diseases and inguinal hernia are abnormalities that are often not diagnosed in childhood because most parents do not know the normal anatomy of this region. We designed a cross-sectional study in order to determine the prevalence of inguinal hernia and penoscrotal abnormalities in the elementary school boys in Zahedan city.

Materials and Methods: We studied 3100 elementary-school boys, aged 7-12 years, who underwent clinical examination of the groin and genitalia in 2008.

Results: Abnormalities were detected in 167 children (5.38%). The most frequent anomaly was indirect inguinal hernia, seen in 81 children (2.6%). The other abnormalities were undescended testis in 39 boys (1.2%), hydrocele in 25 boys (0.8%), hypospadias in 11 boys (0.3%), epispadias in 1 boy (0.03%), varicoceles in 3 boys (0.09%) and micropenis in 7 boys (0.2%).

Conclusion: Since these abnormalities are most common disorder in children, education of the public and medical staff about these abnormalities and screening system are needed to improve the outcome.

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Introduction

Inguinal hernia, hydrocele and other inguino-scrotal abnormalities are the most common congenital disorders in children [1]. Abnormalities of external genitalia in male elementary students have a prevalence rate between 6.6 to 18.7% [1, 2]. The most common disorders of external genitalia include inguinal hernia, varicocele, undescended testis (UDT), hydrocele, hypospadias, epispadias, and micropenis [3-5]. Prevalence of inguinal hernia is about 1-5% in general population [6]. Approximately 3% to 5% of term infants may be born with an inguinal hernia. Preterm infants have a higher incidence (9% to 11%). Approximately 80% to 90% of inguinal hernias appear in boys. Male to female ratio of inguinal hernia varies from 4:1 in infants to 12-25:1 in adults [1, 7]. If strangulated, inguinal hernia may lead to loss of testis and life threatening situations [8]. Hydrocele is a limited collection of fluid in tunica vaginalis of testis or along spermatic cord which lead to swelling and blood supply obstruction of testis resulting in destruction of testicular tissue [1, 4]. Hydrocele and inguinal hernia in children occur from the incomplete or abnormal closure of processus vaginalis and are the most common surgery requiring conditions [2-4]. Varicocele is dilatation of spermatic vessels of pampiniform plexus which causes scrotal swelling and is reason of infertility in 30% of men. It has a 0.18% prevalence rate in children [9, 10].

Cryptorchidism (UDT) refers to failure in descending of testis to scrotum and has complications such as malignancy, torsion and infertility [11, 12]. It has a prevalence rate of 3-5% in male neonates and 1.12% in 6 to 12 years old boys [2, 11, 13]. Hypospadias and epispadias are disorders in position of meatus and cause abnormal appearance of penis, urinary incontinence, and difficult intercourse in adults. For psychological reasons, repair surgery should be performed before age of 2 years [8, 14]. Micropenis is treatable before puberty because testosterone receptors in penis are still active but after puberty they disappear [15]. In an epidemiologic study by Yegane et al. about prevalence of genital abnormalities and inguinal hernia in west of Iran, 3205 elementary school boys were examined of whom 6.6% had genital abnormalities [2]. Therefore, regarding to high prevalence of these disorders in children, physical and psychological complications associated with these disorders, lack of adequate parental attention to these anatomic abnormalities, importance of early diagnosis and treatment of genital disorders and inguinal hernia in preventing their complications, and the fact that genital examination for screening is not done before school age in Iran, we studied on elementary school boys of Zahedan city to determine prevalence rate of inguinal hernia and other genital abnormalities.

Materials and Methods

In this descriptive cross-sectional study run in 2008-2009 school year to determine prevalence of inguinal hernia and genital abnormalities in elementary school boys of Zahedan city with cluster sampling and then systematic sampling of selected clusters, of 46,108 elementary students, 3100 entered the study.

Physical examination of students was performed in presence of a parent in a warm room in supine and upright position with and without valsalva maneuver. A written consent was obtained from parents before examination. Past medical history and history of surgery on inguinal and genital area was taken.

Examination was performed 2 interns who were trained about genital system examination. For cases with positive or suspicious findings, further examinations and evaluation was done by specialists. Data was collected according to study variables and recorded in questionnaire.

To analyze data, we used SPSS-17 software and descriptive tests. In this study, we tried to consider all ethical issues related to clinical research on patients.

Results

In this study, 3100 elementary students aged 7 to 12 years were examined for inguinal hernia and penoscrotal abnormalities which were detected in 167 students (5.38%). Of these, 17 students underwent previous surgery. Sixteen cases had inguinal hernia surgery and only one had repair surgery for epispadias (Table 1).

The most common abnormality in this study was inguinal hernia. Eighty one students (2.6%) had inguinal

hernia, of which 53 cases (65.43%) were right-sided, 25 (30.87%) were left-sided, and 3 (3.7%) were bilateral. Thirty nine cases (1.2%) had cryptorchidism with 22 (56.5%) right-sided, 14 (35.9%) left-sided, and 3 (7.6%) bilateral involvement. Hydrocele was detected in 25 cases (0.8%). It was right-sided in 13 (52%), left-sided in 8 (32%), and bilateral in 4 (16%) cases (Fig. 1). About other abnormalities, we found 11 cases (0.3%) with hypospadias, 3 (0.09%) with varicocele all at left side, 7 (0.2%) with micropenis, and one (0.03%) with epispadias. No cases of ambiguous genitalia and apenia were detected in this study (Table 2).

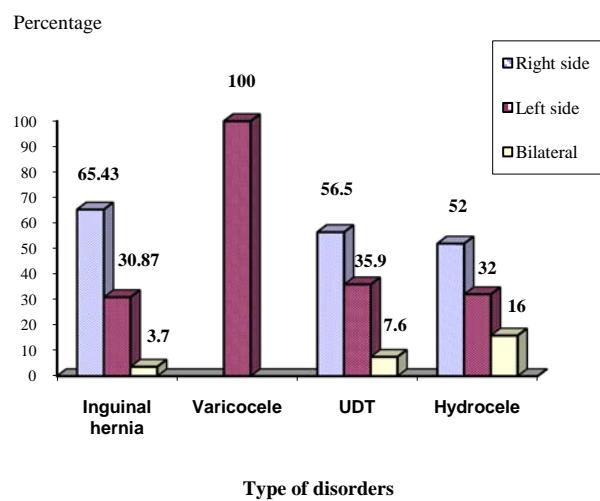


Figure 1. Anatomical distribution of penoscrotal disorders and inguinal hernia

Table 1. Types, frequency and prevalence rates of penoscrotal disorders and inguinal hernia

Type of disorder	Frequency (Proportion of each type with total)	Prevalence rate (%)	Repaired (Surgery)
Inguinal hernia	81 (48.5%)	2.60	16 (19.75%)
UDT	39 (23.3%)	1.20	-
Hydrocele	25 (14.9%)	0.80	-
Hypospadias	11 (6.5%)	0.30	-
Micropenis	7 (4.1%)	0.20	-
Varicocele	3 (2.11%)	0.09	-
Epispadias	1 (0.59%)	0.03	1 (100%)
Total	167 (100%)	5.38	17 (10.17%)

Table 2. Frequency and prevalence rate of patients with penoscrotal and inguinal hernia based on age groups

Age (year)	Inguinal hernia		Hydrocele		Varicocele	
	Frequency (Proportion of each type with total)	Prevalence rate in equal age group (%)	Frequency (Proportion of each type with total)	Prevalence rate in equal age group (%)	Frequency (Proportion of each type with total)	Prevalence rate in equal age group (%)
7-8	18 (22.2%)	2.52	6 (24%)	0.84	0	0
8-9	19 (23.4%)	2.70	6 (24%)	0.85	0	0
9-10	17 (20.9%)	2.70	5 (20%)	0.80	0	0
10-11	14 (17.2%)	2.50	4 (16%)	0.71	1 (33.3%)	0.17
11-12	13 (16.3%)	2.54	4 (16%)	0.78	2 (66.66%)	0.39

Discussion

Prevalence rate of inguinal hernia was 2.6% in this study. In study of Yegane et al. on elementary boys in west of Iran, prevalence of inguinal hernia was 2.4% [2]. In another study by Al-Abbadi et al. in Jordan, 4.2% of 6-12 year old children had inguinal hernia [8]. In that study, they used valsalva maneuver for better detection of inguinal hernia. Since some children are not able to do this maneuver, prevalence rate of hernia may be underestimated [15]. In our study, frequency of inguinal hernia at the right side (65.4%) was more than twice at the left side (30.87%) which is consistent with results of other studies [16-18].

Prevalence of cryptorchidism in our study was 1.2%. This number was 1.12% in study of Yegane et al. and 2.2% in study of Al-Abbadi et al. [2, 8]. Prevalence of UDT in this study is consistent with results of various studies suggesting that no pathologic concern exists about etiology of this abnormality in our region. Similar to other studies, more than half of UDT cases in our study were right-sided [8, 11, 14, 19].

Prevalence of hydrocele in our study (0.8%) was similar to Yegane's (0.78%). More than half of hydrocele cases were right-sided. Since most cases of hydrocele are self-limiting and resolve within 1 year [2], we may conclude that prevalence of hydrocele in our study was high. Studies have shown that prevalence rate of hydrocele in different communities varies due to associated underlying diseases and environmental factors [15].

Prevalence rate of hypospadias in current study was 0.3%. It was reported 0.78% in Yegane's study [2] and 1.9% in Al-Abbadi's [8]. Varicocele had a prevalence rate of 0.09% in our study while it had a rate of 0.46% in Al-Abbadi's study [8]. In comparison with results of mentioned study and similar ones, prevalence of varicocele was low in our study [3, 10]. According to previous studies, socioeconomic status, maternal age, birth weight, history of congenital anomaly and other associated diseases are reasons of difference in prevalence

rate of these disorders in various geographical regions [20].

Results of current study show that inguinal hernia and other genital abnormalities in elementary boys of Zahedan city (representative of the total population of Sistan and Baluchestan province) have a high prevalence. This could be due to differences in race and geographical region, inadequate access to medical care, high prevalence of prematurity and insufficient breastfeeding [1, 3, 5, 15].

An important point in this study is that most parents were unaware of their child's genital abnormality which raises the need for better education in community. On the other hand, regarding to lack of timely diagnosis of these abnormalities before preschool ages, screening of preschool and elementary school students seems to be necessary.

Thus, regarding to relatively high prevalence rate of these abnormalities and their irreversible complications and low level of people knowledge, public and health staff education and screening systems for diagnosis and appropriate treatment of these abnormalities seem to be necessary.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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