

The Prevalence of Grade III Varicocele and Undescended Testis in Turkish Adolescent Males

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Abstract

Objective: To determine the grade III varicocele and undescended testis (UDT) prevalence, testicular atrophy rate, and treatment rate in adolescent boys aged 13-15 in the Turkish population.

Methods: Healthy boys who were candidates for military high schools were evaluated between June and July 2015. Patients with undescended testis or grade III varicocele were recorded. Also, the presence of testicular atrophy and history of previous surgeries were recorded. The prevalence of grade III varicocele and UDT, testicular atrophy rate and treatment data were assessed.

Results: Grade III varicocele was detected in 627 (6.48%) of 9669 boys. Testicular atrophy due to grade III varicocele was detected in 213 (33.97%) of the cases. Patients who did not undergo varicocelectomy are more likely to have testicular atrophy than patients who underwent varicocelectomy (35.37% vs 19.64%, $p=0.018$). The UDT was detected in 96 (0.99%) candidates. Of those, 76 (79.16%) candidates had unilateral, and 20 (20.83%) candidates had bilateral UDT. 84 (87.50%) candidates underwent at least one surgery for the management of UDT and 12.5% of the candidates ($n=12$) were not aware of their diseases.

Conclusion: This study shows us the prevalence of grade III varicocele in our population. Varicocele is a progressive disease that can cause fertility and testicular atrophy increases with the puberty.

Keywords: Varicocele, Undescended Testis, Prevalence, Varicocelectomy, Atrophy

List of Abbreviations

UDT: Undescended testis

Introduction

Infertility is a significant public health problem that has been increasing in recent decades. Nowadays, approximately 15% of couples do not achieve pregnancy within one year of trying and they seek medical treatment for infertility. In 50% of the couples, a male-infertility related factor is found with varicocele and undescended testis (UDT) being the most common known causes [1, 2]. The prevalence of UDT is around 0-4.6% in full-term neonates, and nearly 1.0% of all full-term male infants still have UDT at one year of age [3]. On the other side, varicocele is mostly an adolescent, and young adult disease with prevalence rates changing from 3 to 25% with a majority presenting unilaterally on the left side [4]. Infertility is at least two to three times more frequent among men with a history of UDT or varicocele [5, 6].

The early detection and on-time treatment can improve the adult results on testis size, spermatogenesis, and hormone production [7, 8]. The aim of this study was to assess the grade 3 varicocele and UDT prevalence, testicular atrophy rate, and treatment rate among adolescent boys aged 13-15 in the Turkish population.

Materials and Methods

Boys who were candidates for military high school were evaluated between June and July of 2015. The Research Ethics Board of Gulhane Military Medical Academy Haydarpaşa Training Hospital reviewed and approved the study protocol for this cross-sectional study (approval number: 2015-123).

All candidates were examined in a warm room in both standing and supine positions. The scrotum and inguinal area were evaluated for the presence of testis, collection of dilated and tortuous veins in the varicocele, and the location and size of the testes by inspection and palpation according to a standardized protocol for physical examination. The standard grading system was used for varicoceles and only the grade III cases were recorded [9]. In the

absence of one or both testes in the scrotum, the inguinal canal was examined in the supine position to assess the presence of a palpable testis. Boys were diagnosed as cryptorchid if one or both testes were non-palpable, or when they could not be manipulated to a stable position in the scrotum. Testicular volumes of candidates who had grade III varicocele or undescended palpable testis were measured using a Prader orchidometer. A testicle that is smaller by > 2 mL or 20% compared to the other testis was considered to be atrophic [10]. The past surgical history and inguinal or scrotal surgery scars were assessed to determine the surgical treatments.

Two urologists carried out the physical examination of all the candidates. In the case of grade III varicocele or UDT, each patient was examined by the second urologist and the diagnosis was double-checked. The statistical analyses were performed using SPSS for Windows 16.0 (SPSS Inc, Chicago, IL). The Pearson Chi-Square test was used to compare the groups, and $p < 0.05$ was considered statistically significant.

Results

A total of 9669 male candidates with a mean age of 14.1 years were evaluated. Of those 1.1% (n=109) were 13 years old, 11.2% (n= 1087) were 15 years old and 87.6% (n=8473) were 14 years old.

Grade III varicocele was detected in 627 (6.48%) candidates. 623 (99.36%) patients had left grade III varicoceles. There were only three right-sided and one bilateral grade III varicocele cases. Testicular atrophy on the affected side by varicocele was detected in 213 (33.97%) of the cases. Only 56 (8.93%) candidates had undergone varicocelectomy and the testicular atrophy rate was 19.64% (n=11), whereas atrophy rate was 35.37% (n=202) for the patients who did not undergo varicocelectomy (Table 1). There was a significant relationship between varicocelectomy and testicular atrophy. Patients who did not undergo varicocelectomy were more likely to have testicular atrophy than patients who underwent varicocelectomy ($X^2 (1, N=627) = 5.63, p=0.018$).

Variable	All Adolescents (n=9669)
Number	627
Prevalence (%)	6.48
Patients underwent varicocelectomy, n (%)	56 (8.93)
Testicular atrophy, n (%)	213 (33.97%)
Varicocelectomy +	11 (19.64%)
Varicocelectomy -	202 (35.37%)

The UDT was detected in 96 (0.99%) candidates. Of those, 76 (79.16%) candidates had unilateral, and 20 (20.83%) candidates had bilateral UDT. 84 (87.50%) candidates underwent at least one surgery for the management of UDT and 50 (52.08%) of them had non-atrophic testes located in the scrotum. 34 candidates (35.42%) who underwent surgery had high scrotal or inguinal located testicles or atrophic testicles. 12.5% of the candidates (n=12) were not aware of their diseases and did not undergo surgery (Table 2).

Primary Diagnosis	All adolescents (n=9669)		
	Unilateral UDT n (%)	Bilateral UDT n (%)	Total n (%)
	76 (79.2)	20 (20.8)	96 (100.0)
Operation for UDT	66 (68.7)	18 (18.8)	84 (87.5)
Properly descended	39 (40.7)	11 (11.4)	50 (52.1)
Unsuccessful surgery	27 (28.1)	7 (7.3)	34 (35.4)
No surgery	10 (10.4)	2 (2.1)	12 (12.5)
Testicular Atrophy	17 (17.7)	5 (5.2)	22 (22.9)

Discussion

This study is the largest cross-sectional study on adolescents to assess the prevalence of grade III varicocele and undescended testis. Our results show the prevalence of grade III varicocele and UDT in adolescents as 6.48% and 0.99%, respectively.

In 1971, Oster et al. evaluated 518 adolescents between the ages of 13-15 and reported the prevalence of grade III varicocele as 8.5%.¹¹ More recently, Baek et al. screened 1938 adolescent boys with a mean age of 14.1 years (range 13-16) and they reported the prevalence of grade III varicocele as 3.3% [12]. Zampieri & Cervellione screened 2107 adolescents between the ages of 10-16, of whom 134 (6.36%) were found to have a grade III varicocele [13]. According to the studies reported from the geographically closed populations; Stavropoulos et al. detected grade III varicocele in only 39 (4.3%) of 916 school Greek boys between the ages of 13 -15 [14]. Akbay et al. from Turkey showed the prevalence of grade 3 varicocele as 1.78% among the 2531 boys aged 11 to 19 [15]. A late study from six European countries that evaluated 7035 males with a median age of 19.3 reported the prevalence of grade 3 varicocele as 2.8% [16]. Consistent with the current literature, the prevalence of grade III varicocele was 6.48% in our study.

Varicocele can cause testicular atrophy which increases with age [17, 18]. Lyon et al. reported testicular volume loss in 10% of adolescents and in 20% of adult patients with varicocele [19]. Also Akbay et al. reported testicular atrophy in 7.3% of patients aged 11±14 and 9.3% of patients aged 15±19 [20]. On the other side, for adolescent patients, an increase at testicular volume after varicocelectomy was reported [20-22]. In our study, the testicular atrophy rate was 33.97%, which is higher than the rates found in existing literature. But unlike the studies above, our results focused on grade III varicocele patients only. The proportion of boys with testicular size discrepancies may increase with the severity of the varicocele, especially in the accelerated pubertal development period [12]. And the atrophy rate in patients who did not undergo varicocelectomy was significantly higher than patients who underwent varicocelectomy (35.73% vs 19.64%).

Undescended testis is one of the most common congenital malformations of male neonates. While the incidence varies by gestational age, nearly 1.0% of all full-term male infants still have undescended testes at one year of age and after 10 years old the reported prevalence varies between 0.0 and 6.6% [3]. In addition, up to 30% of cases UDT can affect both sides [25]. A recent

nationwide study, evaluating the UDT in Sweden reported 20,375 boys 0-18 years of age with UDT with a cumulative prevalence of 1.8% [23]. Another study from Denmark reported a prevalence of UDT as 2.3% for a birth cohort of 2001-2003 with 6-9 years' follow-up [24]. Consistent with the current literature, in our cohort, the prevalence of UDT was 0.99%, with 20% of the cases affecting the both testes.

In the population based study that evaluated more than 500,000 Danish boys born alive between 1995 and 2009, 5,473 (54.2%) underwent orchiopexy during follow-up [24]. In the Sweden study, 11,549 (73.6%) patients with UDT underwent surgical treatment for the management of UDT [23]. In our study, the surgical treatment rate was 87.5%, with 59.5% of those having non-atrophic testes located in the scrotum at physical examination. On the other hand, in 12.5% of the cases with UDT, the patients or their families were not aware of the condition, and did not seek treatment.

This study has several limitations. Firstly, patients were screened only by physical examination without using ultrasonography, and testicular volumes were measured by an orchidometer. The pubertal stage of the boys was not recorded and we were unable to distinguish between congenital and acquired UDT. Finally, the age of the patients during the surgical treatment and the type of the surgery were not recorded. Despite the limitations, being the largest cross sectional study evaluating the prevalence of grade 3 varicocele and UDT is the fundamental strength of this analysis. Additionally, all the physical examinations were carried out by two trained urologists.

Conclusion

This study shows the prevalence of grade III varicocele and UDT among the Turkish adolescent population. These two conditions can easily be diagnosed by physical examination and early treatment may prevent the development of later health problems and infertility. Increasing the awareness among doctors performing healthy child and pediatric checkups through training may increase the treatment rates of these progressive diseases.

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