ORIGINAL ARTICLE

Differences in body mass index and height factors between men with and without varicocele

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ABSTRACT

Aim Despite many studies published in recent years concerning the relationship between demographic factors and varicocele, this issue remains controversial. The aim of this study was to identify a possible influence of body mass index (BMI) and height on occurrence varicocele in men.

Methods In a case-control study 153 patients aged 18-40 years from 2004 to 20014, with moderate and sever varicocele were studied. The BMI and height of the 153 patients with varicocele were compared with 250 men who had no varicocele as a control group.

Results After the adjustment for socio-demographic factors**,** the risk of varicocele for obese men was lower than for overweight and normal men (OR= 0.38, 95% CI= 0.17, 0.85). The adjusted OR for varicocele in taller men was higher than in those with low height (OR= 3.42, 95% CI= 1.34, 8.72), and moderate height (OR=2.68, 95% CI= 1.12, 6.46).

Conclusion The results of this study indicated that tall men and non-obese men may be at higher risk of varicocele, therefore counseling and evaluation of the men at high risk of varicocele may be of benefit for reduced infertility.

Key words: pampiniform plexus, spermatic vein, anthropometric parameters

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INTRODUCTION

Varicocele is a dilatation of the testicular veins and swelling of network of veins from the testicles within spermatic cord (1). It is likely that varicocele can cause infertility if it associated with abnormal semen analysis (2,3). Estimated prevalence varies considerably in general population and infertile men (4). It is important to note that the prevalence of varicocele has increased tremendously over the past decades (5,6).

The exact mechanism of varicocele is unclear. However, the interaction of increased pressure in the veins of the testicles and its venous drainage, as well as genetic factors suggested to be the factors that contribute to its development (6, 7). Several studies have shown that varicocele may be decreased in overweight and obese men and increased with taller men (5, 7-9). Similarly, obesity may play a role in detection of varicocele in obese men (10). In contrast, a study showed that the risk of varicocele is associated not only with low body mass index (BMI), but also with high BMI (11).

Varicocele is the most common cause of seminal abnormalities (12). However, varicocele is not associated with infertility despite seminal abnormalities (13), but progressive infertility as varicocele increases surgical repairs in Iranian population. It is critical to identify association between varicocele with several parameters such as BMI and height in men.

PATIENTS AND METHODS

The study design was a case-control study. It was performed on 153 patients with moderate and severe varicocele who were referred to the Outpatient Urology Department for varicocele repair in the period 2004 - 20014. Two hundred and fifty patients who had no varicocele were randomly selected, matched to cases based on age as the control group.

The men with clinical unilateral or bilateral varicocele were detected in the outpatient clinic by the same investigator during physical examination in the upright position, and confirmed by Doppler ultrasongraphy of the scrotum in a warm room (>23 °C). The men with a history of varicocelectomy and / or inguinal hernia surgery, hydrocele, absence of any testicular for any reason, any musculoskeletal disease or deformity were excluded from the study.

Weight was recorded using digital scales, with the subjects minimally without shoes and with a tape measure. The body mass index was calculated using the formula: BMI=weight (kg)/ height ^{2} (m). According to the National Institute of Health and Clinical Excellence (14), a patient is placed in one of the three BMI categories (normal weight - less than 25 kg/m^2), overweight (25-29.9 kg/m^2), and obese (≥30 kg/m^2).

Height was measured with a tape measure. The height of all subjects was categorized by tertiles. The frequency of varicocele in each tertile category was compared.

This study was approved by the Ethical Committee of Babol University of Medical Sciences. Informed written consent was obtained from all eligible subjects (>18 years).

Descriptive statistics were used to describe baseline demographics. To determine association between categorical BMI and height with varicocele, varicocele was considered as a dependent variable for logistic factors included height, education, BMI, residency and occupation of the men were adjusted as confounders. $p< 0.05$ was considered statistically significant.

RESULTS

The mean age of the men with varicocele was 26.7±4.9, and for that one without varicocele it was 26.1±6.0 years, ranged between 18-40 years (p=0.309).

All participants had mean height and mean weight 174.4±7.7 cm and 74.1±12.3 kg, respectively. The mean value for height and weight of the men with varicocele was 175.5±6.5 cm and 73.3±12.1 kg, respectively. The mean of height and weight of these without varicocele was 173.8±8.2 cm and 74.5±12.3 kg, respectively.

The mean BMI of the all participants was 24.3±3.6 kg/m^2. The patients with varicocele had significantly lower BMI (0.014) than the men without varicocele (Table 1).

Table 1. Characteristics of subjects according to varicocele

Variables	Total (n=403)	Patients without varicocele (n=250)	Patients with varicocele (n=153)	p
Age (Mean±SD)	26.4±5.6	26.1±6.0	26.6±4.9	0.309
Height (Mean±SD)	174.4±7.7	173.8±8.2	175.5±6.5	0.027
Weight (Mean±SD)	74.1±12.3	74.5±12.3	73.3±12.1	0.344
Body mass index (Mean±SD)	24.3±3.6	23.8±3.3	24.7±3.8	0.014
Education (No/%)				0.001
Illiterate (No/%)	9 (2.2)	7 (2.8)	2 (1.3)	
<12	167 (41.4)	60 (39.2)	107 (42.8)	
12	136 (33.7)	41 (26.8)	95 (38.0)	
≥12	91 (22.6)	50 (32.7)	41 (16.4)	
Residency (No/%)				0.008
Urban	274 (68.0)	182 (27.8)	92 (60.1)	
Rural	129 (32.0)	68 (27.2)	61 (39.9)	
Occupations (No/%)				0.0001
Office employees	30 (7.4)	25 (10.0)	5 (3.3)	
Industrial/ construction workers	105 (26.1)	31 (12.4)	74 (48.4)	
Drivers	20 (5.0)	14 (5.6)	6 (3.9)	
Farmers	26 (6.5)	10 (4.0)	16 (10.5)	
Business	155 (38.5)	129 (51.6)	26 (17.0)	

The mean of height and weight according to each varicocele category is shown in Table 2. Statistically significant differences between BMI with each grade of varicocele have been found. There was no statistically significant difference between height and severity of varicocele.

Table 2. The mean values of body mass index (BMI) and height according to each varicocele category

Variables	Grade III	Grade I/II	Non-varicocele	p
BMI (kg/m^2)	23.5±3.3	24.2±3.2	24.7±3.8	<0.05
Height (cm)	176.5±6.0	175.1±6.7	173.8±8.21	>0.05

The adjusted OR for varicocele in taller men was significantly higher than in men with low height (OR= 3.42; 95% CI= 1.34, 8.72), and moderate height (OR=2.68; 95% CI= 1.12, 6.46). The risk of varicocele for obese men was found to be lower than in man with overweight and normal BMI (OR= 0.38; 95% CI= 0.167, 0.852) (Table 3).

Table 3. Adjusted ratio (OR) for varicocele according to body mass index (BMI) and height of subjects

Variables	Adjusted OR*	95% Confidence Interval	**BMI** (kg/m^2)
BMI (kg/m^2)			
Obese†	0.38	0.167, 0.852	.019
Overweigh‡	0.71	0.456, 1.09	0.119
Normal	1.00		
Height (cm)			
≥180	3.42	1.34, 8.72	0.010
165-179	2.68	1.12, 6.46	0.028
<165	1.00		

*Adjusted for confounder were height, BMI, education, occupation and residency; †Obese: BMI ≥ 30 kg/m^2; ‡Overweight: BMI=25-29.9 kg/m^2

DISCUSSION

Numerous researchers have assessed the relationship between varicocele and BMI. It is suggested that in obese men excess fat around the renal vein provides a cushion protecting against the nutcracker phenomenon (15-17). But yet, relationship between varicocele and BMI is controversial. The occurrence of varicocele may be decreased with increasing BMI (5,10,15,18). The results of this study support these findings. In contrast, some researchers have shown no significant differences between varicocele and BMI (19-20). In addition, Baek et al. (2011) showed the men with varicocele had a lower BMI (11). Also, in our study, men with severe varicocele had the highest mean of BMI compared with non varicocele men, which is in agreement with two studies, where authors reported that severity of varicocele inversely correlated with obesity (8, 16). Since it is well known that palpation of scrotum in obese men is difficult, it may lead to decreased diagnosis of varicocele (11). It could not be discounted that low grade varicocele may have been missed on physical examination (21). More research is needed to define a role of BMI and pathogenesis of varicocele.

Our finding showed that men with varicocele were significantly taller than the men without varicocele. This finding is consistent with several studies (7, 22). Some studies emphasized that the greater height increases hydrostatic pressure in the spermatic vein, which may have a role in the valve mechanisms in the veins and lead to development of varicocele (9, 16). Several studies reported that higher height was not associated with higher risk of varicocele (22,1). Results of our study support this concept that height directly affected the prevalence of varicocele. Nevertheless, there is no direct evidence to show that valve mechanisms effect is related to the presence of varicocele. Larger control studies may possibly clarify the role of height in the pathogenesis of varicocele.

A limitation of this study is that the study population was selected from only one outpatient clinic, Although there is another urology clinic in Babol, involving of all urology clinics in this study was difficult to achieve. In addition, all men in the control group were selected in the same outpatient clinic, and therefore, the results of the study cannot be considered as a representative of the general Ira-

nian male population. Another limitation is in the number of obese patients because a convenience sample was used instead of population based random sample. Another drawback of this study was related to data collection; unavailability of some information that can affect varicocele in men.

The findings were nearly comparable with the findings in other countries. Data from the present study have shown that males with varicocele had lower BMI and higher height than men without varicocele. Counseling and evaluation of men at high risk of varicocele, especially for couples attended to infertility center, could be beneficial.

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TRANSPARENCY DECLARATIONS

Conflict of interest: none to declare.

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