Original Research Article

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The effect body mass index on varicocele

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ABSTRACT

Background: Varicocele, is the most common abnormal finding among men presenting with infertility, yet controversy exist regarding their etiology. Anecdotal experience suggests that varicoceles are more prevalent in lean men, supporting the "nutcracker" effect of the superior mesenteric artery compressing the left renal vein over the aorta. The aim of this study was to determine the association between Body Mass Index (BMI) and occurrence of varicocele.

Methods: A total of 100 males with varicocele attending the urological outpatient clinic were evaluated from their physical screening examinations. All subjects underwent history taking and physical examinations to evaluate for the presence and severity of varicocele, height, weight, and BMI, those compared with 100 men without varicocele (control group) were selected randomly from general population.

Results: The mean BMI of the 100 patients with varicocele was 26.1620 while that of the control group was 29.7330 (P= 0.0001) which is clinically significant. Varicocele grade decreased with increasing BMI category (P= 0.0001).

Conclusions: The results of this study indicate that there is a decreasing incidence of varicoccle and varicoccle grade with increasing BMI, Supporting the possibility that obesity results in a decreased nutcracker effect in which the adipose tissue prevents compression of the renal vein.

Keywords: Association, BMI, Nutcracker, Varicocele

INTRODUCTION

Varicoceles represent the most common attributable cause of primary and secondary infertility in the male, varicocele is defined as dilated and tortuous veins within the pampiniform plexus of the scrotal veins. The varicocele is the disease of puberty and is only detected in boys less than 10 years of age. Varicocele is found in approximately 15% of the general population, 35% of men with primary infertility, and 75% to 81% of men with secondary infertility. Obesity incidence has

increased, and it is getting higher with aging.³ This condition has strong correlation with cardiovascular diseases, hyperlipidemia, type 2 diabetes, osteoarthritis, hypertension, and even with some cancers.^{4,5} Moreover, it has been associated with changes in the reproductive hormone profile, particularly in women.^{6,7}

Some studies have suggested an influence of the body size on varicocele. In one study, varicocele was reported as the most common abnormal clinical finding in nonfertile, tall, and slim men.8 Some other studies reported

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an inverse relationship between the prevalence of varicocele and the body mass index (BMI).^{9,10} Another study demonstrated a higher prevalence of varicocele among adolescents with higher weight and height, but lower BMI than in their counterparts.¹¹

A statistically inverse association between the indexes of generalized and abdominal obesity and the prevalence and severity of varicocele has also been reported. The mentioned study showed that obesity might result in a decreased nutcracker effect, and in turn prevented renal vein compression by the adipose tissue.¹²

The aim of this study was to determine the association between Body Mass Index (BMI) and occurrence of varicocele.

METHODS

A total of 100 males with varicocele attending the urological outpatient clinic were evaluated from their physical screening examinations.

All subjects underwent history taking and physical examination to evaluate for the presence and severity of varicocele those compared with 100 men without varicocele (control group) were selected randomly from general population.

The patient had complete data that included height, weight, presence or absence of varicocele, varicocele size and grade. All the patients in the study underwent Ultrasound and Doppler study of the scrotal region of the patients.

Only palpable varicoceles were recorded, Varicoceles were categorized as small (grade 1- palpable only with valsalva), Medium (grade 2- palpable without valsalva but not visible), or large (grade 3- visible) by physical examination. Using the National Institutes of Health

definition, those patients with a BMI of less than 25 kg/m² were categorized as normal weight. Patients with a BMI of 25 kg/m² to less than 30 kg/m² were considered overweight. Those with BMI of 30 kg/m² to less than 35 kg/m² was categorized as obesity class I, those with BMI of 35 kg/m² or more as obesity class II.

All data coded and entered to the computer by using statistical package for social signs (SPSS 14), comparison between variables measured by using chi-square test (student t-test) and analysis of variance (ANOVA), Statistical significance was considered at p less than 0.05.

RESULTS

The mean age of 100 patients with varicocele was 29.7 years while that of the control group was 30.6 (p=0.5).

The mean Body Mass Index (BMI) of the 100 patients with varicocele was 26.1620 while that of the control group was 29.7330 (p=0.001), which is clinically significant Table 1.

Table 1: Patient characteristics, by BMI category.

Group	N	Mean	SD	P
Patient Age	100	29.7450	10.1215	0.5
Control Age	100	30.6320	13.8049	
Patient BMI	100	26.1620	6.3817	0.001
Control BMI	100	29.7330	7.1913	

In regard to the association of varicocele grade and BMI categories, it was shown that Obese men, defined as those having a BMI between 30 and 35 kg/m² and very obese men, defined as those having a BMI greater than 35 kg/m², had a lower incidence and low grade of varicocles that did men with a BMI less than 30 kg/m² (p=0.0001).

The varicocele grade decreased with increasing BMI category (p=0.0001), Table 3.

Table 2: Comparison between BMI score with varicocele prevalence and grade.

Varicocele		BMI Score				
		Less than 25	25 - 30	30 - 35	35 or more	Total
Grade	Count %	10	16	12	3	41
1	Within Grade	24.3	39.0	29.2	7.3	100%
	Count %	15	15	4	1	35
2	Within Grade	42.8	42.8	11.4	2.8	100%
	Count %	17	4	2	1	24
3	Within Grade	70.8	16.6	8.3	4.1	100%
Total	Count %	42	35	18	5	100
	Within Grade	42	35	18	5	100%

Table 3: Patient characteristics, by BMI category.

Grade	N	Mean BMI	SD	P value
1	41	27.8150	4.7508	0.0001
2	35	25.0265	4.1200	
3	24	20.0499	3.9488	
Total	100	24.2971	4.2732	

DISCUSSION

A varicocele is a dilatation of the scrotal portion of the pampiniform plexus / internal spermatic venous system that drains the testicle. Approximately 75% to 90% of varicoceles are left side. The incidence of bilateralism is anywhere from 15% to 50% but isolated right varicoceles are fairly rare. It was postulated that increased pressure in the left internal spermatic vein may result from compression of the left renal vein between the aorta and the superior mesenteric artery, a phenomenon known as the nutcracker effect. Another theory describes absent or malfunctioning venous valves as a potential cause of varicocele formation. 13,14

In regard to the relationship of varicolcele and BMI, it was reported that varicocele was more prevalent in tall boys with a lower BMI, who had quickly progressed through puberty. Delaney et al performed a retrospective review of 43 adolescent boys with varicocele and noted that patients with varicocele were taller and heavier than age matched controls. 16

In this study: A total of 100 patients with varicocele, the mean BMI of those with varicocele (26.1620) was less than those without varicoceles (29.7330). (p=0.001). Also, the grade of varicocele correlate inversely with increased BMI (p=0.0001). Among the varicocele group; Varicocele were present on the left side in 85.1%, bilateral in 10.3% and on the right side in 4.6% of patients.

The result of the current study may be explained by several ways; BMI is a measure of adiposity. In those patients with a higher BMI it is plausible that there is a decreased nutcracker effect or compression of the left vein due to increased adipose tissue between the superior mesenteric artery and aorta. Tsao CW et al show the prevalence of varicoceles inversely correlated with obesity. A total of 1000 young males were evaluated from their physical screening examinations. The means of BMI, of those without varicoceles was greater than those with varicoceles.¹⁷

Celiktas M et al evaluated a possible effect of the amount of retroperitoneal fat tissue on testicular venous drainage to shed light on the mechanism of varicocele occurrence. The relationship between bilateral pampiniform plexus diameters and retroperitoneal fat distribution was stronger and significant. Another possible explanation is decreased detection of varicoceles in the overweight patient population due to difficulty in palpation on

physical examination. It is likely that large varicoceles would be easily detected even in obese patients and small varicoceles might be missed on physical examination.

If this the case in the current study one would expect the prevalence of small varicoceles to be less in obese patients.

However, one would not expect the prevalence of large varicoceles to decrease in obese patients because they would likely be easily detected on physical examination, regardless of patient weight.¹⁹ BMI and varicocele development is intriguing to the extent that obesity in men is associated with alterations in serum sex hormone concentrations, including decreased testosterone and increased estradiol. The contribution of alterations in the hormonal milieu to the development of varicoceles represents a potential area for further investigation.

The limitation of the present study was the reliance of the diagnosis on physical findings with no ancillary imaging (color Doppler imaging) to diagnose sub clinical varicoceles or confirm the diagnosis of the clinical varicoceles.

CONCLUSION

The results of this study indicate that there is a decreasing prevalence of varicocele, and varicocele grade with increasing BMI. Supporting the possibility that obesity results in a decreased nutcracker effect in which the adipose tissues prevent compression of the renal vein.

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Institutional Ethics Committee

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