

# Varicocele and BMI: Are Varicoceles More Frequent in Tall and Thin Adolescents

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## Article Information

Received date: Aug 24, 2018

Accepted date: Sep 11, 2018

Published date: Sep 17, 2018

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**Keywords** Varicocele; Adolescent; BMI; Obesity

## Abstract

**Introduction:** Varicocele is a dilatation of the venous pampiniform plexus considered the leading cause of correctible male infertility. It affects 15% of the adolescent population. Over 90% of cases are located on the left hemiscrotum. The treatment is surgical and several methods have been described which main goal is to improve the potential for future fertility. Varicocele etiology remains controversial and there have been several studies that reports varicoceles are found less frequently in obese adolescents but yet, relationship between varicocele and BMI is controversial.

**Material and Methods:** We analyzed patients with varicocele surgical correction in our centre in the last 10 years. At our institution all patients were treated by Palomo technique open or laparoscopic. We analyzed: age, location and degree of varicocele, weight and height, surgical technique, appearance of reactive hydrocele or others complications, varicocele recurrence and reoperation. Our objective is studying the relationship between IMC and varicocele in adolescent boys.

**Conclusion:** We observed varicocele in our serie was found more frequently in taller patients and less frequently in obese patients (higher BMI). Future studies will be needed to confirm that theory and to understand varicocele etiology but we consider that this fact is very useful because we are talking about a pathology with repercussion in fertility so we must be alert about it in adolescent population to correct it.

## Introduction

Varicocele is a dilatation of the venous pampiniform plexus that determines a progressive deterioration of spermatogenesis, by a temperature increase of the testis. It cans produce testicular atrophy; it is considered the leading cause of correctible male infertility [1]. It is identified in up to 35% men with primary infertility [2] so we must be alert about this condition in the pediatric patient.

It affects 15% of the adolescent population [3]. Over 90% of cases are located on the left hemiscrotum and the reason can be anatomically explained: the left gonadal vein has increased length untilist drainage at left renal vein in a perpendicular angle [4]. The exact mechanism of varicocele is unclear but increased pressure in the left 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 [5]. Absent or malfunctioning venous valves have been postuled as another hipotesis [4].

Numerous surgical techniques have been described for varicocele correction but there are no clear guidelines established for treatment of varicocele in childhood [6]. The main goal of all these surgical methods of treating varicocele is to improve the potential for future fertility [7].

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 [8,9]. But yet, relationship between varicocele and BMI is controversial.

Our goal is to review patients with varicocele surgery, studying complications, surgical technique and anthropometric characteristics of each patient, to try to establish a relationship between BMI and the occurrence of varicocele.

## Materials and Methods

We analyzed all patients who underwent varicocele in our center for ten years (from 2005 to 2015).

The variables that we studied in each patient are: age, location and degree of varicocele, weight and height, surgical technique, appearance of reactive hydrocele or others complications, varicocele recurrence and reoperation.

Body mass index was calculated from height and weight data according to the formula weight (kg)/height (m<sup>2</sup>). Those patients with a BMI of less than 25 kg/m<sup>2</sup> were categorized as normal weight.

## Results

From 2005 to 2015 were treated in our center 79 children diagnosed with varicocele. The children were aged between 9 and 14 years. The mean age was 12.5 years.

In all cases, the location was left. Right varicocele was not observed in any case.

Diagnosis was made by physical examination, aided in some Eco-Doppler. The classification according to the degree of varicocele was performed at 4 degrees according to Dubin-Amelar classification based on palpation of the varicocele.

Indications for treatment of varicocele were symptomatic varicoceles, with decreased testicular volume or high degrees of varicocele (III-IV).

Treatment in all cases was varicocelectomy using the classic Palomo technique with high mass ligation of the spermatic vessels. As for the approach in 67% of the cases it was done in an open way and in 33% by laparoscopic route. No differences were observed in the results obtained with both techniques.

Hydrocele reagent rate was 27%, according to described in the literature [10], in most cases it resolved spontaneously [5] of these cases required reoperation with resection of the tunica vaginalis to solve the hydrocele.

Only varicocele recurrence was observed in 5 patients, two of them required reoperation in adulthood. The incidence of varicocele recurrence in the literature following surgical repair varies from 1% to 45% [6].

In all patients weight and height was collected, calculating BMI, with an average of 19.52.

We found that most of the patients have normal or low BMI. BMI was lower than 25 in 72 of the 79 studied patients.

We note that this condition is more common in tall, thin children, since most patients have a low BMI supporting the possibility that a higher BMI results in a decreased nutcracker effect in which the adipose tissue prevents compression of the renal vein.

## Discussion

Varicocele is a dilatation of the venous pampiniform plexus that determines a progressive deterioration of spermatogenesis. It is considered the leading cause of correctible male infertility [1]. Approximately 15 percent of all adolescent males present varicocele [3].

The diagnosis of varicocele is mainly clinical and assisted with ultrasound Doppler testicular and can be classified into 4 categories according to the International Classification of Dubin, Grade 0 varicocele that is only palpable with the Valsalva and grade III is the visible varicocele without any maneuver [6].

Indications for treatment are controversial in children [6] and all symptomatic varicoceles (pain, testicular heaviness) or discrepancies

in testicular size should be treated since the aim of treatment is to preserve testicular function. Although grade of varicocele should not be the sole indication for treatment, treatment may be warranted in adolescents with large varicoceles (grade III) because varicocele repair has been associated with improved semen analysis in adolescents and young men [11,12].

The treatment is surgical and several methods have been described: high ligation of spermatic vascular structures (Palomo) by open or laparoscopic approach, inguinal (Ivanissevich) and subinguinal approaches, microsurgical techniques and radiological procedures: embolization or sclerotherapy [13].

We used in all cases the classic Palomo technique what's includes mass ligation of the testicular artery, testicular vein and lymphatics. We used this technique because it remains an often used procedure because of the low rates of recurrence, low cost, low rates of testicular atrophy and easy performance [14]. We have not found differences between open and laparoscopic approach in the studied population treated with these technique.

As major complications of surgery highlights the reactive hydrocele up to 30% of cases (often resolve spontaneously, requiring in cases that persists resection of the tunica vaginalis), recurrence of varicocele, postoperative bleeding or alterations sensitivity.

Varicocele etiology remains controversial and there have been several reports that varicoceles are found less frequently in obese adolescents [9]. Tsao et al. [8] showed that the prevalence and severity of varicoceles were inversely correlated with obesity, which indicates that obesity may result in a decreased nutcracker effect. Handel et al [15]. reported that the prevalence of varicocele decreases with increasing BMI because of increased adipose tissue, which decreases compression of the left renal vein.

Our data showed that varicocele in adolescents was found more frequently in taller patients and less frequently in obese patients (higher BMI).

## Conclusion

We have observed in our review that patient's varicocele is more frequent in taller and thin children. Future studies will help to further assess the distribution of the incidence of varicocele in closely defined subsets of adolescent growth and development, which may provide some insight into the cause of varicoceles.

The varicocele is a pathology that we must consider in children and treat in time whenever necessary given its potential impact on male fertility. Surgical treatment both open and laparoscopic provides excellent results with complete resolution in most cases and a low rate of complications so we diagnose this disease early and treat it always indicated.

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