



## A study of etiology of secondary varicose veins

Kshitij Arun Manerikar, Chandradip Patil, Simran Bhatia, Gurjit Singh, Harshad Gawade

### ABSTRACT

**Introduction:** Lower limb veins are most prone to having venous disorders – and varicose veins are the biggest issue. Varicose veins can be grouped into Primary or Secondary Varicose veins. Secondary Varicose veins are associated with acquired factors causing stasis and hypercoagulable state. This study addresses the various associated risk factors for secondary varicose veins such as age, sex, Body Mass Index (BMI), pregnancy, prolonged standing, tobacco use, and deep vein thrombosis history and family history of secondary varicose veins.

**Methods:** A prospective non-randomized study of fifty patients was carried out between August 2015 and July 2016. Demographic details of all patients were recorded. Detail history and examination of both lower limbs were performed. Descriptive statistics were calculated by measuring means, standard deviation (SD), and proportions with 95% confidence interval.

**Results:** Tobacco chewing in any form was the most common associated risk factor of secondary varicose vein in our study of 50 patients and it was observed in 46% of patients. We found that varicose veins were more common in males and it was especially predominant in the over fifty years of age. Amongst them, twenty patients were obese with body mass index of more than 25 kg/m<sup>2</sup>. Past history of varicose veins and treatment for same was not associated significantly with varicose veins prevalence. More than two numbers of pregnancies were found in 26% females with varicose veins.

**Conclusion:** We found that prolong standing, smoking (> 10 cigarettes/day), more than two pregnancies, and family history of deep venous thrombosis were some of the major associated risk factors for varicose veins. We couldn't establish any strong association between previous history of deep venous thrombosis and varicose vein surgery with respect to recurrence of it. Among modifiable risk factors, tobacco chewing and smoking should be abandoned to decrease the incidence of varicose veins.

**Key words:** Body mass index, incidence, india, obesity, tobacco, varicose veins, veins, venous thrombosis

### Introduction

Lower limb veins are most prone for venous disorders and varicose veins are the most common. Dilated, tortuous veins are called as varicose veins [1]. Prevalence rate of varicose veins varies between 10–20% in the Western world whereas, in India it is 5% [2].

Primary varicose veins are caused due to intrinsic abnormality of the venous wall. Abnormal collagen synthesis cause weakness and expansion of the valve annulus which leads to poor valve leaflet apposition and further venous reflux in this pathological condition [3].

Secondary Varicose veins are associated with those acquired factors which may cause stasis and hypercoagulable state [3]. Older age, increased BMI, pregnancy, prolonged immobilization, tobacco use and prior deep vein thrombosis are few amongst these factors [3].

This study was undertaken to assess the various risk factors of secondary varicose veins such as age, sex, BMI, pregnancy, prolonged standing, tobacco use and previous history of deep vein thrombosis.

### Materials and Methods

A prospective non-randomized study of fifty patients was carried out in our hospital between 1<sup>st</sup> August 2014 and 31<sup>st</sup> July 2015. Demographic details of all patients were recorded. Detail history and examination of both lower limbs were performed.

Diagnosis of varicose veins was established by clinical examination and further confirmed by venous duplex ultrasound studies of the lower limb venous system.

Descriptive statistics were calculated by measuring mean, standard deviation (SD), and proportions with 95% confidence interval. Inferential statistics were scored by using analysis of variance and Chi-square test was used to compare independent proportions.

### Results

In our study of fifty patients, 36 were male and 14 were female (Table 1).

The mean age of patients in this study was 44 (range: 18–70 years old). Among fifty patients, 66% patients were >50 years of age and remaining 34% were less than 50 years of age (mean = 44, SD = 15.1) (Table 2).

Tobacco chewing was the most common associated risk factor and it was observed in 46% of patients, followed by prolonged standing which was noted in 44% of patients. We did not find any significant association between past history of varicose veins and treatment for same, as it was observed only in 8% patients.

High number of pregnancies which was taken as more two pregnancies were found in 26% females (Table 3). Body mass index (BMI) of more than 25 kg/m<sup>2</sup>, mean being 24.62 kg/m<sup>2</sup>, and SD = 5.10 were noted in 40% of patients (Table 4).

### Discussion

It is mandatory to have sound knowledge of etiology and risk factors associated with any disease specific

**Table 1.** Gender distribution.

Gender	No of cases	Percentage
Male	36	72
Female	14	28
Total	50	100

**Table 2.** Age distribution.

Age (Yrs)	Number of Patients with Primary Varicose Veins	Percentage
>50	33	66
<50	17	34
Total	50	100

**Table 3.** Risk factors amongst study group.

Risk factors	No of cases	Percentage (n=100)
Smoking	13	26
Tobacco	23	46
Prolong standing	22	44
Past H/O Varicose Vein/Deep Vein Thrombosis	6	12
Past H/O Treatment for Varicose Vein	4	8
Family H/O Varicose Vein Deep Vein Thrombosis	11	22
High numbers of pregnancies ( > 2)	13	26

**Table 4.** Body Mass Index in patients.

BMI (kg/m <sup>2</sup> )	Number of patients	Percentage
>25	20	40
<25	30	60
Total	50	100

cally when, the mainstay of treatment is surgery. This will help to prevent such diseases and decrease its incidences.

This study was done to seek a better knowledge about the etiology of secondary varicose veins. This can spread the awareness about the various risk factors of varicose veins and different measures to prevent it.

Varicose veins are mentioned as far back as Hippocrates' time, he was the first to recognize the correlation between varicose veins and ulceration of the leg [4]. The exact causes of varicose veins and its mechanisms are still unclear. The most important suggested risk factors are female sex, older age, family history of varicose

veins, obesity, high numbers of pregnancies such as more than two, past history of deep vein thrombosis and prolonged standing [5]. Smoking, chronic cough, constipation, persistent low fibre diet and physical inactivity have also been suggested as an additional aetiological factors.

Literature doesn't show any consistency in gender specific prevalence of varicose veins. Available literature mentions that varicose veins are more common in women [6]. Whereas few other studies showed no sex differences in the same [7]. In our study fifty patients, 36 were male and 14 were female with a female: male ratio of 1:2.57.

According to literature increasing age related prevalence is due to the increased pressure on superficial veins of lower limb. Weakening of calf muscles coupled with the gradual deterioration of vessel walls over the time is the major responsible culprit for this [8]. Brand et al found that this condition is more common among people younger than 50 years of age, and it was less than 1% and 10% in men and women respectively in their study [9]. We had similar findings and mean age in this study was 44 years (range: 18–70). In our study, 66% of patients were <50 years of age and 34% were more than 50 years of age.

Iannuzzi, et al. showed that disease has more prevalence in women with a BMI of more than 25 kg/m<sup>2</sup> [10]. Edinburgh Vein Study supported similar findings in their study of different pathogenesis associated with the varicose veins [11]. The BMI of patients in our study showed that 40% patients had BMI more than 25 kg/m<sup>2</sup>, whereas 60% of them were within normal BMI range - between 18.5 and 24.99 kg/m<sup>2</sup>, indicating no specific relationship of BMI with respect to disease prevalence.

Cornu-Thenard, et al. reported the risk of developing varicose veins is as high as 90% if both parents suffered from this disease [12]. Literature lacks in information regarding specific genes associated with disease if any. We found that 22% patients in our study group had previous family history of either varicose veins or deep venous thrombosis.

Pregnancy is associated with various physiologic changes which are likely to cause the venous distension and eventually leading to varicose veins. The significant

increase in blood volume during early pregnancy which mainly increases the venous capacitance strain can cause the venous dilatation leading to varicose veins formation [8]. The researchers couldn't find the exact percentage of its association with varicose veins, neither we could find definition of high number of pregnancies taken in such cases. We found 26% of females who had varicose veins in our study had more than two number pregnancies.

According to our study, most common risk factor associated with the varicose veins was consumption of tobacco in any form which was seen in 46%. Other associated risk factors were prolong standing, smoking in any form, more than two numbers of pregnancies, and family history of varicose veins or deep venous thrombosis which were 44%, 26%, 26%, and 22%, respectively. Abnormal collagen synthesis, due to using tobacco, caused weakness and the dilatation of valve annulus further led to poor valve leaflet apposition and then causing venous reflux are the probable postulates in association of tobacco consumption and varicose veins [3].

In our study, previous history of deep venous thrombosis and past history of surgery for varicose veins did not have a significant impact on the development of disease and it was seen only in 12% and 8%, respectively. Winterborn, et al., found that past history of deep venous thrombosis and previous incomplete surgery for varicose veins were important factors for recurrence [13].

Prolong standing was found to be one of the major etiological factor for prevalence of varicose veins and was seen in 44%, similar findings were observed by Winterborn, et al., and it was found in 36% of their patients [13].

### Conclusion

We found that prolong standing, smoking (> 10 cigarettes/day), having more than two pregnancies, and a family history of deep venous thrombosis were the major associated risk factors for varicose veins. We couldn't establish any strong association between previous history of deep venous thrombosis and varicose vein surgery with respect to recurrence of it.

We suggest further study in a larger group is needed to correlate the association of higher number of preg-

nancies with varicose vein prevalence. Among modifiable risk factors, tobacco and smoking in any form should be abandoned in order to decrease the incidence of varicose veins. Simple ergonomics rules can be followed up to decrease the varicose veins prevalence such as, avoiding continuous prolong standing.

#### Conflict of interest statement

The authors have no conflicts of interest to declare.

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