

RISK FACTORS OF CHRONIC VENOUS DISEASE INCEPTION

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Abstract

On the basis of a questionnaire investigation, a set of 319 patients with the manifestation of chronic venous disease was investigated for the occurrence of risk factors affecting the inception and development of lower limb venous system disease.

The following risk factors appeared significantly more frequently in the set of patients: sex, occurrence of VV in the family (inherited disposition), overweight, pregnancy, all of them playing an important role in the development of chronic venous disease (CVD) in predisposed individuals.

Key words

Chronic venous disease, Chronic venous insufficiency, Risk factors

Abbreviations used

CVD, chronic venous disease; CVI, chronic venous insufficiency; LL, lower limb; BMI, body mass index; VV, varicose veins.

INTRODUCTION

Chronic venous disease of lower limbs is characterised by many symptoms, the most prominent of them being usually varicose veins and venous ulceration. However, the symptoms also include oedema, stasis dermatitis and venous eczema, hyperpigmentation of the skin of the ankle, atrophie blanche, and lipodermatosclerosis.

Chronic venous disease can be classified according to descriptive clinical, aetiological, anatomical, and pathophysiological (CEAP) classification, providing a stable base for lower limb venous system status assessment (1, 2).

CEAP classification (1994): Clinical symptoms in the lower limbs affected are categorised into seven classes marked C₀ to C₆ (C - clinical symptoms of CVD, E - aetiological classification, A - anatomical distribution of VV, P - pathophysiological dysfunction).

Clinical stages of CVD according to CEAP:

C0 - without visible and palpable signs of venous disease;

C1 - telangiectasia or reticular VV;

C2 - nodal VV;

C3 - oedema;

C4 - skin changes on lower limbs in case of CVD (hyperpigmentation, venous eczema, lipodermatosclerosis), *Fig. 1*;



Fig. 1

C4 - skin changes on lower limbs in case of CVD (hyperpigmentation, venous eczema, lipodermatosclerosis, oedema)

- C4A - pigmentation, venous eczema or both of them;
- C4B - lipodermatosclerosis, atrophie blanche or both of them;
- C5 - healed venous ulcer;
- C6 - open venous ulcer (*Fig.2*).

Subjective symptoms on lower limbs connected with chronic venous disease include pain in the limbs, feeling of heavy legs, feelings of intumescences, pressure or burning of the skin; lower limbs categorised in any clinical class may be symptomatic (S) or asymptomatic (A).

Chronic venous disease includes a wide spectrum of signs and symptoms connected with classes C_{0,s} up to C₆, while the term “chronic venous insufficiency” is generally reserved for a more serious disease (i.e. classes C₄ to C₆). Varicose veins - in case of absence of skin changes - do not bear evidence of chronic venous insufficiency (3).



Fig. 2
C6 - open venous ulcer

The occurrence of chronic venous disease in the population is connected with the lifestyle of modern society. Chronic venous disease ranks among civilisation diseases and its occurrence increases in both sexes nearly linearly with age. Chronic venous disease is very frequent even though the estimations of its prevalence differ. The majority of studies proved that chronic venous disease occurs more frequently in women. In a population study performed in San Diego, chronic venous disease appeared more frequently in populations of European origin compared to Blacks or Asians (4). The occurrence of venous ulcerations is specified to reach 0.1–1.3 % (5). Risk factors of chronic venous disease include inheritance, age, female sex, obesity (mainly in women), pregnancy, long-time standing, and higher body height (6–10). The aetiology of CVD still remains unclear. The cause of chronic venous disease is multifactorial and represents a combination of internal and external influences.

Risk factors of CVD occurrence (9–15)
1. inheritance (genetic predisposition)
2. obesity
3. number of pregnancies
4. peroral contraception/ hormonal substitution treatment
5. long-time standing or sitting
6. insufficient movement
7. lack of fibre in food / congestion
8. smoking
9. wearing high heels, garters

On the basis of everyday clinical practice we are well aware of the fact that high BMI (Body Mass Index) has an indisputable relation to the development of VV and other symptoms of CVI, mainly the venous ulcer. However, the proofs are much clearer in women than in men. In industrial countries, obese people or people with overweight (mainly women) suffer from various manifestations of CVD much more frequently than a population of the same age but with appropriate weight.

VV appear in many women just in the course of their pregnancy. According to many epidemiological studies, including the Framingham study, there exists a positive correlation between the prevalence of VV and the number of pregnancies. However, the prevalence of varicose veins of lower limbs increases with the number of deliveries. Naturally, there also exist some studies excluding any relation between the number of deliveries and the incidence of VV, e.g. the Tecumseh population study, USA (16). There are several possible causes why pregnancy increases the risk of VV occurrence and development – enlarged pregnant uterus, pushing from the outside to the pelvic veins, sex hormones deteriorating the return of venous blood from lower limbs (estradiol, progesterone) and increased volume of circulating

blood. The mechanical theory of enlarged uterus preventing the return of venous blood has recently been abandoned, as most VV appear in the first trimester of gravidity, when the level of choriogonadotropin (HCG) and progesterone produced by placenta is significantly increased.

In the aetiology of LL CVD the genetic predisposition probably also plays a role. But even though the cause of CVD has been investigated for years, any clear proofs are still missing and the type of inheritance is not known, either. The population studies proving the influence of inheritance are only based on the history (12, 17).

The occurrence of VV is more frequent in patients with a positive family history – mainly in the case of father affection. However, the findings do not fit any model of inheritance. So far it is not clear how the synthesis of collagen is genetically affected with the number of venous valves. Undoubtedly there exist racial differences in the number of valves in the veins of lower limbs (2). The influences of the lifestyle include long-time standing, sitting, lack of dietary fibre and related constipation, use of skintight underwear, increased sitting position on toilets (combination of venostasis in freely pendent lower limbs with increased intra-abdominal pressure during defecation), insufficient movement, and smoking (18). There has not been proved any correlation of dietary habits and constipation to CVD. These factors have not been found statistically important for the occurrence of CVD. Recently, results have been published of a French case and a control study – its results indicate that there is a significant connection between smoking and CVD (19). Employments where people are standing on long-term basis (shop assistants, cooks, dentists, etc.) are connected with an increased prevalence of VV (13,20). The studies were usually aimed at the incidence of VV among people of different jobs, mainly in industry, and some authors confirmed a specific relation between long-term standing and VV (21).

MATERIALS AND METHODS

We monitored the occurrence of risk factors in a group of patients with VV who attended our office of phlebology. The patients each filled in a questionnaire with questions aimed at possible occurrence of risk factors (sex, age, weight, height, occurrence of VV in the family, type of work, number of pregnancies, hormonal treatment, smoking, congestion, food composition, flat feet, sports, sauna, swimming), and we also tried to find out which way of venous disease treatment was applied to them, with concentration on venotonics and compressive treatment.

In total, 319 patients participated in the project by filling in the relevant questionnaires. All the 319 patients were included in the statistical analysis. The number of analysed patients differed with each question, depending on the number of patients specifying the reply to a given question.

We stated the results of statistical processing in absolute numbers and relevant percentage representations, by average values with the standard deviation, and we summarised the values in tables.

RESULTS

The group of 319 patients included 293 (91.8 %) women. The average age of the patients was 50 ± 13.1 years; the youngest patient was 16 years old, the oldest was 80 years old.

Table 1 states the distribution of the patients in individual age categories.

Table 1
Age categories of patients

Age categories	n	%
≤ 30 years	25	7.8
31-40 years	53	16.6
41-50 years	59	18.5
51-60 years	117	36.7
61-70 years	36	11.3
71-80 years	16	5.0
> 80 years	0	0.0
Not specified	13	4.1

The BMI was calculated from specified weight and height, reaching the average value of 25.3 ± 4 (*Table 2*).

A standard BMI value up to 24.8 is set for the standard population.

Table 2
Weight, height, and BMI of patients in the set

Characteristics of the patient	n	average \pm s.d.	min	max
Weight (kg)	303	72 ± 16.3	45	150
Height (cm)	317	169 ± 7.2	150	197
BMI	305	25.3 ± 4.9	17.2	48.1

VV appeared within the families of 278 (87.1 %) patients. An overview of relatives with VV and the number of persons with VV in the family are specified in *Tables 3, 4, 5*.

Table 3
Occurrence of VV in the family

Occurrence of VV in the family (n=319)	N	%
Yes	278	87.1
No	35	11.0
Not specified	6	1.9

Table 4
Relatives with VV

Specification of persons (n = 278):	n	%
Mother	200	71.9
Grandmother	106	38.1
Father	88	31.7
Grandfather	39	14.0
Others:	29	10.4
Sister or brother	19	6.8
Aunt	5	1.8
Great grandmother	1	0.4
“All the others”	1	0.4
Cousin	0	0
Without specification in the family	3	1.1

Table 5
Number of persons with VV in the family

Number of persons with VV in the family (n = 278)	n	%
1 person	9	3.2
2 persons	139	50.0
3 persons and more	130	46.8

142 (44.5 %) of the patients stated alternative work while standing and sitting; sitting work was reported by 85 (26.6 %) patients while 62 (19.4 %) patients worked standing.

259 (81.2 %) of 293 were pregnant in the past; the patients were twice pregnant on average.

117 (39.9 %) of the patients reported hormonal therapy with an average time of treatment of 8 ± 6.7 years.

70 (23.9 %) patients used contraceptive pills, 50 (17.1 %) patients were on hormonal substitution therapy.

48 (15.0 %) of the patients are smokers, 238 (74.6 %) patients are non-smokers, 27 (8.5 %) patients are quit smokers. The average number of cigarettes was 6 ± 4.3 cigarettes per day.

50 (15.4 %) of the patients reported congestion, while 218 (68.3 %) patients stated sufficient quantity of fibre and 255 (79.9 %) patients stated sufficient vegetables in their food.

166 (52.0 %) patients stated that they regularly performed sports activities. The most frequent activity was cycling (61 [36.7 %] patients), swimming (41 [24.7 %] patients), and the third position was taken by skiing - 22 (13.3 %) patients.

166 (52.0 %) patients regularly attended sauna, 42 (13.2 %) patients frequently sunbathed. Occasional sunbathing was reported by 213 (66.8 %) patients.

97 (30.4 %) patients reported flat feet.

67 (21.0 %) patients have been using venotonics for an average time of 13.1 ± 10.8 years. Sixty-seven (21.0 %) patients regularly wear compressive elastic stockings, while 55 (17.2 %) patients use them only occasionally. Twenty-five (7.8 %) patients use roller bandages for compressive treatment, 1 (0.3 %) patient uses them only occasionally. The average time of compressive treatment application in the patients is 9.9 ± 10.5 years.

The assessment of LL venous system status in the patients according to CEAP classification and the occurrence of individual types of venous affections depending on sex and age of the patients can be seen in *Tables 6, 7, 8*.

Table 6
Clinical degree of CVD according to CEAP classification

Clinical degree according to CEAP classification; n = 319	n	%
C1	62	19.4
C2	166	52.0
C3	34	10.7
C4	26	8.2
C5	3	0.9
C6	27	8.5
Not specified	1	0.3

Table 7
Clinical degree of CVD according to CEAP in relation to sex of the patients

Clinical degree according to CEAP x sex	Men n = 25	Women n = 293
C1	0	62
C2	9	157
C3	3	31
C4	1	25
C5	0	3
C6	12	15

Table 8
Clinical degree of CVD according to CEAP in relation to age of the patients

Clinical degree according to CEAP x age categories	≤ 30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years
C1	11	17	11	16	2	1
C2	14	32	30	61	17	5
C3	0	2	12	18	2	0
C4	0	2	3	13	5	1
C5	0	0	0	1	1	1
C6	0	0	3	8	9	7

DISCUSSION

Even though the aetiology of CVD of LL has not been clearly explained yet, especially with regard to the development of primary CVD, there is no doubt that in the case of CVD manifestation many risk factors may be involved. That is why we aimed our work at identification of the factors and their prevalence in the set of patients monitored.

Our set of 319 patients with an average VV affection degree of C2 according to CEAP classification included more frequently women, which is in correlation with the majority of literature studies. In the Framingham study, the annual incidence of varicose veins reached 2.6% in women and 1.9% in men, while the Edinburgh vein study showed higher varicose vein prevalence values in men. A cross-sectional study applied to a random sample of 1566 subjects aged 18 to 64 years, selected from the

general population of Edinburgh, Scotland, revealed that telangiectasia and reticular veins appear in approximately 80 % of men and 85 % of women (22). In the whole Western population, VV have appeared in the course of two years in approximately 39 men out of 1 000 and in approximately 52 women out of 1 000 (16).

We noted the highest rate of VV occurrence in patients in the age category of 51–60 years. Eighty-seven per cent of the patients reported VV occurrence in their families, which also corresponds with the literature data.

The average BMI value in the patients of our set reached 25.3, which is the same as in the case of the patients in the Edinburgh venous study. The Framingham study described the risk of VV occurrence by 33 % higher in women with BMI above 27 (16)

Eighty-one per cent of female patients were pregnant in the past – the average number of pregnancies was 2. In the Framingham study a prevalence of VV of 10 up to 63 % is reported for parous women, while for childless women the occurrence reaches only 4–26 % (16).

We did not succeed in proving any significantly higher occurrence of other risk factors in our set of patients.

CONCLUSIONS

In our set of patients, the following risk factors appeared significantly more frequently: sex, occurrence of VV in the family (inherited disposition), overweight, pregnancy, all of these playing an important role in the development of chronic venous disease in predisposed individuals.

Basing on the presence of risk factor detection it is possible to adjust the daily routine of the patients and to select an optimal treatment procedure in the case of the CVD manifestation development.

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