

Association of Venous Disorders with Leg Symptoms: Results from the Bonn Vein Study 1

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WHAT THIS PAPER ADDS

This paper adds information to the discussion about the role of leg symptoms in venous disorders.

Objectives: The aim was to study the association between venous disorders and leg symptoms in the population based cross sectional Bonn Vein Study 1 (BVS1).

Methods: A total of 1,350 men and 1,722 women aged 18–79 years were enrolled into BVS1. Chronic venous insufficiency (CVI), varicose veins (VVs), and clinical classes (C-classes/CEAP [Clinical, Etiological, Anatomical, and Pathophysiological]) were determined by clinical and duplex investigation. Leg symptoms (heaviness, tightness, swelling, pain after standing or sitting, pain while walking, muscle cramps, itching, and restless legs) were assessed in a standardized interview. For 2,624 subjects (48.7% male) with complete information on venous disorders, relevant characteristics and information on at least one leg symptom, multivariate logistic regression analysis was performed.

Results: More women (929/63.0%) reported at least one leg symptom within the last 4 weeks than men (560/48.7%). Prevalence of reported symptoms increased with age (45.4% of the 18–29 year olds, 73.9% of the 70–79 year olds). Leg symptoms were more frequent in obese and underweight subjects. As confirmed by clinical and duplex examination 22.6% had VV and 15.8% had CVI. VV (OR: 1.4; CI: 1.1–1.7) and CVI (OR: 1.8; CI: 1.3–2.3) were significantly associated with reporting at least one leg symptom. In particular, there was a positive association of VV and CVI with itching, feeling of heaviness, tightness, swelling, and pain after standing or sitting. C2–C6 showed a statistically significant association with feeling of heaviness, tightness, swelling, and itching, while for pain on walking and muscle cramps this was shifted towards C classes C3–C6 and C3–C4, respectively.

Conclusions: Venous disorders show significant associations with several leg symptoms. Itching, feeling of heaviness, or tightness seem to be more closely related than other symptoms. The associations between C classes and symptoms seem to be restricted to classes C2 or higher.

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INTRODUCTION

Chronic venous disorders (CVDs) of the lower limbs are very frequent all over the world.^{1–6}

Venous disorders can be classified by the Clinical, Etiological, Anatomical, and Pathophysiological [CEAP] classification updated in 2004.^{7,8} All clinical classes can be specified as asymptomatic (A) or symptomatic (S). Symptoms include aching, pain, tightness, skin irritation,

heaviness, muscle cramps, and other complaints attributable to venous dysfunction.⁸ The subjective symptomatic course can point to a venous etiology, particularly if the above mentioned symptoms are exacerbated, for example by heat, show diurnal variation, or are relieved with leg rest and/or elevation.⁹ However, none of these leg symptoms are considered to be pathognomonic of CVDs and could either have a venous origin or another cause. In the literature, contrasting statements regarding the diagnostic value of lower limb symptoms such as pain or feeling of heaviness can be found. Bradbury et al.¹⁰ concluded that even in the presence of trunk varices most of the lower limb symptoms, previously assumed to be caused by venous disease,

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probably have a non-venous cause. The same authors suggest that symptoms in patients with and without duplex ultrasound confirmed functional venous disease do not differ.¹¹ On the other side, there is a significant correlation between worsening of clinical classes and lower limb symptoms.² Moreover, the presence of lower limb symptoms in patients with varicose veins (VVs) correlates with decreased health related quality of life (HRQL).¹²

The leg symptoms described may also be associated with other personal characteristics like higher age, female gender, obesity, and others. The aim of this study was to analyze the association between chronic venous disorders like VVs and CVI, including the differentiation of clinical classes and leg symptoms, taking personal characteristics into account. Owing to the international discussion on the association of leg symptoms with venous diseases, cross sectional data from the population-based Bonn Vein Study (BVS) 1, which was conducted from October 2000 till November 2001, was re-evaluated.

METHODS

The analysis is based on data from BVS1, a population based cross sectional study including 3,072 participants: 1,350 (43.9%) male and 1,722 (56.1%) female. The participants were aged 18–79 years (mean 48 ± 16) and drawn from an age stratified random sample of the general population in the city of Bonn and two rural townships. The response rate was 59%. Its methods have been described in detail previously.⁴ The main aims of the BVS1 were to assess the prevalence of venous disorders, the frequency of venous signs and symptoms, and to identify risk factors. Approval for BVS1 was granted by the Bonn University ethics committee.

Participants completed a standardized questionnaire giving general information on socio-demographic status, lifestyle, physical activity, medical history, and quality of life. Standardized interviews on the history of specific venous conditions including subjective leg symptoms attributed to venous disease within the last 4 weeks were conducted by investigators trained in phlebology. In the questionnaire, leg symptoms were documented for each leg separately included the feelings of heaviness, tightness, and swelling, pain after standing or sitting, pain while walking, muscle cramps, itching, and restless legs. Leg symptoms in general were defined as the presence of at least one of these symptoms. Moreover, clinical examination and color coded duplex sonography (in B-Mode with 7.5–10 MHz and duplex with 7 MHz; AU-5 Harmonic, Esaote, Genoa, Italy) were performed in a standardized manner according to a handbook with specific instructions for the study. Weight and height were measured in all participants and body mass index BMI was calculated in kg/m^2 . The venous findings were classified according to CEAP, assigning the highest clinical level. All four investigators who conducted the phlebological examinations took part in an inter-observer reliability test. Ten patients were chosen from among the inpatients of the Bonn dermatology department for

repeated investigations. For the CEAP classification there was complete or almost complete agreement between the investigators, with a kappa value between .85 and 1.00 for the different items. Color coded duplex sonography also showed almost complete agreement between investigators, with a kappa value of .81.¹³

VVs were defined as clinical stages C2–C6, at least one alteration of subcutaneous veins in the anatomic classification and primary origin in the etiological classification. Chronic venous insufficiency (CVI) was defined as clinical stages C3–C6.

Statistics

Subjects with information on at least one symptom, complete information on venous disorders, and on the above mentioned potential confounders form the study base of this analysis ($N = 2,624$). Descriptive statistics are presented as the number of events and relative frequency percentage. Multivariate logistic regression modeling was used to assess the association of venous disorders such as VVs, CVI, and the different C classes of CEAP with leg symptoms in general (presence of any symptom) as well as with individual symptoms as the outcome. A separate analysis was performed for each symptom. For the analysis, CEAP classes C5 and C6 were reduced to one category because of the low prevalence of C6. The reference category for each group in our analysis was C0. Sex, age, BMI, urban versus rural residence, and the number of pregnancies were considered possible confounders and included in the analysis in clinically relevant categories. Odds ratios (OR) and their 95% confidence interval (CI) for each symptom were estimated. Analyses were conducted in the complete group and stratified by sex. Data analyses were performed using the statistical software SAS (version 9.2; SAS Institute Inc., Cary, NC, USA).

RESULTS

Of the 2,624 participants with complete information 44% were male. According to clinical and duplex examination 592 (22.6%) of the participants had VVs, with or without signs of CVI. According to sex, 214 (18.6%) of the men and 378 (25.6%) of the women had VVs. CVI (C3–C6) was diagnosed in 415 (15.8%) of the participants. One hundred and sixty-five (14.3%) of the men and 250 (17.0%) of the women had CVI. A detailed description of the study population including the distribution of age, BMI, and region of living, as well as the prevalence of VVs, CVI, C classes, pregnancies, and hormone use is shown in [Table 1](#).

[Table 2](#) shows the data of participants with at least one leg symptom according to sex, age, BMI, region of living, VVs, CVI, C classes, pregnancies, and hormone use. 1,489 of the 2,624 participants (56.7%) reported at least one leg symptom within the last 4 weeks. Women complained more often about leg symptoms in general than men (63% of women vs. 48.7% of men). With increasing age, a higher prevalence of complaints in the last 4 weeks was observed. In total, 45.4% of the 18–19 year old participants and

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