Lower limb edema among medical students

Obrzęki kończyn dolnych wśród studentów kierunku lekarskiego

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Summary

Paper objective: Chronic venous insufficiency (CVI) is a disease that consists of a set of symptoms in the lower limbs, and edema is one of the first and most common medical complaints. The purpose of the paper was to determine the impact of the classes on the frequency of lower limb edema among medical students.

Materials and methods: Data analysis from the questionnaire conducted among 482 medical students from 12 Polish medical universities in the 2018/2019 academic year. The survey included questions about known and likely risk factors for lower limb edema and the CEAP scale to assess the severity of CVI was used.

Results: Lower limb edema occurred in 30% of the respondents, of whom 55% reported worsening of the symptoms on the days they attended classes.

Conclusions: Lower limb edema occurs among medical students, more often among women. Class mode has an impact on their occurrence. The factors that have the greatest impact on the severity of edema among students are: standing and sitting for a long period of time and high ambient temperature.

Keywords: edema, chronic venous insufficiency, compression therapy, students

Introduction

Chronic venous insufficiency (CVI) is a common disease in developed countries [1]. In Poland, 37% of men and 47% of women in the entire population suffer from this disease [2]. This problem consists of a set of symptoms located in the lower limbs (LLs), caused by a persistent disorder of blood outflow through venous vessels, both superficial and deep [3]. The pathogenesis of the disease is multifactorial and has still not been thoroughly studied. Discussions about the predominance of genetic factors over environmental factors are ongoing [4, 5]. It was found that loss of vascular wall elasticity and impaired valve function, leading to venous reflux, play the biggest role in the occurrence of the disease [1]. Venous hypertension, caused by disturbed vascular function, causes the occurrence of the main symptoms of CVI such as: edema, lipodermatosclerosis, ulceration, telangiectasia, varicose veins [6].

A relationship is observed between the occurrence of CVI and risk factors such as: older age, being female, genetic predisposition, overweight and obesity, use of hormonal contraception, past pregnancies and births, chronic constipation, smoking tobacco and tobacco products, low physical activity, excessive heat exposure, nature of the work performed – prolonged standing and sitting [5–8]. Jawień in his study on the Polish population did not show the relationship between CVI and work in sitting position, however, he showed a much more frequent occurrence of CVI among persons of both sexes performing work in standing position [5].

In European countries, vein diseases affect 35% of the active professionals [1]. CVI can be a cause of inability to work, significantly reduces the quality of life and generates an increase in spending on health care [9, 10]. As much as 90% of all LLs edema cases is caused by CVI [11]. In addition, edema is often the first symptom that announces this disease [10]. A special type of swelling are those caused by so called occupational swelling, which disappears spontaneously after lying down. The appearance of this type of edema is not associated with the presence of other aggravating diseases [12]. These swellings are caused by the passage of fluid from the venous vessels to the extracellular space as a result of increased venous pressure associated with prolonged standing or sitting and the effect of gravity [13].

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Belczak et al. proved that LLs edema is a constant phenomenon, also among persons without diagnosed CVI [14].

The aim of the study was to determine the correlation between the mode of classes of medical students and the associated forced standing position and the frequency of occurrence of CVI symptoms, including so-called "occupational swelling".

Materials and methods

The study used an original survey conducted among medical students from 12 Polish medical universities in the 2018/2019 academic year. A standardized CEAP (Classification of Chronic Venous Insufficiency of the Lower Limbs) scale was used to determine the severity of venous insufficiency [15]. It includes 7 stages: 0 – invisible or imperceptible lesions, 1 – telangiectasias or spider veins, 2 – varicose veins, 3 – edema, 4a – discoloration or blemishes, 4b – lipodermatosclerosis or atrophic scars, 5 – healed ulcerations, 6 – active ulcerations.

The exclusion criterion was the appearance of other possible causes of edema, such as: recent LLs injuries, diabetes, hypertension, pregnancy or childbirth, phlebitis, LLs embolism, chronic liver, kidney or cardiovascular diseases [16]. The results analysis included surveys collected from 482 students, including 84 men (17%) and 398 women (83%). The age of women participating in the questionnaire was 22.34 ± 1.88 years. The body mass index (BMI) of women was 21.39 ± 2.96 kg/m². The age of men was 22.43 ± 1.63 years. The BMI of men was 22.88 ± 2.65 kg/m² (Table 1). The BMI in 358 (74%) of th respondents was within the normal body weight range, while 64 (13%) were overweight (Table 1).

Table 1.

Age, body height body weight, BMI

Parameters	Females	Males
Age (years) x ± SD min-max	22.34±1.88 19-35	22.43±1.63 19-26
Body height (cm) x ± SD min-max	167.23±5.29 153-183	179.9±6.51 163-193
Body weight (kg) x ± SD min-max	59.86±8.89 44-90	74.17±10.27 50-98
BMI (kg/m²) x ± SD min-max	21.39±2.96 15.92-32.87	22.88±2.65 17.99-27.44

BMI – body mass index

The questionnaire was developed in order to analyze the frequency of occurrence of CVI symptoms among medical students, with particular emphasis on edema, in correlation with the conducted lifestyle, family medical history and risk factors of disease development. Respondents reported the type of signs and symptoms found in questions developed on the basis of the CEAP scale created by the International Committee of the American Venous Forum [15]. The survey also assessed the awareness of the relationship between the presented symptoms and CVI.

Results

146 students (30% of all respondents) reported LLs edema, including 142 women and 4 men. Among 86% of persons, edema was most severe in the evening, in 9% in the afternoon, and in 5% in the morning (Fig. 1).

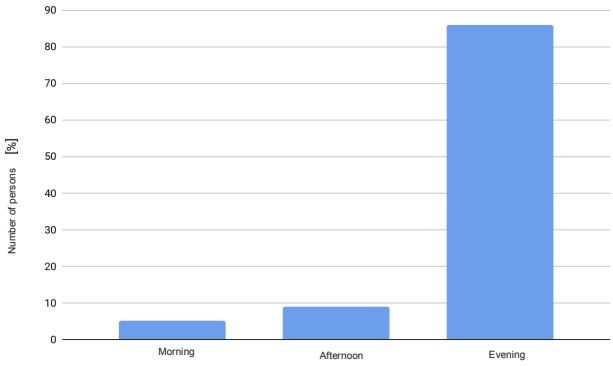

Figure 1. The severity of LLs edema depending on the time of day

In the multiple-choice question, the respondents indicated the following factors as the ones intensifying the symptoms: prolonged standing – 70%, sitting – 59% and high ambient temperature – 47% of responses. Among women, 44% noticed a relationship between the severity of edema and menstruation (Fig. 2).

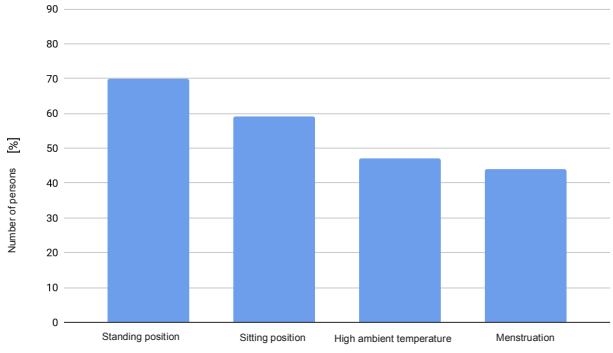

Figure 2. The most common factors enhancing LLs edema

Among respondents confirming the occurrence of edema, 55% of students noticed an increase in symptoms on the days they attended the university. Only 1% of persons observed more advanced edema on non-working days, while the remaining respondents did not notice a significant difference (Fig. 3).

The most commonly reported edema locations were around: ankles – 38%, lower legs – 37%, feet- 25%. The subject symptoms that accompany LLs edema that may suggest CVI and are

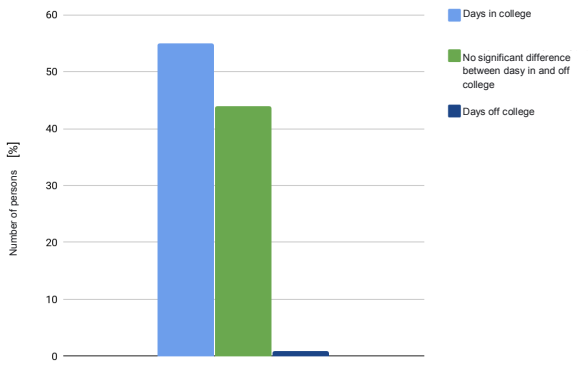

Figure 3. The severity of LLs edema depending on being in the university

most frequently reported were: feeling fatigue of legs appearing at the end of the day, which was confirmed by 78% of respondents, tingling and numbness – 64%, leg pain – 57% (Fig. 4).

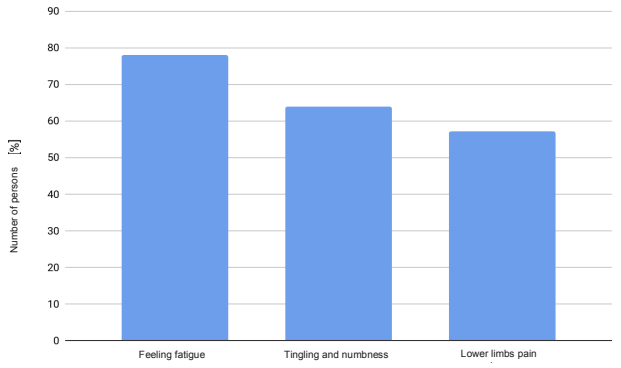

Figure 4. Symptoms associated LLs edema

The most characteristic subject symptoms of CVI occurring together with edema were: spider veins in 49%, trophic changes in 15% and varicose veins, which were reported by 15% of respondents (Fig. 5).

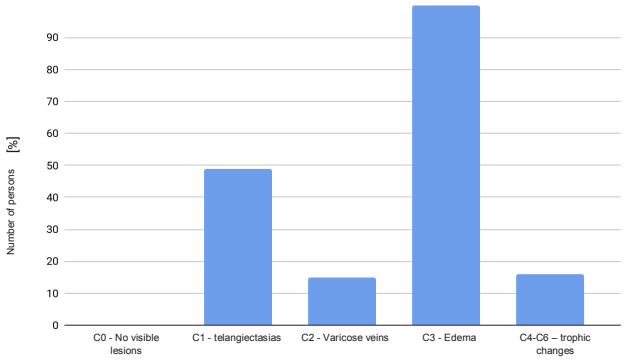

Figure 5. Signs associated with LLs edema developed according to the CEAP scale

Assessing the awareness of the problem, 22% of medical students who had at least one of the symptoms suggestive of CVI besides edema, did not see the link between the presented symptoms and this disease. Knowing the effectiveness of compression therapy in reducing symptoms, the students reporting edema were asked to try it – 85% did not use compression clothing.

Among persons with family medical history of CVI, LLs edema occurred among 36% of persons, while among those without the family history, edema was present among 22%. Among persons with normal BMI, 27% had edema, while overweight persons – 43%. 100% of obese people reported the occurrence of symptoms. Among respondents confirming smoking tobacco and tobacco products, 35% reported edema, compared to 24% of non-smokers (Fig. 6)

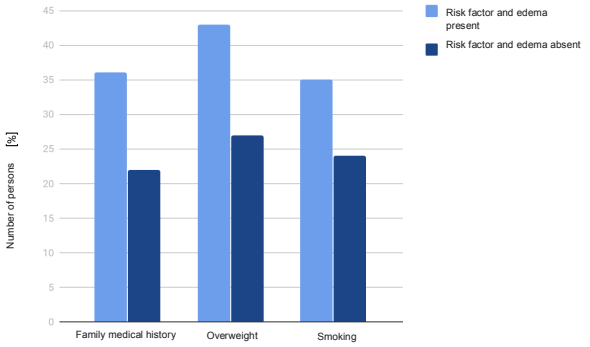

Figure 6. Risk factors and the presence of LLs edema

Discussion

The problem of LLs edema was the subject of the study among groups of active professionals remaining in one position for a long period time – standing or sitting. The following persons were taken into the study in the view of the above: a group of men performing standing work, flight attendants, office workers and hospital staff [14, 17–19]. All studies have shown a link between the position taken and the occurrence of edema. To confirm its presence, however, more advanced study methods were used than the questionnaire: physical examination, Doppler ultrasound, volumetry using water buoyancy or optical.

The current literature has focused on the problem of edema especially among people in middle and older age [2, 7, 14, 17, 20]. Criqui et al. proved that life expectancy is one of the main risk factors, and the frequency of CVI occurrence increases with age [20]. Available data on LLs edema among the population of young people are limited, however Chiesa et al. in their study distinguish a group of people under 30 years of age. [21] with the advancement of lesions similar to the results presented in this paper.

Considering the impact of inherited burden on CVI, it has been proved that the risk of disease occurrence is 40% when one parent suffers from varicose veins; 90% when both parents were ill [6]. Mahapatra et al. in their study showed a significant impact of the BMI indicator on the occurrence of CVI [22]. According to the data collected by Gourgou et al., 37% of smokers and 24% of non-smokers will experience CVI [23]. In this

study, a similar effect of the aforementioned risk factors on the development of the disease was demonstrated, despite the short exposure to them.

Compression therapy improves the effectiveness of the muscle pump, reduces venous reflux, and when used regularly, reduces LLs edema, especially at the end of the day [24]. Weiss et al. in their study on a group of 19 professionally active flight attendants showed that after 4 weeks of systematic use of compression clothing, there was a statistically significant reduction in edema, itching, discomfort and tension [17]. Despite the proven symptom-reducing effect, compression therapy is not used by the tested students. The causes of this phenomenon can be seen in the disadvantages of compression clothing such as: low wearing comfort, high clothing price, long-term therapy in the absence of full effectiveness [25].

The awareness assessment studied in this paper shows the need to expand knowledge about CVI among students and physicians. In the future, this may translate into earlier diagnosis, slowing down the progression of the disease and limiting its complications, as well as reducing health care expenditure in this area. In current papers, there is no definitive division between "occupational swelling" and edema resulting from CVI. De Boer states that edema caused by work is a physiological phenomenon [26], therefore from this paper, prepared on the basis of the questionnaire, it cannot be clearly determined whether the edema was physiological or pathological. In the future, it would be necessary, just like Belczak et al. [14], to take calf size measurements depending on the time of day and duration of classes in order to further investigate the phenomenon and its advancement in a young group of people.

Conclusions

1. LLs edema occurs among medical students, more often among women.
2. The class mode affects the occurrence of LLs edema. Their greatest intensity is observed in the evening.
3. The factors that have the greatest impact on the occurrence of edema among students are: standing and sitting for a long period of time and high ambient temperature.

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Streszczenie

Cel pracy: Przewlekła niewydolność żylna (PNŻ) jest chorobą, na którą składa się zespół objawów występujących w kończynach dolnych, a obrzęk jest jedną z pierwszych i zarazem najczęstszych dolegliwości. Celem pracy było określenie wpływu trybu zajęć na częstotliwość powstawania obrzęków kończyn dolnych u studentów kierunku lekarskiego.

Materiał i metody: Analiza danych z kwestionariusza przeprowadzonego wśród 482 studentów kierunku lekarskiego z 12 polskich uczelni medycznych w roku akademickim 2018/2019. W ankiecie zawarto pytania dotyczące znanych i prawdopodobnych czynników ryzyka obrzęku kończyn dolnych oraz zastosowano skalę CEAP w celu oceny zaawansowania PNŻ.

Wyniki: Obrzęki kończyn dolnych wystąpiły u 30% ankietowanych, spośród których 55% stwierdza nasilenie objawów w dniach, w które uczęszczali na zajęcia.

Wnioski: Obrzęki kończyn dolnych występują u studentów kierunku lekarskiego, częściej wśród kobiet. Tryb zajęć ma wpływ na ich powstawanie. Czynnikami mającymi największy wpływ na nasilenie obrzęków u studentów są: długotrwałe przebywanie w pozycji stojącej i siedzącej oraz wysoka temperatura otoczenia.

Słowa kluczowe: obrzęk, przewlekła niewydolność żylna, kompresjoterapia, studenci