Sarcopenic obesity and severity of chronic venous disease in postmenopausal women

G. O. Kostromin, O. V. Balaban, R. V. Gonza

Bogomolets National Medical University

✉ Kostromin Grygorii : g.kostromin.doc@gmail.com

G. O. Kostromin, http://orcid.org/0000-0001-5907-1880
O. V. Balaban, http://orcid.org/0009-0004-5024-6081
R. V. Gonza, http://orcid.org/0009-0007-9357-3260

Sarcopenic obesity (SO) is a functional and clinical condition that is characterised by the simultaneous existence of sarcopenia and excess adipose tissue. This condition may be one of the pathogenetic factors for chronic venous disease (CVD) of the lower extremities and chronic venous insufficiency (CVI), due to impaired muscle venous pump function. Furthermore, obesity is considered a risk factor for these conditions.

OBJECTIVE — to investigate the association of sarcopenia and sarcopenic obesity with the severity of chronic venous disease in postmenopausal women.

MATERIALS AND METHODS. The study included 117 postmenopausal women who were divided into two groups: Group I — 87 (74.4 %) women with CVD, and Group II — 30 (25.6 %) women without any signs of CVD. Within Group I, two subgroups were distinguished based on the class of CVD as defined by the CEAP classification system. Subgroup IA consisted of 45 women (51.7 %) with CVD classes 1 and 2, which correspond to compensated chronic venous insufficiency (CVI). Subgroup IB included 42 women (48.3 %) with CVD classes 3, 4, and 5, indicating subcompensated or decompensated CVI. The measurement of fat and lean mass was conducted using dual-energy X-ray absorptiometry with the Hologic device (Discovery WI, USA, 2015). The presence of sarcopenia was determined by the skeletal muscle assessment index ASM/height2, where ASM is the total appendicular skeletal muscle mass of the legs and arms. Sarcopenia was diagnosed when the value of ASM/height2 was < 6.0 kg/m². The diagnosis of SO was made in patients with sarcopenia and a body mass index > 25 kg/m².

RESULTS. The mean age of women was 67.32 ± 9.12 years (46—86 years), the mean body mass index was 29.1 ± 6.0 kg/m² (18.4—50.1 kg/m²), and BMI/height2 was 6.72 ± 0.864 kg/m². Women in Group I had lower values of BMI/height2 (6.63 ± 0.72 kg/m²) than women in Group II (6.97 ± 1.0 kg/m², p=0.056). Sarcopenia was detected in 27 (23.1 %) women, and SO in 17 (14.5 %). There was no statistically significant difference between the groups in the frequency of sarcopenia: in Group I, 5 (16.7 %) women had sarcopenia, in Group II — 22 (25.3 %), (p=0.334). The proportion of patients with SO in Group I was statistically significantly larger compared to Group II — 18.4 and 3.3 % (p=0.044). There was an increase in the proportion of women with sarcopenia and SO with increasing severity of CVI: 8 (17.8 %) patients in subgroup IA and 14 (33.3 %) in subgroup IB had sarcopenia (p=0.095), and 4 (8.94 %) and 12 (28.6 %) had SO, respectively (p=0.018).

CONCLUSIONS. Postmenopausal women with CVD were more likely to have SO (18.4 %) compared to patients without CVD (3.3 %, p=0.044). Postmenopausal women with subcompensated and decompensated CVI were more likely to have SO (12 (28.6 %)) than women with compensated CVI (4 (8.94 %, p=0.018, odds ratio 6.54, 95 % confidence interval 0.83—51.58). Menopausal women with CVD were more likely to have sarcopenia and had a higher incidence of subcompensated and decompensated CVI compared to women without sarcopenia, but the difference was not statistically significant.

KEYWORDS
postmenopausal women, chronic venous disease, chronic venous insufficiency, sarcopenia, sarcopenic obesity.

Sarcopenia is defined as a progressive and generalised loss of muscle mass and strength [22]. It is accompanied by physical inactivity, decreased mobility, a slow gait, poor physical endurance, falls, fractures, and mortality [3].

Sarcopenia more often affects the elderly, but a progressive decrease in muscle mass begins at the age of 40, and after 50 years, muscle mass decreases by 1—2 % annually [18].

At the same time, ageing and physical inactivity contribute to an increase in fat mass, in particular visceral fat [21].

Sarcopenic obesity (SO) is defined as a functional and clinical condition characterised by the simultaneous loss of skeletal muscle mass and function as well as excess adipose tissue [30]. The incidence of SO is growing rapidly, mainly due to the ageing of the population worldwide and the current obesity epidemic. The prevalence of SO in people aged 20 to 80 years is 0.8 % to 22.3 % in women and 1.3 % to 15.4 % in men [12], and increases with age [29, 10].

SO is a more severe condition than both obesity and sarcopenia alone, as it is associated with a higher risk of cardiovascular disease, decreased bone mineral density, and all-cause mortality [15, 23, 24, 32].

It is generally recognised that one of the causes of chronic venous disease (CVD) and chronic venous insufficiency (CVI) is a disruption of the so-called «venous pump», which functions through the contraction of the deep muscles of the lower extremities. It is logical to assume that sarcopenia and SO may be one of the pathogenetic factors of venous pump dysfunction and the occurrence of CVD and CVI, especially in older people. After all, it has been shown that women with CVD in the oldest group have higher values of body weight, BMI, total body fat, and lower body fat [13]. In addition, there is evidence that old age, obesity, and muscle weakness are independent factors in deep vein thrombosis [26]. However, the association of sarcopenia and SO with CVD has not yet been studied.

OBJECTIVE — to investigate the association of sarcopenia and sarcopenic obesity with the severity of chronic venous disease in postmenopausal women.

Materials and methods

The study was performed at the Chebotarev Institute of Gerontology of the National Academy of Medical Sciences of Ukraine, NAMS of Ukraine. The study involved 117 postmenopausal women.

The patients were divided into two groups. Group I included 87 (74.4 %) women with CVD, and Group II included 30 (25.6 %) women without any signs of CVD.

Within Group I, two subgroups were distinguished based on the class of CVD as defined by the CEAP classification system.

Subgroup IA consisted of women with CVD classes 1 and 2 without CVI or with compensated CVI. Subgroup IB included women with CVD classes 3, 4, and 5, indicating subcompensated or decompensated CVI.

Subgroup IA included 45 (51.7 %) women, and subgroup IB included 42 (48.3 %), as presented in Table 1.

The diagnosis of CVD was made on the basis of symptoms and a clinical and ultrasound (if necessary) examination of the lower extremities. All patients were examined by vascular surgeons. Demographic (age and gender) and anthropometric (weight, height, body mass index — BMI) characteristics were collected.

To assess CVD, we used the CEAP classification [7]. The C0s category, according to the CEAP classification (no deficiency or obstruction), was determined after excluding other possible causes of the symptoms.

BMI was calculated as the ratio of body weight (kg) to height (m)^2 (WHO, 1998). Obesity was diagnosed when the BMI exceeded 30 kg/m^2. Women were divided into three categories based on their BMI: Category I — with normal body weight (BMI 18.5—24.9 kg/m^2); Category II — with overweight (BMI 25.0—29.9 kg/m^2); and Category III — with obesity (BMI over 30.0 kg/m^2).

The measurement of fat and lean mass was conducted using dual-energy X-ray absorptiometry with the Hologic device (Discovery WI, USA, 2015). [Dual-energy X-ray absorptiometry (DXA) with Hologic (Discovery WI, USA, 2015)].

The presence of sarcopenia was determined by the skeletal muscle assessment index — ASM/height^2 [1], where ASM is the total appendicular skeletal

Table 1. **Distribution of patients in subgroups based on the severity of CVD according to the CEAP scale [7]**

CVD class	Subgroup IA	Subgroup IB	Total
1	36 (41.4 %)	–	36 (41.4 %)
2	9 (10.3 %)	–	9 (10.3 %)
3	–	23 (26.4 %)	23 (26.4 %)
4	–	16 (18.4 %)	16 (18.4 %)
5	–	3 (3.4 %)	3 (3.4 %)
Total	45 (51.7 %)	42 (48.3 %)	87 (100 %)

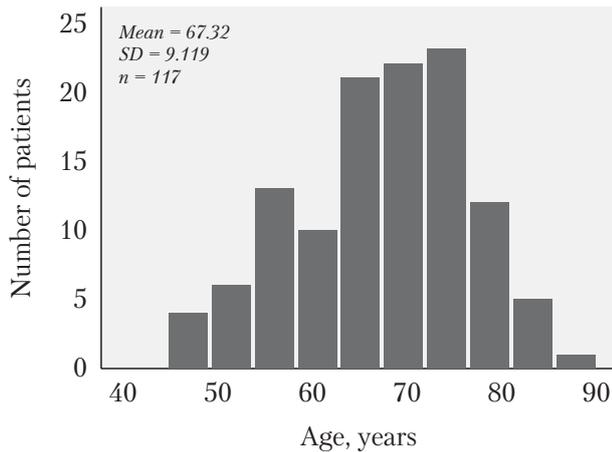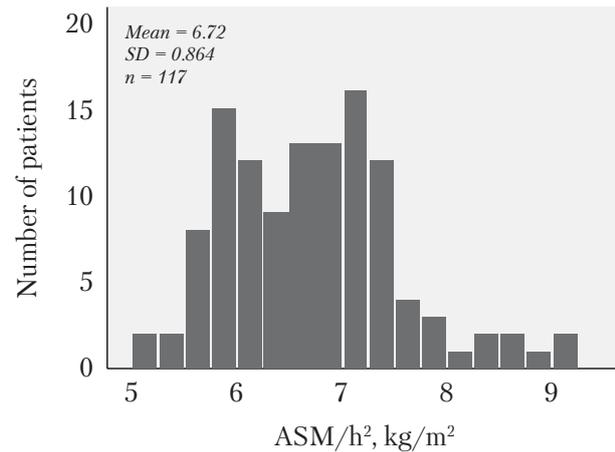Figure 1. **Distribution of women by age**

Figure 2. **Distribution of patients by ASM/ht²**

muscle mass of the legs and arms. Sarcopenia was diagnosed when the value of ASM/h² was less than 6.0 kg/m² [17]. The diagnosis of SO was made in patients with sarcopenia and a BMI of more than 25 kg/m² [14].

Statistical analysis was performed using IBM SPSS Statistics, V 22. Discriminant statistics were calculated. Mean values are presented as $M \pm SD$. A comparison of the mean values of quantitative variables was performed using the Mann-Whitney U-test or Student's t-test, depending on the distribution of the variable. Relative values were compared using Pearson's chi-square test. Odds ratios (OR) with 95 % confidence intervals (95 % CI) were calculated to assess the association between factors and disease occurrence.

The null hypothesis of equality of variables was rejected at $p < 0.05$.

Results

The average age of menopausal women was 67.32 ± 9.12 years (from 46 to 86 years), as presented in Fig. 1.

Women in both groups did not differ in the mean age of 65.63 ± 8.17 years versus 67.91 ± 9.39 years in Group I and Group II, respectively, $p = 0.240$.

There was also no difference between the groups in the distribution of age categories, $p = 0.382$, as presented in Table 2.

There were no differences in anthropometric data between the study groups (Table 3).

The groups did not differ in BMI categories, $p = 0.199$, as seen in Table 4.

The skeletal muscle assessment index averaged 6.72 ± 0.864 kg/m² (Fig. 2).

Table 3. **Anthropometric characteristics of women in the study groups**

Variable	Group I	Group II
Body weight, kg	75.5 ± 15.3 (45—125)	73.2 ± 15.4 (42—121)
Height, cm	159.7 ± 6.5 (146—176)	160.3 ± 8.3 (150—175)
BMI kg/m²	29.6 ± 6.3 (18.4—50.1)	28.6 ± 6.3 (18.7—49.1)

Note. Variables are presented as $M \pm SD$ (min—max).
The difference between Group I and Group II is statistically insignificant ($p > 0.05$) for all variables.

Table 2. **Distribution of patients by gerontological age categories in groups**

Age, years	Group I (n = 87)	Group II (n = 30)	Total (n = 117)
46—59	22 (25.3 %)	11 (36.7 %)	33 (28.2 %)
60—74	37 (42.5 %)	9 (30.0 %)	46 (39.3 %)
75—85	28 (32.2 %)	10 (33.3 %)	38 (32.5 %)

Table 4. **Distribution of women by body mass index categories in groups**

BMI, kg/m²	Group I (n = 87)	Group II (n = 30)	Total (n = 117)
Normal weight, 18.5—24.9	23 (26.4 %)	6 (20.0 %)	29 (24.8 %)
Overweight, 25.0—29.9	25 (28.7 %)	14 (46.7 %)	39 (33.3 %)
Obesity, over 30.0	39 (44.8 %)	10 (33.3 %)	49 (41.9 %)

Women without CVD (Group I) had lower mean ASM/ht^2 values (6.63 ± 0.72 kg/m^2) than patients with CVD (Group II) (6.97 ± 1.0 kg/m^2), but this difference was not statistically significant (p = 0.056).

In general, sarcopenia was detected in 27 (23.1 %) women, and SO in 17 (14.5 %). There was no significant difference in sarcopenia frequency between the groups. Thus, in Group I, 5 (16.7 %) women had sarcopenia, and in Group II—22 (25.3 %), p = 0.334. At the same time, a significantly larger proportion of patients with SO was observed in Group I (18.4 %) compared with Group II (3.3 %), p = 0.044, as presented in Table 5.

There was also an increase in the proportion of women with sarcopenia and sarcopenic obesity with increasing severity of CVI, as seen in Table 6.

Thus, out of 87 women with CVD, sarcopenia was diagnosed in 22 (25.3 %): 8 (17.8 %) with compensated CVI and 14 (33.3 %) with sub- and decompensated CVI, p = 0.095. Sarcopenic obesity was detected in 16 (18.4 %), including 4 (8.94 %) with compensated CVI and 12 (28.6 %) with sub- and decompensated CVI, p = 0.018.

Thus, in menopausal women, the risk of CVD is increased in the presence of sarcopenia and sarcopenic obesity compared with women without sarcopenia and SO: OR 1.69; CI 0.578—4.96 and OR 6.54; CI 0.828—51.58, respectively.

Table 5. **Frequency of sarcopenia and sarcopenic obesity in the study groups**

Variable	Group I (n = 87)	Group II (n = 30)	Total (n = 117)
Sarcopenia	22 (25.3 %)	5 (16.7 %)	27 (23.1 %)
Sarcopenic obesity	16 (18.4 %)	1 (3.3 %)*	17 (14.5 %)

Note. The difference from Group I is statistically significant (p < 0.05).

Table 6. **Incidence of sarcopenia and sarcopenic obesity in Group I depending on the severity of CVI**

Variable	Compensated (n = 45)	Subcompensated/ decompensated (n = 30)	Total (n = 87)
Sarcopenia	8 (17.8 %)	14 (33.3 %)	22 (25.3 %)
Sarcopenic obesity	4 (8.94 %)	12 (28.6 %)*	16 (18.4 %)

Note. The difference from the patients with compensated CVI is statistically significant (p < 0.05).

Women with CVD in the presence of sarcopenia and sarcopenic obesity have an increased risk of sub- and decompensated CVI compared with women without sarcopenia, and SO: OR 2.38; CI 0.877—6.433 and OR 4.20; CI 1.234—14.29.

Discussion

Chronic venous diseases of the lower extremities are one of the most discussed medical problems. In Western countries, approximately 3 % of total healthcare costs are associated with venous diseases, which occur in 25—30 % of women and 10—40 % of men [9, 20, 25]. Among the well-known risk factors for CVD are age, gender, genetic factors, sedentary lifestyle, sedentary work, nutritional aspects (consumption of large amounts of meat food), etc. [16, 28, 31]. Data on the link between obesity and CVD are still considered controversial. A number of studies have reported a significant correlation between BMI and clinical severity, according to the C-category of the Clinical, Anatomical and Pathophysiological (CEAP) classification [11]. Danielsson et al. found a significant association between clinical severity, according to CEAP category C, and BMI [4]. In a study of the San Diego population, increased waist circumference was associated with cardio-vascular diseases in men and women, and increased body weight was a risk factor for mild cardio-vascular diseases, although only in women.

According to Musil D et al., multiple linear regression showed that age (p < 0.0001) and BMI (p = 0.049) are independent predictors of the clinical grade of CVI and CEAP clinical grade of CVD (p < 0.0001) and are significant predictors of the degree of epiphasic venous reflux [19].

Eskici H et al. used multivariate logistic regression analysis to find that high levels of visceral obesity affect clinical complaints in patients with CVI (class C0-C3) [8].

A study of 1116 patients with CVD showed that CVD categories (CEAP C) were significantly associated with overweight and obesity [27],

In contrast, a French epidemiological study found no association between CEAP category C and obesity [1].

S. Demir et al. assessed the association between the severity of venous insufficiency and body mass index in patients referred for Doppler ultrasound and found no association of BMI with the severity of CVI [5].

In 2015, Iranian researchers investigated the incidence of CVD in 197 female hairdressers aged 18—68 years, which was 47.7 %. In this study, no significant association was found between CVD

and participants' body weight. However, CVD was significantly correlated with patient age (OR 1.08; 95 % CI 1.03, 1.13); family history of cardio-vascular diseases (OR 1.99; 95 % CI 1.03, 3.82), blood pressure (OR 4.41; 95 % CI 1.63, 11.90), and standing time (OR 2.34; 95 % CI 1.05, 5.22) [6].

In our study, we hypothesised that one of the risk factors for CVD and CVI may be not so much overweight or obesity, but rather so-called sarcopenic obesity. SO combines the negative effects of both excess weight and the weakness of the muscle venous pump due to sarcopenia. To our knowledge, no similar studies have been conducted. The cohort of patients included in the study was limited to postmenopausal women, which is a drawback. Also, in this study, we did not examine other risk factors for CVD, such as comorbidities, including osteoporosis, osteoarthritis and back pain, which were present in these women.

The results of the study showed that in menopausal women, SO increases the chance of developing CVD by 6.4 times compared to women without SO (OR 6.54; CI 0.828—51.58).

Women with CVD in the presence of SO have a 4.2-fold increased chance of developing sub- and decompensated CVI compared to women without SO: OR 4.20; CI 1.234—14.29.

Thus, in menopausal women, the risk of CVD is increased in the presence of sarcopenia and sarcopenic obesity compared to women without sarcopenia and SO: OR 1.69; CI 0.578—4.96 and OR 6.54; CI 0.828—51.58, respectively.

Women with CVD in the presence of sarcopenia and sarcopenic obesity have an increased risk of sub- and decompensated CVI compared with women without sarcopenia and SO: OR 2.38, CI 0.877—6.433 and OR 4.20, CI 1.234—14.29.

These findings may be important for improving CVD prevention by not only reducing body weight but also preventing muscle loss, especially in the lower extremities. At the same time, it is necessary to further investigate this aspect of the problem by including a more diverse sample of individuals across different age groups and genders.

Conclusions

Menopausal women with CVD were more likely to have SO (18.4 %) compared to those without CVD (3.3 %) (p = 0.044).

Menopausal women with CVI in the stages of sub- and decompensation were more likely to suffer from SO (12 (28.6 %)) than women with compensated CVI (4 (8.94 %)), p = 0.018; OR 6.54; CI 0.828—51.58.

Postmenopausal women with CVD were more likely to have sarcopenia and had a higher incidence of sub- and decompensated CVI compared with women without sarcopenia, but the difference was not statistically significant.

AUTHORS CONTRIBUTIONS

Conception and design — G. O. Kostromin, O. V. Balaban; data collection and analysis — G. O. Kostromin; statistical analysis — G. O. Kostromin, R. V. Gonza; critical revision of the manuscript — G. O. Kostromin, O. V. Balaban, R. V. Gonza.

REFERENCES

1. Baumgartner RN, Koehler KM, Gallagher D, Romero L, Heymsfield SB, Ross RR, Garry PJ, Lindeman RD. Epidemiology of sarcopenia among the elderly in New Mexico. Am J Epidemiol. 1998 Apr 15;147(8):755-63. doi: 10.1093/oxfordjournals.aje.a009520. Erratum in: Am J Epidemiol 1999 Jun 15;149(12):1161. PMID: 9554417.
2. Benigni JP, Cazaubon M, Tourneroche A, Achhammer I, Mathieu M. Is obesity an aggravating factor in chronic venous disease? Results of a French epidemiological study in male patients. Int Angiol. 2006 Sep;25(3):297-303. PMID: 16878080.
3. Cesari M, Leeuwenburgh C, Lauretani F, Onder G, Bandinelli S, Maraldi C, Guralnik JM, Pahor M, Ferrucci L. Frailty syndrome and skeletal muscle: results from the Invecchiare in Chianti study. Am J Clin Nutr. 2006 May;83(5):1142-8. doi: 10.1093/ajcn/83.5.1142. PMID: 16685058; PMCID: PMC2668161.
4. Danielsson G, Eklof B, Grandinetti A, Kistner RL. The influence of obesity on chronic venous disease. Vasc Endovascular Surg. 2002 Jul-Aug;36(4):271-6. doi: 10.1177/153857440203600404. PMID: 15599477.
5. Demir S, Şahin H, Baran Ç, Gelişen M İ. Body mass index and primary chronic venous disease. Turkiye Klinikleri Cardiovascular Sciences. 2016;28:3. doi: 10.5336/cardiosci.2016-53313.
6. Ebrahimi H, Amanpour F, Bolbol Haghighi N. Prevalence and risk factors of varicose veins among female hairdressers: a cross sectional study in north-east of Iran. J Res Health Sci. 2015 Spring;15(2):119-23. PMID: 26175296.
7. Eklöf B, Rutherford RB, Bergan JJ, Carpentier PH, Gloviczki P, Kistner RL, Meissner MH, Moneta GL, Myers K, Padberg FT, Perrin M, Ruckley CV, Smith PC, Wakefield TW; American Venous Forum International Ad Hoc Committee for Revision of the CEAP Classification. Revision of the CEAP classification for chronic venous disorders: consensus statement. J Vasc Surg. 2004 Dec;40(6):1248-52. doi: 10.1016/j.jvs.2004.09.027. PMID: 15622385.
8. Eskici H, Engin M, Eris C, Aydın U, Ata Y, Yavuz Ş. Investigation of the effect of visceral adiposity index on venous clinical severity score in patients with chronic venous insufficiency. Vascular. 2023 Nov 6:17085381231214818. doi: 10.1177/17085381231214818. Epub ahead of print. PMID: 37931595.
9. Feodor T, Baila S, Mitea IA, Branisteanu DE, Vittos O. Epidemiology and clinical characteristics of chronic venous disease in Romania. Exp Ther Med. 2019 Feb;17(2):1097-1105. doi: 10.3892/etm.2018.7059. Epub 2018 Dec 5. PMID: 30679980; PMCID: PMC6327587.
10. Gao Q, Mei F, Shang Y, Hu K, Chen F, Zhao L, Ma B. Global prevalence of sarcopenic obesity in older adults: A systematic review and meta-analysis. Clin Nutr. 2021 Jul;40(7):4633-4641. doi: 10.1016/j.clnu.2021.06.009. Epub 2021 Jun 21. PMID: 34229269.

11. International Union of Phlebology. Vein consult program (Observational, multicentric, descriptive survey of chronic venous disease). Eur J Vasc Endovasc Surg. 1996;12:487-92. Available fro http://www.veinconsult.com/background/.

12. Kim TN, Yang SJ, Yoo HJ, Lim KI, Kang HJ, Song W, Seo JA, Kim SG, Kim NH, Baik SH, Choi DS, Choi KM. Prevalence of sarcopenia and sarcopenic obesity in Korean adults: the Korean sarcopenic obesity study. Int J Obes (Lond). 2009 Aug;33(8):885-92. doi: 10.1038/ijo.2009.130. Epub 2009 Jun 30. PMID: 19564878.

13. Kostromin G, Povoroznyuk V. Age, body composition, body mass index and chronic venous diseases in postmenopausal women. International Journal of Medical and Health Sciences. 2020;(2):94-8.

14. Limpawattana P, Inthasuwan P, Putraveephong S, Boonsawat W, Theerakulpisut D, Sawanyawisuth K Sarcopenia in chronic obstructive pulmonary disease: A study of prevalence and associated factors in the Southeast Asian population. Chron Respir Dis. 2018 Aug;15(3):250-7. doi: 10.1177/1479972317743759.

15. Ma J, Hwang SJ, McMahon GM, Curhan GC, Mclean RR, Murabito JM, Fox CS. Mid-adulthood cardiometabolic risk factor profiles of sarcopenic obesity. Obesity (Silver Spring). 2016 Feb;24(2):526-34. doi: 10.1002/oby.21356. PMID: 26813531.

16. Mahapatra S, Ramakrishna P, Gupta B, Arumalla A, Para MA. Correlation of obesity and comorbid conditions with chronic venous insufficiency. Results of a single-centre study. The Indian Journal of Medical Research. 2018 May; 147(5):471. doi: 10.4103/ijmr.IJMR_1844_16.

17. Masik N, Stepaniuk T, Masik O. Skeletal muscle dysfunction, sarcopenia and sarcopenic obesity in patients with chronic obstructive pulmonary disease. Pain, Joints, Spine. 2022;12(1):8-15. doi: 10.22141/pjs.12.1.2022.323. 23 October 2022.

18. Mitchell WK, Williams J, Atherton P, Larvin M, Lund J, Narici M. Sarcopenia, dynapenia, and the impact of advancing age on human skeletal muscle size and strength; a quantitative review. Front Physiol. 2012;3:260. doi: 10.3389/fphys.2012.00260.

19. Musil D, Kaletova M, Herman J. Age, body mass index and severity of primary chronic venous disease. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2011 Dec;155(4):367-71. doi: 10.5507/bp.2011.054. PMID: 22336650.

20. Rabe E, Guex JJ, Puskas A, Scuderi A, Fernandez Quesada F; VCP Coordinators. Epidemiology of chronic venous disorders in geographically diverse populations: results from the Vein Consult Program. Int Angiol. 2012 Apr;31(2):105-15. PMID: 22466974.

21. Riechman SE, Schoen RE, Weissfeld JL, Thaete FL, Kriska AM. Association of physical activity and visceral adipose tissue in older women and men. Obes Res. 2002 Oct;10(10):1065-73. doi: 10.1038/oby.2002.144. PMID: 12376588.

22. Rosenberg IH, Roubenoff R. Stalking sarcopenia. Ann Intern Med. 1995 Nov 1;123(9):727-8. doi: 10.7326/0003-4819-123-9-199511010-00014. PMID: 7574231.

23. Ryan AS, Nicklas BJ. Age-related changes in fat deposition in mid-thigh muscle in women: relationships with metabolic cardiovascular disease risk factors. Int J Obes Relat Metab Disord. 1999 Feb;23(2):126-32. doi: 10.1038/sj.ijo.0800777. PMID: 10078845.

24. Scott D, Chandrasekara SD, Laslett LL, Cicuttini F, Ebeling PR, Jones G. Associations of sarcopenic obesity and dynapenic obesity with bone mineral density and incident fractures over 5-10 years in community-dwelling older adults. Calcif Tissue Int. 2016;99:30-42. doi: 10.1007/s00223-016-0123-9.

25. Seliverstov EI, Avakyants IP, Nikishkov AS, Zolotukhin IA. Epidemiology of Chronic Venous Disease. Flebology. 2016; 1:297-303.

26. Torii Y, Kusunose K, Zheng R, et al. Association between Sarcopenia/lower muscle mass and short-term regression of deep vein thrombosis using direct oral anticoagulants. Int Heart J. 2020 Jul 30;61(4):787-94. doi: 10.1536/ihj.20-032.

27. Vlajinac HD, Marinkovic JM, Maksimovic MZ, Matic PA, Radak DJ. Body mass index and primary chronic venous disease : a cross-sectional study. Eur J Vasc Endovasc Surg. 2013 Mar;45(3):293-8. doi: 10.1016/j.ejvs.2012.12.011.

28. Vuylsteke ME, Thomis S, Guillaume G, Modliszewski ML, Weides N, Staelens I. Epidemiological study on chronic venous disease in Belgium and Luxembourg: prevalence, risk factors, and symptomatology. Eur J Vasc Endovasc Surg. 2015 Apr;49(4):432-9. doi: 10.1016/j.ejvs.2014.12.031. Epub 2015 Feb 18. PMID: 25701071.

29. Wagenaar CA, Dekker LH, Navis GJ. Prevalence of sarcopenic obesity and sarcopenic overweight in the general population: the lifelines cohort study. Clin Nutr. 2021;40:4422-9. doi: 10.1016/j.clnu.2021.01.005.

30. Wei S, Nguyen TT, Zhang Y, Ryu D, Gariani K. Sarcopenic obesity: epidemiology, pathophysiology, cardiovascular disease, mortality, and management. Front Endocrinol (Lausanne). 2023 Jun 30;14:1185221. doi: 10.3389/fendo.2023.1185221. PMID: 37455897; PMCID: PMC10344359.

31. Willenberg T, Schumacher A, Amann-Vesti B, Jacomella V, Thalhammer C, Diehm N. Impact of obesity on venous hemodynamics of the lower limbs. J Vasc Surg. 2010 Sep; 52(3):664-8. doi: 10.1016/j.jvs.2010.04.023.

32. Zhang X, Xie X, Dou Q, et al. Association of sarcopenic obesity with the risk of all-cause mortality among adults over a broad range of different settings: a updated meta-analysis. BMC Geriatr. 2019;19:183. doi: 10.1186/s12877-019-1195-y

Саркопенічне ожиріння та тяжкість хронічного захворювання вен у жінок у постменопаузі

Г. О. Костромін, О. В. Балабан, Р. В. Гонза

Національний медичний університет імені О. О. Богомольця

Саркопенічне ожиріння (СПО) — функціональний і клінічний стан, що характеризується одночасним існуванням саркопенії (СП) та надлишком жирової тканини, може бути одним із патогенетичних чинників хронічного захворювання вен (ХЗВ) нижніх кінцівок і хронічної венозної недостатності (ХВН) через порушення діяльності м'язової венозної помпи та ожиріння, яке також вважають чинником ризику.

Мета — визначити зв'язок між саркопенією і саркопенічним ожирінням та тяжкістю хронічного захворювання вен у жінок у постменопаузальний період.

Матеріали та методи. У дослідження було залучено 117 жінок у постменопаузі, яких розподілили на дві групи: групу I — 87 (74,4 %) жінок з ХЗВ, групу II — 30 (25,6 %) жінок без ознак ХЗВ. У групі I виділили дві підгрупи за класом ХЗВ відповідно до класифікації CEAP: IA — 45 (51,7 %) жінок із ХЗВ 1 та 2 класу (компенсована ХВН), IB — 42 (48,3 %) жінки з класом ХЗВ 3, 4 та 5 (субкомпенсована або декомпенсована ХВН). Жирову та нежирову масу вимірювали методом двохенергетичної рентгенівської абсорбціометрії за допомогою Hologic (Discovery WI, США, 2015). Наявність СП визначали за індексом оцінки скелетних м'язів AMM/зріст^2, де AMM — це сумарна апендикулярна м'язова маса ніг та рук. Саркопенію діагностували при значенні показника AMM/зріст^2 < 6,0 кг/м^2. Діагноз СПО установлювали в пацієнток із СП та індексом маси тіла > 25 кг/м^2.

Результати. Середній вік жінок становив (67,32±9,12) року (46—86 років), середній індекс маси тіла — (29,1±6,0) кг/м² (18,4—50,1 кг/м²), АММ/зріст² — (6,72±0,864) кг/м². Жінки групи I мали менші значення АММ/зріст² ((6,63±0,72) кг/м²), ніж жінки групи II ((6,97±1,0) кг/м²; p=0,056). Саркопенія виявлена у 27 (23,1 %) жінок, СПО — у 17 (14,5 %). Не було статистично значущої різниці між групами жінок за частотою СП: в групі I СП мали 5 (16,7 %) жінок, у групі II — 22 (25,3 %), (p=0,334). Частка хворих із СПО в групі I була статистично значущо більшою порівняно із групою II — 18,4 та 3,3 % (p=0,044). Відзначено збільшення частки жінок із СП і СПО зі збільшенням тяжкості ХВН: СП була у 8 (17,8 %) пацієнток у підгрупі IA та в 14 (33,3 %) у підгрупі IB (p=0,095), СПО — у 4 (8,94 %) та 12 (28,6 %) відповідно (p=0,018).

Висновки. Жінки в менопаузі з ХЗВ частіше мали СПО — (18,4 %) порівняно з пацієнтками без ХЗВ (3,3 %, p=0,044). Жінки в менопаузі з ХВН в стадії субкомпенсації та декомпенсації частіше страждали на СПО (12 (28,6 %)), ніж жінки з компенсованою ХВН (4 (8,94 %, p=0,018, відношення шансів — 6,54, 95 % довірчий інтервал — 0,83—51,58. Жінки в менопаузі з ХЗВ частіше хворіли на СП і мали більшу частоту субкомпенсованої та декомпенсованої ХВН порівняно із жінками без СП, але різниця була статистично незначущою.

Ключові слова: жінки після менопаузи, хронічні захворювання вен, хронічна венозна недостатність, саркопенія, саркопенічне ожиріння.