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Does pelvic congestion syndrome influence symptoms of chronic venous disease of the lower extremities?

S.G. Gavrilov[a,*], Ye.P. Moskalenko[b]

[a] Savelyev University Surgical Clinic, Medical Faculty, Pirogov Russian National Research Medical University, 10/5 Leninsky Prospect, Moscow, Russia
[b] Department of Ultrasound Diagnostics, Savelyev University Surgical Clinic, Medical Faculty, Pirogov Russian National Research Medical University, 10/5 Leninsky Prospect, Moscow, Russia

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ABSTRACT

Objective: The study was aimed at assessing the influence of pelvic congestion syndrome (PCS) on the clinical manifestations of chronic venous disease (CVD) of the lower extremities in patients with concomitant varicose veins of the pelvis and lower extremities.
Study Design: We examined clinically and with duplex ultrasound 30 women with varicose veins of the lower extremity only (VVLE) and another 45 women with VVLE and concomitant varicose veins of the pelvis (VVP) causing symptoms of the pelvic congestion syndrome (PCS).
All patients had chronic venous disease (CVD) of class C2 (n = 47) or C3 (n = 28) according to the CEAP classification. All patients underwent duplex ultrasound (DUS) of the lower extremities and pelvis. Based on the clinical examination and DUS findings, the patients were allocated into two groups: group 1 (n = 30 patients with isolated VVLE without the signs of PCS and pelvic veins lesions) and group 2 (n = 45 patients with concomitant PCS, VVP and VVLE). The rates and severity of varicose, pain, and edema syndromes, and leg heaviness were assessed.
Results: The patients of the group 2 had significantly more severe clinical manifestations of CVD, 4 times higher risk of leg pain (odds ratio [OR] 4.23; 95% CI 1.57–11.39), 7 times higher risk of leg edema (OR 7.42; 95% CI 2.23–24.78), 5 times higher risk of leg heaviness (OR 5.3; 95% CI 1.85–15.07), and in general 2 times more severe varicose veins, compared with the group 1.
Conclusion: The PCS is associated with an increase in the incidence and severity of the CVD symptoms.

Introduction

The perceived incidence of concomitant varicose veins of the lower extremities and varicose veins of the pelvis has been estimated at 10–70% of women [1–3]. Pelvic-perineal reflux, as a sign of pelvic phlebohypertension, develops in 10%–38% of female patients with varicose veins of the pelvis (VVP) and is accompanied by dilation of the perineal, vulvar and saphenous veins of the posterior side of the thigh [4,5]. The combination of pelvic and lower extremity varicose veins and their valvular incompetence should most probably be accompanied by a change in the severity of symptoms of chronic venous disease (CVD) of the lower extremities [6,7]. The study of Karalkin A.V. et al. [8] using radionuclide techniques has demonstrated a disturbance in the evacuation function of the muscle-venous pump in 58% of patients with VVP. However, there is still a lack of data on the effect of pelvic vein dilation and blood reflux in them on the rates and severity of clinical manifestations of CVD.

Hence, the aim of the present study was to assess the influence of pelvic veins varicose transformation and pelvic congestion syndrome (PCS) on the clinical manifestations of CVD of the lower extremities.

Material and methods

This prospective, comparative study included 30 women with isolated varicose veins of the lower extremities (VVLE) and 45 women with concomitant varicose veins of the pelvis and lower extremities and pelvic congestion syndrome (PCS), who had been treated at the Savelyev University Surgery Clinic, Medical Faculty of the Pirogov Russian National Research Medical University in 2016-2018. The protocol of study was approved by the local ethics committee of the Pirogov Russian National Research Medical University.

Inclusion criteria were the presence of symptoms of the chronic venous disease and pelvic congestion syndrome, age 18–45 years,

* Corresponding author.
E-mail addresses: gavriloffsg@mail.ru (S.G. Gavrilov), moskit41@yandex.ru (Y.P. Moskalenko).

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valvular incompetence of the pelvic veins and superficial conductive veins of the lower extremities according to the duplex ultrasound scanning (DUS) examination. Exclusion criteria were absence of CVD symptoms, pregnancy, climacteric period, or normal functioning of the valvular apparatus of the pelvic veins and superficial veins of the lower extremities. All patients underwent duplex ultrasound (DUS) of the veins of the lower extremities and pelvis using the standard protocol [9,10].

Based on the clinical and ultrasound examination, the patients were allocated into two groups: group 1 of 30 patients with VVLE and without pelvic veins disturbances, and group 2 of 45 patients with concomitant VVLE, VVP, including perineal and vulvar varicose veins (VVV), and PCS.

The rates of clinical manifestations of CVD and PCS in the total study population (n = 75) were as following: VVLE 100%, vulvar varicose veins (VVV) 21.3%, perineal varicose veins (PVV) 5.3%, varicose veins of the posterior side of the thigh 4%, leg pain 54.6%, pelvic pain 29.3%, leg edema 37.3%, swelling of the labia 21.3%, leg heaviness 68%, heaviness in the hypogastric region 42.6%, and dyspareunia 18.6%. The patients had CVD of class C2 (n = 47) or C3 (n = 28) according to the CEAP classification.

Clinical evaluation included the assessment of the severity of most common and characteristic symptoms of CVD, such as leg pain, leg heaviness, heaviness in the pelvic region, leg swelling and varicose veins. Thus, we compared the severity of CVD between patients with isolated VVLE and with a combination of VVLE, VVP, PVV, VVV and PCS. The methods used for the assessment of clinical symptoms and signs of PCS and VVLE are presented in Table 1.

Considering the essential role of metabolic and hormonal factors in the development of varicose veins of the lower extremities and pelvis, we analysed the influence of excessive body weight (*i.e.* body mass index, BMI), the number of pregnancies, and the history of using the combined oral contraceptive pills (COCP) on the clinical manifestations of chronic venous disease and pelvic congestion syndrome in the studied patients.

Statistical analyses were performed using the Microsoft Excel, Statistica 6.0 software, and the statistic online-calculator (www.medstatistic.ru). The data are presented as mean ± standard deviation (SD) for the normally distributed variables, or as absolute value and percentage for the non-normally distributed and qualitative variables. Parametric and non-parametric tests were used as appropriate. The odds ratios with 95% confidence intervals were calculated. Differences were considered as statistically significant at P value < 0.05.

Table 2
Symptoms and sings of the chronic venous disease of the lower extremities in group 1 (n = 30).

Symptom/sing	Prevalence, n (%)	Severity, scores
Varicose veins of the lower extremities	30 (100%)	1
Leg edema	4 (1.3%)	1.25 ± 0.48
Leg pain	9 (30%)	2.2 ± 0.6
Leg heaviness	14 (46.6%)	1.8 ± 0.3

Results

Group 1

Mean age was 39.4 ± 1.6 years. Mean duration of the CVD was 8.7 ± 0.9 years. All patients of this group had varicose syndrome (varicose veins) with severity score of 1 and the venous dilation in only one territory, namely, of the great saphenous vein (GSV). Ankle edema over the medial malleolus was present in 4 patients, and its severity was 1.25 ± 0.48 scores. Painful sensations in the lower extremities were reported by 3 patients, and their severity did not exceed 3 scores. Leg heaviness was reported by almost half of the patients, with the severity of 1.8 ± 0.3 scores (Table 2).

The DUS of the lower extremities revealed valvular incompetence of the GSV in all the patients, and of perforating veins in 86.6% patients. No pelvic venous disease was revealed (Table 3).

Therefore, the presence and severity of the CVD manifestations in patients with isolated VVLE included in this study were consistent with the typical clinical symptoms associated with moderate varicose syndrome, minor leg pain and heaviness, and rare or mild edema syndrome. The main reason for seeking medical care among such patients were complaints of VVLE.

Group 2

Mean age was 32.3 ± 1.4 years. Duration of the disease was 5.3 ± 1.1 years. The severity of varicose veins was rated from 1 to 4 scores (mean 2.04 ± 0.16 scores), and 2 patients had varicosities in the territories of the GSV and small saphenous vein (SSV) associated with vulvar varicose veins. Ankle edema was present in more than half of women (53.3%) and had a substantial severity of 2.2 ± 0.2 scores. Leg pain was present in 64.4% patients and had intensity of 4.9 ± 0.4 scores. Leg heaviness was reported by 82.2% patients, with a severity ranged from 2 to 5 scores (mean 3.6 ± 0.7 scores).

Chronic pelvic pain (CPP) was reported by 45 (100%) patients, with the severity of 6.8 ± 1.5 scores. The feeling of heaviness in the

Table 1
Method of assessment of severity of clinical symptoms and signs of the pelvic congestion syndrome and varicose veins of the lower extremities.

Symptom/sign	Assessment method	Range
Leg pain	VAS	0 to 10 scores
Pelvic pain	VAS	0 to 10 scores
Leg heaviness	VAS	0 to 10 scores
Heaviness in the hypogastrium	VAS	0 to 10 scores
Leg edema	Legometry (circumference measurement of legs at a fixed point 2 cm above medial malleolus)	Difference in the ankle circumferences (above the medial malleolus): below 0.5 cm – 1 score; 0.5 to 1 cm – 2 scores; above 1 cm – 3 scores.
Varicose veins	Visual assessment	Varicose veins in the territory of: GSV – 1 score; SSV – 1 score GSV and SSV – 2 scores; GSV or SSV + PVV or VVV – 3 scores GSV + SSV + PVV or VVV – 4 scores

Abbreviations: VAS – visual analogue scale; GSV – great saphenous vein; SSV – small saphenous veins; VVV - vulvar varicose veins; PVV - perineal varicose veins.

Table 3
Distribution of venous reflux in group 1 patients according to duplex ultrasound (n = 30).

Valvular incompetence	Patients, n (%)
Great saphenous vein	30 (100%)
Small saphenous vein	0
Perforating veins	26 (86.6%)

Table 4
Symptoms and signs of chronic venous disease in group 2 patients suffering lower extremity and pelvic venous disease (n=45).

Symptom/sing	Prevalence, n (%)	Severity, scores
Varicose veins of the lower extremities	45 (100%)	2.04±0.16
Leg edema	24 (53.3%)	2.2±0.2
Leg pain	29 (64.4%)	4.9±0.4
Leg heaviness	37 (82.2%)	3.6±0.7
Chronic pelvic pain	45 (100%)	6.8±1.5
Heaviness in the hypogastrium	32 (71.1%)	3.8±0.4
Dyspareunia	14 (31.1%)	3.2±0.8
Vulvar or perineal varicosities	23 (51.1%)	3

Table 5
Distribution of venous reflux in veins of the pelvis and superficial veins of lower extremities in group 2, according to the duplex ultrasound scanning (n=45).

Valvular incompetence	Patients, n (%)
Great saphenous vein	42 (93.3%)
Small saphenous vein	4 (8.8%)
Perforating veins	39 (86.6%)
Gonadal veins	16 (35.5%)
Parametrial veins	45 (100%)
Uterine veins	24 (53.3%)
Internal iliac veins	3 (4%)
Pelvic-perineal reflux	23 (51.1%)

hypogastrium was reported by 32 (71.1%) patients, with a severity of 3.8 ± 0.4 scores, and dyspareunia was present in 14 (31.1%) women. Clinical manifestations of CVD and PCS in the study group are presented in Table 4.

According to the DUS of the lower extremities and pelvis, the combined valvular incompetence was present in the GSV and parametrial veins in 38%, in the SSV and parametrial veins in 8.8%, in the GSV, parametrial, uterine and gonadal veins in 35.5%, and in the GSV, parametrial and uterine veins in 17.7% of patients (Table 5).

The pelvic-perineal reflux was diagnosed in a half of patients with concomitant PCS, VVP, and VVLE. Therefore, clinical manifestations of the CVD were found to be more severe in patients of group 2.

The study has demonstrated statistically significant differences in the CVD symptoms severity between patients with isolated VVLE and patients with concomitant PCS, VVP, and VVLE (Table 6).

As compared to the patients with isolated VVLE (group 1), the odds ratios (ORs) for the occurrence of CVD symptoms in group 2 were 4 times higher for the leg pain (OR 4.23; 95% CI 1.57–11.39), 7 times higher for the leg edema (due to concomitant PCS, VVP, and VVLE) (OR 7.42; 95% CI 2.23–24.78), and 5 times higher for the leg heaviness (OR 5.3; 95% CI 1.85–15.07).

A comparative analysis of the effects of BMI, the number of pregnancies and the use of COCP on the clinical manifestations of CVD and PCS showed the higher prevalence of some of these factors in the group 2 of patients (Table 7).

No significant differences in BMI were found between the study groups, despite its average value was slightly higher than normal (*i.e.* patients were overweight in general). The opposite situation was revealed in the analysis of hormonal factors. In group 1, the vast majority of women (70%) had no more than 2 pregnancies, while in group 2, 68.9% of patients had 4–6 pregnancies. Regarding the use of COCP, the results were similar: in group 2, 35.5% of women took hormonal contraceptives to prevent pregnancy, compared to only 10% in group 1. The duration of COCP intake in group 2 was almost 2 times higher than in group 1 (P = 0.0275). The data obtained suggest that frequent pregnancies and COCP use are significant factors in the development and progression of PCS and CVD.

Comments

The concomitant venous disease of the pelvis and lower extremities is a common finding. Among patients with recurrent varicose veins of the lower extremities, such a combination is present in 10%–60% of female patients [1–3]. In the studies of Gültaşli N.Z. et al. [1] and Bora A. et al. [7], the concomitant dilation of pelvic veins and superficial veins of the lower extremities and reflux in them were diagnosed in 70% and 78.6% of studied women, accordingly. Asciutto G. et al. [4] reported an increase in the leg pain scores in female patients with valvular incompetence of the pelvic veins.

In group 2, the severity of varicose veins was almost 2 times greater, primarily due to the presence of concomitant valvular incompetence of the great saphenous vein and small saphenous vein, dilation of the vulvar and perineal veins and veins of the posterior side of the thigh in a half of the patients (2.02 ± 0.16

Table 6
Comparative assessment of the severity of clinical manifestations of the chronic venous disease of the lower extremities in the study groups.

Symptom/sing	Group 1 (n=30)	Group 2 (n=45)	P value
Varicose veins of the lower extremities, scores	1	2.02±0.16	0.000001
Leg edema, scores	1.25 ±0.48	2.4±0.2	0.036
Leg pain, scores	2.2±0.6	4.9±0.4	0.003
Leg heaviness, scores	1.8±0.3	3.6±0.7	0.022

Table 7
Metabolic and hormonal factors in the study groups.

Factor	Group 1 (n=30)	Group 2 (n=45)	P value
BMI, kg/m^2	25.6±2.8	24.7±2.1	0.779
Number of pregnancies, n	1.7±0.2	3.6±0.3	0.000001
Previous use of COCP, n of patients	3	16	< 0.05*
Duration of COCP use, months	8.4±1.7	15.2±2.5	0.0275

Abbreviations: BMI - body mass index; COCP - combined oral contraceptive pills.
* Fisher's exact test (2-sided): p = 0.01512.

scores *vs* 1.0 score in group 1; P = 0.000001). The blood reflux from the pelvic veins to the superficial veins of the posterior side of the thigh also contributed to the aggravation of varicose veins. Such an extensive disease of the pelvic veins and superficial veins of the lower extremities can possibly determine the greater severity of the CVD symptoms in the study group. The groups were statistically significantly different in the severity of the leg pain (4.9 ± 0.4 *vs* 2.2 ± 0.6 scores in group 1; p = 0.003), as well as of the leg edema and heaviness.

The odds ratios for leg pain, edema, and heaviness were 7, 6 and 2 times higher in group 2 than in group 1. One of the possible explanations of these findings is that valvular incompetence of the pelvic veins, pelvic phlebohypertension and pelvic-perineal reflux contribute to the aggravation of the disturbances of venous outflow from the lower extremities, and to the increase in the rates and severity of the clinical manifestations of CVD.

In addition to the above, mean age of patients, and the chronic venous disease duration were found to be significantly lower in the group with concomitant PCS, VVP, and VVLE, compared to the group 1 (age: 32.3 ± 1.4 years *vs* 39.4 ± 1.6, P = 0.0013; CVD duration: 5.3 ± 1.1 *vs* 8.7 ± 0.9 years, P = 0.0193). This, in turn, suggests about an earlier occurrence of VVLE in the presence of pelvic venous disease and explains the earlier seeking medical care among patients with concomitant disease of the pelvic veins and veins of the lower extremities.

Conclusion

Pelvic varicose veins and reflux in them contribute to an increase in the incidence and severity of the chronic venous disease symptoms in patients with concomitant varicosities of the pelvic veins and veins of the lower extremities. The extensive anatomical connections between the pelvic and lower extremity veins, valvular incompetence of the pelvic veins, and pelvic-perineal reflux in patients with VVLE are predictors for the occurrence of persisting and intensive signs of the CVD. In addition, frequent pregnancies and long-term use of COCP contribute to the onset and progression of pelvic congestion syndrome and chronic venous disease. Our findings also suggest that during examination of patients with CVD it is important to perform extended DUS examination including assessment of pelvic veins, in order to identify patients at risk of recurrence of the disease, to prescribe high-quality rational pharmacotherapy, and to improve the quality of life of the patients. The further research on this issue is warranted.

Roles of authors

Concept and design of the work: Gavrilov S.G
Writing the manuscript: Gavrilov S.G., Moskalenko Ye.P.
Statistical analysis: Moskalenko Ye.P.
Editing: Gavrilov S.G.

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Declaration of Competing Interest

No conflict of interests to be declared.

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