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# THE SEVERITY OF THE CLINICAL MANIFESTATIONS OF CHRONIC VENOUS DISEASES IN MEN, DEPENDING ON THE DEGREE OF ARTERIAL HYPERTENSION

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## SUMMARY

Study of the effect of the degree of arterial hypertension (AH) on the severity of the clinical manifestations of chronic venous disease (CVD) of the lower extremities in men of working age.

Material and methods. A comparative analysis of the clinical severity and severity of CVD (diagnosed by CEAP) was performed using the VCSS scale of two groups of male patients with hypertension aged 30-55 years. Group 1 – 40 patients with 1 degree of hypertension (SBP 143 (140-147) mmHg, DBP 92 (90-95) mmHg) and group 2 – 34 patients with 2 and 3 degrees of hypertension (SBP 164 (156-179) mmHg, DBP 107 (101-109) mmHg). Comparison of shares is performed using the contingency table using the  $\chi^2$  criterion.

Results. Symptoms of chronic venous diseases such as pain, varicose veins, edema and hyperpigmentation, have been reported in the observed patients. Signs with greater severity were not noted. Leg pain ( $p = 0.047$ ) and edema ( $p = 0.002$ ) were more often diagnosed in patients with grade 2 and 3 hypertension than in patients with grade 1 hypertension.

Conclusion. The severity of hypertension worsens the clinic of chronic venous diseases in men 30-55 years old.

**Keywords:** arterial hypertension, chronic venous diseases, men

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**For citation:** Баев В.М., Вагапов Т.Ф. Выраженность клинических проявлений хронических заболеваний вен у мужчин в зависимости от степени артериальной гипертензии. Евразийский кардиологический журнал. 2019, Сентябрь 25; 3:42-45 [Trans. into Eng. ed.: Baev V.M., Vagapov T.F. The severity of the clinical manifestations of chronic venous diseases in men, depending on the degree of arterial hypertension. Eurasian Heart Journal. 2019, September 25; 3:46-48]

## INTRODUCTION

As far as arterial hypertension (AH) diagnostics and effective treatment are concerned, the modern medicine has made actual progress manifested as reduction in cardiovascular accident related mortality [1]. However, some issues still remain understudied, e.g. AH comorbidity with chronic venous diseases (CVD) of the lower extremities, which is also characterized by high disability and mortality rates [2,3]. According to relevant research data, not only increased number of complaints and sign symptoms of CVD is observed in the AH patients, but also abnormal functional and structural parameters of the lower extremities' venous circulation are noted [4,5]. The CVD incidence is known to depend on the arterial bed tone and to increase both in arterial hypotension and in hypertension [5,6]. However, the mechanisms of AH and CVD comorbidity still remain understudied; in particular, dependence between AH severity and CVD signs' intensity is open to question.

Study objective – to study the effect of the degree of arterial hypertension (AH) on the severity of the clinical manifestations of

chronic venous disease (CVD) of the lower extremities in men of working age.

## MATERIAL AND METHODS

Study subject and scope – 74 male patients with AH. Study object – CVD intensity & severity. Study type – cross-sectional. Inclusion criteria – male patients with AH, of 30–55 years of age. Exclusion criteria: drug abuse; oncological diseases; endocrine diseases (diabetes mellitus, hypothyroidism, adrenal pathology); acute and chronic respiratory diseases; history of acute viral respiratory infections during last 2 weeks; acute infectious diseases; acute and chronic renal diseases (pyelonephritis, glomerulonephritis); differentiated connective tissue dysplasia; anemia; hepatitis; liver cirrhosis; pancreatitis; peptic ulcer; professional athletes; fractures and surgery in the lower extremities; vertebral and cerebral injuries; organic diseases of the central nervous system and of the cord; chronic cardiac insufficiency. The major characteristics of the observed patients with AH are provided in Table 1.

**Table 1. Characteristics of the studied patients, n=74**

| Parameter  | Me (Q <sub>1</sub> -Q <sub>3</sub> ) |
|------------|--------------------------------------|
| Age, years | 41(36-44)                            |
| SBP, mm Hg | 146(140-153)                         |
| DBP, mm Hg | 96(90-100)                           |

Note: Me – median, Q<sub>1</sub> – 25 percentile, Q<sub>3</sub> – 75 percentile

AH Degree 1 was most commonly observed in the patients (Table 2).

**Table 2. Characteristic of the men by AH degree**

| AH degree      | SBP, mm Hg                           | DBP, mm Hg   |
|----------------|--------------------------------------|--------------|
|                | Me (Q <sub>1</sub> -Q <sub>3</sub> ) |              |
| Degree 1, n=40 | 143(140-147)                         | 92(90-95)    |
| Degree 2, n=26 | 150(141-158)                         | 102(96-100)  |
| Degree 3, n=8  | 155(151-160)                         | 111(110-114) |

Note: Me – median, Q<sub>1</sub> – 25 percentile, Q<sub>3</sub> – 75 percentile

Symptoms of CVD such as pain (36%), varicose veins (24%), edema (31%) and hyperpigmentation (0.3%) have been reported in the observed 74 patients. More severe manifestations have not been found.

The AH was diagnosed using ESH/ESC [7] criteria and the criteria of Russian Medical Society for Arterial Hypertension (SBP 140 mm Hg and higher and/or DBP 90 mm Hg and higher) [2]. Two groups have been formed: Group 1 that included those with AH Degree 1 (40 persons) and Group 2 that included those with AH Degree 2 and 3 (34 persons). The CVD intensity and severity were determined by the total number of points allocated using the Venous Clinical Severity Score – VCSS developed in addition to the CEAP [8]. For that purpose, subjective evidence, physical examination data according to CEAP classification [9,10] and ultrasonic examination data were recorded. Great saphenous vein (GSV) and small saphenous vein (SSV) incompetence as the scale parameter was assessed by either presence or absence of pathologic refluxes at scanning angioscopy (duration of over 0.5 sec), of tortuosity in the GSV and SSV system in the standard echo windows. The ultrasonic

examination was conducted using iU22 xMatrix scanner (Phillips, USA, 2014). The maximum total number was 30 VCSS points. The total number reflects the severity of the pathology: the more points, the more severe the CVD course is. The study was conducted at the hospital of FBHI Healthcare Unit of the Russian Ministry of Internal Affairs for Perm Territory (Chief Medical Officer M.G. Nechaeva). The study period is 2017–2019. The study subjects were male patients with AH receiving inpatient treatment at the hospital for uncontrolled AH. All the subjects are employed by authorities of the Ministry of Internal Affairs. The statistical analysis was conducted by Statistica 6.1 software (serial number AXXR912E53722FA, StatSoft-Russia, 2009), using non-parametric statistics, as testing of the principal studied parameters for the probability of normal distribution by H.Lilliefors criterion has confirmed their asymmetry ( $p < 0.05$ ). The descriptive statistic results are presented as median (Me) with values of the first (Q<sub>1</sub>) and third (Q<sub>3</sub>) quartiles. The comparison of shares was performed using the contingency table between the 1st and the 2nd patient groups, using the  $\chi^2$  criterion. The differences were considered statistically significant at  $p < 0.05$ . The Ethics Committee of E.A. Vagner Perm State Medical University of MoH of Russia has approved: the study design, protocol, and the patient's informed consent for participation in the study (Minutes No. 6 of June 28, 2017). All the subjects have provided their written consent for the study.

## RESULTS

Pain syndrome was observed in 65%, edema in 53%, of the patients with AH Degree 2 and 3, which rates were higher than in the patients with AH Degree 1 with 38% and 13%, respectively (Table 3).

## DISCUSSION

Given the previously reported data on the signs of AH and CVD comorbidity [11] characterized by aggravated venous circulation disorders [12–14], it seems reasonable to assume that the AH degree determines both intensity and severity of the existing clinical manifestations of CVD. We have formulated our hypothesis based on study results confirming the venous tone and venous bloodstream disorders in AH [15]. Our results have

**Таблица 3. Результаты анализа таблицы сопряженности между группой 1 и группой 2 в оценке выраженности и тяжести симптомов ХЗВ**

| Symptoms                                      | Group 1, n=40                        |    |   |   | Group 2, n=34 |    |   |   | X <sup>2</sup> | P     |
|---|--------------------------------------|----|---|---|---------------|----|---|---|----------------|-------|
|   | Intensity & severity (points)        |    |   |   |               |    |   |   |                |       |
|   | 0                                    | 1  | 2 | 3 | 0             | 1  | 2 | 3 |                |       |
|   | Absolute incidence (number of cases) |    |   |   |               |    |   |   |                |       |
| Pain  | 25                                   | 15 | 0 | 0 | 12            | 22 | 0 | 0 | 6,12           | 0,047 |
| Varicose veins (according to ultrasound data) | 34                                   | 5  | 1 | 0 | 22            | 6  | 6 | 0 | 4,60           | 0,10  |
| Edema   | 35                                   | 5  | 0 | 0 | 16            | 16 | 2 | 0 | 12,62          | 0,002 |
| Hyperpigmentation                             | 40                                   | 0  | 0 | 0 | 32            | 2  | 0 | 0 | 0,69           | 0,40  |
| Inflammation                                  | 40                                   | 0  | 0 | 0 | 34            | 0  | 0 | 0 | -              | -     |
| Induration                                    | 40                                   | 0  | 0 | 0 | 34            | 0  | 0 | 0 | -              | -     |
| Number of ulcers                              | 40                                   | 0  | 0 | 0 | 34            | 0  | 0 | 0 | -              | -     |
| Active ulcer, duration                        | 40                                   | 0  | 0 | 0 | 34            | 0  | 0 | 0 | -              | -     |
| Active ulcer, dimension                       | 34                                   | 0  | 0 | 0 | 40            | 0  | 0 | 0 | -              | -     |
| Compression therapy                           | 34                                   | 0  | 0 | 0 | 40            | 0  | 0 | 0 | -              | -     |

Note:  $\chi^2$  – chi-square values; P – difference significance level

shown the dependence between AH degree and CVD severity. In our opinion, aggravation of the CVD symptoms at increased BP levels in AH is due to specifics of the comorbidity principal pathogenetic mechanism, i.e. the presence of arterial hypertension and increased venous pressure (phlebohypertension), with subsequent development of venous insufficiency [16]. Increased venous pressure is one of leading pathogenetic mechanisms of CVD [17]. The additional pathogenetic factor of the venous blood stream disorders progressing as BP level increases in AH may be poor vascular adaptation to gravity loads, which may modify the regulation of arterial and venous circulation [18,19]. Our results represent new data on the dependence of CVD clinical intensity not only on AH presence but also on AH severity. The dependence means increased risk of complications of cardiovascular diseases, vascular thromboses, disturbed microcirculation of organs and systems [20]. The established dependence between AH severity and CVD clinical intensity provides another reason for efficient AH control in men with CVD of the lower extremities.

## CONCLUSIONS

The severity of arterial hypertension worsens the clinical signs of chronic venous diseases in men aged 30–55 years.

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Accepted for publication: 15.08.2019