

## **Epidemiology and diagnostics of venous disease in Poland Epidemiologia i diagnostyka choroby żylniej w Polsce**

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### **Streszczenie**

Choroby układu sercowo – naczyniowego są najczęstszą przyczyną zgonów w Polsce. Z roku na rok odsetek osób, które zmarły w wyniku chorób układu krążenia zimniejsza się, jednak w dalszym ciągu niezbędna jest odpowiednia edukacja pacjenta i dostęp do lekarzy specjalistów. Przewlekła choroba żylna jest jednym ze schorzeń tego układu, którego prawdopodobieństwo wystąpienia zwiększa się wraz z wiekiem. Do pozostałych czynników ryzyka należą: płeć, rodzaj wykonywanej pracy zawodowej, otyłość, nawyki żywieniowe i występowanie zapań, ciąża, oraz czynnik genetyczny. Do objawów choroby należą: ból, obrzęki kończyny dolnej, uczucie zmęczenia / ciężkości nóg, mrowienie, poszerzenie drobnych naczyń krwionośnych, poszerzenie i uwypuklenie żył podskórnych, zmiany skórne, przebarwienia skóry, swędzenie skóry nóg, zastoinowe zapalenie skóry, owrzodzenia. Stopień zaawansowania choroby określa się przy użyciu skali CEAP. Działania profilaktyczne i wczesne wykrycie choroby skutkuje krótszym czasem leczenia i ograniczeniem jego kosztów. Niestety znaczna część lekarzy pierwszego kontaktu pomija badanie fizykalne kończyny dolnej, przez co wydłuża się proces postawienia diagnozy i pacjent trafia do właściwego leczenia ze schorzeniem o wyższym stopniu zaawansowania. Badania wskazują na różnice w częstości występowania przewlekłej choroby żylniej i stopnia jej zaawansowania w zależności od województwa, które zamieszkiwał chory. Może to świadczyć o potrzebie ujednoczenia w całym kraju metod szkolenia lekarzy. Metodą leczenia najczęściej stosowaną jest połączenie farmakoterapii i leczenia uciskiem.

## **Abstract**

Cardiovascular diseases are the leading cause of death in Poland. The percentage of people who die from cardiovascular disease is decreasing year by year, but an adequate patient education and access to specialist physicians are still required. The chronic venous disease is one of the disorders of this system, whose probability of occurrence increases with age. Other risk factors include gender, type of occupation, obesity, eating habits and constipation, pregnancy, and genetic factors. The symptoms of the disease include: pain, lower limb edema, fatigue / leg pain, tingling, enlargement of the small blood vessels, enlargement and constriction of the subcutaneous veins, skin lesions, skin discolouration, itching of the skin of the legs, congestive dermatitis, ulcers. The degree of disease is determined using the CEAP scale. A prophylactic and early detection of the disease results in shorter treatment times and reduced costs. Unfortunately, a large number of primary care physicians are skipping the physical examination of the lower limb, thus prolonging the diagnosis process and the patient being treated for a more advanced disease. Studies show that there is a difference in the incidence rate of the chronic venous disease and the severity of the disease, depending on the province that has been affected. This may indicate the need to standardize nationwide training methods for doctors. The most common method of treatment is the combination of pharmacotherapy and compression therapy.

**Słowa kluczowe: żylaki, otyłość, ciąża**

**Key words: varicose veins, obesity, pregnancy**

## **Admission**

A chronic venous insufficiency (CVI) is defined as a state of impaired drainage of venous blood from the lower limbs in a patient test upright occurring secondary to obstructive changes as in the veins of the excessive broadening of light conductors or disorders of the valve. The term chronic venous disease is a variety of symptoms caused by a permanently recurrent venous hypertension as a result of anatomical or functional changes in deep veins, superficial and / or bonding (or perforating). [1] The discomfort felt by the person is both subjective and objective. Symptoms of the chronic venous disease include pain, swelling of the lower limbs, fatigue / heavy legs, tingling, widening of small blood vessels, and widening of the vein bulge under the skin, skin lesions, discoloration of the skin, itchy skin legs, stasis dermatitis, ulcers. You can highlight primary and secondary chronic venous insufficiency. The original is closely related to the construction of a genetic weakening of the walls of veins and blood vessels. In the later stages of life, the patient is often exposed to factors that cause further weakening of the vessels, which include: pregnancy, trauma, hormonal changes, lifestyle. The most common causes of the secondary chronic venous insufficiency include obstruction and reverse flow (or both states at the same time), changes that are secondary to venous thrombosis. In large vessels, the most commonly observed consequence of the disease, arising in connection with the excessive flexibility of the veins and reflux, are varicose veins of the lower extremities. Primary varicose veins are the result of excessive flexibility of the wall, without thrombosis. Varicose veins usually develop secondary damage to the valves, travelled

as a result of deep vein thrombosis. [1] Valvular insufficiency due to their recanalization, then stiffening and loss of elasticity of arterial walls. The complications that can occur with the chronic venous insufficiency are also formed by an inflammatory reaction. Endothelial cells in this reaction may destroy components that are important for the elasticity of the vascular extracellular matrix - collagen and elastin. This mechanism may be a factor, which plays a role in the formation of a primary venous insufficiency, but it has its share in initiating the reconstruction of the venous valves, which is a consequence of venous reflux [2] and then the stiffening and loss of elasticity of arterial walls.

A history of deep vein thrombosis, after 3 years following the occurrence of chronic venous insufficiency in 35% - 69%, and within 5 years, this percentage is higher and amounts to 49% to 100%. [1]

### **CEAP classification**

The first standards for the classification of venous diseases were created in 1988. It is now widely used to assess the severity of the disease using the CEAP classification. A shortcut was created with the words: Clinical, Etiologic, Anatomic, Pathophysiologic and scale aspect includes clinical, etiologic, anatomical and pathophysiological. This scale was created in 1994 by the Ad Hoc Committee of the American Venous Forum, and updated in 2005. The clinical classification includes 7 groups.

Division of Clinical:

Group C0 - no visible changes in the clinical trial

Group C1 - telangiectasia, reticular veins, redness of the skin around the hock

Group C2 - Varicose Veins

Group C3 - the presence of edema without skin lesions

Group C4 - dependent lesions of venous diseases (pigmentation, eczema, lipodermatosclerosis)

Group C5 - skin disorders described above, with traces of healed ulcers of venous

Group C6 - like lesions in the groups C1 to C4 plus active venous ulcers.

Etiological division:

Ec - changes in venous malformations,

Ep - change primary pathological venous system, without identifying their causes,

Es - secondary causes of venous insufficiency of known ethology (post-thrombotic, post-traumatic, other).

The division of anatomic

Conductors - surfaced As:

1- telangiectasia

2- saphenous vein above the knee,

3- saphenous vein below the knee.

4- small saphenous vein.

5- vein side of the thigh and shin

Deep vein - Ad:

6 inferior vena cava,

7- common iliac vein.

8- internal iliac vein.

9- external iliac vein.

10- veins of the pelvis and uterine veins and nuclear

11- common femoral vein,

12 deep femoral vein,

13- superficial femoral vein,

14- popliteal vein,

15 and leg veins.

16- intramuscular vein (venous sinuses soleus muscle).

Veins piercing - Ap:

- 17- succeed,
- 18- drumsticks.

The determination of the pathophysiology takes into account the presence of reflux (Pr), patency of the vein (Po) and the coexistence of these pathologies (Pr, o). [3]

In Poland, the incidence rate of chronic venous insufficiency is comparable to Western Europe. This disease affects approximately 51% of adult women and 38% of adult men. Varicose veins of the lower extremities are found in 34.3% of the population. The occurrence of all categories of varicose veins and the severity of CVI grow with age.[1]

#### Risk factors

Statistical data indicate a higher prevalence of CVI in developed countries than in developing countries. Hence, many authors have studied the impact of not only hereditary factors, but also of the environmental ones, on the formation of the disease. The factors most influencing the incidence rate of CVI include age, family history of varicose veins, constipation, and not significantly sex.

#### Age and sex

With age, the incidence rate of varicose veins increases. Studies carried out in children already attending primary school, aged 10-12 years, allowed to establish the presence of small veins in approximately 10% of the respondents. The percentage of children who had similar changes over the next four years increased to 30%. Less than 35 r. F. disease is rare in women and almost in all men. In the age group 55-64, varicose veins are more common in men than in women. In most cases, the changes, which have occurred, are not very advanced, and the CEAP classification receives degree I. Most authors believe that CVI is more common in women. This especially applies younger respondents. With age, the predominance of women is reduced, and the advanced form of CVI (ulcers) is more frequent in men. These data may be due to the fact that men ignore the symptoms of the disease more frequently than women and are less willing to visit a doctor.

#### Professional work

In developed countries (Western Europe), CVI applies to 29% of working women; it is 17-20% on the global scale. The disease incidence rate is associated with the working environment; the greatest number of cases is diagnosed in people employed in the industry [1]. Despite this, opinions about the impact of standing or sitting work on the incidence rate of CVI are not conclusive. Studies confirm the relationship between the extended time spent at work in a standing position and CVI. The longer the time, the more frequent are cases of CVI and varicose veins. The relationship between the time spent in a sitting position and the occurrence of CVI is just the opposite. Less discomfort has been shown on the part of the venous system. The standing position is therefore more aggravating to the body and is a risk factor for CVI. [4] But this is not the only decisive factor.

#### Obesity

The risk factor, which is the weight of the patient, has also not been clearly confirmed. Some studies suggest a strong correlation between the severity of the disease and the body mass index BMI (Body Mass Index). The higher the BMI, the higher the degree of CEAP classification. This relationship concerns mainly women; men analysed for changes in the BMI were not so important. Overweight and obesity as well as limited physical activity accelerate the development of the disease, especially in people with a predisposition to CVI. The reason for this is considered to be an aberrant endocrine system, which concerns changes of oestrogen that is affected by the increased amount of body fat. It is also likely that the compression of veins in the abdomen (also due to high amounts of fat located in the area and surrounds internal organs) influences the pressure in the veins. Body weight is thus another risk factor for the symptoms of CVI. This also applies to deep venous thrombosis and secondary varicose veins.

#### Eating habits and constipation

It was suggested that constipation and a low-residue diet favour the formation of varicose veins. Fecal masses surging in the cecum oppress the iliac veins, which is associated with an increase in the intra-abdominal pressure. Over the years, this condition can lead to a widening of the veins of the lower limb of light and thus to varicose veins. Association occurrence of varicose veins and

constipation was confirmed only in the case of men. [1]

The occurrence of CVI may also be associated with the use of a diet, which has an insufficient amount of components rich in vitamin E (common in Western Europe). A deficiency of this vitamin can have a negative effect on the wall of the vein.

#### Pregnancy

CVI symptoms in pregnant women occur in about 1/4 of cases. A relationship between the number of pregnancies and childbirths and the presence of varicose veins was also demonstrated. Women who have given birth two or more times are more susceptible to the formation of varicose veins than the other, which gave birth only once or not at all (this risk increases by 20-30%). The most commonly observed changes in pregnancy are: telangiectasia, reticular veins and varicose veins. These changes begin to occur in the first trimester of pregnancy, and after giving birth, they often disappear. During this period, a woman's hormonal system is dominated by progesterone released from the corpus luteum. This hormone also affects venous walls by increasing their deformability and compliance. Currently, it is believed that it has a greater impact on the condition of blood vessels than the pressure of a growing foetus in the iliac veins and inferior vena cava.

There is also a hypothesis that the formation of varicose veins is a defence mechanism against deep vein thrombosis, and pulmonary embolism, which is its complication. The development of deep vein thrombosis was observed more frequently in women without evidence of varicose veins.

#### The genetic factor

The genetic predisposition, based on the data from the interview on the prevalence of CVI in the immediate family members, is considered to be one of the most important factors contributing to the incidence of CVI. This factor was established on the basis of an interview in about 75% of people who observed symptoms of CVI.

If both parents present this disease, there is a 90% probability that the disease will appear in the child in the future. If one parent suffers from this, the risk is somewhat smaller - 62% in girls and 25% in boys. If the disease has not occurred in the interview, the child's risk is 20%.

Despite the clear relationship between the occurrence of CVI in parents and in children, the gene or genes responsible for the disease have not yet been identified. In order to draw up a complete genotype-phenotype, analyses are carried out twin studies, which discuss the influence of hereditary and lifestyle typical of a succession to the development of chronic venous insufficiency [1].

#### The occurrence of chronic venous disease in Poland

According to the survey conducted by Przybylska-Kuc et al. on the involvement of family doctors in the prevention and treatment of chronic venous insufficiency, about 35% of family physicians ignore the physical examination of the lower extremities during the visit. 5% of doctors examine patients very rarely; about 23% occasionally. The test is always performed by about 16.5% of family doctors. According to the authors, most patients do not obtain information about the prevention and treatment of CVI. This condition results in delayed diagnosis and disease development to higher stages. The implementation of preventive measures and an early diagnosis of the disease can reduce costs and shorten the time of treatment. Compression is one of the preventive and curative measures suggested by doctors, but more often it is proposed to pharmacotherapy [6].

The epidemiology of chronic venous disease has been rarely studied in Poland. The first significant study was conducted in 2003. The study included 40 095 adult patients who contacted 803 family doctors and gynaecologists. Due to the significant share of gynaecologists, the percentage of women participating in this study was 84%. 51% of women and 38% of men had symptoms of chronic venous disease. Venous insufficiency (Stage 3-6) was found in 10% of patients, and the ulcers were observed in 1.5% of patients. Among the symptoms reported by the patients, the most frequent ones included pain (70% of men and 77% of women), the severity of the legs (67% of men and 75% of women), cramps (61% of men and 57% women) and edema (48% of men and 57% of women). Only 23% of the patients applied the conservative treatment recommended for the treatment of this disease (pain relievers, compression therapy). [7]

### Territorial differences

The multi-centre study involved a research group of 13,393 people in 15 provinces. The study involved 330 doctors. The aim of the study was to find regional differences in the reported symptoms of chronic venous disease and the conservative treatment prescribed by primary care physicians. Considering the entire country, according to the classification, stage C0 CEAP occurred in 31.9% of cases. Stage C1 (including telangiectasis) occurred in 56.1% of patients. Varicose veins without signs of venous insufficiency have been found among 6% of patients. In contrast, ulcers (active or healed) related to 0.6%. [8] In this study, a strong position was held by the group representing the urban population of sedentary work. Stage C0 occurred least often in Warmińskie - (6.6%) while in Pomorskie, it recorded the highest incidence rate of the disease (41.1%). Ziaja et al. give different interpretations of the CEAP classification as the reason for this state of affairs, resulting from the weak scale prevalence among primary care physicians, who are not involved in the treatment of vascular diseases. The authors point to the problem of the marginalization of vascular disease by doctors in training programs. Among the most common symptoms reported were: feeling of "heavy legs" (72.9%), increased ankle circumference in the evening (68.4%), and night cramps (58.6%). Other symptoms occurred in less than half of the people (swelling of the legs in the evening - 39.8%, paraesthesia - 30.4%, restless legs syndrome - 18.6%). The average calf pain intensity was moderate ( $3.82 \pm 1.86$  points on a scale of 10 points). [8] Also, in the case of symptoms, a differentiation was observed in individual regions. In the case of symptoms, the differences can also arise from other systems of training primary care physicians. Not all areas have applied the exclusion criteria of the study as meticulously. The territorial differentiation of the symptoms can also result from different industries and services in the various provinces.

### Vascular surgery

Vascular surgery is a separate part of surgery dedicated to the treatment of the diseases of blood vessels and lymph, whose main objective is the treatment of surgical complications and sequelae of many diseases, among other things, such as chronic atherosclerotic peripheral vascular disease, narrowing of the extracranial cerebral arteries, including primarily carotid stenosis, aneurysms of the aorta and peripheral arteries, diabetic foot syndrome and chronic venous insufficiency (varicose veins of the lower extremities, venous leg ulcers). [9] In the face of steadily lengthening life expectancy and birth rate, which in recent years does not guarantee the replacement of generations, we have to deal with an aging society. Chronic venous disease and its complications show the increasing number of cases and their severity with age.

Cardio - vascular and their complications are the leading cause of death in Poland. However, for several years, in terms of mortality from these diseases, a gradual improvement is observed - in 2012. They were the cause of approx. 46 percent of all deaths, while in the early 90s, they accounted for approx. 52 percent, and at the turn of the century - approx. 48 percent. Among women, mortality due to cardiovascular diseases is much higher.

To estimate the availability of specialists for patients, an indicator of the number of economically active vascular surgeons per 100 thousand persons was calculated in 2015. The highest rate was reported in Mazowieckie (2.14 vascular surgeons / 100 thousand inhabitants) Dolnośląskie (1.82 / 100 k.) and Śląskie (1.48 / 100 k.). The lowest rates were found in Lubuskie (0.49 / 100 k.) Świętokrzyskie (0.71 / 100 k.) and Podkarpackie (0.85 / 100 k.). The average value of the index for the Polish in 2015 was 1.28 vascular surgeons per 100 thousand residents. The largest number of vascular surgeons worked in Mazowieckie (114 specialists), Śląskie (68 specialists) and Lower Silesia (53 specialists). The least vascular surgeons worked in Lubuskie (5 specialists) and Świętokrzyskie (9 specialists). [9]

Only five provinces in Poland: Mazowieckie, Dolnośląskie, Śląskie, Zachodnio-Pomorskie and Lubelskie, have the number of vascular surgeons at the same level as the average of this parameter for the European Union. Poland is among the countries with a low level, but the situation from year to year is improving.

## Methods of treatment

### Conservative treatment

The goal of the treatment is to reduce the pressure in the venous limb microcirculation, improving performance, strengthening the walls of blood vessels and improving microcirculation parameters. For this purpose, combined compression treatment (compression therapy) and pharmacological treatment of such conduct gives the best therapeutic effects. Compression therapy largely improves the efficiency of the muscle pump, reducing venous reflux, and when used regularly, it can reduce the occurrence of edema of the lower extremities (especially at the end of the day). There are three methods of compression treatment:

finished products using graduated compression (knee socks, stockings, tights)

the use of elastic bands (bandage)

the use of intermittent pneumatic massage.

Production graduated compression treatment is a very good alternative to traditional bandaging. This method is simple to use and provides the ability to determine the specific pressure on the different parts of the leg during the entire day of wearing the product. The key to the success of the use of compression is appropriate to the stage of selection of the degree of oppression and size selection. For this purpose, an experienced person measures the circuitry of the lower limb in the morning (when there is still swelling). The finished products can be found in the form of knee compression stockings and tights. It is also important to measure the length of the leg from the floor, because these products are available in several versions depending on the patient's height. In the case of unusual dimensions, many companies offer the ability to create custom-made knee stockings on the basis of measurements. [10]

Compression products can be found in four classes of compression (referring to the greatest pressure that occurs at the level of the ankle, then decreases gradually to prevent the backflow of venous blood dysfunctional valve):

Class I oppression - 25 mm Hg

Class II oppression - from 25 to 35 mm Hg,

Class III oppression - from 35 to 45 mm Hg,

Class IV oppression - above 45 mm Hg. [2]

In practice, the most commonly recommended products are I or II class oppression. There are also two-piece compression products designed for people with venous ulcers. The inner layer of the fabric is designed to protect the sensitive spot, and the outer layer that goes over the inner layer provides the appropriate pressure.

Compression stockings are also used in the prevention of deep vein thrombosis. This disease is one of the complications of stroke. Often, deep vein thrombosis leads to pulmonary embolism and its prevention in patients immobilized after a stroke, resulting in a reduction in mortality. [11]

The use of compression is considered to be safe; it does not cause any side effects. However, patients with severe peripheral neuropathy or peripheral vascular disease are not recommended to use them because they can lead to ischemia (and consequently to lower limb amputation). The efficacy of the methods of compression (whether they are of graduated compression stockings, intermittent pneumatic compression or pneumatic pump) is evaluated as being 1/3 in the case of using only 1/2 of the compression and when the compression method is combined with pharmacotherapy.

Compression dressing using elastic bands shall include the lower limb from the base of the toes to the tibial tuberosity. Oppression, similarly as in the case of finished goods, decreases in the direction from the ankle to the knee. It is important that a correct pressure is maintained until the next bandage change. [12]

Increasingly popular are devices for an intermittent pneumatic massage. The usefulness of such a massage in the reduction of venous stasis and its positive effect on the activation of microcirculation has been confirmed.

## Pharmacological treatment

The pharmacological treatment is to seal the capillary barrier, preventing changes in blood composition, improving venous tonus and reducing the blood viscosity. Phlebotropic drugs improve the elasticity of the capillaries and restore their proper permeability. They also increase the strength of vessels, intensity lymphatic peristalsis and thereby increase lymphatic drainage. Due to their origin, these drugs are divided into preparations of natural origin (benzopyrenes, and saponins), and synthetic origin (and trybenozyd calcium dobesilate). [2.13]

## Conclusions

1. The incidence rate of chronic venous disease will increase, considering urbanization and socio-economic factors. Monitoring epidemiology is important in the medical, social and economic contexts.
2. The necessary diagnostic procedures should be applied by practitioners in order to diagnose and initiate treatment early.
3. Compression treatment is an effective and evidence-based treatment of venous insufficiency and prothylaxis.
4. Educational programs should be implemented among the public, especially in urban centres, where the disease is most common.

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