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Chronic pelvic pain in women

Grigoryev E.G.[1, 2], Lebedeva D.V.[1], Grigoryev S.E.[3]

[1] *Irkutsk Regional Clinical Hospital*
100, Yubileyniy Str., Irkutsk, 664049, Russian Federation

[2] *Irkutsk State Medical University*
1, Krasnogo Vosstaniya Str., Irkutsk, 664003, Russian Federation

[3] *Irkutsk Scientific Centre of Surgery and Traumatology*
1, Bortsov Revolyutsii Str., Irkutsk, 664003, Russian Federation

ABSTRACT

Chronic pelvic pain resulting from varicose veins of the small pelvis is a multidisciplinary problem. A key cause of pelvic congestion is congenital or acquired gonadal valve failure. Ultrasound and Doppler examination for chronic pelvic pain allows in most cases to diagnose pelvic varicose veins. Multispiral computed tomography or magnetic resonance imaging details the nature and extent of the pathology. Selective phlebography is considered the gold standard for diagnosing varicose veins of the small pelvis. Conservative treatment with phlebotropic drugs is prescribed for limited pelvic varicose veins. Surgical treatments include open resection and retroperitoneal and transperitoneal laparoscopic gonadal vein excision or clipping. The most effective is minimally invasive endovascular occlusion of reflux veins using spiral technologies and sclerosants. The left ovarian vein is reduced more often. The decision on bilateral embolization of blood vessels depends on the severity of changes in veins and the intensity of blood reflux. A decrease in the intensity or disappearance of pain in the pelvic area is achieved in 80-100% of cases after the procedure. Diagnosis of this condition is difficult due to the fact that the appearance of pelvic varicose veins is nonspecific and includes symptoms of surgical, urological, gynecological and other diseases of the pelvic organs.

Key words: pelvic vein varicosity, pelvic vein congestion, radiologic diagnostics, endovascular occlusion, surgical treatment.

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Хроническая тазовая боль у женщин

Григорьев Е.Г.[1, 2], Лебедева Д.В.[1], Григорьев С.Е.[3]

[1] *Иркутский государственный медицинский университет (ИГМУ)*
Россия, 664003, г. Иркутск, ул. Красного Восстания, 1

[2] *Иркутский научный центр хирургии и травматологии (ИНЦХТ)*
Россия, 664003, г. Иркутск, ул. Борцов Революции, 1

✉ *Grigoriev Evgeny G.,* e-mail: egg@iokb.ru.

[3] *Иркутская областная клиническая больница (ИОКБ)*
Россия, 664049, г. Иркутск, мкр. Юбилейный, 100

РЕЗЮМЕ

Хроническая тазовая боль, возникающая в результате варикозной болезни вен малого таза, – мультидисциплинарная проблема. Ключевая причина тазовой конгестии – врожденная или приобретенная несостоятельность клапанов гонадных вен. Ультразвуковое и допплерографическое исследование при хронической тазовой боли позволяет в большинстве наблюдений диагностировать тазовый варикоз. Мультиспиральная компьютерная или магнитно-резонансная томография детализирует характер и распространенность патологии. Золотым стандартом диагностики варикозной болезни вен малого таза считается селективная флебография. Консервативное лечение флеботропными препаратами назначается при ограниченном тазовом варикозе. Хирургические методы лечения включают открытые резекционные вмешательства, ретроперитонеальное и трансперитонеальное лапароскопическое иссечение гонадных вен или их клипирование. Наиболее эффективна мининвазивная эндоваскулярная окклюзия рефлюксных вен с использованием спиральных технологий и склерозантов. Чаще редуцируется левая яичниковая вена. Решение о билатеральной эмболизации сосудов зависит от выраженности изменения вен и интенсивности рефлюкса крови. Уменьшение интенсивности или исчезновение боли в области малого таза достигается в 80–100% наблюдений после процедуры. Диагностика этого состояния затруднена в связи с тем, что проявления тазового варикоза неспецифичны и включают симптомы хирургических, урологических, гинекологических и других заболеваний органов малого таза.

Ключевые слова: варикозная болезнь вен малого таза, тазовая венозная конгестия, лучевая диагностика, эндоваскулярная окклюзия, хирургическое лечение.

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INTRODUCTION

Varicose veins of the small pelvis (VVSP) is an insufficiently studied problem. There is no universal terminology in the Russian and English-language literature; there are no common approaches to the diagnosis and provision of specialized care for patients with this disease.

The development of the syndrome of pelvic congestion as a result of dilatation of the gonadal and intrapelvic veins due to retrograde turbulent blood flow is the cornerstone of VVSP. The most typical manifestations are chronic pelvic pain (CPP) not associated with the menstrual cycle lasting more than 6 months, dyspareunia, and dyschezia [1].

In 1857 M.A. Richet first described ovaricocele [2]. Later, V.F. Snegirev [3] formulated a hypothesis about the role of the venous system in the pathogenesis of chronic ("plethoric") pain in the small pelvis in women. On bimanual examination, the pelvic plexus distended with blood was identified in the form of dense, painful tumors, which, in his opinion, could be analogous to varicocele in men. In 1949, N.S. Taylor established a relationship between varicose veins and chronic pelvic pain [4]. To CPP of mechanical nature A.E. Mandelstam (1956) also attributed plethoric pain [5]. In 1975, O. Craig and J. Hobbs first described in detail VVSP and gave this disease the name adopted in the English language literature, pelvic congestion syndrome [6].

EPIDEMIOLOGY

P. Latthe et al. [7] noted that pelvic congestion syndrome is diagnosed in 24% of women of reproductive age, but the real prevalence of this disease is higher, since many for various reasons do not seek medical help. In the USA, in patients with CPP, one third of women are diagnosed with pelvic varicose veins [8]. In the UK, among patients 12–70 years old, the incidence is 38 per 1,000 per year [9]. CPP significantly reduces the quality of life, leads to psycho-emotional problems, family conflicts, and social maladjustment. Pathology is of socioeconomic importance, as it causes temporary disability in 10–12% of women [10]. They

are being observed for a long time by gynecologists, surgeons and other specialists without receiving adequate treatment. The annual pan-European costs of treatment are 3.8 billion euros [9].

ETIOPATHOGENESIS

There are primary (idiopathic) varicose veins (VV) of the pelvic veins and secondary, caused by obstruction of the pelvic veins from the outside against the background of gynecological, urological, or surgical organ pathology [11].

Two main causes of primary pelvic vein insufficiency and CPP have been described. First, it is congenital or acquired valvular failure of the gonadal, parametric and uterine veins (in 15% of cases on the left, on the right in 6%) [11]. Secondly, during pregnancy, the capacity of the pelvic veins increases 60 times compared to their normal value [12]. Veins do not have the elasticity of arteries, and after childbirth, their diameter does not return to its original diameter, which ultimately can contribute to permanent venous reflux. It is not excluded that the hormonal influence on the formation of VVSP during pregnancy is also possible.

Secondary VVSP includes the features of the architectonics of the abdominal vessels: compression of the left internal iliac vein by the right common iliac artery (May – Thurner syndrome) and compression of the left renal vein by the superior mesenteric artery (Nutcracker syndrome), extending from the aorta at an acute angle, with the development of left-sided renal phlebohypotension. As a result, excessive reflux of blood develops into the venous network of the small pelvis.

Some authors classify VVSP as a type of chronic venous insufficiency, considering it a problem in vascular surgery. This is indicated by the presence of varicose veins of the lower extremities in half of women with VVSP, which does not exclude the version of the unity of causes and pathogenetic mechanisms in these diseases [13, 14].

In the pathogenesis of phlebohypertension, the prevalence of varicose transformation of the pelvic veins and the formation of varicose veins of the external genital organs as a result of drainage of blood from the vessels of the small pelvis into the saphenous veins of the perineum are important [15], which probably reduces pelvic congestion. The formation of CPP in varicose disease of the pelvic veins remains unclear. It is possible that turbulent blood flow affects the receptors of the vascular wall, disrupts the production of neurotransmitters and contributes to the appearance of pain syndrome [16]. S.G. Gavrilov et al. observed patients with VVSP and dilation of the gonadal and parametric veins up to 10 mm or more in the absence of CPP [15]. Therefore, the dilation of the ovarian veins should not be considered an objective indicator of pathological blood reflux [17].

Risk factors for the development of the pathology under discussion coincide with those in varicose veins of the lower extremities: heredity, gender, age, and sedentary lifestyle, nature of work, two or more pregnancies, and hormonal imbalance.

CLASSIFICATION

A.E. Volkov (2000) proposed a classification of varicose veins of the small pelvis depending on the diameter of the vessels and their localization:

– first degree: vein diameter up to 5 mm (of any venous plexus of the small pelvis), "corkscrew" course of the vessel;

– second degree: vein diameter 6-10 mm with the total type of varicose veins, diffuse ectasia of the ovarian plexus (*pl. pampiniformis ovarii*), varicose parametric veins (*pl. uterovaginalis*), VV of the arcuate plexus of the uterus;

– third degree: vein diameter > 10 mm with the total or main type of VV of parametric localization [18].

In 2004, the Japanese radiologist T. Hiromura proposed a classification of blood reflux in the left ovarian vein [19]:

– reno-gonadal reflux of blood without varicose changes in the pelvic veins;

– reflux into the gonadal vein with limited left-sided varicose veins of the pelvic veins;

– reflux of blood into the gonadal vein with total varicose veins and drainage of blood into the right ovarian vein.

G. Asciutto [20] diagnosed VVSP on the following grounds:

– varicose reflux towards the ipsilateral or contralateral proximal thigh;

– visualization of reflux along the entire course of the ovarian vein;

– retrograde filling of the main trunk of the internal iliac vein and at least one lateral branch (gluteal, sciatic or obturator veins);

– retrograde filling of contrast medium along the midline.

The authors of the Guidelines of the Russian Phlebological Association for the Diagnosis and Treatment of Chronic Venous Diseases (2018) classify the following forms:

1. According to the clinical manifestations:

– varicose veins of the pelvis – a disease characterized by the dilation of the ovarian veins and intrapelvic venous plexuses;

– varicose veins of the vulva (vulvar varicose veins) - dilation of the veins of the external genital organs;

– varicose veins of the perineum (perineal varicose veins) – dilation of the veins of the perineum outside the external genital organs;

– varicose veins of the gluteal region (gluteal varicose veins);

– secondary dilation of the intrapelvic veins – dilation and reflux of blood through the intrapelvic veins against the background of postthrombotic occlusions of the iliac and (or) inferior vena cava.

2. According to the clinical course:

– painful form;

– painless form;

– latent form (asymptomatic).

3. According to the prevalence of the pelvic vein lesions:

– isolated dilation of the pelvic venous plexus;

– combined dilation of the gonadal veins and pelvic venous plexuses;

– unilateral or bilateral dilation of the gonadal veins;

– dilation of the trunk or branches of the internal iliac veins [1].

S.G. Gavrilov et al. argue that since the symptoms of plethora are not due to the degree of dilation of the pelvic veins, pathology should be classified depending on the intensity of gonadal reflux of blood, which will allow formulating an algorithm for further examination and treatment [15].

The relationship between the severity of patients' complaints and the degree of dilation of the pelvic veins and the area of their lesions is subject for further study.

CLINICAL PICTURE

The manifestations of VVSP are nonspecific and include signs symptoms found in various gynecological, surgical, urological and neurological diseases. The pathognomonic clinical equivalent is chronic pelvic pain (72%), which increases during the day with prolonged standing and decreases in the supine position. A decrease in the frequency of pain during pregnancy was noted, possibly due to a change in hormonal levels [21]. Increased pain may be associated with overwork, emotional stress, hypothermia, exacerbation of chronic diseases of the genitals [22].

The syndrome of pelvic venous congestion is accompanied by discomfort and pain in the hypogastric zone of the abdomen during exercise in 67% of cases, dyspareunia in 57.5%, fear of sexual intercourse, and less often, urinary incontinence and frequent painful urination as a result of congestion in the venous bladder plexus [23]. Varicose veins of the perineum, pubic and groin areas occur in 25% of cases. Dysmenorrhea develops in 22.5% of patients [13]. An increased secretion from the vagina has been described, especially in the second half of the cycle [24]. In addition, there is a direct link between pelvic congestive syndrome and the development of obstetric problems in 6% of cases: infertility, miscarriage and termination of pregnancy, secondary ovarian dysfunction [25].

With CPP, psychoemotional disorders (anxiety, depression) of varying severity are observed, and a pathogenetic nociceptive vicious circle is formed. Sometimes the patient's interpretation of the pain sensation, her emotional reaction and behavior may not correspond to the severity of pelvic venous congestion, which must be taken into account when choosing a treatment strategy [26].

DIAGNOSIS

In the 1950s P. Guilhem et al. [27, 28] diagnosed venous pelvic varicose veins based on X-ray examinations without describing the clinical equivalent of the detected changes.

Congestive syndrome should be suspected already in the presence of CPP. To confirm this condition, methods of visualization of the pelvic venous system using ultrasound and Doppler examinations are used [29]. As a result, it is possible to diagnose pathology in most cases [30]. The examination is carried out in the Fowler position, transabdominally and transvaginally. In some cases, proximal compression techniques are used to stimulate reflux through the gonadal veins.

Varicose veins of the small pelvis are often an accidental finding when performing multislice computed tomography of the vessels (MSCT) or magnetic resonance imaging (MRI) for another reason. These methods make it possible to detect not only varicose intrapelvic venous plexuses, but also compression from the outside of the left renal and internal iliac veins (Nutcracker and May – Thurner syndromes).

It is advisable to perform MSCT phlebography or MR phlebography with the creation of a three-dimensional image of the topographic and anatomical picture.

S.G. Gavrilov et al. in their study used emission computed tomography with "*in vivo* labeled erythrocytes before and after conservative therapy or surgery to evaluate the effectiveness of treatment" [31].

The disadvantages of these methods are the difficulties in examining patients in the Fowler position and performing proximal compression to improve visualization of dilated gonadal and intrapelvic veins.

Invasive selective phlebography proposed in 1965 by J. Tavernier and D. Lange [32], which allows detailing pathological changes in the venous system of the small pelvis [30], is considered the gold standard for diagnosing VVSP. The femoral vein is more often used for access. The English-language literature describes catheterization under the control of ultrasound sonography of the jugular, subclavian, brachial veins, which provides reliable access to intrapelvic communications. Selective left-sided renal phlebography is performed against the background of the Valsalva maneuver. With reflux of blood into the ovarian vein, it is superselectively contrasted. After that, ovarycography from the opposite side is performed. In some cases, the internal iliac veins are examined. This reveals isolated refluxes and dilatation of the perineal veins, which can also cause pelvic pain [33].

Diagnostic laparoscopy is more often used in gynecological practice as the final stage of a comprehensive examination of patients to identify competitive pelvic pathology (endometriosis, adhesions, Allen – Masters syndrome, etc.). Pathological reflux of blood, causing congestion in the veins of the small pelvis, was found in only 20% of patients with visually detectable varicose veins. The dilated veins of the small pelvis without pathological reflux of blood, revealed during the examination, cannot be the cause of venous pelvic pain. Such findings should be considered as a common condition in multiparous women [31]. The informative value of laparoscopic examination of vascular communications of the small pelvis is significantly inferior to the results of radiation diagnostic methods (ultrasound, MSCT, MRI, catheter phlebography).

On this basis, a diagnostic algorithm for chronic pelvic pain has been proposed by S.G. Gavrilov et al. [31].

LABORATORY DIAGNOSTICS

There are no specific biochemical signs of VVSP. Markers of collagen breakdown and connective tissue dysfunction (hydroxyproline, glycosaminoglycans, neuraminic acid metabolites and its derivatives) indicate only the presence of varicose veins, without its clear localization [8]. In 2018, a study was published on the use of pro- and antioxidant systems (diene conjugates, malondialdehyde, catalase, superoxide dismutase, and glutathione peroxidase) as additional diagnostic markers. This is due to their role in the onset and development of VVSP in women [34].

TREATMENT

Conservative treatment is prescribed for dilated gonadal veins without clinical manifestations of pelvic congestion and limited intrapelvic varicose veins [31]. Modern phlebotropic drugs occupy a leading place in the treatment of VVSP [8]. Anticoagulants, antioxidants, collagen formation stimulants, glycosaminoglycan metabolism regulators, physiotherapy and hirudotherapy are also used. In 2018, a work was published on the prophylactic use of antioxidants, taking into account their role in the pathogenesis of the disease [34].

Adnexectomy, hysterectomy and resection of the wide ligament of the uterus are the first surgical interventions that have been used to treat this pathology [35]. When analyzing the results obtained, it turned out that 33% of patients still had discomfort, and 20% of the pain remained at the same level. Later, ligation or clipping of the ovarian veins was proposed. However, due to frequent recurrences of CPP (up to 80%), this method was abandoned.

The trunk type of gonadal veins without concomitant gynecological pathology and in the absence of varicose veins of the lower extremities allows the use of endovascular occlusion of the ovarian veins for the treatment of pelvic congestion syndrome. In the diffuse type, it is advisable to use laparoscopic resection of the gonadal veins, which allows simultaneous correction of concomitant pathology. With this approach, the number of relapses can be minimized [8, 31].

Unlike conventional open or laparoscopic surgical methods, endovascular interventions use a minimally invasive approach: selective occlusion of reflux veins [36]. Transcatheter ovarian vein embolization was first described by R.D. Edward et al. in 1993 [37]. For this procedure, metal elements, adhesive compositions, polyvinyl alcohol, and liquid sclerosants are used. Further study of the problem showed that spiral technologies are effective in no more than 60% of cases, which is associated with the formation of roundabout reflux venous blood flow [38]. According to V.Yu Bogachev., it is advisable to combine spiral technologies with the introduction of sclerosants [29]. A fairly effective sclerosing agent is 96% ethyl alco-

hol [39]. The technique involves the installation of a coil and (or) the introduction of a sclerosant at the L4–L5 level into the gonadal vein [40]. Some authors use a laparoscopic approach for sclerosing, reporting a decrease in pain intensity in 61.2% of patients with concomitant varicose veins of the uterine appendages and in 90.0% of patients with isolated congestion [11].

The decision on mono- or bilateral embolization of vessels is made based on the severity of changes in veins and the intensity of blood reflux [8].

A decrease in the intensity or disappearance of chronic pain in the pelvic area was achieved in 80% of patients. In further studies on the occlusion of both ovarian and internal iliac veins, a positive result was achieved in 94% of cases [33]. In the treatment of 41 patients G. Maleux noted its effectiveness in 98% of cases [41]. In the long-term period, 59% of patients with unilateral ovarian vein embolization had no symptoms of the disease [41]. The embolization efficiency, according to different authors, is 67–89% [33]. There is evidence of 100% success and symptom improvement over a 12-month follow-up period after the procedure [33]. S.G. Gavrilov et al. report an 86% success rate [31].

Complications of the endovascular method of treatment occur in 4–22%. Migration of embolizing material into the right chambers of the heart and the pulmonary artery is the most commonly diagnosed (1.9%). It has not been confirmed that pelvic vein embolization has an adverse effect on fertility associated with decreased ovarian function [33].

It is advisable to perform open extraperitoneal excision of altered veins in patients with a trunk and (or) multilateral type of ovarian vein structure and concomitant varicose veins of the pelvis or atypically located varicose veins. The efficiency of the operation reaches 100%; meanwhile, priority is given to minimally invasive techniques [31].

With regard to endoscopic interventions, depending on the access, retroperitoneal and transperitoneal resections are distinguished [42].

The first is performed with the patient on the right or left side. The obvious benefits of the method as compared to the transperitoneal approach include half the time of the intervention, decrease of complication rates, relief of pain in the site of ports, and a decrease in the postoperative hospital stay. This technique is optimal for unilateral lesions of the gonadal veins. In addition, the use of retrocarboxyperitoneum determines the possibility of wide mobilization of the gonadal vein from the ovary to the left renal or inferior vena cava without trauma to the abdominal organs [42].

Transperitoneal endoscopic resection is performed for bilateral lesions of the gonadal veins [42].

According to S.G. Gavrilov et al., the efficiency of laparoscopic resection of the gonadal veins also reaches 100% [26].

CONCLUSION

Varicose veins of the small pelvis is a fairly common disease, its main manifestation is pelvic pain, which reduces the quality of life, leads to the formation of psychoemotional problems, and leads to social maladjustment. Often, women are observed by various specialists (obstetricians, gynecologists, surgeons, urologists, neurologists, psychiatrists, etc.) without prescribing etiopathogenetic treatment.

Since the middle of the nineteenth century, the causes of plethoric pain and, above all, the role of changes in the venous system of the pelvis in their occurrence are discussed. Varicose transformation of the pelvic veins with the formation of phlebohypertension occurs primarily as a result of reflux of blood into the gonadal veins. It is possible that pelvic congestion is a type of chronic venous insufficiency, given the theory of the unity of the etiopathogenetic mechanism of development of varicose veins of the small pelvis and lower extremities.

Difficulties in diagnosis are due to the fact that the manifestations of pelvic varicose veins are nonspecific and include symptoms of surgical, gynecological, urological and other diseases of the pelvic organs.

At the core of the instrumental diagnosis of pelvic varicose veins are radiation methods: ultrasound and Doppler examinations, MSCT phlebography, and MRI. The most accurate information can be obtained after performing invasive selective and superselective phlebography.

For the treatment of pelvic congestion, open resection and endoscopic interventions, clipping of ovarian veins, and endovascular reduction of pathological blood flow have been proposed. The latter method of correcting pelvic venous congestion is highly effective in the main type of gonadal reflux.

In the problem of pelvic venous congestion, questions and unresolved problems remain in the diagnosis and treatment of chronic pain.

REFERENCES

1. Diagnostics and treatment of chronic venous disease: guidelines of Russian Phlebological Association. *Flebologiya. Journal*

of Venous Disorders. 2018; 3: 146–240 (in Russ.). DOI: 10.17116/flebo20187031146.
2. Richet M.A. Traité pratique d'anatomie médico-chirurgicale. Paris: F. Chamerot, Libraire-Editeur, 1857: 1026.
3. Snegirev V.F. Uterine bleeding. Etiology. Diagnostics. Treatment. 4th ed. Moscow, 1907: 804 (in Russ.).
4. Taylor H.C. Vascular congestion and hyperemia. Their effect on structure and function in the female reproductive system. *Am. J. Obstet. Gynecol*. 1949; 57 (2): 211–230. DOI: 10.1016/0002-9378(49)90422-6.
5. Mandelstam A.E. Semiotics and diagnosis of female diseases. Leningrad: Medicine, 1976: 698 (in Russ.).
6. Craig O., Hobbs J.T. Vulval phlebography in the pelvic congestion syndrome. *Clin. Radiol*. 1975; 26 (4): 517–525. DOI: 10.1016/S0009-9260(75)80112-7.
7. Latthe P., Latthe M., Say L., Gülmezoglu M., Khan K.S. WHO systematic review of prevalence of chronic pelvic pain: a neglected reproductive health morbidity. *BMC Public Health*. 2006; 6: 177. DOI: 10.1186/1471-2458-6-177.
8. Verezgova S.V., Troik E.B., Ryzhkov V.K. Congestive syndrome in women. Endovascular methods of diagnosis and treatment. *Practical Medicine*. 2015; 1: 16–20 (in Russ.).
9. Riding D.M., Hansrani V., McCollum C. Pelvic vein incompetence: clinical perspectives. *Vasc. Health Risk Manag*. 2017; 13: 439–447. DOI: 10.2147/VHRM.S132827.
10. Khomenko N.E., Voskanyan Yu.E., Gasparyan S.A. Varicose veins of the small pelvis: etiology, pathogenesis, diagnosis, treatment. *Obstetrics and Gynecology*. 2006; 6: 8–10 (in Russ.).
11. Semendyaeva M.A., Khamoshina M.B., Gus A.I., Semendyaev A.A. Therapeutic and diagnostic potential of laparoscopy in women with varicose veins of the appendages of the uterus. *RUDN Journal of Medicine*. 2010; 6: 287–295 (in Russ.).
12. Hodgkinson C.P. Physiology of the ovarian veins during pregnancy. *Obstet. Gynecol.* 1953; 1 (1): 26–37.
13. Gavrilov S.G., Kirienko A.I. Varicose disease of the pelvis. Moscow: Planida TM, 2015: 104 (in Russ.).
14. Hansrani V., Morris J., Caress A.L., Payne K., Seif M., McCollum C.N. Is pelvic vein incompetence associated with symptoms of chronic pelvic pain in women? A pilot study. *Eur. J. Obstet. Gynecol. Reprod. Biol*. 2016; 196: 21–25. DOI: 10.1016/j.ejogrb.2015.10.023.
15. Gavrilov S.G., Moskalenko E.P., Karalkin A.V., Lebedev I.S., Son D.A., Turishcheva O.O. Can the diameter of pelvic veins be a predictor of pelvic congestion syndrome? *Flebologiya. Journal of Venous Disorders*. 2017; 11 (1): 28–31 (in Russ.). DOI: 10.17116/flebo201711128-31.
16. Ozerskaya I.A., Ageeva M.I. Chronic pelvic pain in women of reproductive age. Ultrasound diagnostics. Moscow: Vidar, 2009: 299 (in Russ.).
17. Dos Santos S.J., Holdstock J.M., Harrison C.C., Lopez A.J., Whiteley M.S. Ovarian vein diameter cannot be used as an indicator of ovarian venous reflux. *Eur. J. Vasc. Endovasc. Surg*. 2015; 49 (1): 90–94. DOI: 10.1016/j.ejvs.2014.10.013.
18. Volkov A.E., Rymashevsky N.V., Mikhelson A.F., Okorokov A.A., Karnushin E.I., Kazaryan M.S. The role of echography in the diagnosis of the causes of pelvic pain syndrome. *Ultrasound Diagnostics in Obstetrics, Gynecology and Pediatrics*. 2000; 8 (1): 62–66 (in Russ.).
19. Hiromura T., Nishioka T., Nishioka S., Ikeda H., Tomita K. Reflux in the left ovarian vein: analysis of MDCT findings in asymptomatic women. *Am. J. Roentgenol*. 2004; 183 (5): 1411–1415. DOI: 10.2214/ajr.183.5.1831411.
20. Asciutto G., Asciutto K.C., Mumme A., Geier B. Pelvic venous incompetence: reflux patterns and treatment results. *Eur. J. Vasc. Endovasc. Surg*. 2009; 38: 381–386. DOI: 10.1016/j.ejvs.2009.05.023.
21. Mozes V.G., Ushakova G.A. Varicose veins of the small pelvis in women in the main age-biological periods of life. Clinical picture, diagnostics, treatment, prevention. Moscow: Eliks Kom Publ., 2006: 103 (in Russ.).
22. Savitsky G.A., Ivanova R.D., Shcheglov I.Yu., Popov P.A. Surgical treatment of pelvic pain syndrome in a gynecological clinic. Saint-Petersburg: Elbi-spb Publ., 2003: 137 (in Russ.).
23. Saveliev V.S., Kirienko A.I., Bogachev V.Yu., Golovanova O.V., Gavrilov S.G., Zolotukhin I.A., Zhuravleva O.V., Bryushkova A.Yu., Devyatykh E.A. Chronic venous insufficiency of the lower extremities as a general medical problem. *Consilium Medicum*. 2004; 6 (6): 433–435 (in Russ.).
24. Mozes V.G., Ushakova G.A., Dikova S.N., Minaeva T.A. The role of undifferentiated forms of connective tissue dysplasia in the formation of pathology of the venous system of the small pelvis in women. *Kazan Medical Journal*. 2007; 88 (5-S): 123–125 (in Russ.).
25. Lasry J.L., Coppe G., Balian E., Borie H. Pelvi-perineal venous insufficiency and varicose veins of the lower limbs: duplex Doppler diagnosis and endoluminal treatment in thirty females. *J. Mal. Vasc*. 2007; 32 (1): 23–31. DOI: 10.1016/j.jmv.2006.12.003.
26. Gavrilov S.G., Balashov A.V., Yanina A.M., Kamchatnov P.R. Mechanisms of the formation of chronic pelvic pain in plethora. *S.S. Korsakov Journal of Neurology and Psychiatry.* 2013; 113 (2): 71–75 (in Russ.).
27. Guilhem P., Baux R., Paille J. Pelvic phlebography by the ischiatic transosseous route. *J. Radiol. Electrol. Arch. Electr. Medicale*. 1952; 33 (5-6): 311–314.
28. Guilhem P., Baux R., Paille J., Combel R. Findings in pelvic phlebography in phlebitis. *J. Radiol. Electrol. Arch. Electr. Medicale*. 1954; 35 (7-8): 601–606.
29. Bogachev V.Yu. Varicose veins of the small pelvis. *Gynecology*. 2006; 4: 64–65 (in Russ.).
30. Verezgova S.V., Troik E.B. Diagnosis and treatment of pelvic congestion syndrome in women with interventional radiology methods. *Kazan Medical Journal*. 2017; 4: 526–530. (in Russ.). DOI: 10.17750/KMJ2017-526.
31. Kirienko A.I., Karalkin A.V., Gavrilov S.G., Saitova G.D., Moskalenko E.P., Cherkashin M.V. Diagnostic capabilities of emission computed tomography for varicose veins of the small pelvis. *Annals of Surgery*. 2004; 1: 50–54 (in Russ.).
32. Tavernier J., Lange D. Selective renal phlebography. Primary results. *J. Radiol. Electrol. Med. Nucl*. 1964; 45: 716–718.
33. Lopez A.J. Female pelvic vein embolization: indications, techniques, and outcomes. *Cardiovasc. Intervent. Radiol*. 2015; 38 (4): 806–820. DOI: 10.1007/s00270-015-1074-7.

34. Kolesnikova, L.I., Semendyaev A.A., Stupin D.A., Darenskaya M.A., Grebenkina L.A., Natyaganova L.V., Danusevich I.N., Cherepanova M.A., Kolesnikov S.I.. The intensity of lipid peroxidation processes in women with primary varicose veins of the pelvic depending on the stage of the disease. *Annals of the Russian Academy of Medical Sciences*. 2018; 73 (4): 229–235 (in Russ.). DOI: 10.15690/vramn1005.
35. Sushkov S.A. Varicose veins of the pelvis. *Medical News*. 2016; 12: 4–12 (in Russ.).
36. Mathis B.V., Miller J.S., Lukens M.L., Paluzzi M.W. Pelvic congestion syndrome: a new approach to an unusual problem. *Am. Surg*. 1995; 61 (11): 1016–1018.
37. Edwards R.D., Robertson I.R., MacLean A.B., Hemingway A.P. Case report: pelvic pain syndrome – successful treatment of a case by ovarian vein embolization. *Clin. Radiol*. 1993; 47 (6): 429–431. DOI: 10.1016/S0009-9260(05)81067-0.
38. Boersma D., van Eekeren R.R., Werson D.A., van der Waal R.I., Reijnen M.M., de Vries J.P. Mechanochemical endovenous ablation of small saphenous vein insufficiency using the Clarivein® device: one year results of a prospective series. *Eur. J. Vasc. Endovasc. Surg*. 2013; 45 (3): 299–303. DOI: 10.1016/j.ejvs.2012.12.004.
39. Marsh P., Holdstock J.M., Bacon J.L., Lopez A.J., Whiteley M.S., Price B.A. Coil protruding into the common femoral vein following pelvic venous embolization. *Cardiovasc. Interv. Radiol*. 2008; 31 (2): 435–438. DOI: 10.1007/s00270-007-9249-5.
40. Grigoryev E.G., Melnik A.V., Grigoryev S.E., Novozhilov A.V. X-ray surgical treatment of chronic pelvic pain caused by perimetrium venous congestion. *Yakut Medical Journal*. 2019; 2 (66): 111–112 (in Russ.). DOI: 10.25789/YMJ.2019.66.34.
41. Maleux G., Stockx L., Wilms G., Marchal G. Ovarian vein embolisation for the treatment of pelvic congestion syndrome: long-term technical and clinical results. *J. Vasc. Interv. Radiol*. 2000; 11 (7): 859–864. DOI: 10.1016/S1051-0443(07)61801-6.
42. Sazhin A.V., Gavrilov S.G., Temirbolatov M.D. Endoscopic technologies for the diagnostics and treatment of pelvic congestion syndrome. *Flebologiya. Journal of Venous Disorders*. 2017; 11 (3): 146–153 (in Russ.). DOI: 10.17116/flebo2017113146-153.

Authors information

Grigoryev Evgeny G., Dr. Sci. (Med.), Professor, Corresponding Member of RAS, Irkutsk Scientific Centre of Surgery and Traumatology; Head of the Department of Hospital Surgery, Irkutsk State Medical University, Irkutsk, Russian Federation. ORCID 0000-0002-5082-7028.

Lebedeva Daria V., Resident, Department of Hospital Surgery, Irkutsk State Medical University, Irkutsk, Russian Federation. ORCID 0000-0001-7388-1679.

Grigoryev Sergey E., Cand. Sci. (Med.), Surgeon, Department of Portal Hypertension, Irkutsk Regional Clinical Hospital, Irkutsk, Russian Federation.

(✉) **Grigoriev Evgeny G.,** e-mail: egg@iokb.ru.

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