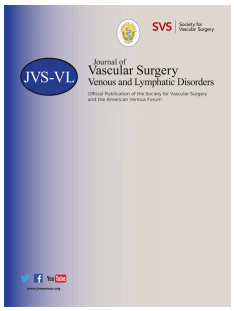


# The Symptoms-Varices-Pathophysiology (SVP) Classification of Pelvic Venous Disorders A Report of the American Vein & Lymphatic Society International Working Group on Pelvic Venous Disorders

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# The Symptoms-Varices-Pathophysiology (SVP) Classification of Pelvic Venous Disorders

## *A Report of the American Vein & Lymphatic Society International Working Group on Pelvic Venous Disorders*

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Keywords: Venous insufficiency, Varicose veins, Pelvic pain, May Thurner syndrome, Renal nutcracker syndrome

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## ARTICLE HIGHLIGHTS

**Type of Research:** Multispecialty, intersocietal development of a discriminative classification instrument.

**Key Findings:** The clinical presentation of patients with pelvic venous disorders can be accurately and fully characterized by a discriminative instrument that includes presenting symptoms (S); the involved variceal reservoirs (V); and the underlying pathophysiology (P) which includes the anatomic (A), hemodynamic (H), and etiologic (E) features of the disease. A patient's presentation is summarized as $SVP_{A,H,E}$.

**Take home Message:** The use of historical nomenclature for pelvic venous disorders fails to recognize the complex and interrelated pelvic venous circulation; contributes to misdiagnosis and poor treatment outcomes; and hinders clinical research. In defining homogenous patient populations, the SVP instrument will facilitate clinical communication, allow treatment to be more precisely directed, and facilitate the development of patient-reported outcome measures and clinical trials.

**Table of Contents Summary**

A multi-specialty, intersocietal, international working group developed a discriminative classification instrument (SVP) for pelvic venous disorders. Use of this instrument will accurately characterize a patient's clinical presentation and define homogenous patient populations for future clinical research.

**Abstract:** As the importance of pelvic venous disorders (PeVD) has been increasingly recognized, progress in the field has been limited by the lack of a valid and reliable classification instrument. Misleading historical nomenclature, such as the "May-Thurner," "pelvic congestion," and "nutcracker" syndromes, often fails to recognize the interrelationship of many pelvic symptoms and their underlying pathophysiology. Based upon a perceived need, the American Vein and Lymphatic Society (AVLS) convened an international, multidisciplinary panel charged with the development of a discriminative classification instrument for PeVD. This instrument, the "SVP" classification for PeVD, includes three domains – Symptoms (S), Varices (V), and Pathophysiology (P), with the pathophysiology domain encompassing the Anatomic (A), Hemodynamic (H), and Etiologic (E) features of the patient's disease. An individual patient's classification is designated as $SVP_{A, H, E}$. For patients with pelvic origin lower extremity signs or symptoms, the SVP instrument is complementary to and should be used in conjunction with CEAP. The SVP instrument accurately defines the diverse patient populations with PeVD, an important step in improving clinical decision making, developing disease-specific outcome measures and identifying homogenous patient populations for clinical trials.

The importance of venous disorders of the abdomen and pelvis has become increasingly recognized over the past decade. Unfortunately, progress has been hindered by the use of historical syndromic nomenclature – for example the "May-Thurner," "pelvic congestion," and "nutcracker" syndromes – which has often confused the underlying pathophysiology and led to diagnostic errors and suboptimal treatment outcomes. Furthermore, the lack of a robust classification system defining homogenous patient populations limits clinical communications, makes interpretation of the literature difficult, and hinders the development of appropriate clinical trials. The existence of pelvic venous disorders (PeVD) and their appropriate treatment has also been questioned due to the lack of validated definitions and imaging criteria as well as rigorous randomized clinical trials. [1] There is a critical need for a classification system for PeVD that recognizes the variable, but often overlapping, clinical presentations, as well as the underlying pathophysiology. A multidisciplinary panel has ranked the development of validated diagnostic criteria and a discriminative classification instrument as the most important research priorities for pelvic venous disorders. [1]

For venous disorders of the lower extremities, the CEAP (Clinical-Etiologic-Anatomic-Physiologic) classification, originally published in 1996[2] and revised in 2004[3] and 2020[4], has become the international standard for classification of these disorders. By defining patient groups with similar clinical presentations and pathophysiologic features, the instrument has facilitated clinical communication regarding individual patients and is recognized as a reporting standard for clinical research. Despite its utility and general acceptance, the CEAP classification system is limited to lower extremity venous disorders. Since its original description, rapid advancements in diagnostic imaging and catheter-based interventions have improved our

understanding of disorders arising from veins other than those in the legs, particularly those of pelvic and abdominal origin.

Venous disorders of the pelvis are associated with a spectrum of symptoms arising from both reflux, most commonly involving the gonadal and internal iliac veins, and obstruction, usually of the left renal and iliac veins. These hemodynamic patterns are associated with at least four broad clinical presentations including a) left flank or abdominal pain and hematuria (left renal vein compression); b) chronic pelvic pain (pelvic varicosities associated with primary reflux in the ovarian/internal iliac veins or obstruction of the left renal or common iliac veins); c) venous claudication (iliac venous obstruction); and d) symptomatic lower extremity varicosities in either atypical (vulva / testicles, medial and posterior thigh, sciatic nerve) or typical saphenous distributions, the latter frequently recurring after initial treatment.

The relationship between pelvic symptoms and venous pathology is far more complex than in the lower extremity. Multiple symptoms may be present concurrently and several potential pathophysiologic mechanisms, such as left renal and iliac venous compression, may be simultaneously present. Additionally, similar symptoms may arise from disparate underlying causes (e.g. chronic pelvic pain can arise from primary ovarian vein reflux, left common iliac compression, or left renal vein compression) while similar anatomic derangements may lead to different symptoms (e.g. left renal vein compression may be associated with either left flank pain and hematuria or chronic pelvic pain). This can lead to diagnostic errors and may be responsible for the suboptimal results of many interventions. [5, 6] From a research perspective, appropriate patient classification is also important in ensuring homogenous patient populations for the development of disease-specific outcome instruments and clinical trials. There is thus a critical

need for precise classification of pelvic venous disorders that has implications for both individual patient management and future clinical research.

***Methods***

Based upon the need for a classification instrument for PeVD, the American Vein and Lymphatic Society (AVLS) convened an International Working Group on Pelvic Venous Disorders in Chicago, Illinois on July 27, 2018. International societies representing the broad spectrum of specialties involved in the care of patients with PeVD, including gynecologists, interventional radiologists, vascular surgeons, and phlebologists, were invited to participate either in-person or remotely. Invited societies and their representatives are listed in Table I.

The specific goal of the group was to develop a discriminative classification instrument for pelvic venous disorders. Discriminative instruments are designed to measure cross sectional differences between individuals at a single point in time, as opposed to evaluative instruments which measure longitudinal changes within people over time. [7, 8] Discriminative instruments include key components of the disease that are stable, at least over short periods of time; have a limited number of options and clear definitions that enable uniform interpretation; and have large and stable-between subject variation. [8] From a simplistic standpoint, discriminative instruments place patients into homogenous groups with similar clinical features, natural histories, and responses to treatment.

At the initial meeting, the clinical, anatomic, and pathophysiologic aspects of PeVD were presented and discussed among panel members, incorporating the views of the various subspecialties included on the panel. The methodology underlying instrument development was

then reviewed and alternative approaches discussed. Based upon this discussion, it was agreed that the instrument should be based on the following principles,

a. The instrument should be patient-centric, that is focused on the primary concerns of the patient rather than simply the underlying pathophysiology.
b. In addition to patient-important clinical features, complete characterization of a patient's presentation requires a precise description of the underlying anatomy and pathophysiology.
c. Asymptomatic patients with pelvic venous disease should be included in the classification, although among symptomatic patients, only those with a recognized venous etiology should be included. Similar clinical presentations that are not of venous origin (e.g. chronic pelvic pain due to other causes) are not included in this classification.
d. Several nuances of PeVD, particularly the observation that PeVD are primarily symptom rather than sign-based, preclude a purely CEAP-based approach. However, as venous disorders of the pelvis and lower extremity are a continuum, the instrument should, as much as feasible, follow the conventions of and be complementary to CEAP. Accordingly, the pelvic instrument should avoid duplication of lower extremity signs that are included in CEAP. For example, while localized pelvic origin extra-pelvic symptoms, such as tenderness associated with pelvic origin varicosities should be included in the pelvic instrument, more generalized lower extremity signs, such as swelling continue to be best classified with CEAP.

Guided by these principles, the domains to be included were discussed and precise definitions developed, emphasizing the importance of optimizing the validity and reproducibility of the instrument. Small groups were then formed to craft an initial strategy for each domain,

which was then discussed among the entire group. Based upon the discussion, a draft instrument (the "SVP" classification) was developed and three rounds of simulated patient classification performed by the writing group (MHM, NK, NL, AG, KG, and MG) to identify potential problems with the definitions and ensure reproducibility of the instrument. Definitions were further refined based on the simulated classification exercises and review of the literature, striving to make them as evidence-based as possible. The final draft was then circulated to all participants for revision.

***Results – The Classification of Pelvic Venous Disorders***

**Definitions**

Minimizing inter-observer variability through precise definitions is critical to the reproducibility of a discriminative instrument. The following definitions were developed and should be utilized for the purpose of pelvic venous classification. When possible, efforts were made to make these definitions congruent with lower extremity CEAP.

*Symptoms*

*Pelvic Venous Disorders (PeVD) – The spectrum of symptoms and signs arising from the veins of the pelvis (the gonadal veins, the internal iliac veins and their tributaries, and the venous plexuses of the pelvis) and their primary collateral pathways (the left renal vein, the iliac veins, and the pelvic escape points).*

This includes symptoms historically ascribed to the "May-Thurner," "nutcracker," and "pelvic congestion" syndromes. Given their imprecise and overlapping nature, these historical terms should no longer be used. [1]

*Venous Origin Renal Symptoms – Symptoms arising from renal venous hypertension secondary to left renal vein obstruction.*

These include micro- or macrohematuria and left flank or abdominal pain that is worsened by activities such as standing, sitting or walking. [9].

*Chronic Pelvic Pain – Pain symptoms perceived to originate from pelvic organs / structures typically lasting more than 6 months. It is often associated with negative cognitive, behavioral, sexual and emotional consequences as well as with symptoms suggestive of lower urinary tract, sexual, bowel, pelvic floor, myofascial, or gynecologic dysfunction.* [10]

Although there has historically been a lack of consensus[11] regarding the definition of chronic pelvic pain, we have adopted that proposed by the American College of Obstetricians and Gynecologists (ACOG). Causes of chronic pelvic pain include a wide range of disorders of the reproductive, urinary, gastrointestinal, neurologic and musculoskeletal systems[12], often with overlapping symptoms in an individual patient[13]. PeVD are included in the range of somatic, visceral and neurologic pain generators that are often associated with chronic pelvic pain.

Data regarding the demographics and symptomatology of women with venous origin pelvic pain is largely derived from small case series of those presenting for treatment and there is a clear need for larger studies comparing women with chronic pelvic pain of venous and non-venous origin. Such limited case series suggest that venous origin pelvic pain most commonly occurs in multiparous women of reproductive age[12, 14-16].

Despite this general observation, a somewhat older population with iliac venous obstruction has recently been described in which pelvic pain often occurs in conjunction with leg symptoms [17, 18], implying that patient demographics and associated symptoms may depend on the underlying etiology.

As chronic pelvic pain includes a spectrum of symptoms, there is substantial overlap between women with pain secondary to venous and non-venous causes. Descriptions of the typical characteristics of venous origin pelvic pain come largely from a single dated but well-done study comparing women with pelvic pain and varices on transuterine venography to those with either pelvic pain due to other pathology or without pelvic pain undergoing elective sterilization. [15] Most of the signs and symptoms associated with venous-origin pelvic pain have been found to be relatively sensitive, but non-specific. [19] Pelvic pain of venous origin is often characterized as dull unilateral or bilateral pain with occasional sharp flares. Bimanual examination, demonstrating focal adnexal tenderness, often reproduces the pain. Symptoms are often worse with activities such as walking and prolonged standing and improve with lying down. Although deep dyspareunia is common among women with pelvic pain from a variety of causes, venous origin pain is more likely to be associated with prolonged post-coital ache. [12, 15, 19] The combination of post-coital ache and tenderness over the ovarian point (the junction of the upper and middle thirds of a line drawn from the

umbilicus to the anterior superior iliac spine) has been reported to be 94% sensitive and 77% specific for distinguishing a venous origin from other causes of pelvic pain. [15]

Although chronic pelvic pain also occurs in males[20, 21], there is little to suggest that pelvic venous disease is an important contributing factor. This is likely due to both differences in venous anatomy as well as the role of pregnancy in pelvic venous disorders in women. The gonadal veins follow an extra-pelvic course in males and the arrangement of the visceral pelvic venous plexuses are substantially different.

*Pelvic Origin Extra-Pelvic Symptoms – Symptoms localized to the external genitalia or lower extremities that arise from either reflux through recognized escape points in the pelvic floor[22] or from iliocaval venous obstruction.*

In females, reflux-related symptoms may include pain, discomfort, tenderness, itching, bleeding and superficial venous thrombosis associated with non-saphenous varicosities. These may be localized to the vulva or the posteromedial thigh in the distribution of the perineal and inferior gluteal escape points. In males, these include testicular discomfort and infertility related to a varicocele. Extra-pelvic reflux arising from the inferior gluteal vein may also rarely be associated with sciatic or tibial nerve symptoms. Symptoms associated with sciatic nerve varices include pain radiating from the buttock to the lateral aspect of the leg, often worsened with sitting. [23, 24] Anecdotal reports suggest tibial nerve symptoms are milder, often including only paresthesias on compression of

the nerve. Obstruction-related extra-pelvic symptoms include venous claudication.

*Venous Claudication – Exertional pain in the lower extremities frequently described as a tight, "bursting" pain, in the thigh, buttock, or leg; not associated with a specific walking distance or confined to specific muscle groups, but relieved by rest and elevation of the legs.*[25-28] Symptoms of venous claudication are most commonly associated with iliocaval venous obstruction.

*HASTI ® (Provensis, Uxbridge, UK) symptoms – Non-specific symptoms typically associated with lower extremity venous disease including heaviness(H), aching (A), swelling (S), throbbing (T), and itching (I).* [27, 29]

Such symptoms are usually generalized to the lower extremity rather than localized to any pelvic origin extra-pelvic lower extremity varices. Although the responsible pathology may arise in the pelvis, generalized signs of lower extremity venous disease are not included in the SVP classification and should be accounted for by the concurrent use of CEAP.

*Signs*

*Left Renal Vein Obstruction – Compression of the left renal vein at the crossing of the abdominal aorta associated with symptoms related either to a) renal venous hypertension (hematuria and/or abdominal/flank pain) or b) if decompressed by collaterals, pelvic varices and chronic pelvic pain or a left-sided varicocele.*

Symptomatic obstruction of the left renal vein is usually attributed to compression of the renal vein between the abdominal aorta and superior mesenteric artery (anterior "nutcracker" syndrome), although compression may also arise from a retro-aortic course of the left renal vein (posterior "nutcracker" syndrome) or stretching of the renal vein over the abdominal aorta. [9] Symptoms of flank pain and hematuria are presumed secondary to renal venous hypertension, often defined as a trans-renal pressure gradient ≥ 3 mm Hg at the time of venography. [30-33]. Hematuria in such cases is often attributed to renal varices, which are often asymptomatic, effect predominantly the left kidney, and have been identified in 10% of left renal venograms performed for a variety of indications. [34] However, such a gradient may be absent it there is significant decompression via refluxing collaterals including the left gonadal, ascending lumbar, adrenal, periureteral, capsular, or intrarenal veins. [9, 31] In such cases, pelvic varices or a varicocele may be associated with secondary gonadal vein reflux.

A variety of imaging modalities including ultrasound, venography (with or without IVUS and measurement of pressure gradients), computed tomography (CT), and magnetic resonance (MR) imaging have been used in the evaluation of left renal vein compression. Although mean renal vein diameter reduction by CT is significantly higher in patients with symptoms related to renal venous hypertension (74.5 ± 1.9%) than in controls (25.4 ± 2.4%)[35] and a trans-renal pressure gradient ≥ 3 mm Hg has been associated with hematuria[30-32], definitive diagnostic criteria and

cut points are lacking and may vary between patients. Furthermore, asymptomatic ≥ 50% compression of the left renal vein ("nutcracker" phenomenon) is seen in 51 – 72% of CT angiograms. [32] Given the lack of definitive anatomic and hemodynamic criteria across a variety of clinical settings, we have not included them in the definition, which instead relies on correlating the patient's symptoms and imaging studies.

*Pelvic Varicose Veins –Tortuous, dilated veins ≥ 5 mm in diameter around the ovary and uterus.*[36]

Pelvic varices may involve both the ovarian (pampiniform) and uterovaginal venous plexuses, which communicate through the broad ligament. [12, 22, 37-39]. There may also be extensive communication with the vesicular and external rectal plexus. [22]

Although venography has historically been the reference standard for the diagnosis of pelvic varices[14, 37, 39], it remains an invasive study associated with the risks of ionizing radiation and is now often limited to definitive imaging at the time of planned intervention. Several non-invasive imaging studies[37, 40], more suitable for initial evaluation, have been suggested including transabdominal ultrasonography, transvaginal ultrasonography (TVUS), CT, and MR imaging. Among these, pelvic ultrasound, either transabdominal or transvaginal, is the most widely available, has been the most extensively investigated, and allows an evaluation of both venous diameter and reflux. We have accordingly defined pelvic varices based on commonly cited ultrasound criteria. [36]

Other diagnostic criteria have been proposed including greater than 4 tortuous, dilated veins > 4 mm in diameter surrounding the ovaries and uterus[41]; the appearance of dilated transuterine veins (arcuate and/or myometrial veins) connecting the left and right uterine veins[37]; and reversed flow direction or disappearance of flow with Valsalva [37, 40, 42]. However, Park[36] found transuterine crossing veins in only 25% of patients with symptomatic pelvic varicosities in comparison to 8.6% of controls. Similarly, reversal of Doppler flow direction during a Valsalva's maneuver was identified in only 26.9 % of symptomatic patients, in comparison to 8.8% of controls. [36]

Position does influence the ability to detect pelvic venous pathology. Investigators have reported ultrasound evaluation in the supine[36], 30º to 45º reverse Trendelenburg position[42, 43], semi-erect[44] and upright positions[43]. CT and MR imaging are obligatorily performed in the supine position. As there is no consensus regarding positioning for non-invasive examinations, it has not been included in the definitions of pelvic varicose veins or reflux. However, clinicians should be aware of the role that position may have in the interpretation of all imaging studies.

*Gonadal Vein Reflux – Retrograde flow in either gonadal vein, spontaneously or in response to a Valsalva's maneuver, as documented by ultrasound, venography, or time resolved magnetic resonance angiography (MRA).*

Retrograde flow is the primary criteria for the definition of venous reflux and in the left ovarian vein, has been identified in 100% of patients

with symptomatic pelvic varices in comparison to 25% of controls. [41] Although some[45] have defined pelvic reflux as retrograde flow greater than 1 second in duration and persisting until the end of the maneuver, others[41, 46] have noted no validated cut point for pathologic duration of reflux in the ovarian veins. Still others have noted variable reflux patterns including spontaneous, intermittent retrograde flow; retrograde flow only during a Valsalva maneuver; and continuous retrograde flow. [47] Given the conflicting evidence, we have chosen not to include reflux duration in the definition.

Gonadal vein diameter, in the presence of pelvic varices is often used as a surrogate for retrograde flow. Although some[44, 45, 48] have reported ovarian vein diameter to be an insensitive maker of reflux, others[36] have reported positive predictive values of 71.2%, 83.3%, 81.8% and 75.8% for diameters of 5, 6, 7, and 8 mm respectively. Others[41] have similarly found pelvic varices to be present in all patients with a left ovarian vein diameter > 6 mm by ultrasound. Diameter criteria have also been reported for CT and MR. [40]. However, in view of the conflicting evidence, we have not included diameter as a criteria for gonadal vein reflux.

*Iliac venous obstruction – Greater than 50% cross sectional area reduction by intravascular ultrasound (IVUS) or ≥ 50% diameter reduction by multiplanar venography of the common or external iliac veins in association with appropriate lower extremity or pelvic symptoms.*

This definition was derived from those commonly used in the literature, although it must be acknowledged that there is currently no

validated method of defining a clinically or hemodynamically significant venous stenosis[49-51] and that this value may differ between patients[52]. In evaluating predictors of clinical improvement after iliac venous stenting, a cross sectional area reduction of >54% by IVUS had the highest sensitivity (83% sensitivity, 47% specificity) while a >52% diameter reduction by multiplanar venography had the highest specificity (50% sensitivity, 71% specificity). [49] Notably, the thresholds for clinical improvement after stenting were somewhat higher for non-thrombotic lesions. However, as a ≥ 50% iliac stenosis may be present in one-quarter to one-third of the general population[52, 53], it is critical that anatomic stenosis alone not be considered a criterion for intervention and that any measurement of stenosis be interpreted in the context of the patient's clinical presentation. Both cross sectional imaging and transabdominal ultrasound have been used in the initial evaluation of iliac obstruction and a number of ultrasound criteria for detection of a ≥ 50% iliac venous obstruction have been developed. [51, 53]

*Internal iliac venous reflux – Retrograde flow in the internal iliac vein or its tributaries, either spontaneously or in response to a provocative Valsalva's maneuver.*

Reflux can be demonstrated by antegrade or selective descending venography, transabdominal/transperineal ultrasound[43, 47], or transvaginal ultrasound[42, 44]. Pathologic flow patterns observed with ultrasound include retrograde flow isolated to main internal iliac trunk; cephalad flow in the main trunk and reflux in the tributaries; or retrograde flow in both the main trunk and tributaries.

*Pelvic Origin Extra-Pelvic Varices – Retrograde flow in extra-pelvic veins arising from reflux exiting the pelvis through recognized escape points.* [22]

Pelvic origin extra-pelvic varices include refluxing veins in either atypical locations (vulva in females and pampiniform plexus in males, perineum, gluteal cleft and posterior thighs), or, through communication with saphenous tributaries, in a typical saphenous distribution. Extra-pelvic varices also include intra/perineural (sciatic and tibial) varices arising from the inferior gluteal tributary of the internal iliac vein[22, 54].

As elsewhere, this is an ultrasound-derived definition that includes both visible varicosities as well as refluxing pelvic-origin tributaries that are seen only with ultrasound. Protocols for visualization of these refluxing tributaries are well defined elsewhere. [43]

Pelvic origin extra-pelvic varices may arise from either pelvic reflux or obstruction. However, by definition, collateral veins from the lower extremity to the pelvis that demonstrate antegrade flow at rest and function to bypass an iliocaval venous obstruction are not pelvic origin extra-pelvic varices.

*Lower extremity varices* – As defined in CEAP[3], *subcutaneous, dilated veins ≥ 3 mm in diameter which demonstrate reflux in the upright position* and involve the named saphenous and accessory saphenous trunks, their tributaries and non-saphenous superficial leg veins.

**Classification of Pelvic Venous Disorders – The SVP Instrument**

Discriminative instruments for venous disorders consist of descriptive domains or categories, such as the clinical "C", etiologic "E", anatomic "A", and pathophysiologic "P" domains of CEAP, with precisely defined responses within each domain. The proposed classification for pelvic venous disorders has been designated the SVP classification and includes three domains, symptoms (S); varices (V), the primary sign of PeVD; and a composite anatomic-pathophysiologic domain (P). The composite "P" domain is composed of 3 subdomains, including the anatomy of the involved abdominal and pelvic veins (A), the associated hemodynamic abnormalities (H), and the underlying etiology (E), which are listed as subscripts following the P domain ($P_{A, H, E}$). An individual patient's pelvic classification is thus designated as $SVP_{A,H,E}$.

Symptoms (S) and varices (V) associated with PeVD are considered to occur in 4 anatomic zones extending in a descending fashion from the renal veins to the lower extremities. (Figure 1). Three of these zones – 1) the left renal vein; 2) the gonadal and internal iliac veins and associated pelvic venous plexuses; and 3) the pelvic origin extra-pelvic transitional veins arising from reflux exiting the pelvic floor through recognized escape points– are included in the SVP classification. Although often communicating with zone 3, the fourth zone, the superficial and deep veins of the lower extremity and their tributaries, is optimally classified with CEAP and is not included in the SVP instrument.

Each of the 3 primary domains – symptoms (S), varices (V), and pathophysiology (P) with its 3 subdomains - are discussed below.

*Symptoms (S)*

Pelvic venous classification begins with the patient's clinical symptoms ("S") designated by subscripts from 0 through 3. (Table II) As above, responses are arranged in descending

anatomic zones from the renal veins to the lower extremities. While some complaints may occur in either sex, others such as pelvic pain and varicocele occur predominantly or exclusively in one sex. Venous origin extra-pelvic symptoms ($S_3$) are further subdivided into those involving the external genitalia; those related to pelvic origin non-saphenous varicosities of the leg (posteromedial thigh and sciatic / tibial nerve); and those of venous claudication.

The pelvic origin extra-pelvic veins of the thigh may communicate with the superficial and deep veins of the lower extremity and be associated with any of the manifestations of $C_2$ through $C_6$ disease. While localized symptoms such as discomfort, pruritis, bleeding, and superficial thrombosis are included in S3a and S3b, to avoid redundancy and potentially compromised reproducibility, generalized lower extremity signs (e.g. swelling) and symptoms (e.g. HASTI® symptoms associated with $C_{2S}$) are not specifically included in SVP and must be further classified using CEAP. Patients presenting with more than one clinical symptom should have all presenting features included as subscripts, separated by commas, following the "S" designation.

*Varices (V)*

The venous system of the pelvis can be considered to consist of 3 reservoirs where varices may develop – 1) the renal hilum, 2) the venous plexuses of the pelvis, and 3) the pelvic origin extra-pelvic veins. The lower extremity veins comprise a fourth reservoir, which may communicate with pelvic origin extra-pelvic varices. However, as with symptoms, the lower extremity reservoir is optimally defined with CEAP and is not included in SVP.

Increased venous pressures, arising from proximal reflux or obstruction, are transmitted to these reservoirs, where symptoms related to either varices or increased venous pressure may develop. Most therapeutic interventions are directed towards decreasing venous pressure in

these reservoirs. The variceal reservoirs of the pelvis are designated "V" and are again denoted in a descending fashion by the subscripts 0 to 3. (Figure 1, Table III)

Although some varices (e.g. pelvic origin varices of the vulva or posteromedial thigh) may be apparent on physical examination, others (renal hilar, pelvic, and some pelvic origin extra-pelvic varices) are identified only through imaging studies. The "V" classification should therefore include the full extent of varices defined by both physical examination and imaging studies. As with symptoms, patients presenting with varices in more than one reservoir should have all of their presenting features included as multiple subscripts, separated by commas, to "V". Finally, as the pelvic and lower extremity venous systems are in continuity, patients with lower extremity signs and symptoms arising in the pelvis should be described using both SVP and CEAP as complementary instruments.

*Pathophysiology (P)*

The pathophysiology domain (P) is a composite of the anatomic (A), hemodynamic (H), and etiologic (E) subdomains. Involved anatomic segments in the abdomen and pelvis are designated by anatomic abbreviations that include laterality. (Table IV).

As in CEAP, the underlying hemodynamic (H) derangements - reflux (R), obstruction(O), or both (R,O) - are designated by a subscript to the "P" category. (Table V) Obstruction, which may be thrombotic or non-thrombotic in origin, primarily involves the left renal, common iliac, and external iliac veins. Reflux occurs most commonly in the gonadal veins, internal iliac veins, and pelvic escape points with their associated pelvic origin extra-pelvic veins. By convention, the hemodynamic subscript should immediately follow designation of each involved anatomic segment. In contrast to the lower extremities, concurrent reflux and obstruction in a single pelvic venous segment is unusual, but if present, should be designated by both the R and O subscripts.

Also, some congenital malformations, may not be associated with either reflux or obstruction, in which case the "H" subscript should be omitted.

The etiology (E) of pelvic venous pathology is defined as being thrombotic (T), non-thrombotic (NT), or congenital (C). (Table VI) Venous obstruction can arise from either a previous episode of deep venous thrombosis (thrombotic) or extrinsic compression by adjacent arterial structures or mass lesions (non-thrombotic). Thrombotic reflux can similarly develop after an episode of deep venous thrombosis (DVT), while non-thrombotic reflux is presumed to represent a degenerative process of the vein wall leading to venous dilation and valvular incompetence. Congenital etiologies include vascular malformations, either venous or mixed. The designated etiology (E) should be denoted by a subscript to the "P" category, immediately following the designation of the involved anatomic segments and the hemodynamic derangements.

*Using the SVP Classification*

For the purposes of documenting reproducibility of the instrument and for recording data in clinical studies, all 5 domains and subdomains of SVP – S, V, A, H, and E - should be independently documented. However, such a system is overly complicated for routine clinical use and communication. For such purposes, the A, H, and E sub-domains are collapsed into a single anatomic-pathophysiological domain "P". By convention, this single term should include the anatomic segment(s) involved, the underlying hemodynamics, and the etiology in this order. That is, notation for the "P" domain should be $P_{\text{anatomic segment, hemodynamics, etiology}}$. If multiple anatomic segments are involved, each venous segment following "P" should be specified in this fashion, separating the full anatomic-pathophysiologic description of each segment with a semi-colon. In such cases, the anatomic segments and associated pathology should be listed beginning

at the inferior vena cava and proceeding caudally. For example, non-thrombotic obstruction of the left common iliac vein associated with internal iliac reflux should be designated as $P_{LCIV,O,NT;\ LIIV,R,NT}$. The historic syndromes of the abdomen and pelvis would be now be designated as follows in the SVP classification,

- "Pelvic congestion" syndrome with chronic pelvic pain due to bilateral ovarian reflux. - $\mathbf{S_2V_2P_{BGV,R,NT}}$
- "Nutcracker" syndrome with flank pain and hematuria - $\mathbf{S_1V_1P_{LRV,O,NT}}$
- "May-Thurner" syndrome with left lower extremity edema – $\mathbf{S_0V_0P_{LCIV,O,NT}}$**; Left** $\mathbf{C_{3s}E_{se}A_dP_{o(CIV)}}$

Clinical examples of the SVP classification are shown in figures 2 – 9. Use of a scoring sheet as shown in Table VII may aid in early application of the instrument. Smart phone applications to assist in classification will also be available after publication of this manuscript.

All components of the instrument, that is S, V, and $P_{A,H,E}$ are to be used in designating a patient's final SVP classification. This presumes imaging (abdominal/transperineal ultrasound, TVUS, cross-sectional imaging, venography / IVUS, laparoscopy) has been done as part of the classification, recognizing that some components of the classification may change as the evaluation progresses from non-invasive to more definitive imaging such as venography. It is acceptable to use an interim designation (x) as a subscript for those domains where evaluation is not yet complete (e.g. $S_{0\text{-}3}V_xP_x$).

***Discussion***

Despite technical advances, progress in the diagnosis and management of pelvic venous disorders has been hampered by the use of historic nomenclature – the "May-Thurner," "pelvic

congestion," and "nutcracker" syndromes – to describe underlying anatomic lesions that often have variable clinical presentations. Use of these terms ignores the complex and interrelated abdominal and pelvic venous circulation as well as the observation that similar clinical presentations may have different underlying pathophysiologies while identical pathology may have different clinical presentations. Inaccuracy in precisely characterizing a patient's clinical presentation has often led to misdiagnosis and suboptimal treatment outcomes and has hindered progress in the field. Use of the historical syndromic terms should be abandoned in favor of a more precise characterization of the patient's clinical presentation, including symptoms, signs (varices), and the underlying venous anatomy and pathophysiology. [1] Although incomplete, our understanding has progressed to the point that a discriminative instrument is needed to characterize patients with PeVD.

Discriminative instruments characterize a patient's clinical presentation at a particular point in time. From a pragmatic standpoint, such instruments place patients into categories with similar clinical features, natural histories and responses to treatment. By virtue of their fundamental features (large between subject variability), these instruments are not designed to quantitatively measure either severity or change over time or in response to treatment, which is the role evaluative instruments. Although both types of instrument depend on a high ratio of signal to noise (low measurement error), for discriminative instruments the signal is differences between subjects while for evaluative instruments it is longitudinal changes within subjects. [7] Responsiveness to change is not a primary concern for discriminative instruments. This dichotomy is well illustrated for lower extremity venous disorders. CEAP [2-4] was designed as a purely discriminative instrument while the Venous Clinical Severity Score[55, 56] is its evaluative complement. The development of disease-specific evaluative instruments for PeVD is in its

infancy but depends on defining homogenous patient populations with instruments such as the SVP classification. For example, patient-reported outcomes for symptomatic left common iliac venous obstruction associated with lower extremity symptoms would be very different than if associated with chronic pelvic pain.

As the pelvic venous system is in continuity with that of the lower extremities and can be the origin of lower extremity signs, compatibility with the CEAP classification was considered to be important. This was thoroughly considered by the panel which ultimately concluded that, although the basic clinical, etiologic, anatomic, and pathophysiologic domains of CEAP are equally relevant to PeVD, many unique considerations prevent precise alignment between discriminative instruments for PeVD and chronic lower extremity venous disease. Most importantly, while the CEAP clinical classification ("C") focuses on the signs of venous disease, patient important features of pelvic venous disease necessarily include both symptoms and signs (varices). Furthermore, while lower extremity varices largely develop in the distribution of the saphenous trunks and their tributaries, symptomatic varices in the abdomen and pelvis may occur in multiple beds or reservoirs, including the renal hilum, the pelvic venous plexus, the transition ("escape") points between the pelvis and lower extremities, and the lower extremities.

The situation is further complicated by the observation that symptoms of pelvic reflux or obstruction may be related to the development of increased venous pressure in the immediately upstream (considering normally directed venous flow from peripheral to central) venous reservoir or, if decompressed from one reservoir to another via refluxing collaterals, to more caudal venous reservoirs. Although occurring between all variceal reservoirs[57], this phenomenon has been most thoroughly described for symptomatic compression of the left renal vein which may be associated with either an elevated (non-compensated) or normal to borderline abnormal

(compensated) trans-renal pressure gradient in the presence of collaterals. [30, 31] Left renal vein obstruction may accordingly be associated with symptoms of flank pain and hematuria (non-compensated obstruction) or with chronic pelvic pain (compensated obstruction) if decompressed by left ovarian vein collaterals. In a similar fashion, increased venous pressure due to reflux or obstruction in any of the three anatomic zones included in the SVP instrument, may be transmitted to a more caudal zone by collateral reflux flow (compensated reflux or obstruction). [57]. The clinical implication is that similar symptoms, such as venous origin chronic pelvic pain, may arise from diverse anatomic-pathophysiologic patterns while, depending on the degree of collateralization, similar anatomic-pathophysiologic lesions may be associated with variable symptoms.

Despite these differences, the manifestations of pelvic and lower extremity venous disease are a continuum which frequently co-exist and there is a clear need to use CEAP as a complement to any proposed pelvic venous classification. The SVP classification has the granularity needed to account for the complex and interrelated nature of pelvic symptoms and pathophysiology, while CEAP accurately characterizes the signs of lower extremity venous disease, even if the pathophysiologic derangements arise in the pelvis. Reasonable attempts have been made to make the instruments congruent by incorporating the anatomic and physiologic conventions that are familiar to users of CEAP. The overlap between the two instruments are a) refluxing veins traversing the pelvic escape points and b) the transmission of increased venous pressure from iliocaval venous obstruction to the lower extremities. These veins, as well as their pathophysiologic origins are precisely described in SVP (e.g.$V_{3b}P_{PELV,R,NT}$) and more generally in the recent revision of CEAP (e.g. $P_{(r)Pelv}$)[4]. In contrast, CEAP more precisely defines the subsequent communications and clinical manifestations of these veins in the legs. The

instruments are therefore to be used together in limbs with pelvic origin lower extremity symptoms ($S_{3b}$ and $S_{3c}$) and signs ($V_{3b}$).

The SVP instrument characterizes a patient's presenting features in terms of signs, symptoms, and the underlying pathophysiology. However, there are some caveats to be considered in using the instrument. The instrument is a purely discriminative instrument and carries no implication of disease severity. As with CEAP, the responses within each domain are categorical variables that should be described by absolute numbers and percentages rather than by a mean score. Furthermore, SVP presumes an underlying venous etiology to the patient's clinical presentation and does not include similar clinical presentations that are non-venous in origin. Finally, although interim designations are allowed, complete classification will usually only be possible once initial diagnostic studies are completed. Abbreviated forms of SVP were considered, similar to basic CEAP[3], but truncating the full anatomic-pathophysiologic description of a patient's presentation resulted in potentially misleading overlaps in classification. For example, if the classification was abbreviated to $SVP_H$, chronic pelvic pain due to either left renal vein or iliac vein compression would be identically classified as $S_2V_2P_{R,O}$.

The SVP instrument attempts to comprehensively describe a patient's clinical presentation. The inclusion of additional descriptive subdivisions beneath the elements of some domains was considered, but ultimately deferred due to concerns of making the instrument overly complicated and limiting initial adoption. Additional subdivisions that were considered included,

a) Subcategorization of $S_1$ (venous origin renal symptoms) to include separate designations for flank pain and hematuria
b) Subcategorization of $S_2$ (chronic pelvic pain) to include sexual, menstrual, urinary, and defacatory symptoms

c) Subcategorization of $S_3$ to include hemorrhoids. Some investigators have reported a relationship between pelvic venous disorders and hemorrhoids. For example, hemorrhoids on transvaginal ultrasound have been noted in 36.3% of women presenting with pelvic origin lower extremity reflux. [58] Although the internal rectal (hemorrhoidal) plexus drains primarily through the inferior mesenteric vein via the superior rectal vein, there is some contribution from the middle rectal tributary of the internal iliac vein. The external rectal plexus drains through the middle and inferior rectal tributaries of the internal iliac vein. However, there are communications between all three rectal veins, allowing drainage into both the portal and systemic circulation. [22, 59] There are also anecdotal reports of improvement in hemorrhoidal symptoms following pelvic venous embolization[60], although the effectiveness of phlebotonic agents, such as micronized purified flavonoid fraction, has been inconsistent. [61, 62] Despite these observations, the pathophysiology of hemorrhoids is more complex than simple venous dilation[59, 61, 63] and their relationship to other pelvic venous disorders is not clear. Although at present, there is insufficient evidence to support a strong relationship between hemorrhoids and pelvic venous disorders, this is an area that warrants further investigation.

d) More precisely characterizing lower extremity venous symptoms and signs, beyond those of pelvic origin extra-pelvic varices ($S_{3b,}$ $V_{3b}$), by adding additional subdivisions of each. That is, more precisely defining signs and symptoms arising from each of the pelvic escape points.

Strengths of the SVP instrument include its collaborative multidisciplinary development, ensuring that the spectrum of clinical presentations encountered by multiple specialties is well represented. In addition to accurately describing and classifying the spectrum of clinical presentations, the other goals of instrument development were to ensure that it included patient important domains and that it had high reproducibility. The instrument's domains and responses are therefore precisely defined with minimal overlap between groups and have clinical relevance to the patient. Efforts were made to ensure the definitions were evidence-based and as precise as possible, recognizing that there are deficiencies in the current literature. The underlying pathophysiology and involved anatomic segments are similarly precisely described.

The SVP instrument does have some limitations. Although members of the multi-disciplinary panel were all experts in their respective fields, patient representatives were not included and may have identified other factors of importance to patients. Additionally, the knowledge base with respect to PeVD is rapidly advancing and it is fully recognized that future revisions with be required. For example, there are no consistent and widely accepted diagnostic criteria for most PeVD.[46] As many definitions are based on non-invasive imaging studies with variable diagnostic criteria, definitions were occasionally problematic and it is anticipated that these will be refined as the field advances. Although every effort was made to ensure that definitions were precise and that reproducibility was acceptable in simulated classification exercises, the instrument awaits clinical validation.

It is also anticipated that there will be resistance to abandoning the historic nomenclature for PeVD and that the SVP classification will be criticized as being overly complex for clinical use. Despite bringing much needed clarity to lower extremity venous disorders, the CEAP classification has been similarly criticized. However, with increasing familiarity, CEAP has

been successfully adopted by most clinicians and investigators and has become the international standard for the classification of lower extremity venous disorders. Despite efforts to make the classification of pelvic venous disorders as simple as possible, it must be appreciated that PeVD are quite complex with variable, but interrelated hemodynamic and clinical features that cannot be adequately described by the current nomenclature. As with CEAP, the nuances of the SVP classification cannot be appreciated from simply reading this manuscript. Comfort and familiarity with the classification, as well as identification of additional limitations, can only come with routine use. It is hopeful that use of Table VII, as well as an electronic version that is available through https://myavls.org/svp, will aid in initial adoption of the SVP classification.

The SVP instrument is a starting point in bringing greater scientific rigor to pelvic venous disorders. It is presumed that, much like lower extremity CEAP, the instrument will be carefully studied and any deficiencies addressed in future revisions. However, it is only through the precise definition of homogenous patient populations that clinical care can be optimized, appropriate outcome instruments developed, and rigorous clinical trials conducted.

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# Legends

*Figure 1* – The symptoms, signs (varices), and pathophysiologic manifestations of pelvis venous disorders (PeVD) occur in 4 anatomic zones of the abdomen and pelvis. These are arranged in descending order from the renal veins to the lower extremities and include symptoms and varices associated with 1) the left renal vein; 2) the gonadal, internal iliac and pelvic veins; 3) the pelvic origin extra-pelvic veins arising in the pelvis and refluxing through the pelvic floor to the genitalia and lower extremity veins; and 4) the lower extremity veins. The first three zones are included in the SVP classification while the fourth zone, associated with the superficial and deep veins of the lower extremity and their tributaries, is optimally classified with CEAP and is not included.

*Figure 2* - Left renal vein compression associated with symptoms of left flank pain and hematuria. CT scan (A) demonstrates compression of the left renal vein (white arrow) over the abdominal aorta. Venography (B) demonstrates contrast attenuation over the abdominal aorta (black arrow), renal hilar varices (white arrow), and ascending collaterals (dashed white arrow) consistent with renal vein compression. SVP classification – $\mathbf{S_1V_1P_{LRV,O,NT}}$.

*Figure* 3 – Chronic pelvic pain due to compression of the left renal vein with secondary reflux in the left ovarian vein. Selective renal venography (A) demonstrates compressive obstruction (white arrow) of the central left renal vein (black arrow) associated with renal hilar varices. The left renal vein is drained through the renal-azygous trunk (red star) and a refluxing left ovarian vein (white star). Selective left ovarian venography (B) demonstrates associated pelvic varices, myometrial veins (red star) and small arcuate veins (red arrow). SVP classification – $\mathbf{S_2V_{1,2}P_{LRV,O,NT;\ LGV,R,NT}}$.

*Figure 4* – Left flank pain associated with chronic microscopic hematuria and pelvic pain. Selective renal venography (1) demonstrates a left inferior pole renal venous malformation (black arrow) drained by a left ovarian vein with no visible connection to the renal vein. Pelvic venography (2) shows associated pelvic varicosities (white star). SVP classification - $S_{1,2}V_{1,2}P_{LRV,C;\ LGV,R,NT.}$

*Figure 5* - Chronic pelvic pain due to bilateral primary ovarian vein reflux. A dilated, refluxing left ovarian vein (black arrow) is associated with multiple pelvic varicosities (white arrow). Right ovarian vein reflux is also present, but not demonstrated in this image. No obstruction of the left renal or common iliac veins or internal iliac reflux is present by ultrasound. SVP classification - $\mathbf{S_2V_2P_{BGV,R,NT.}}$

*Figure 6* – Chronic pelvic pain due to left common iliac compression. The patient has no lower extremity symptoms. Transabdominal ultrasound (not shown) demonstrates > 50% compression of the left common iliac vein, retrograde flow in the left internal iliac vein, and peri-uterine varices. Intravascular ultrasound (not shown) demonstrates 70% cross sectional area reduction of the left common iliac vein at the crossing of the right common iliac artery. Antegrade venography demonstrates flattening of the left common iliac vein with contrast attenuation at the arterial crossing (black arrow) and left internal iliac reflux (white arrow). Associated pelvic varices are better seen on delayed imaging (not shown). SVP classification – $\mathbf{S_2V_2P_{LCIV,O,NT;\ LIIV,R,NT.}}$

*Figure 7* – Symptomatic vulvar varicosities with associated pelvic pain due to bilateral ovarian and internal iliac venous reflux. There are no associated lower extremity varices. Transabdominal ultrasound (not shown) shows peri-uterine varices with bilateral ovarian and internal iliac reflux and no evidence of left renal or common iliac venous

obstruction. Balloon occlusion venography performed from a left internal iliac injection demonstrating vulvar varicosities associated with the internal (black arrow) and external (white arrow) pudendal veins. Similar reflux through the pudendal veins is present on the right. Ovarian and right internal iliac vein injections not shown. SVP classification - $\mathbf{S_{2,3a}V_{2,3a}P_{BGV,R,NT;\ BIIV,R,NT;\ BPELV,R,NT}}$.

*Figure 8* – Post-thrombotic venous claudication and left lower extremity swelling without visible lower extremity varices. Ultrasound (not shown) demonstrates post-thrombotic reflux with partial obstruction in the left common femoral, femoral, and popliteal veins and no superficial venous reflux. The figure shows post-thrombotic changes in the left common and external iliac veins (black arrows) with large obturator collaterals (dashed white arrow) draining into the left internal iliac vein (solid white arrow). Collateral veins with antegrade flow bypassing an obstruction are not considered varices by the SVP instrument. As the presentation involves lower extremity symptoms and signs, the SVP classification should be used in conjunction with the CEAP classification. SVP classification – $\mathbf{S_{3c}V_0P_{LCIV,O,T;\ LEIV,O,T;}}$ Left $\mathbf{C_{3s}E_{si}A_dP_{(o)CIV,\ EIV;\ (r,o)CFV,FV,POPV}}$

*Figure 9* – Locally painful, recurrent, left medial thigh varicosities in 56-year old $G_3P_3$ female twenty-one years after great saphenous stripping. She has no pelvic symptoms. Ultrasound (not shown) demonstrates reflux in the bilateral ovarian and left internal iliac veins associated with pelvic varices communicating with the extra-pelvic varices over the left medial thigh. No right internal iliac or superficial or deep lower extremity reflux is seen on ultrasound. Venography demonstrates pelvic origin varices over the medial thigh communicating with pudendal (black arrow) and inguinal (red arrow)

tributaries of the left internal iliac vein. $\mathbf{S_{3b}V_{2,3b}P_{BGV,R,NT;\ LIIV,R,NT;\ LPELV,R,NT}}$ **;** Left $\mathbf{C_{2s,r}E_pA_{s,d}P_{(r)\ IIV,Pelvic,NSV}}$.

# TABLES

## Table I

International Working Group on Pelvic Venous Disorders Participants

| | |
|---|---|
| Diana Atashroo, MD | International Pelvic Pain Society (IPPS) |
| Antonio Basile, MD | Cardiovascular and Interventional Radiological Society of Europe (CIRSE) |
| Antonio Gasparis, MD | American Venous Forum (AVF) |
| Kathleen Gibson, MD | American Vein and Lymphatic Society (AVLS) |
| Milka Greiner, MD, PhD | European Venous Forum (EVF) |
| Nicos Labropoulos, PhD | International Union of Phlebology (UIP) |
| Zaza Lazarashvilli, MD | International Union of Phlebology (UIP) |
| Lee Learman, MD, PhD | American College of Obstetricians and Gynecologists (ACOG) |
| Joanne Lohr, MD | American Venous Forum (AVF) |
| Neil Khilnani, MD | Society of Interventional Radiology (SIR) |
| Man-Deuk Kim, MD, PhD | Korean Society of Interventional Radiology |
| Fedor Lurie, MD, PhD | Society for Vascular Surgery |
| Mark Meissner, MD | American Vein and Lymphatic Society (AVLS) |
| Philippe Nicolini, MD | European Venous Forum (EVF) |
| Waleska Pabon-Ramos, MD, MPH | Society of Interventional Radiology (SIR) |
| Marc Passman, MD | Society for Vascular Surgery |
| Mel Rosenblatt, MD | American Vein and Lymphatic Society (AVLS) |

## Table II

Symptoms ("S")

| | |
|---|---|
| $S_0$ | No symptoms of a pelvic venous disorder (No renal, pelvic, or extra-pelvic symptoms) |
| $S_1$ | Renal symptoms of venous origin |
| $S_2$ | Chronic pelvic pain of venous origin |
| $S_3$ | Extra-pelvic symptoms of venous origin |
| a | Localized symptoms (pain, discomfort, tenderness, itching, bleeding and superficial venous thrombosis) associated with veins of the external genitalia (vulva and scrotum) |
| b | Localized symptoms associated with pelvic origin non-saphenous veins of the leg. These include those related to pelvic origin varices of the posteromedial thigh (pain, discomfort, tenderness, itching, superficial venous thrombosis) as well as those related to sciatic / tibial nerve varices (pain, paresthesias). More generalized lower extremity symptoms and signs, such as heaviness and swelling, are classified with CEAP not SVP.* |
| c | Venous claudication.* |

* Must include CEAP classification for full characterization of lower extremity symptoms.

## *Table III*

Varices ("V")

| | |
|---|---|
| $V_0$ | No abdominal, pelvic, or pelvic origin extra-pelvic varices on clinical or imaging examination |
| $V_1$ | Renal hilar varices |
| $V_2$ | Pelvic varices |
| $V_3$ | Pelvic origin extra-pelvic varices. |
| a | Genital varices (vulvar varices and varicocele) |
| b | Pelvic origin lower extremity varicose veins arising from the pelvic escape points and extending into the thigh. Includes visible varicosities, typically over the posteromedial thigh, as well as sciatic varices and other refluxing veins transitioning the pelvic floor which are visualized only with ultrasound.* |

* Must include CEAP classification for full characterization of lower extremity varices.

## *Table IV*

Anatomy

| | |
|---|---|
| IVC | Inferior vena cava |
| LRV | Left renal vein |
| GV | Gonadal (testicular, ovarian) veins |
| LGV | Left gonadal vein |
| RGV | Right gonadal vein |
| BGV | Bilateral gonadal veins |
| CIV | Common iliac veins |
| LCIV | Left common iliac vein |
| RCIV | Right common iliac vein |
| BCIV | Bilateral common iliac veins |
| EIV | External iliac veins |
| LEIV | Left external iliac vein |
| REIV | Right external iliac vein |
| BEIV | Bilateral external iliac veins |
| IIV | Internal iliac veins |
| LIIV | Left internal iliac vein and tributaries |
| RIIV | Right internal iliac vein and tributaries |
| BIIV | Bilateral internal iliac veins and tributaries |
| PELV | Pelvic escape veins[22] (“escape points”) – Inguinal, obturator, pudendal, and/or gluteal |

| | |
|---|---|
| RPELV | Right pelvic escape veins |
| LPELV | Left pelvic escape veins |
| BPELV | Bilateral pelvic escape veins |

***Table V***

Hemodynamics

| | |
|---|---|
| Obstruction (O) | Thrombotic or non-thrombotic (venous compression) venous obstruction |
| Reflux (R) | Thrombotic or non-thrombotic reflux |

***Table VI***

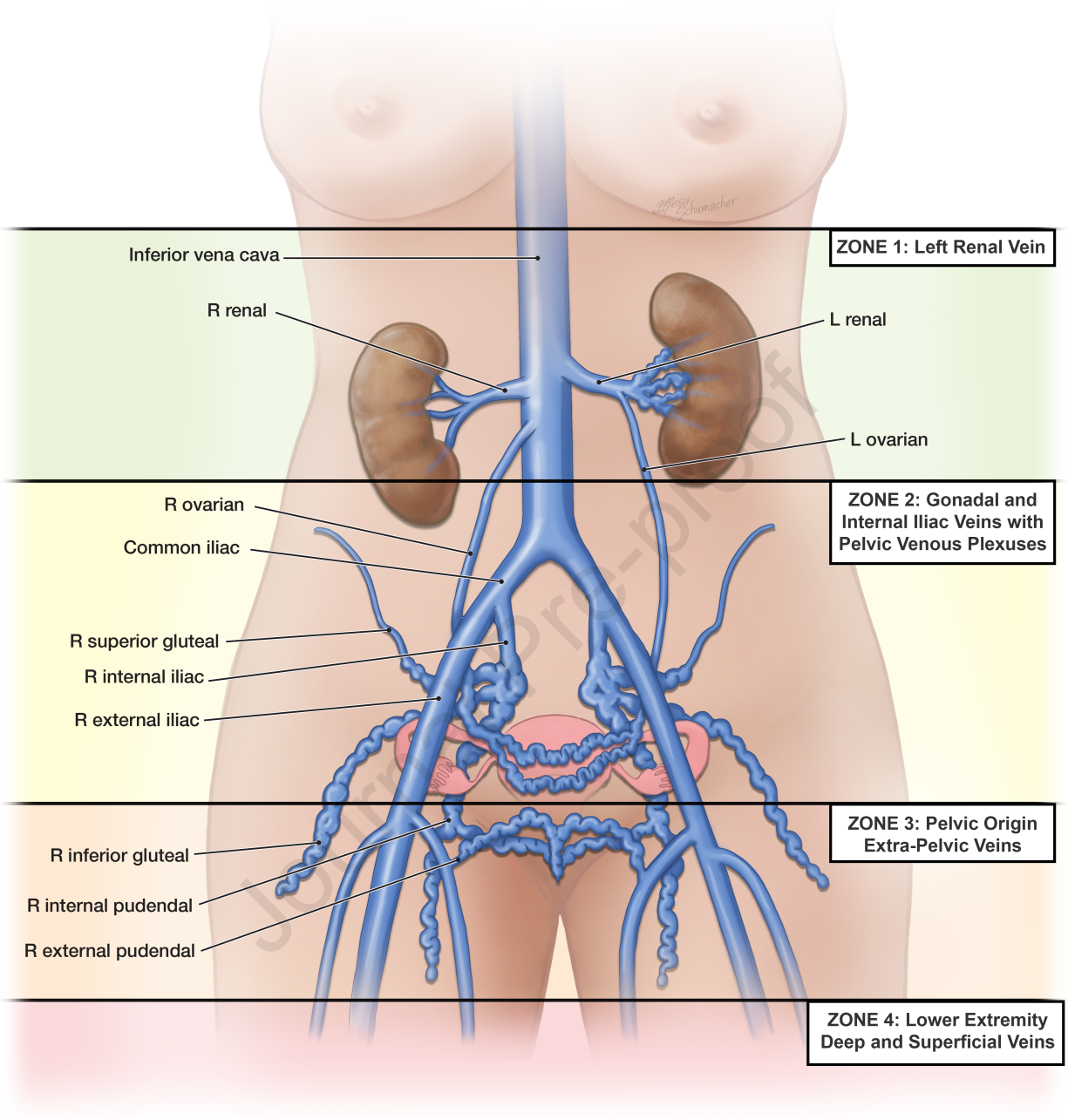
Etiology (E)

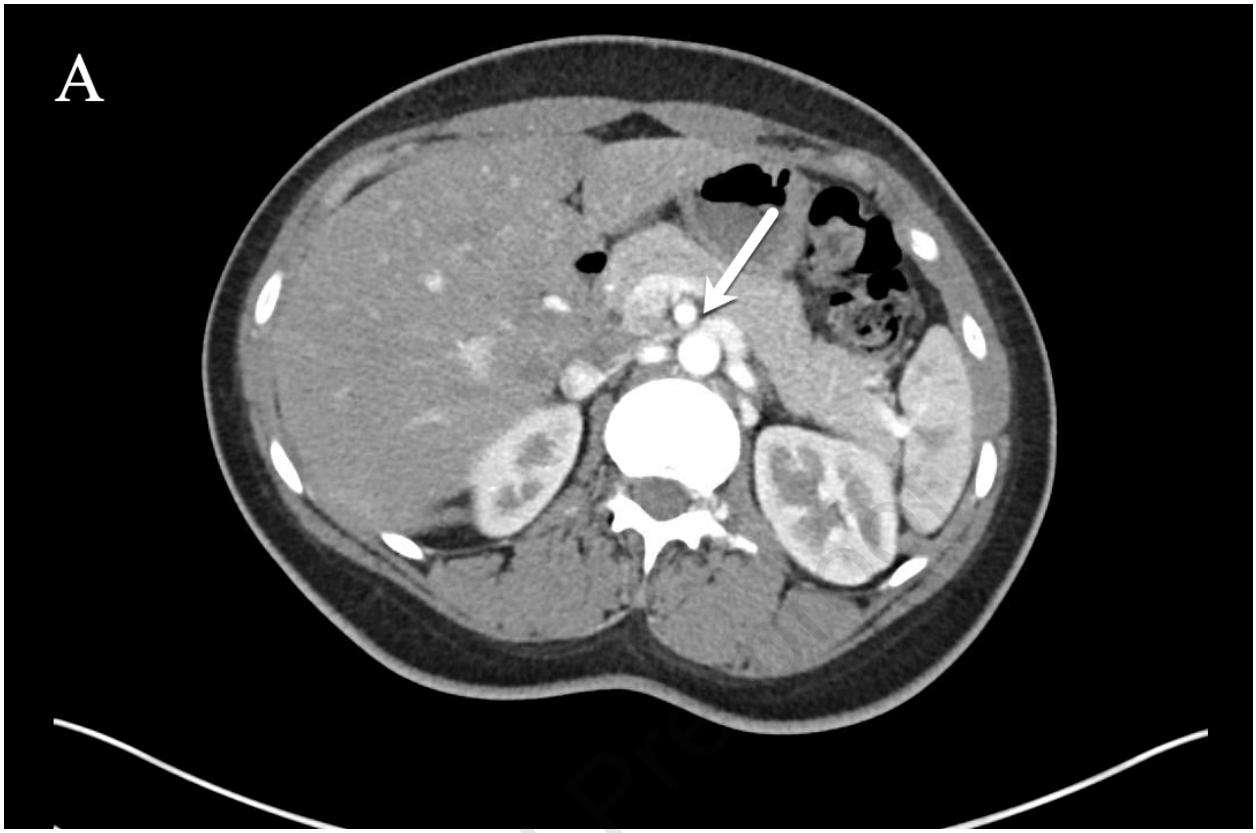
| | |
|---|---|
| Thrombotic (T) | Venous reflux or obstruction arising from a previous episode of DVT |
| Non-Thrombotic (NT) | Reflux arising from a degenerative process of the vein wall or proximal obstruction; Obstruction arising from extrinsic compression |
| Congenital (C) | Congenital venous or mixed vascular malformations |

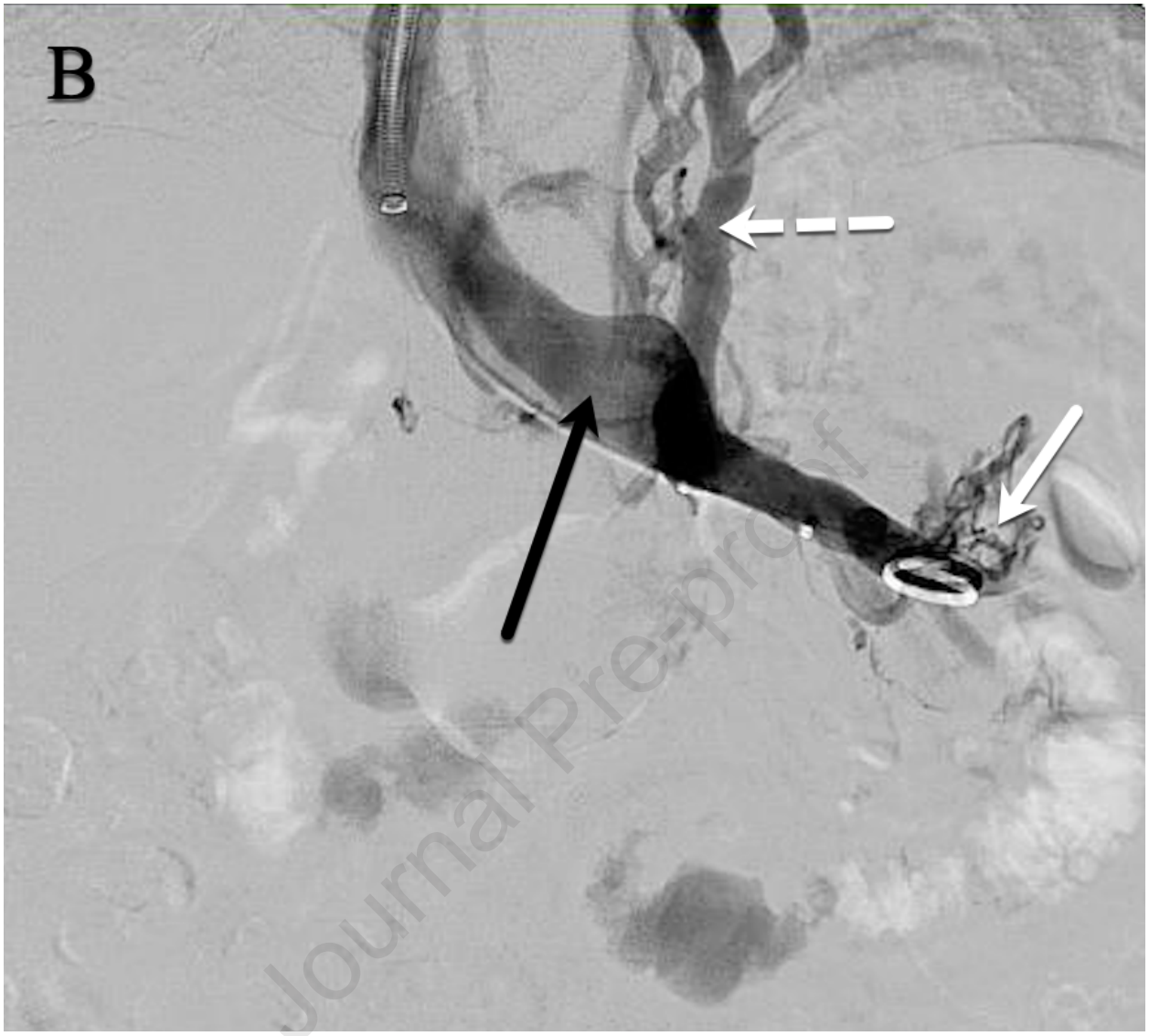
## Table VII

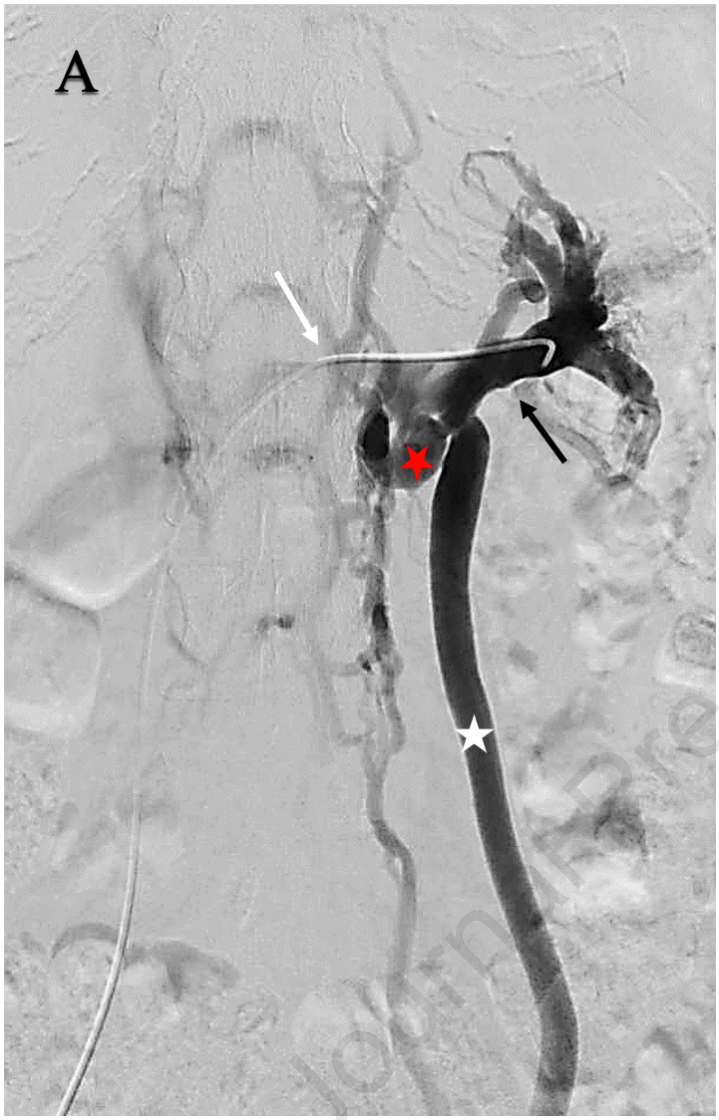
SVP Classification Scoring Sheet

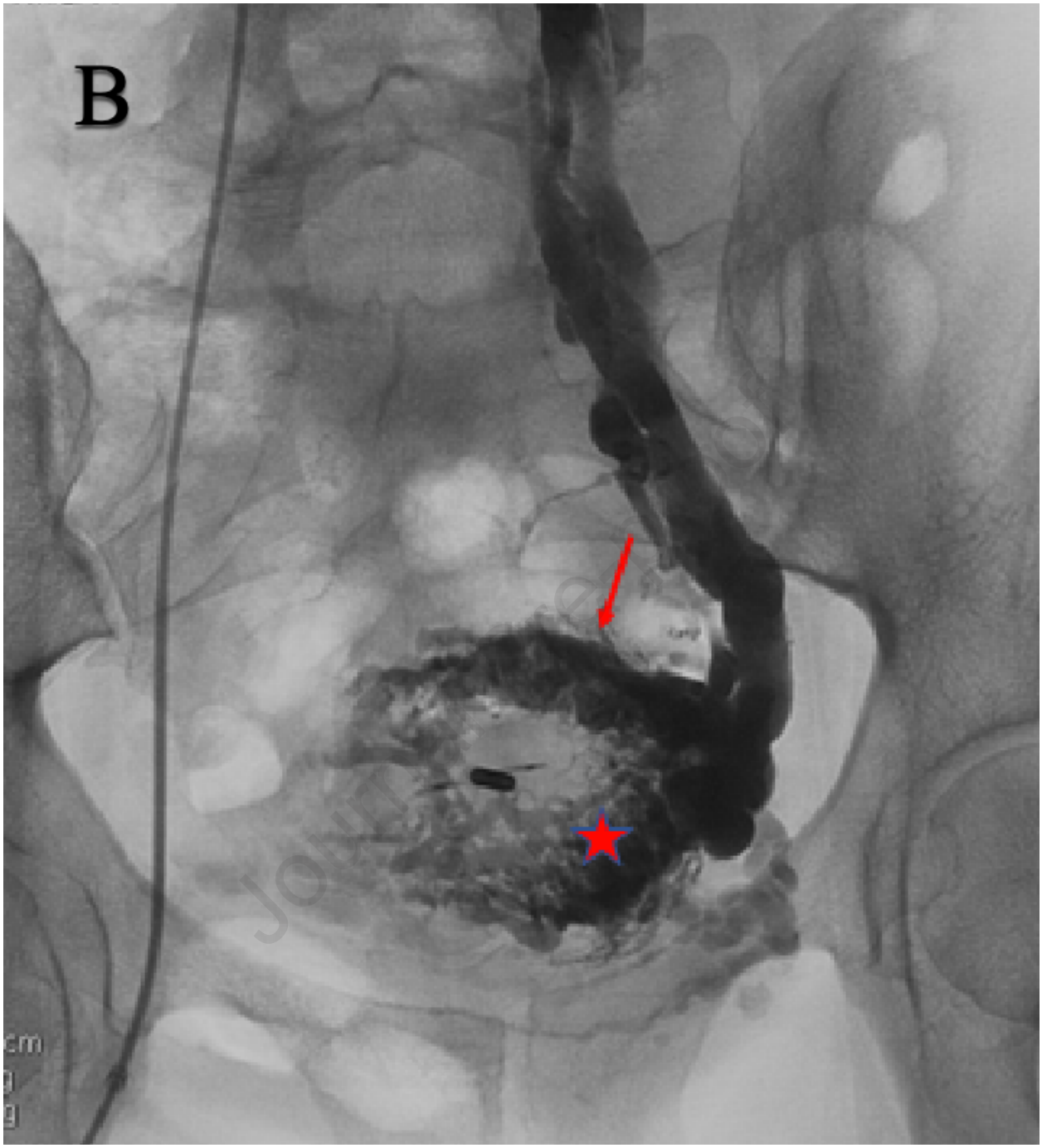
| **Symptoms (S)** | | **Varices (V)** | | **Anatomy/Pathophysiology (P)** | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **A** | **H** | **E** |
| No Pelvic Symptoms | 0 | No Pelvic Varices | 0 | | IVC | O | T |
| Renal | 1 | Renal | 1 | | | | NT |
| Pelvic | 2 | Pelvic | 2 | | | | C |
| Extra-Pelvic | 3 | Extra-Pelvic | 3 | L | RV | O | T |
| *Genital* | $3_a$ | *Genital* | $3_a$ | | | | NT |
| *Leg Symptoms* | $3_b$ | *Leg Varices* | $3_b$ | | | | C |
| *Venous Claudication* | $3_c$ | | | R | GV | O R | T |
| | | | | L | | | NT |
| | | | | B | | | C |
| | | | | R | CIV | O R | T |
| | | | | L | | | NT |
| | | | | B | | | C |
| | | | | R | IIV | O R | T |
| | | | | L | | | NT |
| | | | | B | | | C |
| | | | | R | EIV | O R | T |
| | | | | L | | | NT |
| | | | | B | | | C |
| | | | | R | PELV | O R | T |
| | | | | L | | | NT |
| | | | | B | | | C |
| S | | V | | $P_{segment1,H,E;segment\ 2,H,E}$ | | | |


Inferior vena cava
R renal
L renal
L ovarian
R ovarian
Common iliac
R superior gluteal
R internal iliac
R external iliac
R inferior gluteal
R internal pudendal
R external pudendal
ZONE 1: Left Renal Vein
ZONE 2: Gonadal and Internal Iliac Veins with Pelvic Venous Plexuses
ZONE 3: Pelvic Origin Extra-Pelvic Veins
ZONE 4: Lower Extremity Deep and Superficial Veins








B