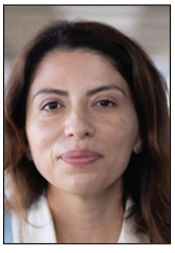
Perspectives in PeVD Decision-Making

Let the image guide treatment or treat all four pelvic vessels?

By Gloria Salazar, MD, FSIR, and Jake F. Hemingway, MD

I Let the Image Guide Me

By Gloria Salazar, MD, FSIR



Clinical diagnosis of pelvic venous disease (PeVD) is crucial for categorizing patients for treatment, with imaging serving as a complementary tool in the treatment algorithm. PeVD encompasses symptoms and signs from the pelvic veins and their primary drainage pathways. First described as "congestion-fibrosis" of the reproductive tract by Howard Taylor in 1949, multiple disorders like May-Thurner, nutcracker, and pelvic congestion syndromes have since been identified. The first successful transcatheter embolization of bilateral ovarian veins was reported in 1993, yet PeVD remained poorly understood without diagnostic criteria.

In the past decade, understanding of PeVD has improved, leading to the Symptom-Varices-Pathophysiology (SVP) instrument published by the American Vein and Lymphatic Society in 2021.[1] This system reflects a nuanced understanding of PeVD, characterized by various pathologic mechanisms affecting the pelvis, genitalia, and lower extremities, often presenting with overlapping symptoms. Improved diagnosis and optimized treatments require understanding of these underlying causes and symptom patterns.

WHAT TYPE OF IMAGING?

Ultrasound, CT, and MRI are noninvasive imaging techniques used in the evaluation of PeVD. Catheter venography is another imaging tool that remains the gold standard for diagnosis, despite being more invasive than the other modalities.[2] Diagnostic imaging plays a crucial role in identifying PeVD and guiding treatment and intervention plans.

Imaging elements typically observed in patients with PeVD include gonadal vein diameter and the presence of gonadal vein reflux, pelvic variceal reservoir, iliac vein obstruction, and renal vein obstruction.[3] The choice of imaging modality depends on availability and expertise; however, the SVP consensus document identifies the major criterion for diagnosing PeVD as the presence of varices in the ovarian or uterovaginal plexus measuring at least 5 mm in diameter, regardless of the imaging technique employed.[4]

The best approach is to correlate symptoms with the location of anatomic abnormality. To that end, my approach is to start with either ultrasound or CT venography (CTV) and then plan for diagnostic venography with intravascular ultrasound (IVUS) if compression is suspected.

Ultrasound evaluation can be performed via a transvaginal approach, and parauterine veins measuring > 5 mm are considered criteria for PeVD. A comprehensive approach, as described by Labropoulos et al, aims to evaluate all potentially affected veins in PeVD.[5] This protocol examines the inferior vena cava, left renal, left ovarian, and left iliac veins in both transverse and longitudinal axes. If the caliber of the left iliac vein decreases at the point where the right common iliac artery crosses, Doppler ultrasound can be used to assess for velocity acceleration. Additionally, dynamic imaging can be conducted by having the patient sit up from the supine position. If the luminal diameter improves when the patient becomes upright, it usually indicates that the lesion is not clinically significant.[5]

The primary challenge with using dedicated PeVD ultrasound is the lack of expertise in different centers, with most physicians relying on a combination of transvaginal ultrasound and cross-sectional imaging. Therefore, performing CTV/MRI is recommended; however, CTV may underestimate iliac vein stenosis

while MR venography may overestimate stenosis due to dehydration status. If stenosis is suspected, IVUS is the ideal tool to assess for a fixed venous stenotic lesion.

TREATMENT PLANNING GUIDED BY IMAGING

When developing a treatment plan for patients with PeVD, it is crucial to recognize that many individuals have multiple venous abnormalities contributing to their symptoms. Effective treatment, defined by symptomatic improvement or resolution, relies on identifying the underlying venous conditions involved in the patient's presentation.

Careful assessment for the presence of previously described patterns associated with PeVD—such as gonadal vein incompetence/reflux, venous compression, escape points, and anatomic variants—is essential for effective treatment and determining individualized treatment plans. Given that most patients present with a combination of these pathophysiologic variants, understanding general treatment strategies is critically important.

Many patients with PeVD experience more than one abnormality that contributes to their symptoms. Initial data based on 19 patients indicated that addressing common iliac vein stenosis with stent placement resulted in symptom improvement for the majority of patients.[6] These findings were later supported by a study of 227 patients, which demonstrated 80% of patients had both gonadal vein insufficiency and iliac vein compression.[7] This study advocated for initially treating venous stenosis, followed by gonadal vein embolization if symptoms persisted, and recommended simultaneous treatment in cases of large pelvic reservoirs. More recent data endorse stenting alone as a primary treatment pathway for PeVD with chronic pelvic pain (CPP) without addressing the gonadal veins.[8,9]

In my practice, I will only treat vessels if they are abnormal (presence of reflux/stenosis) and if patients have symptoms that correlate with these findings.

KEY TAKEAWAYS

Imaging provides valuable information about a patient's condition and symptom correlation, as not all venous reflux and stenosis are symptomatic. The key to achieving successful outcomes lies in accurately categorizing symptoms (renal, pelvic, extrapelvic) in relation to imaging-diagnosed abnormalities to properly intervene in these patients.

1. Meissner MH, Khilnani NM, Labropoulos N, et al. The Symptoms-Varices-Pathophysiology classification of pelvic venous disorders: a report of the American Vein & Lymphatic Society International Working Group on Pelvic Venous Disorders. J Vasc Surg Venous Lymphat Disord. 2021;9:568–584. doi: 10.1016/j.jvsv.2020.12.084
2. Steenbeek MP, van der Vleuten CJ, Schultze Kool LJ, Nieboer TE. Noninvasive diagnostic tools for pelvic congestion syndrome: a systematic review. Acta Obstet Gynecol Scand. 2018;97:776–786. doi: 10.1111/aogs.13311
3. Arnoldussen CWKP, de Wolf MAF, Wittens CHA. Diagnostic imaging of pelvic congestive syndrome. Phlebology. 2015;30(1 suppl):67–72. doi: 10.1177/0268355514568063
4. Khilnani NM, Meissner MH, Learman LA, et al. Research priorities in pelvic venous disorders in women: recommendations from a multidisciplinary research consensus panel. J Vasc Interv Radiol. 2019;30:781–789. doi: 10.1016/j.jvir.2018.10.008
5. Labropoulos N, Jasinski PT, Adrahtas D, et al. A standardized ultrasound approach to pelvic congestion syndrome. Phlebology. 2017;32:608–619. doi: 10.1177/0268355516677135
6. Daugherty SF, Gillespie DL. Venous angioplasty and stenting improve pelvic congestion syndrome caused by venous outflow obstruction. J Vasc Surg Venous Lymphat Disord. 2015;3:283–289. doi: 10.1016/j.jvsv.2015.01.003
7. Santoshi RKN, Lakhanpal S, Satwah V, et al. Iliac vein stenosis is an underdiagnosed cause of pelvic venous insufficiency. J Vasc Surg Venous Lymphat Disord. 2018;6:202–211. doi: 10.1016/j.jvsv.2017.09.007
8. Tanaka ME, Kutsenko O, Salazar G. Choosing the most appropriate treatment option for pelvic venous disease: stenting versus embolization. Semin Intervent Radiol. 2021;38:182–188. doi: 10.1055/s-0041-1727104
9. Gavrilov SG, Vasilyev AV, Krasavin GV, et al. Endovascular interventions in the treatment of pelvic congestion syndrome caused by May-Thurner syndrome. J Vasc Surg Venous Lymphat Disord. 2020;8:1049–1057. doi: 10.1016/j.jvsv.2020.02.012

I Plan to Treat All Four Pelvic Vessels

By Jake F. Hemingway, MD

Effective treatment of venous-origin CPP (VO-CPP) requires a thorough knowledge of pelvic venous anatomy and hemodynamics. In the case of pelvic venous reflux, embolization has become the first-line treatment given the high rates of clinical success and low morbidity. Although a number of studies have demonstrated a significant improvement in symptoms in most patients after embolization, there is considerable variability in the rates of both initial symptom relief and recurrence.[1-4] Variable short- and long-term outcomes are likely related to several factors, including technique differences during the procedure and the care used in ensuring appropriate patient selection; however, the extent of embolization also likely plays a critical role.

WHY SELECTIVE EMBOLIZATION MAY NOT BE THE BEST STRATEGY

Selective embolization of only those pelvic venous trunks demonstrating reflux based on preoperative imaging is a reasonable thought, given our approach to superficial venous reflux in the lower extremity. We do not ablate every vein and instead only treat truncal superficial veins with reflux, which also contribute to the symptomatic varicosities. In this way, only addressing the pelvic veins with reflux is a common strategy to treat VO-CPP secondary to reflux. However, studies employing this strategy generally report higher rates of treatment failure and recurrence.[1,3,5]

These studies vary greatly in the reported extent of ovarian and iliac vein involvement, based on the rates of ovarian vein and iliac vein embolization performed. This variability cannot be explained solely by anatomic and hemodynamic variation between different study populations and likely is

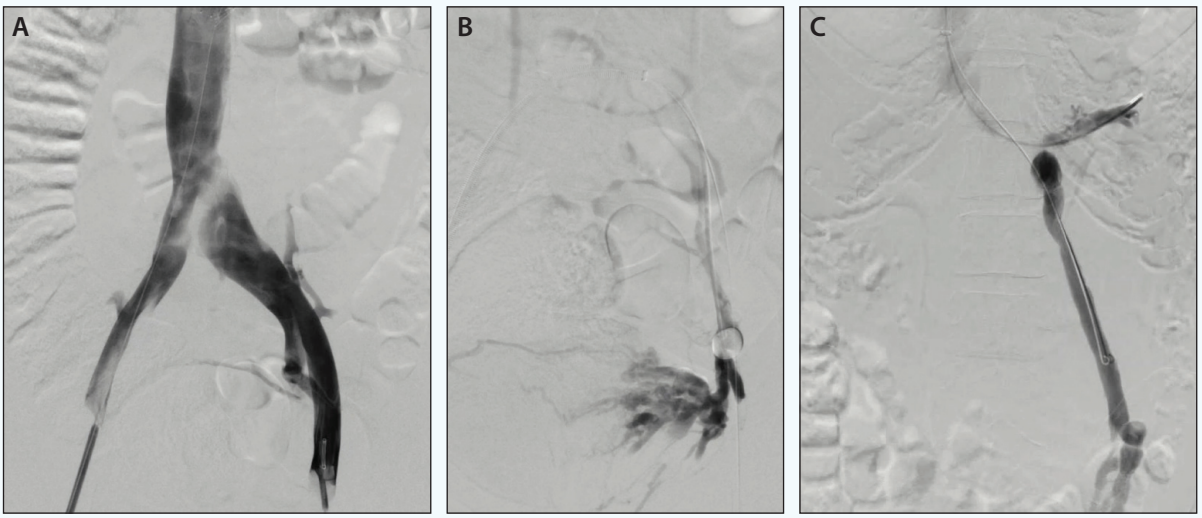


Figure. Left common iliac vein compression (A). Pelvic varices of internal pudendal vein origin seen on balloon occlusion venography (B). Left gonadal vein reflux (C).

the result of inadequate interrogation, diagnosis, and treatment of refluxing trunks.[3,6] Although some studies report successful four-vessel embolization in > 85% of patients, others report that the right gonadal vein, which is difficult to cannulate and treat, only required embolization in 15% of patients. Furthermore, no embolization was performed of the internal iliac veins (IIVs) in several studies, despite the well-documented involvement of the IIVs in patients with severe symptoms. This is especially important given the high failure rate (36%) seen if the IIVs are not treated.

The variability seen in the number and types of vessels embolized likely has less to do with anatomic differences than technique and may explain the higher recurrence and treatment failure rates when "selective" embolization is used. The treatment failures and recurrences may instead represent inadequate treatment up front, as opposed to a true "failure."

FOUR-VESSEL EMBOLIZATION OPTIMIZES TREATMENT OUTCOME

On the other hand, careful four-vessel interrogation and embolization has consistently shown both the highest success rates and the lowest recurrence rates (5%).[1,3,5] This is likely the result of complete treatment of the distal pelvic reservoir, in which careful selective venography of all four pelvic venous trunks is used to identify and treat all veins communicating with the pelvic reservoir. This strategy accounts for the interconnected nature of the pelvic venous trunks via the utero-ovarian arcade and ensures a more complete treatment.

Selective embolization will result in more treatment failures and recurrence, and as such, four-vessel interrogation and embolization is the only way to optimize treatment outcomes. ■

1. Champaneria R, Shah L, Moss J, et al. The relationship between pelvic vein incompetence and chronic pelvic pain in women: systematic reviews of diagnosis and treatment effectiveness. Health Tech Assess. 2016;20:1-108. doi: 10.3310/hta20050
2. Daniels JP, Champaneria R, Shah L, et al. Effectiveness of embolization or sclerotherapy of pelvic veins for reducing chronic pelvic pain: a systematic review. J Vasc Interv Radiol. 2016;27:1478-1486.e8. doi: 10.1016/j.jvir.2016.04.016
3. De Gregorio MA, Guirola JA, Alvarez-Arranz E, et al. Pelvic venous disorders in women due to pelvic varices: treatment by embolization: experience in 520 patients. J Vasc Interv Radiol. 2020;31:1560-1569. doi: 10.1016/j.jvir.2020.06.017
4. Jambon E, Le Bras Y, Coussy A, et al. Embolization in pelvic venous disorders using ethylene vinyl alcohol copolymer (Onyx®) and aetoxysclerol: a prospective evaluation of safety and long-term efficacy. Eur Radiol. 2022;32:4679-4686. doi: 10.1007/s00330-022-08567-z
5. Hansrani V, Abbas A, Bhandari S, et al. Trans-venous occlusion of incompetent pelvic veins for chronic pelvic pain in women: a systematic review. Eur J Obstet Gynecol Reprod Biol. 2015;185:156-163. doi: 10.1016/j.ejogrb.2014.12.011
6. Barge TF, Uberoi R. Symptomatic pelvic venous insufficiency: a review of the current controversies in pathophysiology, diagnosis, and management. Clin Radiol. 2022;77:409-417. doi: 10.1016/j.crad.2022.01.053

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