

Gonadal Vein Embolization

Diagnosing and treating pelvic congestion syndrome.

BY SANDEEP BAGLA, MD

Fifteen percent of all outpatient gynecologic visits and 30% of patients who present with pelvic pain are secondary to pelvic congestion syndrome (PCS). Unfortunately, this disease is often overlooked, with patients frequently undergoing an exhaustive evaluation before being diagnosed with PCS. Pelvic congestion with varices was first described more than 150 years ago, and the symptoms were considered psychosocial more than 50 years ago;¹ even still, there are often delays in diagnosis because general practitioners are not aware of the syndrome and typically refer patients to psychologists or other counselors. The underlying pathophysiology of PCS was first described around the same time, with further anatomical understanding developed in more recent decades. Negative psychosocial associations with the term *pelvic congestion syndrome* has led to *pelvic venous insufficiency* being the preferred term for describing the underlying pathophysiology of the condition.¹

Although the etiology of PCS is poorly understood, the primary abnormality is the absence of functioning valves in the ovarian or internal iliac vein branches. This likely congenital absence of valves or hereditary predisposition is the most common explanation. The condition is worsened with each successive pregnancy due to increased blood flow and hormonal fluctuations. Subclinical thrombosis of these veins may further contribute to the development of the syndrome. Other less common etiologies are secondary to uterine malposition and nutcracker syndrome (eg, left renal vein compression between the aorta and the superior mesenteric artery).

EVALUATION

Typically, multiparous women present between the ages of 20 and 45 years with chronic pelvic pain of > 6 months' duration, exacerbated by prolonged sitting or standing. Pain is described as dull, heavy, and aching,

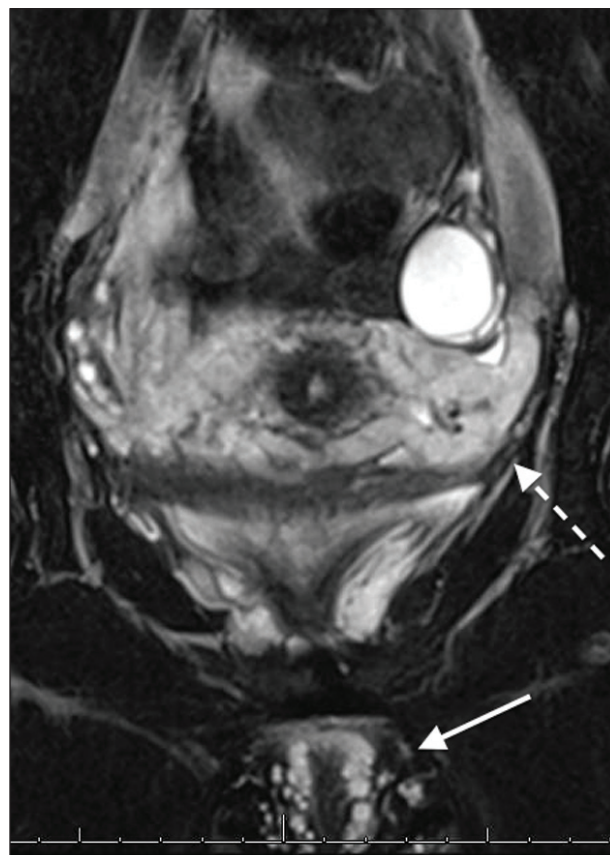


Figure 1. Coronal T2 short TI inversion recovery image depicts parauterine varices (dashed white arrow) and labial varices (white solid arrow), which may often be appreciated on physical exam.

worsened with menses or sexual activity (dyspareunia). On physical exam, patients may present with visible labial, vulvar, or pudendal varices, often with extension of varices to the posterior medial thigh or gluteal regions.

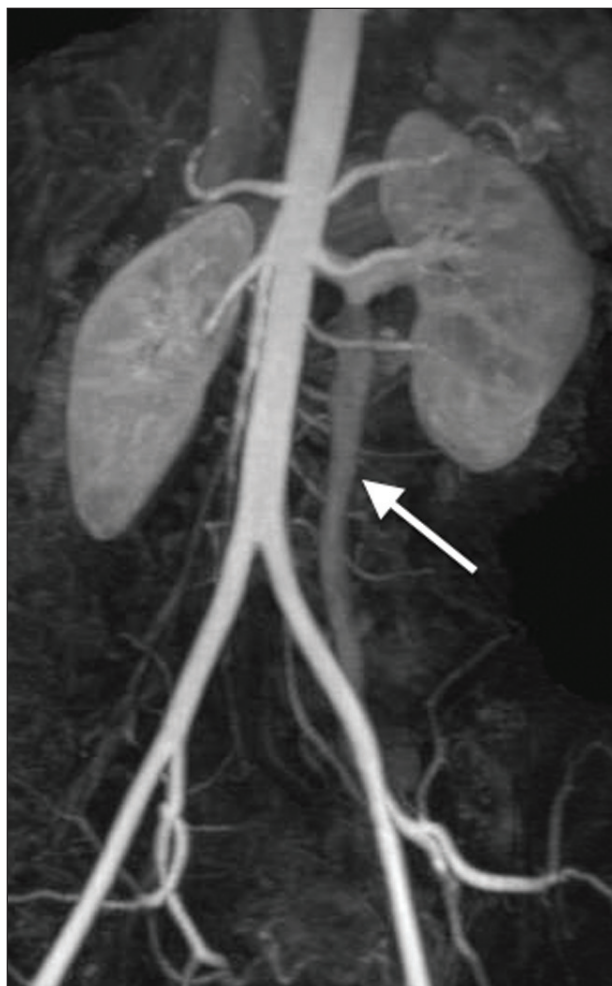


Figure 2. Coronal maximum-intensity projection of fat-suppressed 3D gradient MRI with contrast depicts early contrast opacification of the left gonadal vein (white arrow) secondary to incompetence.

In addition, one in seven women with lower extremity varicose veins are found to have underlying PCS.²

Imaging

Imaging plays a key role in the diagnosis of PCS. Ultrasound evaluation may detect parauterine varices or gonadal vein reflux; however, ultrasound's operator dependency and anatomic variability together with patient size limit its ability to detect abnormalities in all patients.

Patients who have undergone CT imaging may also show abnormal gonadal vein enlargement, but it is not generally used as a primary modality in the evaluation of PCS. CT exposes patients to radiation and lacks directional imaging and proper ovarian and uterine evaluation. In the setting of suspected anatomic causes, how-

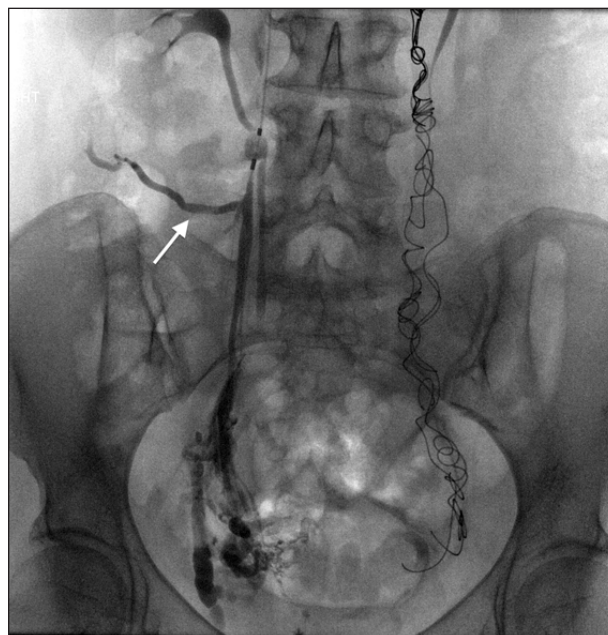


Figure 3. A venogram after the placement of a balloon occlusion catheter depicts paralumbar collaterals (white arrow). Occlusion of these collaterals with sclerosants is critical to preventing recurrence. Note coil placement in the left gonadal vein, which has been embolized; coils are generally more formed rather than placed in an elongated fashion to avoid recanalization. This image highlights the need for evaluating the collateral tributaries, which is what the right gonadal vein shows.

ever (eg, nutcracker syndrome), CT scans may provide detailed imaging.

Magnetic resonance imaging (MRI) and venography provide superior ability to detect retrograde gonadal vein flow, parauterine and labial varicosities (Figure 1), and venous anomalies that may affect catheterization and treatment planning. Specialized techniques, such as time-of-flight imaging, allow for detection of retrograde gonadal vein flow. This gradient echo imaging is performed with a saturation band below the pelvis, so that caudally flowing blood is seen with increased signal strength. Multiphase postcontrast imaging is critical for the detection of early dense venous enhancement, with newer albumin binding agents offering increased length of time within the blood pool (Figure 2). There are no exact size criteria of the adnexal varicosities whether ultrasound, CT, or MRI is used, due to the fact that these examinations are performed in the supine position. Laparoscopy is frequently performed on patients undergoing an evaluation for chronic pelvic pain, and prominent varices may be seen without other pathology, confirming the diagnosis of PCS.

PROCEDURAL TECHNIQUES

Embolization may be performed from a transjugular or transfemoral approach based on operator preference. At our institution, selective gonadal venography is performed with the patient in 15° reverse Trendelenburg position to emulate an upright position. After confirming venous incompetence, a balloon occlusion catheter is advanced into the gonadal vein, and venography is performed to identify the often-multiple gonadal vein tributaries and pelvic collaterals (Figure 3). Lack of embolization of these tributaries can lead to clinical failure or recurrence. The volume of sclerosant for injection can be estimated from this venogram. We typically use foamed sodium tetradecyl sulfate 3% for embolization with the goal of occluding distal gonadal vein branches and tributaries. Various embolic agents have been described in the literature;³ however, the principle of venous tributary occlusion combined with main gonadal vein embolization is critical to the procedure's long-term success and reducing recurrence. After sclerosant, metallic coils are placed to within 3 cm of the gonadal vein confluence with the renal vein/inferior vena cava.

We perform internal iliac venography to assess for pudendal venous incompetence; however, we often do not treat pelvic venous disease in the same session unless gross incompetence filling numerous pelvic varicosities is seen to avoid a difficult clinical postembolization course. In patients who have symptom resolution after treatment of the gonadal veins alone, pudendal vein embolization is deferred. We generally consider treatment of the pelvic venous disease approximately 1 month or later after the initial embolization.

TREATMENT OPTIONS AND CLINICAL DATA

Various treatment options have shown promise in the treatment of PCS symptoms; however, these are limited by success rates, associated morbidity, or patient tolerance. A randomized, controlled pharmacological trial⁴ comparing medroxyprogesterone acetate versus goserelin acetate demonstrated the latter as more effective. However, these medications that suppress ovulation are often not tolerated longer than 6 months. The investigators concluded that this treatment is unlikely to yield long-term effectiveness. Surgical hysterectomy with bilateral oophorectomy was reported in an observational study to improve symptoms; however, surgery has been associated with recurrence and residual pain rates of 20% and 30%.⁵

After Edwards et al⁶ reported their initial success with transcatheter gonadal vein embolization using metallic coils, multiple case series were published showing

technical success rates of > 95% and significant relief of symptoms in 68% to 100% of patients, with follow-up ranging from 1 to 48 months. Embolic materials have included coils, sclerosants, glue, and vascular plugs. One randomized, controlled trial⁷ compared embolization to hysterectomy with unilateral or bilateral oophorectomy. The trial involved 106 patients with PCS confirmed by laparoscopy and venography, who did not respond to medication after 4 to 6 months of medication. The patients were divided into three groups: (1) embolization; (2) hysterectomy with bilateral oophorectomy and hormone replacement therapy; and (3) hysterectomy with unilateral oophorectomy. The visual analog scale was used to measure degree of pain. Stress level data were scored with the revised social readjustment rating scale. Embolization was significantly more effective at reducing pelvic pain compared to the other methods ($P < .05$). The mean percentage decrease in pain was significantly greater in the patients with lower stress scores ($P < .05$). The investigators concluded that ovarian and/or internal iliac vein embolization appears to be a safe, well-tolerated, effective treatment for PCS that has not responded to medication.

FUTURE DIRECTION

Despite the published clinical success and low morbidity of gonadal vein embolization in the treatment of PCS, there is limited level 1 evidence supporting the endovascular treatment of PCS. With a wide range of embolic choices and significant health care impact, future prospective trials on PCS are warranted. Trials may aim to demonstrate advantages in terms of cost, morbidity, and clinical success. These data will support meaningful gynecologic practice change as well as reimbursement for insurance companies not currently supporting embolization. ■

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