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Under the Beam

Pelvic Congestion Syndrome

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Introduction

A substantive percentage of women will experience chronic pelvic pain (CPP) during their lifetime, which has an estimated prevalence of 3.8%. By definition, CPP is noncyclic and persists for 6 months or more (Howard 2003). It affects nearly 20% of women between the ages of 20 and 30 years (Howard 2003). Although a variety of infectious, inflammatory, malignant, and benign disorders may result in CPP, many patients never receive a definitive diagnosis for their symptoms (Cheong 2006). One underidentified disorder is pelvic congestion syndrome (PCS). For instance, up to 33% of patients with unexplained CPP may have PCS (Karcaaltincaba et al. 2008). Herein, the etiology, clinical manifestations, imaging findings, and treatment approaches for PCS are presented.

Etiology

The pathophysiology of PCS is incompletely understood; however, it is thought to be a consequence of insufficient or incompetent venous valves in the gonadal veins or internal iliac veins. Less commonly, compression of venous outflows as seen in Nutcracker Syndrome may also result in similar findings. Ultimately, retrograde flow occurs and blood pools in the pelvic veins, engorging them under the higher pressure (Karcaaltincaba 2008). Venous dilation and distention alone may not cause pain, but stretching and stagnant flow of the overfilled vessels may stimulate receptors within the vessel walls and cause the dull and aching pelvic pain characteristic of CPP. It remains unclear which patients with these anatomic findings will be symptomatic, and a PCS diagnosis should only be reached only after excluding other likely causes of CPP (Cheong 2006; Rozenblit 2001).

PCS appears more often in multiparous and premenopausal women suggesting anatomical and hormonal components. A gravid uterus may cause venous compression of the ovarian and pelvic vein, increasing their capacity and potentially irreversibly damaging the venous valves (Karcaaltincaba 2008). Environmental factors include obesity, prior pelvic surgery, phlebitis, estrogen therapy, and careers involving heavy lifting or prolonged standing. Associated conditions include iliocaval compression syndrome (May-Thurner Syndrome) or acquired venous stenosis from trauma, tumors, or deep vein thrombosis (Beard 1984; Liddle 2007; Karcaaltincaba 2008).

Clinical manifestations

Most commonly, PCS sufferers describe noncyclic, dull, and achy pain in the pelvic region that worsens with heavy lifting, coitus, at the end of the day, and after standing upright for long periods. Symptoms may be partially relieved when lying down. Dyspareunia, dysmenorrhea, and hemorrhoids are also frequently reported (Liddle 2007). Associated, but nonspecific symptoms may include bloating, nausea, headache, lower back pain, vaginal discharge, vulvar swelling, feeling of leg fullness, rectal discomfort, urinary urgency, anxiety, and depression. On pelvic examination, vulvar, perineal, suprapubic, or medial thigh varicose veins may be seen (Liddle 2007). Ovarian point tenderness, particularly if associated with postcoital pain, is 94% sensitive and 77% specific for PCS (Beard et al. 1984). Despite the standard characteristics of pelvic pain and enlarged pelvic veins in women with PCS, women can also have asymptomatic pelvic varicosities, making the diagnosis challenging (Rozenblit et al. 2001).

Imaging

Imaging is critical in both the evaluation of CPP and the diagnosis of PCS. A combination of imaging modalities is used to

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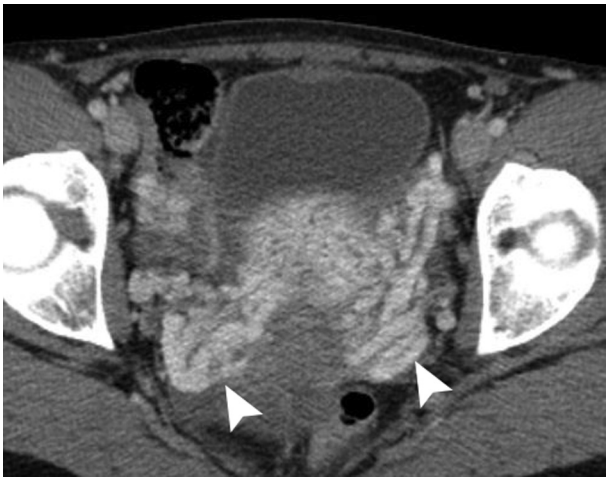

Figure 1. 29-year-old female with vulvar varices. Computed tomography venography (CTV) reveals tortuous, tubular structures representing para-uterine veins (white arrowheads).

exclude alternative causes of CPP and identifying dilated gonadal and pelvic veins. Ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI), and conventional venography are the most frequently used modalities (Gloviczki et al. 2011).

Transvaginal US with Doppler evaluation allow visualization of the pelvic venous plexus and evaluate direction of blood flow. Additional benefits include the possibility of performing US while the patient is standing or performing a Valsalva maneuver, which may allow for increased sensitivity. However, US examinations are operator dependent and may be difficult to reproduce. In patients without PCS, the normal ovarian venous plexus presents as a straight tubular structure with a diameter <4 mm, whereas patients with PCS will have dilated veins that are >6 mm (Karcaaltincaba et al. 2008). CT and MRI can both provide detailed cross-sectional pelvic anatomy. If the examinations are performed through protocoled venous structures (CT or MRI venography), then tortuous, tubular, and dilated pelvic veins can be seen with either modality (Figures 1-3). Diagnostic criteria include presence of 4 or more veins, each measuring >4 mm or gonadal veins measuring over 8 mm in diameter (Gloviczki et al. 2011). Although MRI provides better soft tissue resolution and avoids radiation, it is a longer examination and claustrophobic patients may not prefer it.

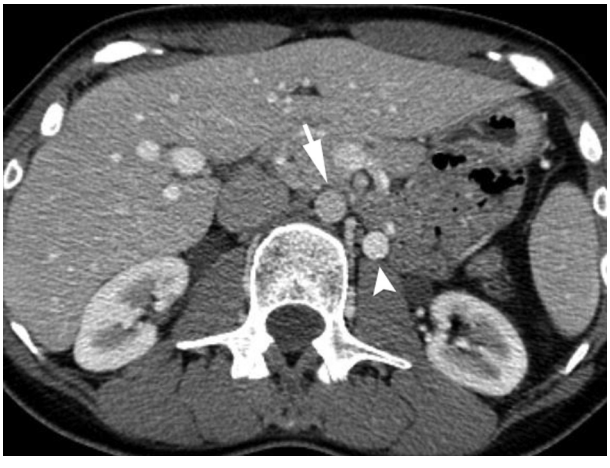

Figure 2. 29-year-old female with vulvar varices. CTV revealing an enlarged left gonadal vein (white arrowhead), nearly approaching the size of the patient's aorta (white arrow).

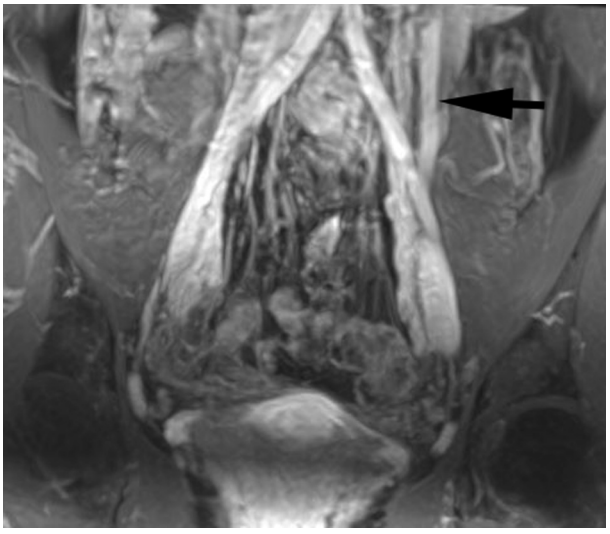

Figure 3. 42-year-old female with left sided pelvic pain which has worsened with subsequent pregnancies. Magnetic resonance venography (MRV) reveals and enlarged left gonadal vein (black arrow).

Conventional venography is an invasive examination with a catheter placed in the venous system followed by injection of contrast in different locations to evaluate vein size and direction of flow (Figures 4-6). The left gonadal, right gonadal, and internal iliac veins are studied most often (Koo and Fan 2014). Generally, venography is not a primary diagnostic test and instead is performed during the time of embolization.

Medical and surgical treatment

Nonsteroidal antiinflammatory medications may temporarily relieve pain. Medical management with hormonal agents such as

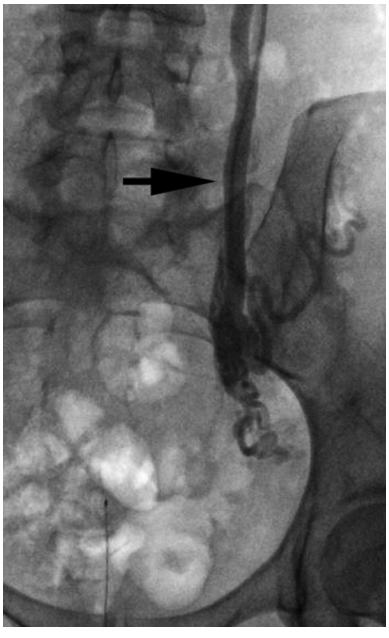

Figure 4. Conventional venography of the left gonadal vein (black arrow) revealing dilation of the vein with retrograde flow and pelvic varicosities.

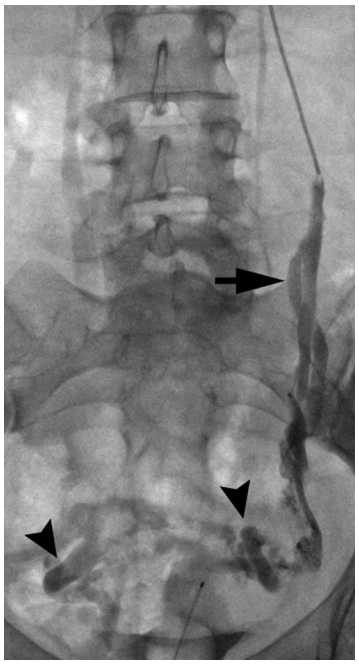

Figure 5. Conventional venography of the left gonadal vein with distal venous channels (black arrow) and cross pelvic collaterals (black arrowheads).

medroxyprogesterone acetate or a gonadotropin-releasing hormone analog can also alleviate symptoms, but may have intolerable side effects, particularly if used over time. Surgical therapy may include laparoscopic gonadal vein ligation, which is effective in approximately 75% of patients. Hysterectomy and bilateral oophorectomy is another option, although less common, and is effective in approximately 67% of patients. Surgery has generally fallen out of favor in lieu of transcatheter embolization,

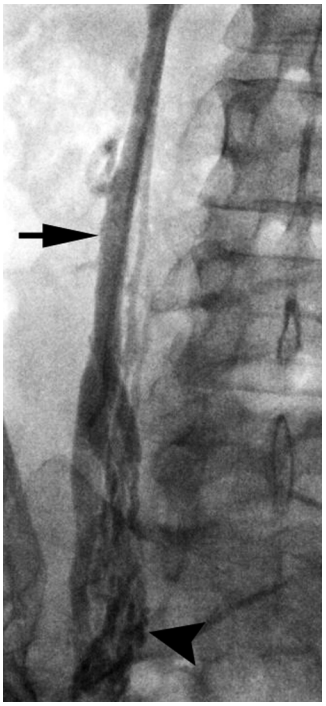

Figure 6. Conventional venography of the right gonadal vein (black arrow) revealing duplication and dilation of the distal veins (black arrowhead).

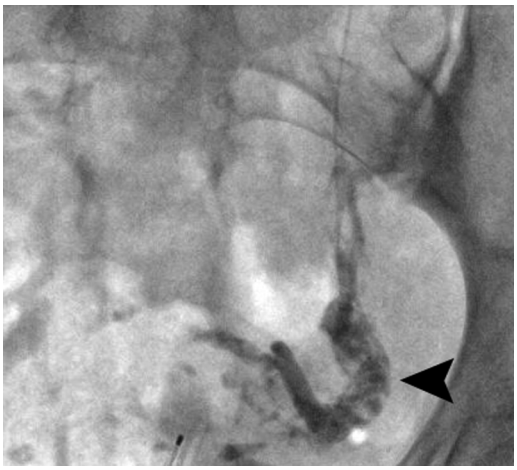

Figure 7. Fluoroscopic image of sclerosant filling the left parauterine varicosities (black arrowhead).

given the decreased morbidity and faster recovery time (Gloviczki et al. 2011).

Embolization therapy

Embolization therapy of the gonadal veins dates back to 1993 and is an outpatient procedure that is done with conscious sedation (Edwards et al. 1993). Transfemoral or transjugular venous access is acquired. A catheter is then used to select the left gonadal vein from the left renal vein and subsequently the right gonadal vein from the inferior vena cava. Next, contrast injection is performed to evaluate gonadal vein size, reflux, pelvic varicosities, and cross-pelvic collaterals. A variety of embolic agents such as sclerosants, gelfoam, coils, and plugs have been

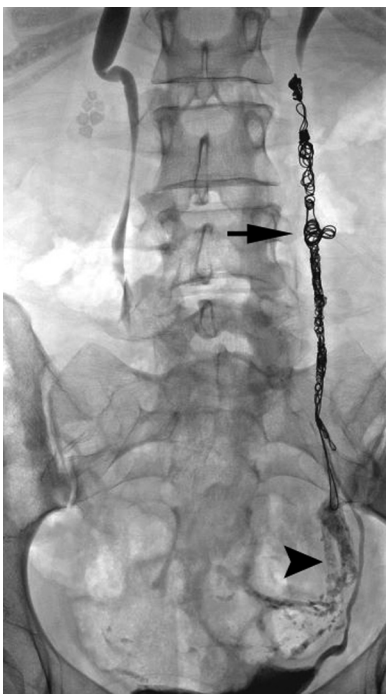

Figure 8. Completion radiography with coils deployed in the left gonadal vein (black arrow) as well as sclerosant and gelfoam (black arrowhead) in the parauterine varicosities.

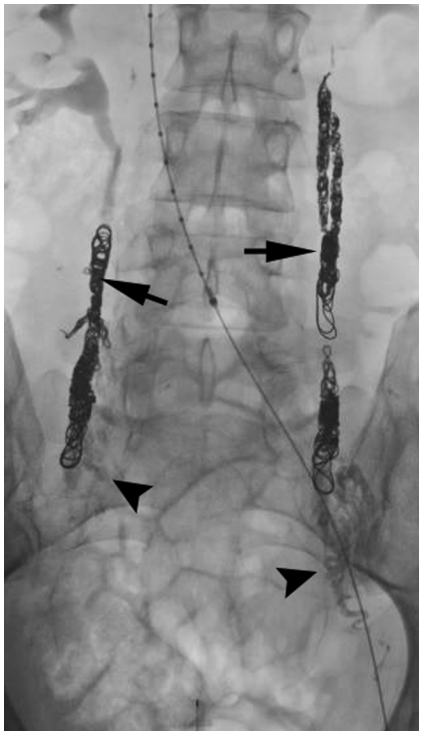

Figure 9. Completion radiograph with coils deployed in the right and left gonadal veins (black arrows), sclerosant and gelfoam in the parauterine varicosities (black arrowheads).

successful in treating PCS (Figure 7-9). Technical and clinical success rates generally exceed 90%, although it is important to note that PCS embolization has not yet been studied in a randomized clinical trial (Kim et al. 2006; Koo et al. 2014; Maleux et al. 2000; Venbrux et al. 2002).

Postprocedure care

Patients are often discharged the same day with a focus on controlling any pelvic pain or other symptoms with nonsteroidal antiinflammatories. Patients are ambulatory within hours and can return to a full range of activities within days. Procedure-specific potential complications can include thrombophlebitis, which will subside within a few weeks with oral medications (Venbrux et al. 2002).

Conclusion

PCS is a known cause of CPP in women. If properly diagnosed, it can be safely and effectively treated with embolotherapy.

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