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ENDOVASCULAR THERAPY FOR PELVIC CONGESTION SYNDROME

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Clinical Presentation

Pelvic congestion syndrome (PCS), a condition associated primarily with ovarian vein incompetence, is manifested by pelvic pain of variable intensity that is heightened before or during menses and aggravated by prolonged standing, fatigue, and intercourse. Women may also report pelvic or perineal heaviness and bladder urgency and often will complain of labial varicosities and engorgement that worsens with standing.^{1, 2} It is not infrequent to elicit these complaints and symptoms after careful evaluation of a patient who presents with varicose veins in the proximal lower extremity.

The association of PCS with chronic pelvic pain was first described by Topolanski-Sierra in 1958.³ Chronic pelvic pain (CPP) accounts for approximately 10% of outpatient gynecologic visits. Common causes of CPP include ovarian varicocele, endometriosis, pelvic adhesions, atypical menstrual pain, urologic disorders, irritable bowel syndrome, and psychosomatic conditions.⁴ More recent studies have demonstrated that up to 30% of patients with CPP have PCS as a sole etiology of their pain, and an additional 12% have PCS in combination with another pelvic pathology.^{5, 6}

Pathophysiology and Implications for Clinical Management

The primary causative factor of PCS is thought to be incompetence of the ovarian veins leading to periovarian and pelvic varicosities. However, given the known pelvic collateral circulation between the internal iliac veins and the ovarian veins in women, it is not surprising that internal iliac vein incompetence can contribute to this pathology.⁷ Both anatomical and hormonal factors have been described as leading to this problem.

The anatomical theory is sustained by the following proposals. Pregnancy increases intra-abdominal pressure, leading to an increase in pelvic vein capacity by 60%; this in turn can lead to venous incompetence and reflux after pregnancy. PCS is more common on the left side, possibly because of an extrinsic compression of the left renal vein between the aorta and the superior mesenteric artery, also known as “nutcracker phenomenon.” This can lead to increased hydrostatic pressure and ovarian vein dilatation. In addition, the absence of ovarian vein valves, which occurs on the left side in 15% of women and on the right side in 6% of women, can

contribute to the observation that ovarian vein incompetence is more common on the left.⁸

Alternatively, the hormonal dysfunction theory suggests that PCS does not exist after menopause. During the menstrual cycle, the ovarian veins are exposed to an approximately 100-fold higher concentration of estrone and estradiol than that found in peripheral plasma.⁹ Estrogen is considered a venous dilator, and induction of a hypo-estrogenic state either pharmacologically or surgically with bilateral oophorectomy may resolve or improve symptoms.⁸ Uterine and ovarian veins have been shown to have added sensitivity to exogenous administration of ovarian steroid hormones, leading to their enlargement when compared to peripheral veins studied in mice.⁹ This theory is also supported by the fact that PCS most commonly occurs after pregnancy and resolves with menopause.⁴

The traditional therapy for PCS has included medical management, with the administration of dihydroergotamine or pharmacological agents to suppress ovarian function such as medroxyprogesterone acetate and gonadotropin-releasing hormone agonists.^{8, 9} Surgical approaches have included uterine ventrosuspension,

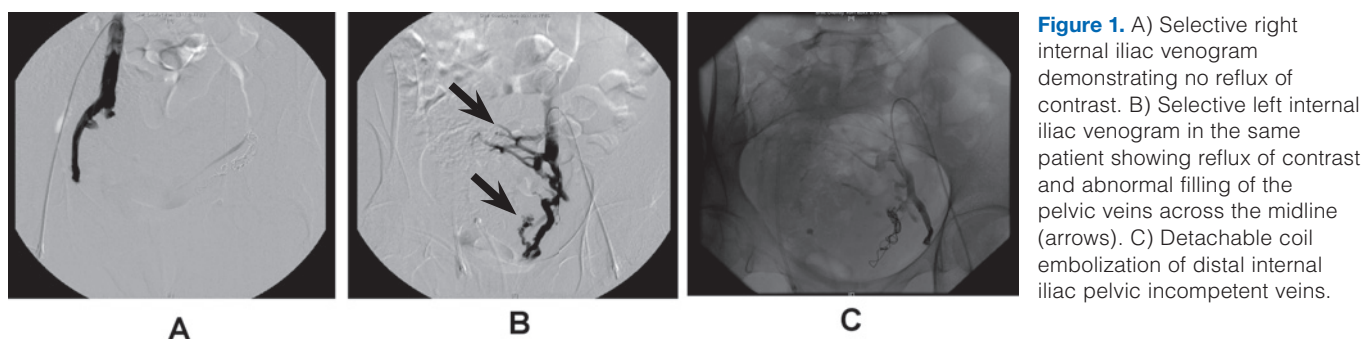


Figure 1. A) Selective right internal iliac venogram demonstrating no reflux of contrast. B) Selective left internal iliac venogram in the same patient showing reflux of contrast and abnormal filling of the pelvic veins across the midline (arrows). C) Detachable coil embolization of distal internal iliac pelvic incompetent veins.

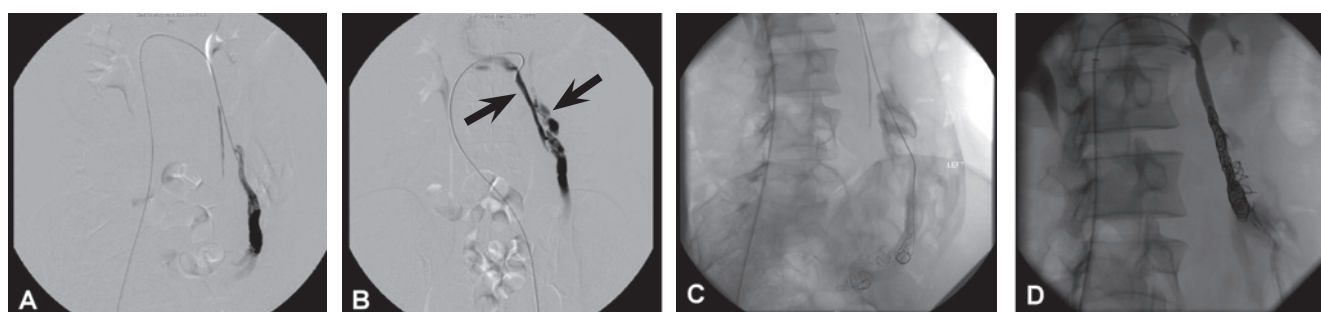


Figure 2. A and B) Left ovarian venogram demonstrating dilatation of the ovarian vein with reflux into the pelvis. C and D) Detachable coil embolization of the distal and proximal left ovarian vein, respectively.

open or laparoscopic ovarian vein ligation or excision, and hysterectomy with bilateral oophorectomy. The majority of pelvic collaterals form in the utero-ovarian arcade. An incomplete resection of these multiple anastomoses during either oophorectomy or hysterectomy alone would not eliminate the known pelvic collaterals, including those between the internal iliac veins and the ovarian veins.¹⁰ Thus, the latter, more aggressive approach also eliminates the utero-ovarian arcade and the iliac venous contribution to the pelvic parauterine circulation.

Diagnostic Imaging

Transabdominal and transvaginal ultrasound are useful tools in evaluating patients with CPP as they can exclude a number of other pelvic pathologies. Characteristic sonographic findings for the diagnosis of PCS include a thickened endometrium, polycystic ovaries, reversed caudal flow in dilated ovarian veins, dilated periuterine veins, and tortuous pelvic veins with a diameter >5 -6 mm.^{11, 12}

Computed tomography (CT) and magnetic resonance imaging (MRI) studies show pelvic varices as dilated and tortuous tubular structures leading to the ovaries and surrounding the uterus and the vagina. Magnetic resonance venography (MRV) is gaining preference because it avoids radiation to the pelvic organs, allows complete evaluation of the pelvic structures, and

provides quality anatomic images that can be reconstructed in 3-D.¹²

The diagnosis of PCS is typically confirmed by selective ovarian and internal iliac venograms via the basilic, femoral, or internal jugular approach. In fact, venography remains the gold standard for diagnosing PCS. We prefer to perform venograms using the femoral approach and selectively imaging both the ovarian and internal iliac veins.

Endovascular Therapy for PCS

Indications for ovarian vein coil embolization include dilatation of the ovarian vein >5 -6 mm, ovarian vein reflux into the pelvic cavity involving incompetent valves, severe congestion of the pelvic venous plexus, significant stasis of contrast medium in the pelvic veins, abnormal filling of the pelvic veins across the midline, and filling of vulvovaginal or thigh varicosities. The procedure is employed to stop the veins from refluxing to the ovaries and pelvis, preserve the ovarian and uterine pelvic organs, and maintain arterial and lymphatic drainage.

The ultimate goal of vein embolization is to provide relief to the clinically symptomatic patient. Thus, the incidental finding of ovarian vein incompetence in an asymptomatic patient should not lead to its embolization. We prefer to use detachable or retrievable coils that can be placed with precision in high-flow areas

STUDY	#PTS	MATERIALS	MEAN F/U (MO)	CLINICAL OUTCOME (RELIEF)
Capasso, et al. 1997 ¹³	19	Coils	15.4	Significant 57.9% Partial 15.8% None 26.3%
Maleux, et al, 2000 ²	41	Glue	19.9	Significant 58.9% Partial 9.7% None 31.8%
Venbrux, et al, 2002 ⁷	56	Sclerosant Coils	22.1	Significant and Partial 96% None 4%
Pieri, et al, 2003 ¹⁴	33	Sclerosant	12	Significant 100%
Kwon SH, et al. 2007 ⁴	67	Coils	44.8*	Significant and partial 82% None 18%
Kim HS, et al, 2006 ¹⁰	127 (108)	Sclerosant Gelfoam Coils	45	Significant 83% None 13% Worse 4%

Table 1. Review of large series results of ovarian vein embolization in pelvic congestion syndrome.

*Indicates an estimate of the mean follow-up.

and in locations with challenging anatomy. However, a variety of materials have been utilized to achieve this purpose (Table 1).

It is our practice to embolize both ovarian varicosities and incompetent internal iliac vein branches during the initial intervention (Figures 1-2). This approach alleviates most symptoms in the majority of patients. We allow approximately eight to 12 weeks of recovery prior to reassessing if further embolization of residual incompetent veins is necessary.

Conclusion

Percutaneous therapy is emerging as a viable alternative to open or laparoscopic surgical intervention in patients with PCS. This minimally invasive approach has proven safe and efficacious. The immediate challenge is for gynecologists, interventional radiologists, and vascular surgeons to devise a diagnostic algorithm to guide management and intervention.

References

1. Cordts PR, Eclavea A, Buckley PJ, DeMaiores CA, Cockerill ML, Yeager TD. Pelvic congestion syndrome: early clinical results after transcatheter ovarian vein embolization. *J Vasc Surg.* 1998 Nov;28(5):862-8.
2. Maleux G, Stockx L, Wilms G, Marchal G. Ovarian vein embolization for the treatment of pelvic congestion syndrome: long-term technical and clinical results. *J Vasc Interv Radiol.* 2000 Jul-Aug;11(7):859-64.
3. Topolanski-Sierra R. Pelvic phlebography. *Am J Obstet Gynecol.* 1958 Jul;76(1):44-52.
4. Kwon SH, Oh JH, Ko KR, Park HC, Huh JY. Transcatheter ovarian vein embolization using coils for the treatment of pelvic congestion syndrome. *Cardiovasc Intervent Radiol.* 2007 Jul-Aug;30(4):655-61.
5. Robinson JC. Chronic pelvic pain. *Curr Opin Obstet Gynecol.* 1993 Dec;5(6):740-3.
6. Beard RW, Reginald PW, Pearce S. Pelvic pain in women. *Br Med J (Clin Res Ed).* 1986 Nov 1;293(6555):1160-2.
7. Venbrux AC, Chang AH, Kim HS, Montague BJ, Hebert JB, Arepally A, Rowe PC, Barron DF, Lambert D, Robinson JC. Pelvic congestion syndrome (pelvic venous incompetence): impact of ovarian and internal iliac vein embolotherapy on menstrual cycle and chronic pelvic pain. *J Vasc Interv Radiol.* 2002 Feb;13(2 Pt 1):171-8.
8. Fassiadis N. Treatment for pelvic congestion syndrome causing pelvic and vulvar varices. *Int Angiol.* 2006 Mar;25(1):1-3.
9. Stones RW. Pelvic vascular congestion — half a century later. *Clin Obstet Gynecol.* 2003 Dec;46(4):831-6.
10. Kim HS, Malhotra AD, Rowe PC, Lee JM, Venbrux AC. Embolotherapy for pelvic congestion syndrome: long-term results. *J Vasc Radiol.* 2006 Feb;17(2 Pt 1):289-97.
11. Park SJ, Lim JW, Ko YT, Lee DH, Yoon Y, Oh JH, Lee HK, Huh CY. Diagnosis of pelvic congestion syndrome using transabdominal and transvaginal sonography. *AJR Am J Roentgenol.* 2004 Mar;182(3):683-8.
12. Ganeshan A, Upponi S, Hon LQ, Uthappa MC, Warakaulle DR, Uberoi R. Chronic pelvic pain due to pelvic congestion syndrome: the role of diagnostic and interventional radiology. *Cardiovasc Intervent Radiol.* 2007 Nov-Dec;30(6):1105-11.
13. Capasso P, Simons C, Trotteur G, Dondelinger RF, Henroteaux D, Gaspard U. Treatment of symptomatic pelvic varices by ovarian vein embolization. *Cardiovasc Intervent Radiol.* 1997 Mar-Apr;20(2):107-11.
14. Pieri S, Agresti P, Morucci M, de'Medici L. Percutaneous treatment of pelvic congestion syndrome. *Radiol Med (torino).* 2003 Jan-Feb;105(1-2):76-82.