



## Initial Experience with Ovarian Vein Embolization for the Treatment of Chronic Pelvic Pain Syndrome

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**Key words:** chronic pelvic pain syndrome, embolization, coils, ovarian vein, Doppler ultrasound, venography

### Abstract

**Background:** Ovarian vein embolization was recently suggested as the preferred treatment for chronic pelvic pain syndrome.

**Objective:** To evaluate the technical feasibility, complications and early clinical and radiographic results of ovarian vein embolization in women with pelvic pain syndrome.

**Methods:** Percutaneous transcatheter ovarian vein embolization with coils was performed in six patients aged 27–53 years who presented with pelvic pain syndrome. All had lower abdominal pain, and pelvic varicosities were found on Doppler ultrasound and retrograde ovarian vein venography. Embolization was done unilaterally in three patients (on the left side) and bilaterally in three. Mean follow-up by telephone questionnaire was 7.3 months.

**Results:** The procedure was technically successful in all patients. Two patients reported partial relief of symptoms (33.3%) and three had complete relief (50%), for a total of 5 patients (83.3%) with some measure of improvement. There were no complications following the procedure.

**Conclusions:** Percutaneous transcatheter ovarian vein embolization seems to be safe and feasible for the treatment of pelvic pain syndrome. The procedure is performed on an outpatient basis and is well tolerated by patients.

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Pelvic congestion syndrome or chronic pelvic pain syndrome is caused by utero-ovarian varices and affects mainly young multiparous patients. It accounts for up to 9.9% of outpatient gynecologic visits [1–3]. The main symptom is chronic pelvic pain, which may be of variable intensity and duration and is worse premenstrually and during pregnancy. The pain is aggravated by standing, fatigue and coitus. Patients often describe pelvic fullness or heaviness that may extend to the vulvar area and legs [2–6]. Associated symptoms are fatigue, urinary urgency, constipation and dyspareunia. CPPS is often overlooked or misdiagnosed since most routine urologic and gynecologic investigations in affected patients

are normal. Surgical ligation of the ovarian veins has been performed with some success, but it entails significant morbidity and prolonged hospital stay [5,7]. More recently, embolization of the ovarian vein was proposed as a first-choice therapeutic modality [3–6,8–10]. The purpose of the present study was to evaluate the technical feasibility, complications, and early clinical and radiographic results of ovarian vein embolization in patients with CPPS.

### Patients and Methods

Six women of median age 38 years (range 27–53 years) with chronic CPPS were treated by percutaneous retrograde ovarian vein embolization (Table 1). The study was approved by the hospital ethics committee and all patients gave informed consent prior to the procedure. All presented with lower abdominal pain or discomfort, which was associated with dyspareunia in three patients (50%) and intermittent pelvic pain related to menses in four (80%). One patient was perimenopausal at the time of treatment and five were premenopausal. Five patients were multiparous (range 2–5) and one was nulliparous. The duration of pelvic pain prior to diagnosis ranged from 2 to 10 years and during that time the patients had undergone various examinations, including laparoscopy (n=5, 83.3%), computed tomography (n=1, 16.6%), colonoscopy (n=1, 16.6%), sigmoidoscopy (n=1, 16.6%) and gastroscopy (n=1, 16.6%).

Clinically suspected CPPS was confirmed by findings on Doppler ultrasound examination of the peri-uterus in four patients and by laparoscopy in one. Ultrasound was performed using an ATL HDI 5000 unit (Advanced Technology Laboratories, Bothell, USA), equipped with a 5 MHz sector probe. Machine settings were adjusted to optimize the detection of blood flow. Valsalva's maneuver was used to elicit reflux in the ovarian veins. Before referral to the interventional radiology unit, all patients also underwent physical and gynecologic examinations to exclude other pelvic pathologies.

Prior to the procedure all the patients were premedicated

CPPS = chronic pelvic pain syndrome

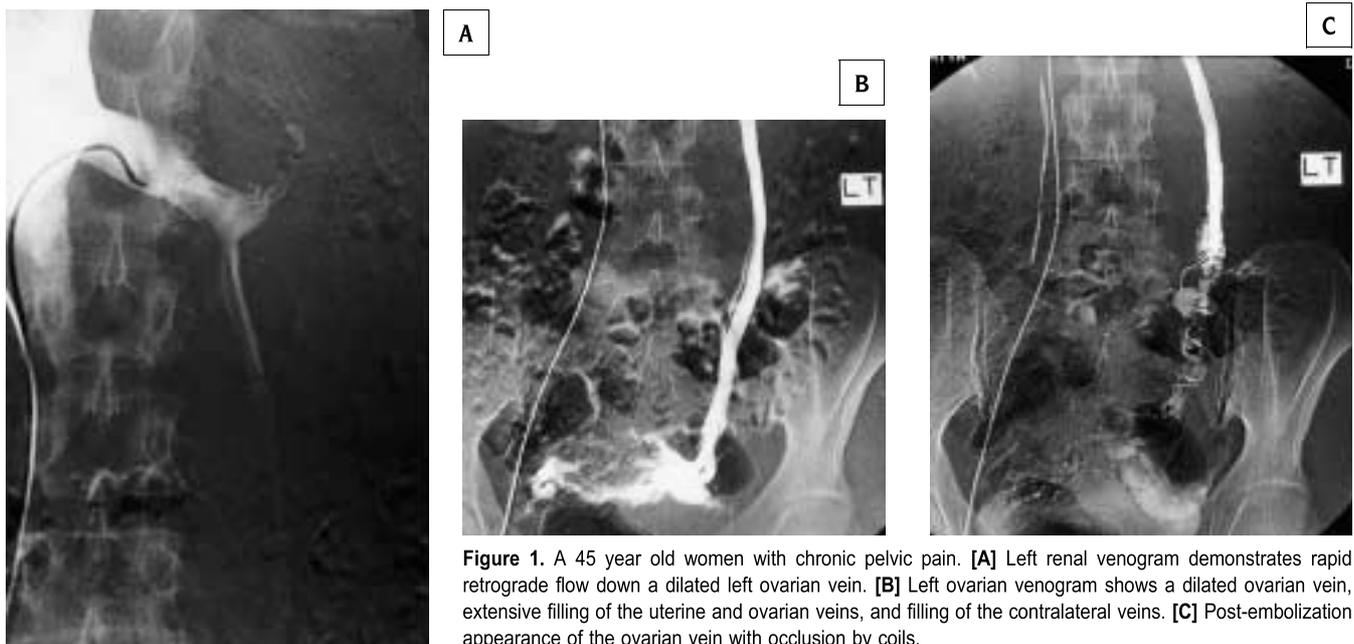
**Table 1.** Patient data, means of diagnosis, venographic findings, treatment, and outcome

No.	Age (yr)	Parity	Symptoms	Duration (yr)	Examinations	Embolization	Relief (%)	Duration of follow-up (mo)
1	27	G0P0	Abdominal pain with menses Dyspareunia	2	Laparoscopy	Bilateral	100%	16
2	29	G5P5	Abdominal pain Vulval varices Anal varices	4	Physical exam	Bilateral	75%	12
3	45	G4P4	Abdominal pain with menses Constipation	2	Ultrasound Doppler Laparoscopy CT	Left OV	100%	8
4	38	G4P3	Abdominal pain with menses	5	Ultrasound Doppler Laparoscopy	Left OV	100%	4
5	53	G3P3	Abdominal and back pain with menses Constipation Dyspareunia	2	Ultrasound Doppler Laparoscopy Iolonscopy Sigmoidoscopy Gastroscopy	Left OV	No relief	3
6	42	G2P2	Abdominal pain with menses	10	Ultrasound Doppler Laparoscopy	Bilateral	70%	3

G = gravidity, P = parity, OV = ovarian vein.

intravenously with 1 g cephalosporin. No sedation or analgesia was administered during or after the procedure. The procedure was performed on an outpatient basis in an interventional radiology suite equipped with an Integris 3000 digital unit (Phillips Medical System, Best, USA). With the patient in the supine position, venous access was obtained through the femoral vein (n=4) or jugular vein

(n=2). A guide-wire was advanced into the inferior vena cava. The left renal vein were selectively catheterized using a 5 French Cobra catheter (Cook Inc., Bloomington, USA) from the femoral approach and a 4F JBI catheter from the jugular route. Left renal venography was performed during normal breathing using Valsalva's maneuver with iopromide (Ultravist 350, Schering, Germany). Passive reflux



**Figure 1.** A 45 year old women with chronic pelvic pain. **[A]** Left renal venogram demonstrates rapid retrograde flow down a dilated left ovarian vein. **[B]** Left ovarian venogram shows a dilated ovarian vein, extensive filling of the uterine and ovarian veins, and filling of the contralateral veins. **[C]** Post-embolization appearance of the ovarian vein with occlusion by coils.

into the ovarian vein was demonstrated in all patients. Selective proximal and distal injections of the left ovarian vein were then performed [Figure 1A]. The diagnosis of varicose veins was confirmed venographically by the presence of at least one of the following: ovarian venous diameter of at least 8 mm, uterine venous engorgement, moderate or severe congestion of the ovarian plexus, and filling of veins across the midline [Figure 1B]. An enlarged or incompetent left ovarian vein was treated by transcatheter coil embolization with stainless steel fibrocoils (Cook Inc.). An average of four to six coils was used for each vein. Coil deployment was begun as close to the level of the pelvic inlet as possible in order to include the branching point of all potential longitudinal venous collaterals. After embolization, venography was repeated to confirm thrombosis of the ovarian vein and the concomitant parallel trunks and patency of the left renal vein [Figure 1C]. A selective right ovarian vein study was then done with direct cannulation from the inferior vena cava, and the procedure was repeated as necessary. In our sample, left-sided embolization was conducted in three patients and bilateral ovarian vein embolization in three.

Patients were observed in hospital for a few hours after the procedure and then discharged home with instructions to avoid all strenuous activity for 7 days. To determine symptomatic relief the patients were interviewed by telephone 3–6 months after the procedure and at the end of follow-up (average 7.3 months, range 3–16 months).

## Results

Successful embolization was achieved in all six patients. Two patients reported partial relief of symptoms (33.3%) and three complete relief (50%), for a total of five patients (83.3%) with some measure of improvement. The patient who did not respond had unilateral embolization only. Most responses occurred within 2–3 weeks after therapy, however in one patient symptoms persisted for 3 months after the procedure. There was no relationship between clinical response and parity: of the three patients with complete relief of symptoms two were multiparous (G4P4 and G4P3) and one was nulliparous (G0P0). The patient with persistent symptoms was multiparous (G3P3). Follow-up with Doppler ultrasound was performed in four patients 2 months after embolization and complete thrombosis of utero-ovarian varices was observed in all of them.

There were no complications resulting from the procedure. Two patients became pregnant during follow-up, one of whom was nulliparous at embolization.

## Discussion

Pelvic congestion syndrome or chronic pelvic pain syndrome is a distinct clinical entity that should be recognized by clinicians and radiologists [2,4]. The etiology of CPPS is probably multifactorial, involving both hormonal and mechanical factors [4,8]. It may begin in pregnancy when venous flow greatly increases, dilating pelvic veins and potentially damaging the valves in the veins.

In an anatomic study, Ahlberg et al. [11] reported the absence of ovarian vein valves on the left side in 15% of women and on the

right side in 6%. This venous dilatation combined with valvular malfunction may lead to venous stagnation, flow reversal, and varicosities. Venous kinking associated with various anatomic variants such as retro-aortic left renal vein and circumflex left renal veins may also contribute to this condition. In our series all six patients complained of chronic pelvic pain that was aggravated before or during menses in accordance with the typical clinical picture of CPPS [2–6]. Five of the six (83.3%) were multiparous (G2P2 to G6P5).

Clinicians have used Doppler ultrasound, CT, laparoscopy and magnetic resonance imaging to evaluate the venous dilatation [9,10], but selective retrograde ovarian vein venography remains the gold standard for diagnosis [4,5,9,10,12]. Because most of the routine urologic and gynecologic investigations fail to reveal abnormalities in women with CPPS, this clinical entity is often misdiagnosed or initially missed. In our series, patients had chronic pelvic pain for 2–10 years and remained undiagnosed after various examinations, including vaginal ultrasound, CT, laparoscopy, colonoscopy, sigmoidoscopy and gastroscopy. In four patients the diagnosis of venous congestion was made by Doppler ultrasound, in one patient by laparoscopy, and in one by physical examination on the basis of varices around the anus and labia. In patients with a medical history compatible with pelvic congestion syndrome, transabdominal or transvaginal ultrasonography is essential to exclude other pelvic pathologies. Even if the pelvic congestion syndrome is diagnosed by other means, selective retrograde ovarian vein venography still needs to be done to determine the presence of retrograde reflux, contralateral venous filling, internal iliac drainage, or extension of the venous congestion into the inguinal, vulval, perivesical, rectal and lower limb veins [13]. According to the literature, different criteria have been used to diagnose venous congestion, including ovarian vein diameter of at least 10 mm, uterine venous engorgement, moderate or severe congestion of the ovarian plexus, and venous filling across the midline [1,3,12].

Initially, treatment of CPPS consisted of surgical repair by either an abdominal or lumbar approach and ligation of one or both ovarian veins [7,14]. To reduce prolonged hospital stay and postoperative pain some surgeons applied a laparoscopic technique for ovarian vein ligation, however it still required general anesthesia and a hospital stay of several days. We contend that transcatheter embolization performed as an outpatient procedure under local anesthesia is the treatment of choice. In their study of 19 women after ovarian vein embolization, Capasso et al. [4] observed significant symptomatic relief in 73.7%, with complete relief in 57.9% at 15 months follow-up. Maleux et al. [12], reporting the results of ovarian vein embolization in 41 patients, noted an initial technical success rate of 98%. On clinical follow-up, 9.7% of the patients reported variable symptomatic relief and 58.5% complete relief. These results are consistent with our initial technical success rate of 100%, partial symptomatic relief in 33.3%, and complete relief in 50% on follow-up. Overall, 83.3% of our patients achieved a significant improvement. Furthermore, the procedure was done on an outpatient basis with hospital stay reduced to only a few hours after embolization.

Different agents can be used to embolize ovarian veins, such as

coils, detachable balloons, sclerosing agents, or glue (embucrilate) [4–6,12]. Some authors have reported [4,12] the successful use of liquid sclerosing agents for this procedure, similar to its use in male varicocele embolization. The liquid state of the agent enables reflux into various branches and collaterals. However, we chose not to use them because of the risk of chemical oophoritis since the ovarian vein cannot be compressed to avoid reflux of the agent into the ovaries. All our patients were successfully treated with macrocoils, which proved to be safe, easy to use, and reliable; in no cases were they associated with clinical inflammatory changes in the post-procedure period.

We did not embolize ovarian veins that had competent valves and met none of the venographic diagnostic criteria for pelvic varices. In three of the six patients (50%) the right valve was competent, with no reflux demonstrated on venography and Doppler ultrasound. We believe that the right side should not be treated if venography is normal.

In summary, CPPS is an underdiagnosed condition that should be suspected in patients with chronic pelvic pain and normal routine gynecologic examinations. The diagnosis can be made by duplex ultrasonography during the Valsalva maneuver or ovarian vein venography. Percutaneous transcatheter ovarian vein embolization appears to be safe and effective for the treatment of this condition. It is minimally invasive and well tolerated, and can be done on an outpatient basis.

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