

ORIGINAL ARTICLE / *Genito-urinary imaging*

Evaluation of the efficacy of endovascular treatment of pelvic congestion syndrome



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KEYWORDS

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Abstract

Aim: To assess the efficacy of venous embolization treatment for the pelvic congestion syndrome (PCS).

Patients and methods: Retrospective study of 33 female patients undergoing pelvic venous embolization between January 2008 and May 2012 in Bordeaux. The inclusion criteria were clinical symptoms of PCS documented by transabdominal Doppler ultrasound and/or pelvic magnetic resonance imaging. Patients with pelvic varicose veins feeding saphenous varicose veins were excluded. The efficacy of treatment was assessed on a Visual Analog Scale (VAS).

Results: Thirty-three patients were included and the mean follow up period was 26 months (3–59 months). The VAS was 7.37 (standard deviation: 0.99) before embolization and 1.36 (standard deviation: 1.73) after embolization ($P < 0.0001$). Twenty patients reported that their symptoms had completely disappeared, 11 had partially disappeared and two had gained no improvement. A significant fall was found in the number of patients with dyspareunia ($P < 0.0001$). A single technical embolization failure was reported.

Conclusion: Our series demonstrates the efficacy of embolization treatment with a significant fall in the VAS in patients with PCS.

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The clinical presentation of symptomatic pelvic venous insufficiency or the pelvic congestion syndrome (PCS) in women has been recognized for several years [1] and is an association of pelvic pain and heaviness lasting for more than 6 months, occurring with the same periodicity as the menstrual cycles, with dyspareunia, dysuria and dysmenorrhea [2]. The presence of dilated pelvic veins is not synonymous with PCS [3] and it is the incompetence of these veins, which results in symptoms. These varicosities can be fed by

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2 venous systems, the gonadal and the internal iliac veins. Genital varicose veins may be due to a gonadal or uterine venous valvular or wall abnormality but also to obstructed suprapelvic drainage (Nutcracker syndrome, thrombosis or congenital variation) or pelvic drainage (May–Turner syndrome, extrinsic compression or thrombosis). The combination of pelvic venous anatomy and anastomoses between the abdominal and lower limb veins are such that a strong association is seen between pelvic and lower limb varicose veins [4]. Pelvic venous incompetence has been shown to correlate significantly with pelvic pain [5]. Chronic pelvic pain accounts 10% of the gynaecological consultations [6] of which PCS is reported to be the second leading cause, behind adhesions and ahead of endometriosis in non-nulliparous patients [7].

The aim of diagnostic imaging is to identify venous incompetence (and not only the existence of varicose veins) and to exclude the differential diagnoses of endometriosis, adenomyosis, cysts, adhesions and inflammatory diseases. The diagnostic criteria published in the literature are a gonadal vein diameter of over 8 mm [8], para-uterine varicose vein diameter over 5 mm [9,10] and above all the presence of reflux during the Valsalva maneuver on pulsed Doppler imaging [11,12] and/or on a dynamic MR angiography [13] or on phlebography.

Venous embolization is currently the reference treatment for PCS and, as evidenced by several publications, is very effective on symptoms [5,10,14–20].

The aim of this study was to assess the efficacy of venous embolization to treat PCS in patients without pelvic varicosities feeding saphenous varicose veins.

Materials and methods

We carried out a retrospective analysis of 33 patients having their first pelvic venous embolization between 1st January 2008 and 30 May 2012 at Bordeaux University Hospitals, France. Patients with PCS were included and each underwent abdominal and pelvic ultrasound or magnetic resonance (MR) imaging with dynamic MR angiography. Patients with pelvic varicosities feeding saphenous varicose veins were excluded. A suprapubic transabdominal Doppler ultrasound was used to identify the two gonadal veins, measure their diameter and establish the presence or absence of reflux during the Valsalva maneuver and/or from abdominal pressure. The renal and iliac veins were investigated routinely for compressive disease. Pelvic varicose veins were identified and their diameter was measured by suprapubic pelvic ultrasound. Perineal ultrasound was used as applicable to confirm or exclude perineal and vulval varicose veins, which are often symptomatic. MR was performed on a 1.5 T instrument (Advento, Siemens) and involved T2-weighted pelvic sequence with fat saturation in the 3 spatial planes, a T1-weighted axial image with fat saturation before and after Gadolinium chelate enhancement and coronal dynamic MR angiography (Twist) was used to confirm the presence of pelvic varicose veins or reflux in the gonadal veins and exclude the differential diagnoses. Diagnostic phlebography followed by a single stage embolization was organized on an ambulatory basis and was carried out under transdermal local anesthesia with 2 mL of lidocaine followed by a brachial

venous approach through an 18 G needle and a 0.035, 180 cm long hydrophilic guide. A 5-Fr, 11 cm Désilet catheter was then introduced and phlebography was performed to examine the three venous systems, the gonadal veins, the internal iliac venous system and its afferent vessels (particularly, the pudendal and internal obturator veins) and the left external iliac system. A 5-Fr HH1 catheter was used to catheterize the right renal vein followed by phlebography with a Valsalva maneuver to investigate for ovarian vein varicocele. Incompetent segments were localized by ovarian vein and pelvic varicose vein phlebography with opacification during a Valsalva maneuver or coughing. The same procedure was carried out on the right side. Bilateral phlebography was performed on the internal iliac veins and their afferent vessels, with opacification during a Valsalva maneuver or coughing. In many cases, a microcatheter was needed to examine the afferent internal iliac vessels. Left internal iliac phlebography was performed (examining for the Cockett syndrome) and leakage points were embolized by lauromacrogol sclerosant in microfoam form (2% Aetoxysclerol) and coils, occasionally combined with the insertion of a plug. If a second embolization session was required for the afferent internal iliac system, a femoral venous approach was used. After embolization, the patients were given step 1 analgesics and anti-inflammatory drugs. They were reassessed clinically and by MR at three months. All the patients were contacted by telephone to record the recent findings.

The primary end point for efficacy of treatment was a Visual Analogue Scale (VAS). The secondary end points were the patients' opinion of whether or not they had benefited from treatment and the change in their main symptoms (dyspareunia and dysuria).

Statistics

The Student *t*-test was used to compare normally distributed variables and the Wilcoxon test for non-parametric variables. *P* values of less than 0.05 were deemed to be statistically significant.

Results

Characteristics of the population included

Our study population consisted of 33 patients with PCS referred by their gynaecologist. No patients had venous return obstruction (Nutcracker or May–Turner syndromes). Twenty-nine of the 33 patients had ovarian and pelvic venous ultrasound and abdomino-pelvic MR. Four patients were investigated only by Doppler ultrasound, two because of contraindications to MR (foreign body and claustrophobia). On each occasion, a dilated refluxing left gonadal vein or pelvic varicose veins > 5 mm were found. The characteristics of the population are summarized in [Table 1](#).

Results of embolization

No definitive technical failures occurred and only one patient required repeat treatment because of an inability to catheterize the left ovarian vein during the first

Table 1 Characteristics of the population included.

Number of patients included	33
Average age (years) (standard deviation)	41.4 (20–65)
Average number of pregnancies (standard deviation)	2.15 (0–5)
Past history of DVT/PE	3
Hysterectomy	2
Surgery for lower limb venous insufficiency	6
Pelvic pain > 6 months	32 (97%)
Dyspareunia	20 (60%)
Vulval varicose veins	11 (33%)
Lower limb varicose veins	13 (39%)
Dysuria	2 (6%)

Table 2 Topography of embolized veins.

Embolized pelvic veins	Number of cases
Left ovarian vein	17
Right ovarian vein	2
Left internal iliac vein and its afferent branches	1
Right iliac vein and its afferent branches	1
Ovarian and hypogastric vein and its branches	14

embolization attempt. Each incompetent vein was embolized. The distribution of veins embolized in the first session is shown in Table 2. One patient had bilateral ovarian vein incompetence (VI) and another had bilateral incompetence of the internal iliac vein or its afferent vessels. According to the M. Greiner classification [21], the population included 18 cases of genital varicose veins (arising from the gonadal veins), one case of non-genital varicose veins (arising from afferent internal iliac vein

venous system) and 14 cases of mixed varicose disease (Fig. 1). Four of the 33 patients required one further embolization and two required two further embolizations. The average time to recurrence of symptoms of pain leading to further treatment was eight and a half months (range: 4–12 months). Four cases of genital varicose veins (GVV) recurred as non-genital varicose veins (NGVV) (Fig. 2). One case of GVV recurred due to the incompetence of the contralateral gonadal vein. One mixed varicose vein recurred contralaterally in the same way and one recurred as a NGVV. No recanalization of embolized veins were recorded on the MRI control at 3 months and in subsequent phlebographies performed because of clinical recurrence. Two complications were seen. One was coil migration into the

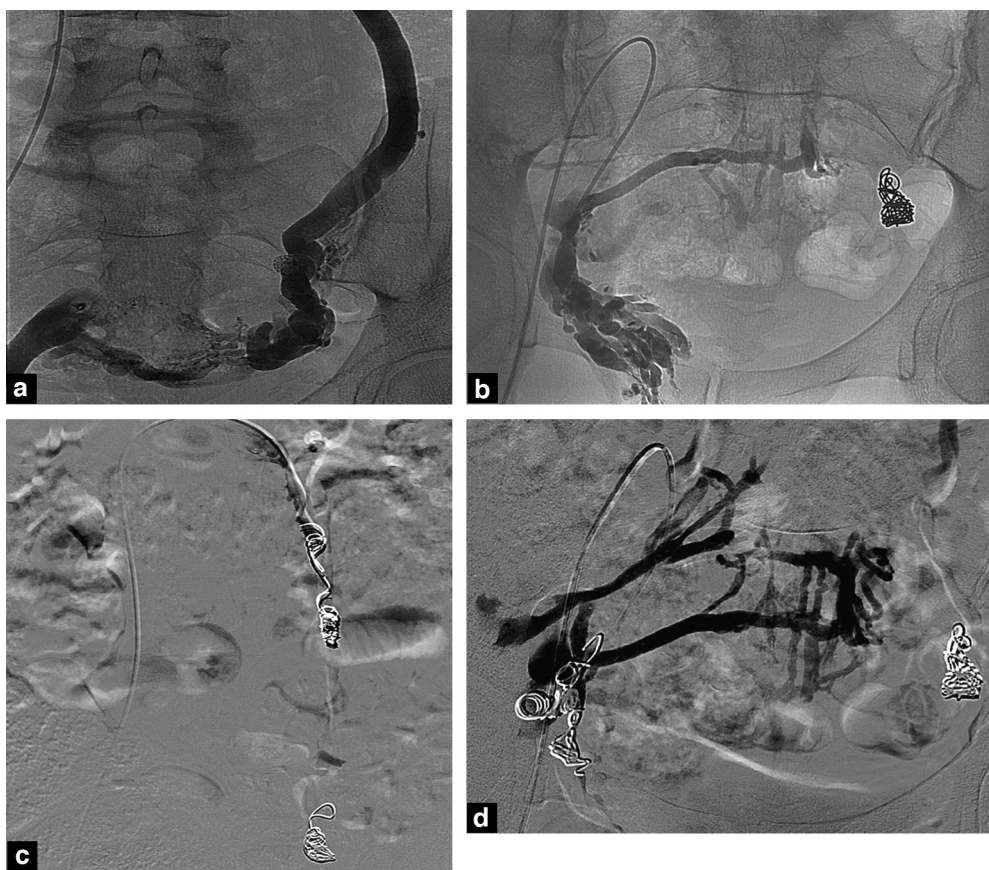


Figure 1. Phlebography showing mixed varicose veins. a: incompetence of the left ovarian vein; b: incompetence of the right internal iliac venous system; c: complete occlusion of the left ovarian vein with coils and a sclerosing agent; d: occlusion of the afferent reflux right internal iliac veins by coils.

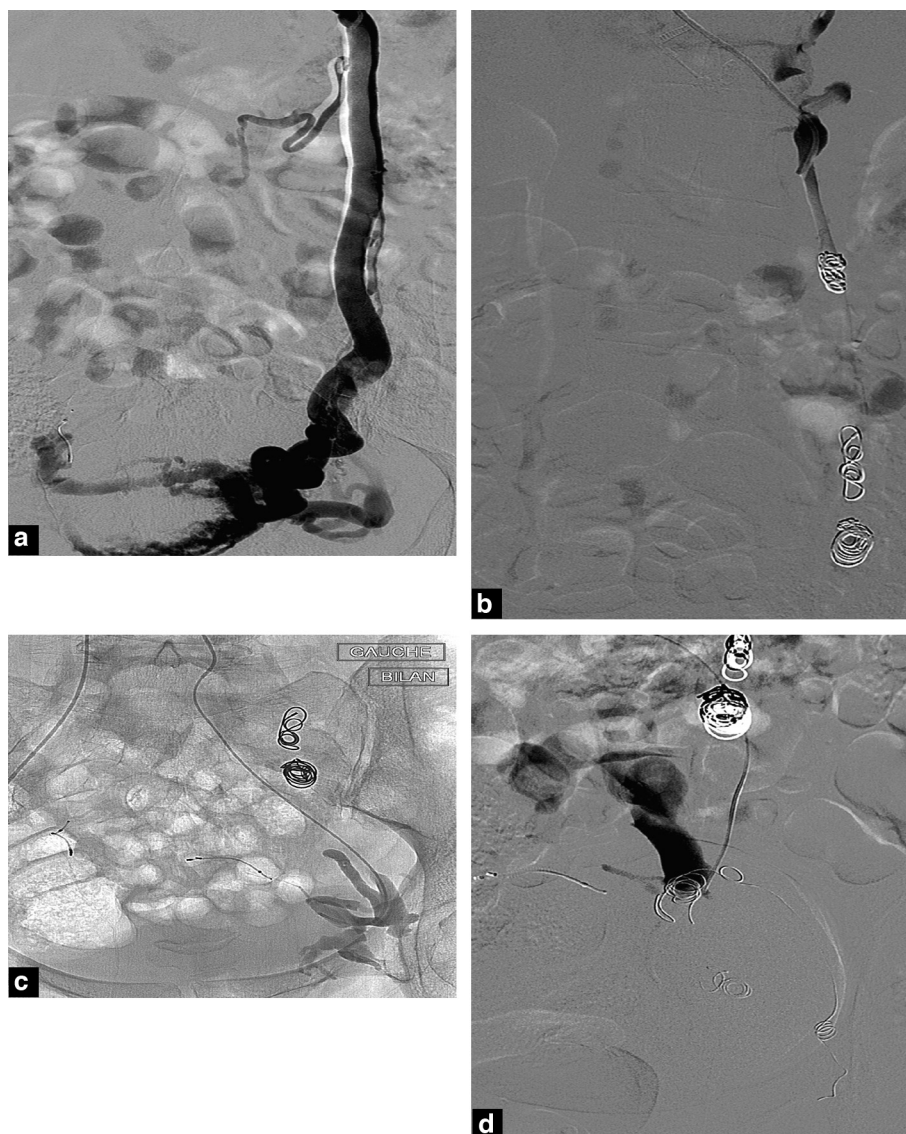


Figure 2. Phlebography showing genital varicose veins with a recurrent non-genital varicose vein. a: refluxing left ovarian vein; b: refluxing left ovarian vein embolized with coil and sclerosant; c: non-genital varicose recurrence due to incompetence to the afferent left internal iliac veins; d: coil embolization of the left internal iliac venous system.

pulmonary arterial venous system with no haemodynamic or respiratory consequences. The coil was left in place, as it was located very distally. The second was a left internal iliac vein thrombosis following embolization of the left ovarian vein, which caused severe pain. The patient was anti-coagulated for two and a half months and the venous system recanalized and showed no obvious complications on repeat MR.

An average 105 mL of the contrast medium was used during the one stage phlebography and embolization. The average radioscopy time was 24.5 min and the average dose surface area product was $103.2 \text{ Gy}\cdot\text{cm}^{-2}$.

Primary end point results

Average patient follow up was 26 months (3–59 months) with a median of 23 months. The average VAS before embolization was 7.37 (standard deviation, 0.99) compared to 1.36 (standard deviation, 1.73) after embolization ($P < 0.0001$).

Twenty patients reported that their symptoms had disappeared completely, 11 had partially disappeared and two had not improved. There were no significant differences between VAS between the GVV and mixed varicose vein subgroups before ($P > 0.1$) or after ($P > 0.3$) embolization.

Secondary end point results

We found a significant fall in the number of patients with dyspareunia ($P < 0.0001$). Seventeen (85%) of the 20 patients with dyspareunia reported that their symptoms had disappeared. There was no statistical difference between the number of patients complaining of dyspareunia in the two subgroups before ($P = 0.1$) and after embolization ($P > 0.4$). Two patients had dysuria, symptoms of which were unchanged after embolization. Changes in the VAS and dyspareunia in the two subgroups (genital and mixed varicose veins) are shown in [Table 3](#).

Table 3 Change in VAS and dyspareunia in the subgroup with genital and mixed varicose veins.

	Before embolization	After embolization	P value
Genital varicose vein group			
VAS (mean \pm SD)	7.33 \pm 0.9	1.55 \pm 1.69	< 0.0002
Dyspareunia (n)	9	1	< 0.006
Mixed varicose vein group			
VAS (mean \pm SD)	7.75 \pm 0.8	1.21 \pm 1.85	0.001
Dyspareunia (n)	11	2	< 0.004

Discussion

Our study shows that pelvic venous embolization is technically extremely successful (1 single temporary failure of catheterization), and very effective in 93% of the cases, including 85% of the patients in whom dyspareunia had disappeared after an average follow up of 26 months.

The main limitation of our study was that it was retrospective and on small numbers although no patients were lost to follow up. We did not specifically study post-embolization pain because of a lack of standardized data collection. This is an important feature as it is almost the only discomfort caused by treatment of PCS.

Comparison of our findings on the embolization technique with those reported in the literature

Several publications describe difficulties catheterizing the right ovarian vein (ROV) [5]. The main benefit of the brachial approach is that a single catheter is used to catheterize all of the main veins, which are to be investigated and embolized. This appears to reduce right ovarian vein catheterization failures. Some authors recommend a left femoral vein approach if ROV catheterization fails [10] although several series using the right femoral approach only do not report any catheterization failure [14].

Like other groups [20,22], we combine foam sclerosant with coils as the embolization method. Foam sclerosant is recommended as the embolization agent for proximal treatment of veins compared to a pure liquid sclerosant [23]. Although no studies have shown the use of coils alone to be superior to coils with a sclerosant or other liquid embolization agent, foam sclerosis has the advantage of spreading more readily into all of the venous collaterals and increasing the treatment surface area on the venous endothelium with a small amount of sclerosant, particularly, if concomitant venous dysplasia is present. Distal occlusion of the large venous trunks is supplemented by coils. We found no minor side effects from using the sclerosant although these are recognized (allergy, headaches, dizziness). The case of internal iliac vein thrombosis in our series may be due to the sclerosant, just as deep vein thrombosis being a classical complication of treatment for lower limb varicose veins. The case of coil migration in our series is a rare complication [5,14,17,24] and often has no consequences, as these can be removed endovascularly in the same procedure.

The irradiation received by patients during the embolization procedures in our study (103.2 Gy·cm⁻²) is similar to

the doses delivered for lower limb arteriography, coronary angiography with angioplasty or diagnostic cerebral arteriography and appears to be far lower than the doses delivered during uterine embolization according to the French National Institute for Radiation Protection and Nuclear Safety (IRSN). We found little information about dosimetry for PCS venous embolization in published series although the Laborda series reports a lower exposure level of 72 Gy·cm⁻²[14].

Comparison of clinical efficacy to results published in the literature

Our treatment goal, based on the recommendations from the French Society for Diagnostic and Interventional Cardiac and Vascular Imaging in 2007, is only to occlude the diseased segments, a principle which is described in other studies [25]. Some authors, however, report that gonadal vein embolization is sufficient to be effective although these data are based on a very small number of patients [26,27]. The pathophysiological principle of PCS, which is similar to communicating vessels, is such that of the diseased segments need to be treated. Some authors go further, recommending routine embolization of both ovarian and internal iliac veins [14,28]. These authors' series show excellent clinical efficacy (> 85%) without recurrences. The clinical efficacy in our series was similar to those published [5,10,14–18,29], in which pain and dyspareunia often improve.

The recurrence rate is difficult to assess. In several publications, treatment was deemed to be ineffective if significant improvement was not reported after the first embolization session. Our series suggest that there is a tendency for recurrence in veins, which are not embolized. Some publications report a recurrence rate of up to 42% [15] although the term recurrence is debatable. We did not find any cases of recurrence at embolized sites in our series but rather failure of the venous system on which increased demand is placed as a result of treating other diseased sites. This highlights the complex pathophysiological nature of PCS and the need for regular follow up after treatment.

In conclusion, the results of our study are consistent with those published in larger series, which show embolization treatment to be effective with few side effects provided. Practitioners understand the use of the various imaging methods to select the population of women who will benefit from it. A good understanding of the pathophysiology of venous reflux disease and skill in embolization techniques are also required.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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