Effectiveness of Embolization or Sclerotherapy of Pelvic Veins for Reducing Chronic Pelvic Pain: A Systematic Review

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ABSTRACT

Purpose: Chronic pelvic pain (CPP) in the presence of dilated and refluxing pelvic veins is often described as pelvic congestion syndrome (PCS), although the causal relationship between pelvic vein incompetence and CPP has not been established. Percutaneous embolization is the principal treatment for PCS, with high success rates cited. This study was undertaken to systematically and critically review the effectiveness of embolization of incompetent pelvic veins.

Materials and Methods: A comprehensive search strategy encompassing various terms for pelvic congestion, pelvic pain, and embolization was deployed in 17 bibliographic databases, with no restriction on study design. Methodologic quality was assessed. The quality and heterogeneity generally precluded meta-analysis. Results were tabulated and described narratively.

Results: Twenty-one prospective case series and one poor-quality randomized trial of embolization (involving a total of 1,308 women) were identified. Early substantial relief from pain was observed in approximately 75% of women undergoing embolization, and generally increased over time and was sustained. Significant pain reductions following treatment were observed in all studies that measured pain on a visual analog scale. Repeat intervention rates were generally low. There were few data on the impact on menstruation, ovarian reserve, or fertility, but no concerns were noted. Transient pain was common following foam embolization, and there was a $< 2\%$ risk of coil migration.

Conclusions: Embolization appears to provide symptomatic relief of CPP in the majority of women and is safe, although the quality of the evidence is low.

ABBREVIATIONS

CPP = chronic pelvic pain, IIV = internal iliac vein, OV = ovarian vein, PCS = pelvic congestion syndrome, PVI = pelvic vein incompetence

Pelvic congestion syndrome (PCS) is described as chronic pelvic pain (CPP) arising from dilated and refluxing incompetent pelvic veins. The diagnosis is based on patient-reported symptoms, clinical examination, anatomic features, and venographic findings. There are no generally accepted, well-defined clinical criteria for the diagnosis of PCS, reflecting the residual uncertainty that there is a causal relationship between pelvic vein incompetence (PVI) and CPP.

Elimination of the blood flow is a recognized strategy for the treatment of incompetent veins. This can be achieved surgically by ligation of a vein or, since the

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Appendix A and Tables E1–E3 are available online at *www.jvir.org*.

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early 1990s, via percutaneous introduction of an embolic agent downstream of the dilated or refluxing veins (1). When the incompetent vein has been occluded, blood is diverted via other veins, and, in time, new vessels can form in the place of the original, although, in theory, these too could become incompetent. Whether recurrence of symptoms is a result of failure of the original embolization or is caused by collateral or recanalized veins diverting the flow to the internal iliac vein (IIV) or elsewhere, or through untreated or de novo varices, is unclear.

The objective of this systematic review of the literature was to assess the effectiveness of percutaneous embolization of incompetent pelvic veins in reducing CPP in women. Secondary objectives were to assess radiologic features, impact on fertility, and adverse events.

MATERIALS AND METHODS

The systematic review was conducted based on a protocol developed before commencing the review, and it has also been registered with the PROSPERO database. Ethics approval was not needed because no patients or patient-identifiable data were involved.

Search Strategy

A comprehensive search strategy was developed. This was used in the following bibliographic databases: Web of Knowledge, British Nursing Index, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, DARE, Embase, MEDION, Medline, and Web of Science. The foreign databases Abridged Index Medicus, Index Medicus for the Eastern Mediterranean Region (IMEMR), Index Medicus for the South East Asian Region (IMSEAR), LILACS, Pan-American Health Organisation bibliography (PAHO), Popline, Scientific Electronic Library Online (SciELO), and Western Pacific Rim Index Medicus (WPRIM) (on the World Health Organization portal) were also searched from database inception to November 2013. Bibliographies of all relevant primary articles and reviews were hand-searched to identify articles missed by the electronic searches. No language or study design restrictions were applied in the searching phase.

Search terms for the condition included "pelvic pain," "pelvic congestion," "pelvic or ovarian vein," "incompetence," or "reflux," and variations of these, as keywords and text. Search terms for the intervention included "treatment," "endovascular therapy," "interventional radiology," "embolization," "sclerotherapy," "ligation or occlusion," and variations of these, as keywords and text. Wild-card characters were used to capture alternative spellings and stems of words. The condition and treatment terms were each combined by using the "or" term to broaden the search, and the two components were combined by using the "and" function (**Appendix A** [available online at *www.jvir.org*]).

Study Selection and Data Extraction

Studies were selected for inclusion in the review in a three-step process (**Fig 1**) if they fulfilled the following criteria:

Population. Women with a clinical diagnosis of PCS and/or radiologic diagnosis of PVI, with or without CPP, were included. No restriction was placed on any previous treatment, age of the participants, duration of symptoms, comorbidity (including concomitant presence of endometriosis or other gynecologic cause), or severity of the symptom in selection of the studies or on the method of identification of the pelvic varices to be embolized.

Interventions. Cases of coil embolization or sclerotherapy of pelvic veins, using any method, were included.

Outcomes. Studies reporting subjective assessment of pain or improvement in pain symptoms were included.

Study design. Ideally, only reports of well-designed, randomized controlled trials were to be included, but

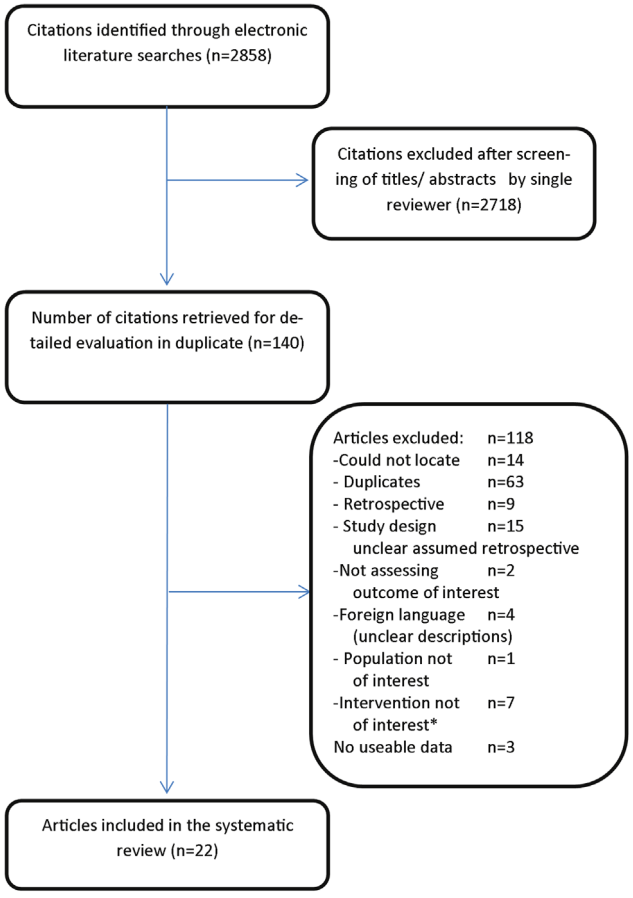

Figure 1. Flow diagram showing the study selection process for the systematic review of embolization and sclerotherapy for the reduction of CPP. (*Seven studies of OV ligation were identified in an initial scoping search. We made a decision after registration on the PROSPERO database to exclude studies of ligation from this review, as it is rarely performed in current practice now that the technically less demanding and lower-risk option of percutaneous vein embolization is widely available.)