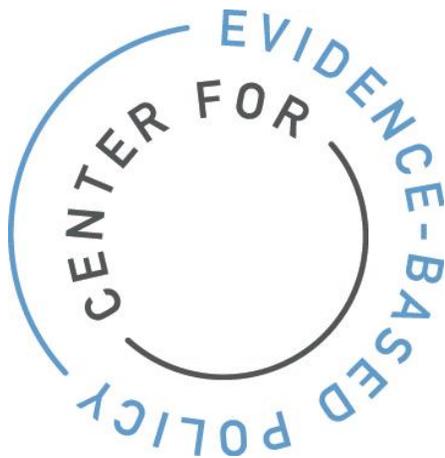


Mechanochemical Venous Ablation for Varicose Veins

December 2017

Updated Information/Addendum



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Overview

This addendum provides an update to the October 2017 report by Ray, Thielke, and King (2017) that evaluated the effectiveness and safety of mechanochemical ablation (MOCA) for varicose veins.

Key Findings

- One additional systematic review was identified in the updated search of the Ovid MEDLINE database.
- The fair methodological quality systematic review identified seven studies that reported on the effectiveness of MOCA for varicose veins. All of the studies included were also included in the poor methodological quality systematic review (Witte, Zeebregts, de Borst, Reijnen, & Boersma, 2017b) that was evaluated in the October 2017 (“original”) report by Ray et al. (2017).
- Based on the additional evidence identified, there are no updates to the strength of evidence findings of the original report by Ray et al. (2017).

Methods

Center for Evidence-based Policy (Center) researchers searched Ovid MEDLINE for systematic reviews (with or without meta-analysis), technology assessments, and individual studies on the use of MOCA for varicose veins that were published between January 1, 2017 to November 20, 2017. The original report included systematic reviews and technology assessments published within the last 10 years, and updated the identified systematic reviews by including an additional search of the Ovid MEDLINE database for individual studies published between January 1, 2016, and September 30, 2017 (Ray et al., 2017). This report update is intended to identify any newly published studies since the search completed for the original report (Ray et al., 2017). Given the delay of article indexing in the PubMed database, the search dates of the original report and this update intentionally overlap.

Center researchers evaluated the methodological quality of systematic reviews and individual studies eligible for this report update using the methodology described in detail in Appendix B of the original report (Ray et al., 2017) and methodological quality assessment tools described in the New York State Department of Health’s dossier process (available on pages 14 to 33 of the *Dossier Submission Form* located on the New York State Department of Health [website](#)). Center researchers followed the study inclusion and exclusion criteria as described in the original report (Ray et al., 2017). See Appendix A for a full description of methods.

Evidence Review

Findings

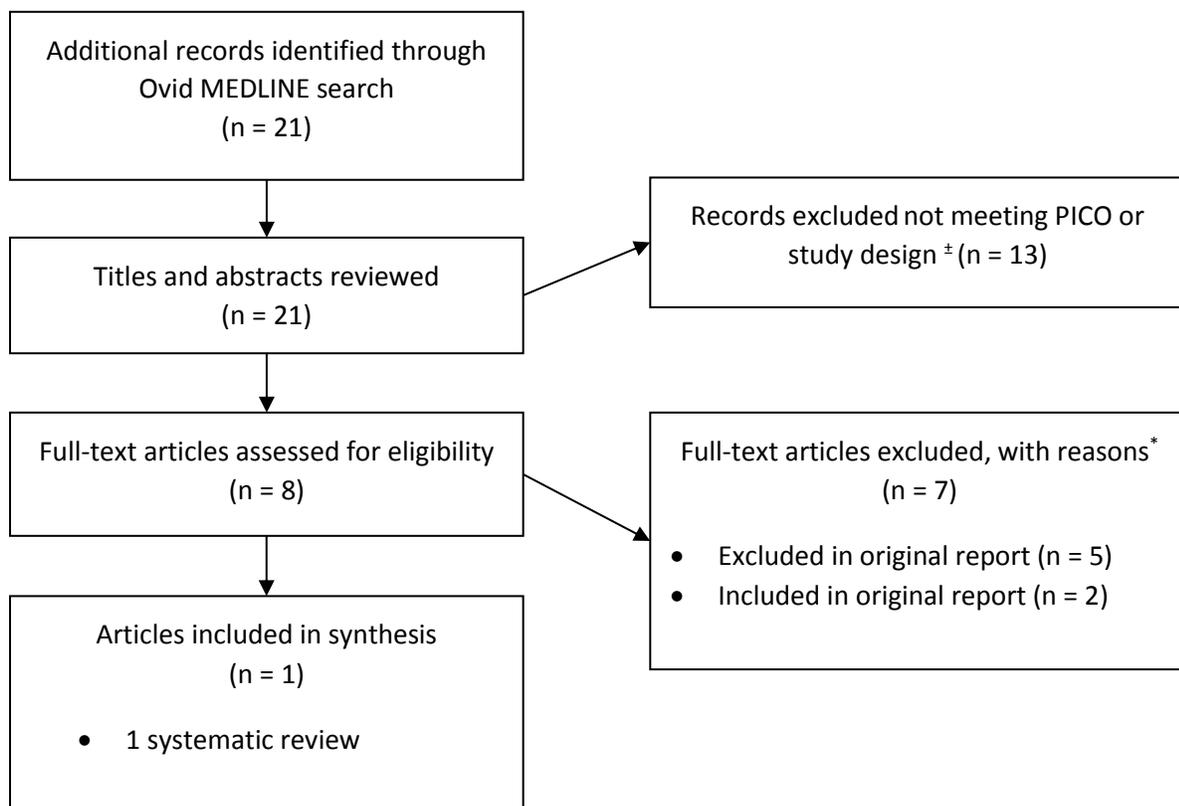
Center researchers, through a search of the Ovid MEDLINE database, identified one additional systematic review (Vos et al., 2017) relevant to the effectiveness of MOCA for varicose veins that met inclusion criteria.

Figure 1 outlines the number of articles identified by the Ovid MEDLINE search and the total number of studies included in the updated literature search. The search strategies and list of studies reviewed in full text form, with reasons for exclusion, are in Appendices A and B, respectively.

Overview of Evidence Sources

Center researchers summarized the evidence as reported by the included systematic review. Center researchers did not review the methodological quality of eligible individual studies within the systematic reviews unless necessary for clarification of information reported in the systematic review. The studies included by the Vos et al. (2017) systematic review were also included by the systematic review (Witte et al., 2017b) included in the original report by Ray et al. (2017).

Figure 1. Search Results



± Articles were excluded if they did not meet predetermined inclusion criteria (e.g., PICO, study design, English language, publication date) as described in Appendix A.

* Exclusion rationale provided in Appendix B.

Systematic Reviews with Meta-analysis

Vos et al. (2017)

Vos et al. (2017) conducted a fair methodological systematic review that evaluated the effectiveness of MOCA (n = 691) compared to cyanoacrylate vein ablation (n = 954) for great saphenous vein incompetence. The authors conducted an extensive literature search for prospective studies published between January 1966 and December 2016 and that had a minimum of six months of follow-up data and sample sizes of at least 10 individuals. The authors identified seven studies: one randomized controlled trial; and six case series studies (Vos et al., 2017). The authors commented that data from four of the six case series studies were derived from the same cohort at different follow-up periods. Data from the individual studies included by Vos et al. (2012) were also included by the poor quality methodological systematic review (Witte et al., 2017b) evaluated in the original report (Ray et al., 2017).

Quality and Limitations

Center researchers rated the single identified systematic review as having fair methodological quality (Vos et al., 2017). Center researchers did not assess the methodological quality of the individual studies included in Vos et al. (2017).

Summary of the Evidence

The additional evidence is summarized in the table below by outcomes of effectiveness and harms. Table 1 includes evidence for the use of MOCA for the treatment of varicose veins.

Table 1. Overview of Additionally Included Studies

Citation, Study Details	# of Studies (k) Population (n) <i>Individual Study Quality^a</i>	Study Summary and Findings	Comments
Systematic Review with Meta-analysis			
<p>Vos et al. (2017)</p> <p><u>Search Dates</u> January 1966 to December 2016</p> <p><u>Eligible Study Designs</u> Prospective studies</p> <p><u>Methodological Quality of the SR (assessed by Center researchers)</u> Fair</p>	<p>k = 7 prospective studies (1 RCT)</p> <p>total n = 691</p> <p><i>Methodological quality of included studies (assessed by the SR authors):</i> Poor to good</p>	<p><u>Comparators</u> Mechanochemical ablation vs. cyanoacrylate vein ablation</p> <p><u>Outcomes</u> Author’s conclusions: “These results are promising for these novel techniques that could serve as alternatives for thermal ablation techniques. However, to determine their exact role in clinical practice, high-quality randomized controlled trials comparing these novel modalities with well-established techniques are required.” (p. 880).</p>	<p>The authors report data from the same cohorts as if they are derived from unique study groups. However, data from four of the seven studies are from the same cohort with different reported durations of follow-up.</p> <p>The authors compared the combined data from 7 studies that evaluated mechanochemical ablation to the combined data from 8 studies that independently evaluated cyanoacrylate vein ablation. All of the studies included by Vos et al. (2017) were case series with the exception of one RCT that compared mechanochemical ablation with radiofrequency ablation (RFA), and one RCT that compared cyanoacrylate vein ablation with RFA. Because the meta-analysis data were not comparative, the study findings are not reported in this table. The study authors did not identify any studies that directly compared the two interventions.</p> <p>All of the studies included in this systematic review were also identified and included by the poor methodological quality systematic review (Witte et al.,</p>

Citation, Study Details	# of Studies (k) Population (n) <i>Individual Study Quality^a</i>	Study Summary and Findings	Comments
			2017b) included in the original report by Ray et al. (2017).

Abbreviations. RCT: randomized controlled trial; SR: systematic review.

Discussion

Center researchers identified one additional systematic review on the effectiveness and harms of MOCA for the treatment of varicose veins. The individual studies included in the newly identified systematic review were also included by the Witte et al. (2017b) systematic review included in the original report (Ray et al., 2017). The additional evidence does not change the strength of evidence findings from the original report by Ray et al. (2017).

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Appendix A. Methods

Ovid MEDLINE Search Strategy

To ensure that the most recent data were included, Center researchers searched Ovid MEDLINE from January 1, 2017, to November 20, 2017, for systematic reviews and individual studies on the use of MOCA for varicose veins. The search strategy from the original report by Ray et al. (2017) was used with modifications to the date limitations.

Database: Ovid MEDLINE Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE Daily, Ovid MEDLINE and Versions

Search Strategy:

- 1 exp Venous Insufficiency/
- 2 ((venous or vein*) adj4 (incomp* or insuffic*).tw.
- 3 ((venous or vein*) adj4 ulcer*).tw.
- 4 telangiectasis/
- 5 telangiect*.tw.
- 6 ((reticular or thread or spider) adj4 (vein* or venous)).tw.
- 7 or/1-6
- 8 exp lower extremity/
- 9 (lower limb* or lower extremit* or leg* or calf or valves or thigh* or membrum inferius).tw.
- 10 or/8-9
- 11 7 and 10
- 12 exp varicose veins/
- 13 (varicos* adj4 vein*).tw.
- 14 (varix or varices or microvaricosity or phlebarteriectasia or phlebectas* or prevaricos* or vein ectasia or venectasia).tw.
- 15 Saphenous vein/
- 16 GSV.tw.
- 17 ((saphenous or perforator) adj4 (vein* or vena or imcomp* or insuffic*).tw.
- 18 or/11-17
- 19 clarivein.tw.
- 20 MOCA.tw.
- 21 ((mechanochemical or mechano-chemical or mechanical) adj4 ablat*).tw.
- 22 ((non-thermal or nonthermal or "non thermal") adj4 ablat*).tw.
- 23 (infus* adj4 catheter*).tw.
- 24 ((damag* or disrupt* or distrub* or destroy* or break* or destruct*) adj4 (endothelium or endothelial or lining)).tw.
- 25 (rotat* adj4 (wire* or tip*).tw.
- 26 tumescentless.tw.
- 27 ((spasm* adj2 vein*) or venospasm).tw.
- 28 or/19-27

- 29 18 and 28
- 30 animals/ not humans/
- 31 29 not 30
- 32 limit 31 to english language
- 33 limit 32 to yr="2017 -Current"
- 34 remove duplicates from 33

Study Inclusion/Exclusion Criteria

Two Center researchers independently reviewed the results from the Center core sources and Ovid MEDLINE database searches at each stage of review (e.g., title and abstract, full text). Any study that was identified by at least one researcher as potentially meeting inclusion criteria was advanced to the next review level. All excluded studies were determined by two Center researchers as not meeting the predetermined inclusion criteria. Any disagreement between study reviewers regarding the inclusion of a study was arbitrated by a third Center researcher. Center researchers excluded studies that were not systematic reviews, meta-analyses, technology assessments, or individual studies (as applicable by topic); that were published before 2007; were published in a language other than English; or did not meet the specific inclusion/exclusion criteria outlined below.

Inclusion Criteria

Population: Individuals with symptomatic lower extremity chronic venous disease

Intervention: Mechanochemical ablation

Comparators: Conservative therapy (e.g., compression, leg elevation); other endovenous ablation therapies (e.g., laser, radiofrequency); sclerotherapy; surgery (e.g., ligation/stripping, phlebectomy)

Outcomes: Symptom resolution, quality of life, function, time to complete healing, incidence of repeat procedure or other procedures, adverse events, economic outcomes (e.g., cost, cost-effectiveness)

Exclusion Criteria

Study exclusion criteria included the following:

- Animal and in-vitro studies
- Studies only reporting on laboratory biological markers, historical findings, technical success without follow-up, and procedure time
- Case series that did not report on harms
- Case reports, letters, editorials, comments
- Duplicate information from a research study published in more than one source (only the highest quality, most recent publication with outcome of interest was included)

- Systematic reviews that included only studies that were summarized by more comprehensive systematic reviews or systematic reviews of higher quality and/or that were more recently published
- Studies identified that were included in a summarized systematic review or technology assessment

Quality Assessment

Center researchers assessed the methodological quality of the included studies using standard instruments developed and adapted by the Center that are modifications of the systems in use by the Campbell Collaboration, Cochrane, the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA), the National Institute for Health and Care Excellence (NICE), and the Scottish Intercollegiate Guidelines Network (SIGN) (Campbell Collaboration, 2015; Higgins & Green, 2011; Moher, Liberati, Tetzlaff, & Altman, 2009; NICE, 2014; SIGN, 2015). Two Center researchers independently rated all studies. In cases where there was not agreement about the quality of a study, consensus was reached through discussion.

Each rater assigned the study a rating of good, fair, or poor, based on its adherence to recommended methods and potential for biases. In brief, good-quality systematic reviews include a clearly focused question, a literature search sufficiently rigorous to identify all relevant studies, criteria used to select studies for inclusion (e.g., RCTs) and assess study quality, and assessments of heterogeneity to determine whether a meta-analysis would be appropriate. Good-quality RCTs include a clear description of the population, setting, intervention, and comparison groups; a random and concealed allocation of patients to study groups; low dropout rates; and intention-to-treat analyses. Good-quality systematic reviews and RCTs also have low potential for bias from conflicts of interest and funding source(s). Fair-quality systematic reviews and RCTs have incomplete information about methods that might mask important limitations. Poor-quality systematic reviews and RCTs have clear flaws that could introduce significant bias.

Appendix B. Articles Selected for Full-Text Review Inclusion/Exclusion Rationale

Citation	Inclusion/Exclusion Rationale
Kim et al. (2017)	Exclude: Excluded in original report
Kugler and Brown (2017)	Exclude: Excluded in original report
Lane et al. (2017)	Exclude: Included in original report
Moon et al. (2017)	Exclude: Excluded in original report
Tang, Kam, and Gaunt (2017)	Exclude: Excluded in original report
Vos et al. (2017)	Include
Witte et al. (2017a)	Exclude: Excluded in original report
Witte et al. (2017b)	Exclude: Included in original report

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The Center for Evidence-based Policy (Center) is recognized as a national leader in evidence-based decision making and policy design. The Center understands the needs of policymakers and supports public organizations by providing reliable information to guide decisions, maximize existing resources, improve health outcomes, and reduce unnecessary costs. The Center specializes in ensuring that diverse and relevant perspectives are considered and appropriate resources are leveraged to strategically address complex policy issues with high-quality evidence and collaboration. The Center is based at Oregon Health & Science University in Portland, Oregon.

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