

A comparison and AGREE II analysis of the revised Society for Vascular Surgery/American Venous Forum/American Vein and Lymphatic Society and European Society for Vascular Surgery clinical practice guidelines in the management of varicose veins

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ABSTRACT

Objective: The aim of this study was to compare the Society for Vascular Surgery/American Venous Forum/American Vein and Lymphatic Society (SVS/AVF/AVLS) and the European Society for Vascular Surgery (ESVS) revised Clinical Practice Guidelines (CPGs) for treatment of C2 varicose veins (VVs) by an analysis of content, methodology, level of evidence, and strength of evidence as well as by Appraisal of Guidelines for Research and Evaluation II (AGREE II) analysis.

Methods: The 2022 SVS/AVF/AVLS guidelines for VVs were compared with the 2022 ESVS CPGs on VVs for: specific methodology, evidence development, strength of recommendation, and level (quality) of evidence. Additionally, an AGREE II analysis was performed to compare the two guidelines. These guidelines were scored on six different domains as well as overall quality using a 7-point Likert scale according to the AGREE II methodology.

Results: The two CPGs differed in methodology and scope of content. The two guidelines varied significantly on their ratings of levels of evidence as well as their overall strengths of recommendations. The AGREE II analysis found that both guidelines scored as high quality in the domains of scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, editorial independence, and overall assessment. For the domain of applicability, ESVS guidelines (65.28%) scored significantly higher than SVS/AVF/AVLS guidelines (51.39%; $P \leq .05$).

Conclusions: Although the methodology differed significantly between both guidelines, the overall conclusions remained similar, and both guidelines were rated as high quality by AGREE II analysis. (J Vasc Surg Venous Lymphat Disord 2025;13:102238.)

Keywords: AGREE II; Guidelines; Varicose veins; Veins

Varicose veins (VVs) are one of the oldest diseases known to humans and a common disease, whose prevalence increases with age.^{1,2} The comparative epidemiologic study, The Framingham Heart Study, showed that venous reflux disease had a greater annual United States incidence and prevalence than did other cardiovascular diseases, including coronary artery disease, peripheral arterial disease, heart failure, stroke, cardiac arrhythmias,

and heart valve disease.³ In a systematic review of epidemiologic studies conducted in a unique population, health care workers, the mean (overall) prevalence for VVs was 22%, whereas C2-classified VVs on physical exam or Doppler ultrasonography numbered 18.8%.⁴

Due to the widespread prevalence of VVs, interventions for VVs are quite common. Endovenous ablations are performed over 1 million times per year in the United States.⁵ This count dwarfs other vascular procedures such as interventions for infrainguinal peripheral arterial disease, dialysis access, carotid disease, and aortic aneurysms.⁵

Given the magnitude of the VV disease burden confronting clinicians, both the European Society for Vascular Surgery (ESVS) and a multisociety United States-based group have recently revised previously published Clinical Practice Guidelines (CPGs) for the diagnosis and treatment of VVs, in particular Clinical, Etiological, Anatomical, and Pathophysiological (CEAP) C2 class disease.^{6,7} CEAP C2 disease is of particular note as systematic reviews of both randomized controlled trials and case series shows that CEAP C2 predominates as

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the disease class of patients with VVs most frequently undergoing intervention.⁸

Because CPGs recommend a diagnostic and treatment protocol for a common medical problem like VVs, which may be treated by a wide variety of clinicians from different training backgrounds, CPGs for VVs have the potential for a major impact on patient care. The application of CPGs have been associated with improvements in both the effectiveness and the quality of care.⁹ In addition, CPGs may be accompanied by a reduction in the cost of care.¹⁰ Inherent to the value of a CPG is the methodology used to provide the quality of evidence for each recommendation, as well as the rigor with which these recommendations were developed. As the number of CPGs being published has increased, there has been an increasing concern within the medical community regarding the quality of these CPGs.¹¹ The quality of CPGs can be assessed by using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument.¹² This assessment tool is helpful in judging the value of the burgeoning number of CPGs addressing a medical problem.

Two CPGs, which are revisions of previous CPGs, on the management of VVs have been published recently. The first, the European Society for Vascular Surgery (ESVS) CPG on the management of chronic venous disease in the lower limbs contains a section on the management of CEAP class 2 VVs.¹³ Similarly the Society for Vascular Surgery (SVS), American Venous Forum (AVF), and the American Vein and Lymphatic Society (AVLS) recently collaborated to revise a CPG on the management of varicose veins of the lower extremity.¹⁴ Part one of this CPG addresses the diagnosis and management of CEAP C2 disease. It is the purpose of this study: (1) to compare the methodology and content of these two recently released CPGs for CEAP C2 VVs; and (2) to perform an AGREE II analysis to assess the quality of these two guidelines.

METHODS

Key elements of diagnosis, assessment, and treatment. Two independent reviewers (A.T. and T.O.D.), blinded of each other's evaluations, performed a comparative analysis of the two CPGs for the following qualitative factors: format; guideline methodology; sponsors; strength of recommendation (SOR); and level of evidence (LOE). In addition, the methods by which the guidelines were developed, who performed the systematic review and meta-analyses, the evidence and recommendation criteria for the LOE and classes of recommendation, and finally, patient input to the CPG were compared. Because these two CPGs were revisions of a previous CPG, the number of new guideline recommendations, as well as changes in SOR and quality of evidence, were ascertained.

ARTICLE HIGHLIGHTS

- **Type of Research:** Review of two recently published Clinical Practice Guidelines (CPGs)
- **Key Findings:** The two guidelines, which are revisions of previous CPGs, employed different methodology to produce two new CPGs on C2 varicose veins. Both CPGs are rated as high quality according to an Appraisal of Guidelines for Research and Evaluation II (AGREE II) analysis.
- **Take Home Message:** Both the European Society for Vascular Surgery and the multi-society group of Society for Vascular Surgery/American Venous Forum/American Vein and Lymphatic Society have produced valuable high-quality CPGs on C2 varicose veins.

Comparison of level of evidence and strength of recommendation. The SVS/AVF/AVLS CPG used the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) method for determining LOE and SOR, whereas the ESVS employed the European Society of Cardiology system for both LOE and SOR.^{15,16} Although the scale and criteria for LOE are similar between the two CPGs, the ESVS SOR has four categories in contrast to the two ratings of the SVS/AVF/AVLS CPG.

Guideline quality. Our approach has been described previously in detail and will be outlined briefly here.¹⁷ The quality of each CPG was determined by applying the AGREE II instrument, which was developed to examine the issue of variability in guideline quality. AGREE II assesses the methodologic rigor and transparency by which a guideline was developed. Two of the reviewers for the current analysis (A.T., I.G.) used the AGREE II Handbook to familiarize themselves thoroughly with the methodology,¹² whereas the senior author (T.F.O.) has conducted previous AGREE II analyses.¹⁷ In addition, the AGREE II checklist was employed when assessing each CPG. All six domains were scored, as well as an overall assessment. The two CPGs were rated by each reviewer independently and blinded of the other's assessments. Finally, the sequence of review of the two CPGs was different for the three reviewers.

Scoring of AGREE II domains. The AGREE II instrument is comprised of six domains: (1) scope and purpose of the CPG; (2) stakeholder involvement; (3) rigor of development; (4) clarity of presentation; (5) applicability; and (6) editorial independence.¹²

The individual subject of each domain was graded using a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). The maximum achievable score for each item was 7, which represents that the quality of reporting was exceptional, and that the CPG had met

Table I. A comparison of the methodology employed by the two guidelines

Factor compared	Guideline	
	ESVS	SVS/AVF/AVLS
Original CPG	2015	2011
Format	Component of CVI CPG	1 of 2 parts specific to VVs
Sponsor	ESVS	SVS/AVF/AVLS
Development	List of topics	5 PICO questions
Systematic review and meta-analysis	Internal (1/1/2013-6/30/2020)	External - MAYO EBPC (through 12/7/2020)
Evidence and recommendation criteria	European Society of Cardiology	GRADE
LOE	3 (A, B, C)	3 (A, B, C)
Classes of recommendations	4 (I, IIA/IIIB, III)	2 (strong vs weak)
Patient input	Focus group	Historical survey data

AVF, American Venous Forum; AVLS, American Vein and Lymphatic Society; CPG, clinical practice guidelines; CVI, chronic venous insufficiency; EBPC, evidence-based practice center; ESVS, European Society for Vascular Surgery; GRADE, grades of recommendation, assessment, development, and evaluation; LOE, levels of evidence; PICO, patient/population, intervention, comparison, and outcome; SVS, Society for Vascular Surgery; VVs, varicose veins.

the breadth of criteria stipulated in the AGREE II instrument. The minimum possible score for each item was 1, which indicates that no information about that particular item had been reported in the CPG. The score for each domain was calculated by summing the scores of the individual items in each domain, as rated by the three individual evaluators, who were unaware of each others' scores. The total score was scaled as a percentage of the maximum possible score for each domain using the following formula: $\text{obtained score} - \text{minimum possible score} / \text{maximum possible score} - \text{minimum possible score} \times 100 = \text{percentage}$, as described in the AGREE II handbook.

RESULTS

Table I compares the various qualitative factors between the two CPGs. ESVS had a more recent preceding CPG (2015)⁶ than did the SVS/AVF/AVLS CPG (2011).⁷ The ESVS CPG addressed CEAP Class 2 as a component of a larger 83-page overall guideline on chronic venous disease.¹³ By contrast, the SVS CPG was one of two separate guideline documents on VVs. Part one (30 pages), the comparator in this paper, addressed the diagnosis and treatment of CEAP C2 chronic venous disease (CVD).¹⁴ The ESVS CPG had one sponsoring society, whereas the SVS CPG was sponsored by three societies, as well as being endorsed by both the Society for Vascular Medicine and the International Union of Phlebology. The ESVS guideline was developed through a list of topics compiled by the guideline writing committee, whereas the SVS/AVF/AVLS CPG arose from five patient/population, intervention, comparison, and outcome (PICO) questions. The systematic review and meta-analysis for the ESVS was performed internally. The Mayo Evidence-Based Practice group, however, conducted the

systematic review and meta-analysis independently of the SVS/AVF/AVLS guideline committee for their CPG. The criteria for quality of evidence and SOR for the ESVS followed the European Society for Cardiology criteria with three levels of evidence and four classes of recommendations.¹⁶ By contrast, the SVS/AVF/AVLS CPG employed the GRADE format with three levels of evidence and two classes of recommendation, the latter differing from the ESVS four classes.¹⁸ Finally, patient input for the ESVS was provided by a focus group, and the SVS/AVF/AVLS CPG employed a historical patient survey.

A major difference between the two CPGs was seen in the SOR provided by each group as well as LOE used to make these recommendations (Table II). When comparing eight key clinical scenarios relevant to simple VVs, the SOR differed between the two guidelines. The SVS/AVF/AVLS CPG had a level one strength of recommendation for all eight of these clinical scenarios, whereas, for the ESVS, one-half (4/8) of the recommendations were level one, and the remainder were either 2A (2) or 2B (3). Finally, the recommendation for not treating incompetent perforating veins in C2 patients was judged to be 3 in SOR. Table II also compares the judged level of evidence used to make these key recommendations and to assess the strength of these recommendations. There were no key recommendations that achieved a quality of evidence ranking of A in the SVS/AVF/AVLS guidelines, whereas in the ESVS level of evidence ranking, three key recommendations achieved an A level of evidence.

The difference in the rating of quality of evidence between the two CPGs is related to several factors. The SVS/AVF/AVLS CPG provided a unique hierarchy of outcome measures (Table III) with quality of life by patient-reported outcome measures at 5 years being

Table II. Comparison of the strength of recommendation (SOR) and level of evidence (LOE) by key guideline

Key recommendation	SOR		LOE	
	ESVS	SVS/AVF/AVLS	ESVS	SVS/AVF/AVLS
Use of duplex for diagnosis of CVI	1	1	B	B
Intervention over the use of elastic stockings for C2 GSV/SSV	1	1	B	B
Treatment for GSV -> EVA over L&S	1	1	A	B
Treatment for SSV -> EVA over L&S	1	1	A	C
Use of thermal and NTNT treatment for GSV	2A-2 B	1	A	B
Use of thermal and NTNT treatment for SSV	2B	1	B	C
Concomitant treatment via EVA of GSV/SSV and tributary veins	2A	1	B	C
Recommendation to not treat perforators	3	1	C	C
Level A evidence			3/8	0/8

AVF, American Venous Forum; AVLS, American Vein and Lymphatic Society; CVI, chronic venous insufficiency; EVA, endovenous ablation; GSV, great saphenous vein; L&S, ligation and stripping; NTNT, non-thermal non-tumescent ablation; SSV, superficial saphenous vein; SVS, Society for Vascular Surgery.

rated highest, whereas recurrence and need for reintervention at 5 years was next in priority of the end points scale. The surrogate measure, anatomic closure of the saphenous at 5 years, was rated lowest. By contrast, there was no apparent pyramidal ranking of outcome measures in the ESVS CPG.

New recommendations and changes in class for the latest edition of both CPGs. A helpful feature of the ESVS VVs CPG is their Figure 1, which compares the new recommendations in the 2022 CPG vs the 2015 CPG and is broken down by the SOR.¹³ A total of 21 new recommendations are included in the 2022 ESVS CPG affecting treatment of C2 disease. Seven recommendations were rated as Class 1, eight as Class 2A, four as Class 2B, and finally, two as Class 3. In addition, changes in Class (upgraded or downgraded) were summarized in another of their figures (#2). Relevant to superficial venous disease, two recommendations were upgraded and three downgraded for SOR. By contrast, the 2022 SVS/AVF/AVLS CPG summarizes the individual recommendations

at the beginning of the document, but the reader must cross-compare with the 2011 version to discern in this document what is a new recommendation as well as how the LOE or SOR may have changed.

In our comparison of the new revised SVS/AVF/AVLS CPG to the original 2011 version, there are a total of 31 guideline recommendations vs the 40 recommendations in the original document (Table IV). The revised 2022 document relates the guideline statements in direct response to the five PICO questions.


Of the 31 guideline statements in the revised SVS/AVF/AVLS guidelines, 18 were new statements, whereas three were downgrades of the original statement due to quality of evidence.

AGREE II analysis. The scores for the AGREE II analysis were relatively similar between the two CPGs (Table V).

It should be noted that, in an AGREE II analysis, a score above 70% is considered to reflect excellent quality, whereas a score between 31% to 70% is rated as moderate quality and lower than 30% is judged of poor quality.¹² Table V demonstrates that three of the six domains in the ESVS CPG scored above 70%, whereas in the SVS/AVF/AVLS CPG four were above 70%. No domain score was in the poor-quality rating range (<30%) for either CPG. There was no significant statistical difference between the scores for the ESVS and the SVS/AVF/AVLS CPGs ($P \geq .05$) in the five domains of Scope and Purpose, Stakeholder Involvement, Rigor of Development, Clarity of Presentation, and Editorial Independence.

The *Applicability* domain for both CPGs scored below the high-quality metric observed in the other domains. Analysis of the scoring for the individual components that comprise this domain showed particularly low scores in both CPGs for two of the four elements of this domain: (1) a description of the facilitators and barriers to application of the guideline recommendations; and

Table III. Hierarchy of evidence for outcomes rating by Society for Vascular Surgery (SVS)/American Venous Forum (AVF)/American Vein and Lymphatic Society (AVLS) Guideline

	1 QoL at 5 years
	2 Recurrence and need for reintervention at 5 years
	3 Major/minor perioperative adverse events
	4 Postoperative pain and return to activity
	5 Anatomic closure at 5 years
	6 Cost

QoL, Quality of life.

Table IV. Five Patient/Population, Intervention, Comparison, and Outcome (PICO) questions and resultant number of guideline statements for Society for Vascular Surgery (SVS)/American Venous Forum (AVF)/American Vein and Lymphatic Society (AVLS) Clinical Practice Guideline (CPG)

	Total recommendations	New recommendations	Downgraded QoE
1. The diagnostic utility of duplex ultrasound in adults with VVs class C2-C6	9	0	1
2. High ligation and surgical stripping vs any EVA technique for patients with VVs and axial incompetence of the GSV or SSV	11	9	0
3. Thermal vs nonthermal endovenous ablation technique outcomes for patients with VVs and axial incompetence of the GSV or SSV	3	3	0
4. Incompetent perforating vein ablation vs no perforator ablation for patients with CEAP class C2 VVs with or without axial incompetence of the GSV or SSV	3	2	1
5. Treatment of tributaries with phlebectomy or sclerotherapy, concomitant with, or staged after EVA of the incompetent GSV or SSV	5	4	1
Total	31	18	3

CEAP, clinical, etiological, anatomical, and pathophysiological; EVA, endovenous ablation; GSV, great saphenous vein; QoE, quality of evidence; SSV, superficial saphenous vein; VVs, varicose veins.

(2) a presentation of monitoring and auditing criteria for guideline implementation. These factors depressed the overall score for this domain. The ESVS guidelines (65.28%), however, scored significantly higher than the SVS/AVF/AVLS guidelines (51.39%) in this domain ($P = .05$), due to its better provision of advice or tools on how the recommendations could be put into practice.

DISCUSSION

This analysis of two CPGs addressing the diagnosis and treatment of CEAP C2 CVD showed differences in the following areas: the methodology for developing the CPG, who performed the systematic review (internal or external), SOR, and evidence quality (Table I). However, both CPGs were rated highly (>70%) in the AGREE II analysis of Overall Quality. The multisociety SVS/AVF/

AVLS CPG, endorsed by the Society for Vascular Medicine and the International Union of Phlebology, followed the principle of a multidisciplinary development group, one of the essential elements for developing high-quality guidelines. This feature may also contribute to wider dissemination and utilization of the CPG.¹⁹ Alternatively, the ESVS CPG invited “vascular physicians, an interventional radiologist, and a “gynecologist – obstetrician” to expand the medical disciplines of the predominantly vascular surgeon group.

The SVS/AVF/AVLS CPG was directed specifically at varicose veins CEAP C2 (Part I, 30 pages exclusive of supplementary appendices), whereas the 83-page ESVS CPG addressed CVD as a whole, with a section of approximately 20 pages on superficial venous disease. Although both CPGs were revisions of previous

Table V. Appraisal of Guidelines for Research and Evaluation II (AGREE II) scores for each domain and guideline

AGREE II analysis			
Domain	ESVS Score	SVS/AVF/AVLS	P values
Scope and Purpose	83.33%	87.03%	.44
Stakeholder Involvement	88.88%	77.78%	.28
Rigor of Development	78.50%	81.25%	.72
Clarity of Presentation	88.88%	92.59%	.44
Applicability	65.28%	51.39%	.05
Editorial Independence	75.00%	70.83%	.43
Overall Assessment	77.78%	77.78%	
Quality according to AGREE II			
>70%			High
31-70%			Moderate
<30%			Lower

AVF, American Venous Forum; AVLS, American Vein and Lymphatic Society; ESVS, European Society for Vascular Surgery; SVS, Society for Vascular Surgery.
Bolded P values indicate statistical significance ($P < .05$).

documents, they differed in their approach to identifying what should be addressed by the required systematic reviews for the revision (Table I). The SVS/AVF/AVLS CPG employed the customary PICO method of developing four key questions to be examined, whereas the ESVS CPG used a topical approach, which was similar to their method for the original CPG. The systematic review and meta-analyses for the SVS/AVF/AVLS CPG was performed by an “independent health science group,” and the results of this systematic review were published as a separate document.²⁰ By contrast, in the ESVS CPG, members of the guideline working group carried out the systematic analysis. Employing an independent group to conduct systematic analysis minimizes the potential for bias where guideline members may be influenced by their own clinical biases or preferences as well as mitigating other conflicts of interest for the same reasons. These two factors could affect the objectivity of the review. Obviously one major disadvantage of using an independent group is the added cost to producing the CPG.

Although the scoring of the LOE or evidence quality is comparable for both CPGs and divided into A, B, C levels, the SOR differs between the two CPGs. The ESVS CPG employed the European Society of Cardiology scale,¹⁶ which has four categories, for SOR, whereas the SVS/AVF CPG employed the GRADE scale with two ratings, strong or weak. The difference between the two ratings lies in the Class II recommendation where IIa signifies “weight of evidence/opinion is in favor of usefulness/efficacy” vs IIb “usefulness/efficacy is less well established by evidence/opinion” for the ESVS CPG. It is argued that this system allows greater flexibility and a purported “greater level of precision” in rating vs the “strong or weak” binary scale of the GRADE method.

Table II compare both the LOE and SOR for the SVS/AVF/AVLS CPG vs the ESVS CPG. The two documents are in general agreement for SOR, except for one guideline recommendation, treatment of small saphenous vein incompetence by thermal or non-thermal techniques, which is dependent on patient choice and physician expertise. For this guideline statement, the ESVS recommendation is of lower strength (Class 2B) than the SVS/AVF recommendation (Class 1). By contrast, the SVS/AVF CPG rates quality or LOE lower than the ESVS for five of the eight recommendations. If the two groups were examining in general the same evidence, why does the rating of that evidence differ? Rating quality of evidence is a subjective process, especially when applied to determining level of certainty in evidence. Moreover, the hierarchy of outcome measures scale adopted in the SVS/AVF/AVLS CPG places the patient-centered endpoints of: (1) quality of life as well as (2) recurrence and need for reintervention at 5 years as more important than the surrogate outcome measure of anatomic closure (Table III).

AGREE II analysis. In Table V, the highest score for both CPGs was in the domain of Clarity of Presentation, and the rating of this ESVS domain achieved the highest score (91.67%) for the two CPGs. This rating depends upon the ease of use of a particular CPG. The Tables in the ESVS CPG demonstrating new recommendations or recommendations that have increased or decreased in strength from the previous CPG as well as the flow charts outlining the treatment options for patients with symptomatic saphenous incompetence exemplify this desirable and reader-friendly characteristic.

A multiple linear regression model was employed after a systematic bibliographic search to determine which of the six domains had the greatest influence on overall guideline quality and in particular whether the guidelines in the end would be recommended. Rigor of Development was rated the highest of the six domains for its influence, which was higher, although not significant, in the SVS/AVF/AVLS CPG (81.25%; high quality) than the ESVS CPG (78.5%; high quality).²¹

Both the ESVS (65.28%) and the SVS/AVF/AVL (51.39%) scored below 70% for high quality in the Applicability domain. Rating of the domain for Applicability depends upon the document outlining barriers to its implementation as well as providing methods to facilitate its adoption and use. One of the rating requirements for this domain stipulates that the CPG provide criteria that can be used to audit the extent of utilization. The Applicability domain also scored the lowest in our AGREE II analysis of lymphedema CPGs, which may indicate the general lack of promoting and monitoring the utilization of a CPG. Editorial Independence was rated high quality; however, it achieved one of the lower scores in both CPGs. Although the ESVS clearly states that there were no funding sources from industry supporting the development of the guideline, there is no listing in the document of the potential conflicts of interest for the individual members of the guideline writing committee (“they are kept on file”). The SVS/AVF/AVLS CPG presents the converse, where there is no statement about industry support, but in an effort on transparency, there is a detailed section in the CPG on the 13 members who had no conflicts and the four who had some relationship with industry.

CONCLUSIONS

Because the methodology of the ESVS and the SVS/AVF/AVLS CPGs varied significantly, this factor was associated with differences between the two in ratings for both LOE and SOR. The overall conclusions of these two CPGs for venous practice, however, remained comparable. Both documents were high-quality guidelines, as judged by AGREE II analysis, that can guide clinicians in the practice of management and treatment of CEAP C2 VVs.

AUTHOR CONTRIBUTIONS

Conception and design: AT, TO, PS
Analysis and interpretation: AT, TO
Data collection: AT, TO, IG
Writing the article: AT, TO
Critical revision of the article: AT, TO, IG, PS
Final approval of the article: AT, TO, IG, PS
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