The Cost-effectiveness of Interventions for Superficial Venous Insufficiency: A Systematic Review

Peart L, Bayat I, Shan L

RESEARCH WEEK
5-9 OCTOBER 2020
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Background

Superficial venous insufficiency (SVI) is extremely common and causes significant detriments to patients' health and quality of life.

Common treatment options for SVI can broadly be classified into conservative treatment (compression stockings), open surgery (junction ligation, stripping, phlebectomies), and endovenous ablation (radiofrequency ablation - RFA or endovenous laser ablation - EVLA).

Intervention is effective in treating symptoms and preventing disease progression. However, this incurs substantial costs to healthcare services, and with an aging global population there is projected to be significant increases in the economic burden of SVI in coming years.

Cost-effectiveness evidence is critical to informing both treatment modality choices in individual patients and resource allocation within healthcare systems.

Objective

The aim of this study is to assess the existing evidence on the cost-effectiveness of interventions for SVI.

Methods

A systematic review of published economic evaluation studies was performed using strict eligibility criteria and the PRISMA guidelines. Studies were included if they were full economic evaluations, i.e. comparing interventions according to both costs and consequences over a set time frame.

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Table I. Key results

First author, year	Cost perspective	Time horizon	Interventions	Conclusions
Brittenden, 2019[1]	Healthcare system	5 years	UGFS, EVLA, Surgery	EVLA is the most cost-effective option in suitable patients.
Carroll, 2013[2]	Healthcare system	10 years	Surgery, UGFS, EVLA, RFA	Differences between clinical outcomes of treatments are negligible, so the cheapest treatment is the most cost-effective. UGFS offers the most cost-effective alternative to surgery.
Disselhof, 2008[3]	Not specified	2 years	Cryostripping, EVLA	Outpatient cryostripping is the most cost-effective, but EVLA yields comparable outcomes for relatively little additional cost.
Epstein, 2018 [1][4]	Healthcare system	1 year	Early EVA, Deferred EVA	Early EVA for SVI Is likely to be cost-effective in patients with venous leg ulcers compared to deferred EVA.
Epstein, 2018 [2][5]	Healthcare system	Lifetime	Compression only, surgery, EVLA, UGFS	Surgery is more effective and less costly than compression therapy alone for venous leg ulcers. There is insufficient evidence regarding EVLA and UGFS to draw conclusions.
Epstein, 2018 [3][6]	Healthcare system	5 years	Conservative care, UGFS, RFA, EVLA, MOCA, HL/S, CAE	Endothermal procedures are cost-effective options. Further effectiveness evidence for cost-effectiveness of MOCA and CAE is needed. At current prices CAE is not cost-effective.
Eskelinen, 2009[7]	Healthcare provider	6 months	Surgery	Surgery is cost-effective.
Gohel, 2010[8]	Healthcare system	5 years	Conservative care, UGFS, EVLA, RFA, Surgery	Day case surgery, outpatient EVLA, and outpatient RFA are likely cost-effective. Further evidence for cost-effectiveness of UGFS is needed. Inpatient surgery and endothermal ablation under general anaesthetic are unlikely to be cost-effective.
Inderhaug, 2018[9]	Patient and Societal	1 year	No treatment, HL/S, EVLA, RFA, SVS, CAE	Cost-effectiveness results depend upon the perspective chosen. EVLA is the most-cost effective option from a societal perspective, and SVS from a patient perspective. HL/S has higher societal costs due to long sick leave periods.
Luebke, 2015[10]	Not specified	6 months	HL/S, EVLA	Surgery is more cost-effective than EVLA.
Marsden, 2015[11]	Healthcare system	5 years	Conservative care, surgery, UGFS, ETA	All interventions are cost-effective compared to compression therapy. ETA is the most cost-effective in suitable patients, followed by UGFS, then surgery.
Michaels, 2006[12]	Healthcare system	2 years and 10 years	Conservative care, sclerotherapy, surgery	Surgery is the most cost-effective, and produces greater cost-effectiveness when modelled over a longer time horizon.
Ratcliffe, 2006[13]	Healthcare system	2 years	Conservative care, surgery	Surgery is cost-effective compared to conservative care.
Shepherd, 2015[14]	Healthcare system	6 months	EVLA, RFA	EVLA is more likely to be cost-effective than RFA but absolute differences in costs and effectiveness are small.
Subramonia, 2009[15]	Healthcare system	37 days	Surgery, RFA	The increased cost of RFA is partly offset by a quicker return to work in employed patients.

UGFS indicates ultrasound-guided foam sclerotherapy; EVLA, endovenous laser ablation; RFA, radiofrequency ablation; EVA, endovenous ablation; MOCA, mechanochemical ablation; HL/S, high ligation and stripping; CAE, cyanoacrylate adhesive; SVS, steam vein sclerosis; ETA, endothermal ablation.

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Key findings

Interventional treatment vs. conservative management

- Surgery and endovenous interventions, including EVLA, RFA, and UGFS were all more cost-effective than non-operative management.
- Analysing the benefits of interventional treatments over a longer time horizon increased their cost-effectiveness.
- Modelled over the patients' lifetime, surgery and endovenous options cost less to a healthcare system than conservative management.

Endothermal ablation vs. open surgery

- Five studies found endothermal ablation, including RFA and EVLA, to be more cost-effective than surgery. Two showed endothermal ablation to be less cost-effective.
- Including the indirect costs from loss of productivity in the analysis increased the cost-effectiveness of endovenous interventions due to the faster recovery and decreased sick leave compared to surgery.

RFA vs. EVLA

- Absolute differences in costs and clinical outcomes between RFA and EVLA were generally small.
- Four studies found EVLA to be more cost-effective than RFA, while one found RFA to be more cost-effective.

Other endovenous options

- UGFS was shown to be less effective than endothermal ablation or surgery. However, UGFS was substantially cheaper and thus generally had good cost-effectiveness.

Conclusion

Intervention for SVI is cost-effective, regardless of the treatment modality chosen. The findings of this review support the ongoing use of endovenous ablation as a cost-effective option in suitable patients.

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