Endovenous therapies of lower extremity varicosities: A meta-analysis
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CRD summary
This review compared endovenous laser therapy, radiofrequency ablation and ultrasound-guided foam sclerotherapy with surgical ligation and stripping for the treatment of lower extremity varicosities and concluded that endovenous laser therapy was more effective than the other minimally invasive techniques. The conclusions were appropriate and reflected the evidence, but their reliability needs to be confirmed with randomised controlled trials.

Authors' objectives
To compare the effectiveness of minimally invasive techniques (endovenous laser therapy (EVLA), radiofrequency ablation (RFA) and ultrasound-guided foam sclerotherapy (UGFS)) with surgery (ligation and stripping, great saphenous vein or small saphenous vein) for lower extremity varicosities.

Searching
MEDLINE, The Cochrane Library and CINAHL were searched up to February 2007 without language restrictions. Search terms were reported. Specialty journals, reference lists of retrieved articles and clinical trial registries were searched.

Study selection
All clinical studies (randomised controlled trials, open and case studies) on the treatment of lower extremity varicosities with minimally invasive techniques such as small saphenous vein, great saphenous vein, endovenous laser therapy, USFS and radiofrequency ablation were eligible for inclusion. Only studies that used ultrasound examination as an outcome measure were eligible.

In the included studies, 23% of 12,320 limbs were stripped, 17% were treated by UGFS, 40% were treated by endovenous laser therapy and 20% were treated by radiofrequency ablation. Most studies had a follow-up between three months and 10 years. A proportion of studies reported separate results for ligation and stripping of great saphenous veins and small saphenous veins. Nine of the 10 studies that assessed UGFS used aethoxysclerol, one used only sodium tetradecyl sulfate and three studies used both sclerosants. Given various definitions of the outcome of treatment success by ultrasound in the included studies, a consensus of three authors agreed on a standardised definition.

The authors stated neither how the papers were selected for the review nor how many reviewers performed the selection.

Assessment of study quality
Quality assessment of the included studies was not performed, but the authors distinguished between retrospective and prospective data collection for the studies that were case series.

Data extraction
Data were extracted on the type of veins treated (great saphenous or small saphenous), treatment procedure, study type, follow-up, ultrasound outcome definitions and success rate.

Two reviewers independently extracted data on the included studies; it was not reported how disagreements were resolved.

Methods of synthesis
Characteristics of each included study were reported in tabular format. Natural logarithms of the odds of success were derived for each study and pooled estimates of success rate, with 95% confidence intervals (CIs), were calculated for all four treatments using a random-effects model with one general random intercept. Treatments were used as covariates in the model and summary log odds ratios were used to compare differences between treatments. Meta-regression was
undertaken with follow-up time per treatment to display success rates for different time intervals of follow-up. Subgroup analysis was undertaken according to study type and study size (more or less than 60 limbs). Between study variances of models with and without covariates were compared to assess heterogeneity.

Results of the review
Sixty-four studies with 72 arms (number of limbs=12,320) were included: seven were randomised controlled trials (RCTs) and the rest were prospective or retrospective case series. Results were reported with great saphenous and small saphenous veins combined.

After three years follow-up, pooled success rates were: 78% (95% CI, 70% to 84%) for small saphenous/great saphenous veins; 77% (95% CI, 69% to 84%) for UGFS; 84% (95% CI, 75% to 90%) for radiofrequency ablation; and 95% (95% CI, 87% to 98%) for endovenous laser therapy.

After adjusting for follow-up, UGFS and radiofrequency ablation were as effective as small saphenous/great saphenous veins. Adjusted odds ratios (AOR) were 0.12 (95% CI -0.61 to 0.85) for UGFS and 0.43 (95% CI -0.19 to 1.04) for radiofrequency ablation. Endovenous laser therapy was significantly more effective compared with small saphenous/great saphenous veins (AOR 1.13, 95% CI 0.4 to 1.87), UGFS (AOR 1.02, 95% CI 0.28 to 1.75) and radiofrequency ablation (AOR 0.71, 95% CI 0.15 to 1.27).

Subgroup analyses (analysis restricted to only prospective studies, studies that treated >60 limbs and studies only of great saphenous veins) confirmed the main result that endovenous laser therapy was significantly more effective than the other therapies.

Authors’ conclusions
In the absence of large RCTs, minimally invasive techniques (UGFS, radiofrequency ablation and endovenous laser therapy) were at least as effective as surgery in the treatment of lower extremity varicose veins.

CRD commentary
The review addressed a clear research question. Inclusion criteria appeared appropriate for participants, interventions and outcomes. Inclusion criteria were very broad for study design and most studies were case series without comparisons; the authors acknowledged that these criteria were chosen because of lack of comparative RCTs. Several relevant sources were searched without language restrictions to identify potential studies. Attempts were made to identify unpublished studies, but publication bias was not formally assessed. Methods were used to minimise bias and reviewer error in the extraction of data, but it was not reported whether such methods were used for selection of studies. No validity assessment was undertaken, other than determination of whether studies were prospective or retrospective, so it was not possible to determine whether study quality influenced the results. Subgroup and sensitivity analyses were performed for type of study, duration of follow-up and study size; these confirmed the overall results. Heterogeneity was partly addressed by the prespecification of subgroups, but there was no indication of the degree of heterogeneity in overall analyses or subgroup analyses; visual inspection of the forest plots suggested that this might be substantial. The authors acknowledged that differing definitions of success used in the included studies may have affected results. The authors’ conclusions were appropriate and reflected the evidence base, but given the low level of study designs and some methodological weaknesses in the review process the reliability of the conclusions is unclear and needs to be confirmed with RCTs.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice
Research: The authors suggested that large long-term comparative RCTs were needed and that these should include patient-reported outcomes, cost effectiveness analyses and safety assessment.

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