Liquid versus foam sclerotherapy
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CRD summary
The authors concluded that foam sclerotherapy showed much greater efficacy than liquid sclerotherapy for saphenous veins. There was no conclusive evidence for reticular veins and telangiectases. The authors' conclusions represented the evidence presented, but no comparative measures were reported and the authors' conclusions should be interpreted with caution.

Authors' objectives
To compare the efficacy and safety of foam sclerotherapy versus liquid sclerotherapy for the treatment of primary varicose veins of the lower limbs

Searching
MEDLINE, PubMed, EMBASE and Institut de l'information Scientifique et Technique databases were searched up to April 2009. There were no language or year of publication restrictions. Search terms were reported. Abstracts of conference proceedings were searched. Electronic and manual searching of journals not consistently indexed in the major databases was performed.

Study selection
Eligible studies were randomised controlled trials (RCTs) and non-randomised comparative studies that evaluated the efficacy and safety of foam sclerotherapy versus liquid sclerotherapy for venous disease. Studies were divided into two groups for the types of veins treated: saphenous veins and reticular veins/telangiectases.

All studies of saphenous veins included great saphenous veins; two also included small saphenous veins and one also included other types of varices. The primary outcome measure was success rate, which was defined as duplex ultrasound criterion (disappearance of abnormal reflux, vein occlusion). Secondary outcomes included refilling time (air plethysmography), quality of life and patient satisfaction. Most studies used a direct puncture injection technique and foam produced using the Tessari method (three-way stopcock) or an equivalent two-way valve connector. Three studies reported a method of compression after treatment. Two studies reported that no compression was used. One study provided no information on compression. The required diameters for treated saphenous veins, volumes of sclerosing agent and air, and number of sessions of treatment varied.

In all studies of reticular veins and telangiectases, treatment was applied to the lateral thigh and foam was produced using the Monfreux method with 0.25% polidocanol. The primary outcome measure was patient and investigator satisfaction score. One study reported that a method of compression was used after sclerotherapy; the other study did not provide any information on this. The number of sessions of treatment varied between studies.

The authors did not state how many reviewers were involved in study selection

Assessment of study quality
The authors did not state whether study quality was assessed.

Data extraction
For saphenous veins, data were extracted to calculate success rate and 95% confidence intervals (CI) for each treatment arm. For reticular veins and telangiectases, data on patient/investigator satisfaction scores were extracted as reported in the articles. Adverse event data were extracted.

Methods of synthesis
The authors presented the number of veins treated and the success rate/satisfaction scores and 95% CI in tables. Success rates and 95% CI of a subset of studies in saphenous veins were combined in a meta-analysis. Heterogeneity was assessed using the X² test. The authors used a narrative synthesis for success rate/satisfaction score and side effects.
Results of the review

Six studies of saphenous veins (four RCTs and two non-randomised comparative studies) and two studies of reticular veins and telangiectases (one RCT and one non-randomised comparative study) were included in the review. Follow-up in the saphenous vein studies ranged from six months to 10 years. Follow-up in the reticular veins and telangiectases studies ranged from five weeks to 75 days.

**Saphenous veins:** In studies of saphenous veins, all success rates were in favour of foam (lowest 67%, 95% CI 59% to 75% and highest 84%, 95% CI 74% to 94%) compared with liquid (lowest 17.5%, 95% CI 6% to 29% and highest 76%, 95% CI 69% to 83%). Four studies (three RCTs and one non-randomised comparative study) were combined in a meta-analysis. This meta-analysis did not report a comparative outcome measure for foam and liquid, but instead reported a separate outcome for each type of treatment. Success rate was statistically significantly greater with foam (76.38%, 95% CI 71% to 82%) compared with liquid (39.5%, 95% CI 33% to 43%). There was evidence of statistically significant heterogeneity (p≤0.0001).

Side effects were reported to be rare for all trials. One study reported that 2.5% of patients who received foam experienced visual disturbance that lasted less than two minutes compared with none in the liquid group. One study reported that 0.2% of patients in the foam group experienced unspecified side effects compared to 2.4% in the liquid group. One study reported that local reactions were rare and moderate with no statistical differences between groups. One study reported that there was no difference in adverse events (paraesthesia included) between the two groups.

**Reticular veins and telangiectases:** One of the two studies of reticular veins and telangiectases showed a higher patient and investigator satisfaction score for foam (80%) compared to liquid sclerotherapy (59.3%). The other study found no significant difference in median patient satisfaction score or in expert scores between the two groups. Both studies reported that local side effects (pigmentation, microthrombi, matting) were more common in the foam group than the liquid group, but this was not statistically significant.

Authors’ conclusions

Foam sclerotherapy showed much greater efficacy compared to liquid sclerotherapy for saphenous veins. For reticular veins and telangiectases, comparative trials did not provide conclusive evidence to support the superiority of efficacy of one form over the other. Concerning side effects, no statistical significant differences were found between liquid and foam sclerotherapy.

CRD commentary

The review addressed a clear research question supported by adequate inclusion criteria. The search strategy was good and was not restricted by language. The authors did not report how many reviewers performed study selection or data extraction and so it was unclear whether these were subject to reviewer error or bias. The authors did not report whether study quality was assessed and so the reliability of the included studies was unclear. Throughout the analysis, including the pooling of a subset of studies of saphenous veins, data for the two intervention arms were handled separately and no comparative measures were reported.

The authors' conclusions represented the evidence presented, but should be interpreted with caution because data for the two intervention arms were handled separately throughout the analysis and no comparative measures were reported.

Implications of the review for practice and research

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that trials concerning reticular veins and telangiectases should take into account that practitioners tended to use the Tessari method or two-way valve connector. Comparative studies of compression versus non-compression were needed for an accurate determination of the expected role of compression in sclerotherapy and a protocol for its application.

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