Ultrasound-guided foam sclerotherapy of the small saphenous vein

More than just an alternative treatment?

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Keywords
Small saphenous vein, ultrasound guided foam sclerotherapy

Summary
Ultrasound guided sclerotherapy (UGFS) of varicose veins is a worldwide spread method, in many countries recognized by guidelines. Important for the outcome is the patients history, clinical investigation and a detailed colour coded ultrasound mapping previous to UGFS. In previous studies varicose small saphenous vein (SSV) treatment with UGFS were reported to have worse results compared to GSV. Other studies report good outcome after UGFS of SSV varicose veins up to 12 months follow up. In my experience UGFS of insufficient SSV is safe and effective with high patient’s satisfaction, good longterm results and improvement in quality of life. UGFS can be used in all age groups. UGFS has the additional benefit that repeated treatments are easy to perform if needed and that this method is very cost effective. Treatment sessions last 20 to 30 minutes so that patients do not need significant time off work.

Methods
UGFS may be indicated if the SSV is incompetent to the mid-calf (Reflux: >0.5 sec). The contraindications given in the guidelines must be respected (12).

Before treatment begins, the medical records of the patient and his family should be reviewed, and he should be examined clinically and with colour-coded duplex ultrasound (CCDU). The focus of the CCDU examination is on the superficial, deep and perforating veins. This is followed by functional examination by light reflection rheography and/or venous occlusion plethysmography.

During treatment the patient lies on his stomach with the lower leg slightly raised (approx. 30%). Fine-bubble foam sclerosant is injected under colour duplex ultrasound guidance (Caution: a small artery ant is injected under colour duplex ultrasound guidance (Caution: a small artery

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Varicosis of the small saphenous vein (SSV) accounts for around 15% of varices; if untreated it can lead to venous ulcer (18). The SSV and its treatment are not comparable with the great saphenous vein (GSV). The length of the varicose section requiring treatment may vary considerably, as may the pressure column. The proximity of the SSV to nerves such as the sural nerve gives rise to additional risks in SSV treatment (19, 21).
procedure at a concentration of 1–3 % depending on the diameter of the vein.

The amount of sclerosant foam is calculated according to the diameter and length of the incompetent section of the SSV. In my opinion the volume used should be considerably less than the maximum of 10 ml given in the European guidelines, in order to minimise the risk of thrombosis (6, 12).

The foam is injected under CCDU guidance, generally approximately 10 cm distal of the popliteal fold. Varicose tributaries of the SSV can be treated in the same session, or a few weeks later if still necessary. After the injection, the patient should remain lying for another 3–5 minutes. Eccentric compression should then be applied to the course of the SSV. This is provided by a thigh-length Class II compression stocking which is left in place for 48 hours.

Thereafter the patient wears the Class II compression stocking by day for another 3–4 weeks. After treatment the patient should walk for 1 hour. Thrombosis prophylaxis is required where there is a high risk of thrombosis.

After one week the patient returns for clinical and ultrasound check-up. If necessary a second UGFS can be carried out on the SSV or a varicose tributary at the same session. In this case a further check-up of the deep and surface veins should be carried out with CCDU one week later.

A short film of UGFS of the SSV can be downloaded from the DGP home page (www.phlebo logy.de) under „Videos“.

### Side effects

Guexx et al. report 1 deep vein thrombosis, 4 cases of thrombosis in muscle veins and

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**Tab. 1** UGFS of the SSV – overview of outcomes

<table>
<thead>
<tr>
<th>Author</th>
<th>Year of publication</th>
<th>N SSV</th>
<th>L lg/foam</th>
<th>Follow-up</th>
<th>Check-up</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildenhuis (5)</td>
<td>2005</td>
<td>21</td>
<td>Foam/Catheter</td>
<td>2 years</td>
<td>UG</td>
<td>88 % of all SSV and GSV</td>
</tr>
<tr>
<td>Coleridge-Smith (3)</td>
<td>2006</td>
<td>145</td>
<td>Foam</td>
<td>11 Months</td>
<td>UG</td>
<td>83 %</td>
</tr>
<tr>
<td>Meyers (8)</td>
<td>2007</td>
<td>174</td>
<td>Foam</td>
<td>3 years</td>
<td>UG</td>
<td>52.4 %</td>
</tr>
<tr>
<td>O’Hare (22)</td>
<td>2008</td>
<td>5</td>
<td>Foam</td>
<td>6 Months</td>
<td>UG</td>
<td>20 % complete, 40 % partial</td>
</tr>
<tr>
<td>Darvall et al. (17)</td>
<td>2009</td>
<td>92</td>
<td>Foam</td>
<td>12 Months</td>
<td>UG</td>
<td>91 %</td>
</tr>
<tr>
<td>Murena-Schmidt (26)</td>
<td>2013</td>
<td>104</td>
<td>Foam</td>
<td>2 years/5 years</td>
<td>UG</td>
<td>83 % / 66.1 % complete occlusion, 15.4 %, 30.4 % partial occlusion</td>
</tr>
</tbody>
</table>

SSV: Small saphenous vein; GSV: Great saphenous vein; UG: Ultrasound-guided
Discussion

The anatomical variants of the SSV and saphenopopliteal junction make surgical procedures difficult; other treatment alternatives are therefore needed (23, 25).

Study results of UGFS of the SSV are comparable with those of other forms of treatment. The SSV occlusion rates with UGFS in comparative studies between this treatment and other ablative procedures are similar or even favourable (19).

No cases of nerve damage are described for UGFS, whereas they do occur after surgical interventions and endovascular laser treatment (16, 19, 24).

One possible problem is hyperpigmentation after foam sclerotherapy, especially of tributaries which have developed varicosity in association with the SSV. These problems may be visually disturbing for the patient, however in most cases they disappear naturally (4).

Thrombophlebitis may occur but responds well to treatment (4).

In Quality of Life analyses, UGFS performs as well as other ablation treatments (14, 17, 19), while it offers clear advantages in the amount of time required off work (14). The ease of application of UGFS is also a clear advantage. If further sclerotherapy is required, the procedure can simply be repeated. It is also a cost-effective method. Treatment time is short (around 20–30 minutes) and anaesthesia is not needed. UGFS can be applied to patients taking oral anticoagulation and to all age-groups.

There is a learning-curve which must be respected. There is a lack of large comparative randomised clinical studies with at least 5 years’ follow-up (13).

The literature can be downloaded from www.phlebologieonline.de.

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