

European Consensus Meeting on Foam Sclerotherapy, April, 4–6, 2003, Tegernsee, Germany

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BACKGROUND. The introduction of sclerotherapy using foam sclerosants has revitalized interest in this method of treating varicose veins. Foam is made from detergent-type sclerosants already established as safe and effective in conventional liquid sclerotherapy.

OBJECTIVE. European experts in foam sclerotherapy were invited to exchange their opinions and to work on consensus statements and recommendations.

METHODS. A questionnaire covering different areas of foam sclerotherapy was sent to experts who have published or presented data, participated in clinical trials, or otherwise contributed to sclerotherapy with extemporaneous (self-made) foam. Based on the answers, several consensus statements and recommendations were approved during the consensus meeting.

RESULTS. The use of sclerosing foam is an appropriate procedure in the treatment of varicose veins. It is a powerful tool in the hands of an expert who has sufficient experience in sclerotherapy. Sclerosing foam is more powerful than liquid. Most recommendations for conventional liquid sclerotherapy also apply to foam sclerotherapy. Some differences between these two treatments were highlighted.

CONCLUSION. Foam sclerotherapy is a variation of a well-established treatment that improves varicose vein management. European experts came together to harmonize their opinions about sclerosing foam. The final document reflects the experts' opinion with the aim of defining principles for a safe and effective use of sclerosing foam and for its practical application. Foam sclerotherapy allows a skilled practitioner to treat larger veins including saphenous trunks.

FRANZ-XAVER BREU AND STEPHAN GUGGENBICHLER HAVE INDICATED NO SIGNIFICANT INTEREST WITH COMMERCIAL SUPPORTERS.

THE AIM of sclerotherapy is the elimination of intracutaneous, subcutaneous, and/or trans fascial varicose veins (perforating veins). The contact of the sclerosant with the endothelium leads to changes in the venous wall and to a local clot formation.¹ In the long term, successfully treated veins will be transformed into fibrous cords that cannot recanalize. The functional result corresponds to the surgical removal of a varicose vein.²

Varicose vein treatment with liquid sclerosing drugs has been performed for almost 100 years. This started with the work of Paul Linser in 1911³ and, independently, with that of Jean Sicard in 1916.⁴ There followed a search for sclerosing agents with fewer side effects than those used initially. The outcome of treatment using sclerosing drugs was not always very satisfactory during the period in which it was introduced.

In 1944, Egmont James Orbach⁵ described a new technical enhancement in varicose vein sclerotherapy. A small amount of air was injected into the vein before the liquid sclerosing solution to clear the vessel from blood and to allow undiluted contact of the drug with the endothelium. This procedure, known as "air block," was improved during the decades that followed.

The introduction of detergent sclerosing solutions allowed the production of foam. Initially, these were

used to replace the "air" in the air block⁶ and later on were used alone.^{7,8} Various techniques of foam preparation have been described since 1944. These range from "aspirating" (Flückiger,⁷ Gachet,⁹ and Sigg⁶), "stirring" (Cabrera and Garcia-Olmedo¹⁰), or "pumping" (Tessari,¹¹ Frullini,¹² and Grigg¹³) to the use of special devices (Mayer and Brücke⁸) and pressurized systems (Garcia-Mingo¹⁴). Foam produced immediately before the injection is now called "extemporaneous foam."

In the 1990s, the publications of Juan Cabrera^{10,15} and Alain Monfreux¹⁶ once again awakened interest in foam sclerotherapy. This has led to a renaissance of sclerotherapy in general. Doctors treating patients with varicose veins have been especially attracted to the use of duplex-guided sclerotherapy,^{17,18} which has been combined with foam sclerotherapy. A growing number of publications has appeared on this subject alongside articles describing other new techniques. These have provoked discussion as to whether foam sclerotherapy can be used as a single treatment of varicose veins or in combination with other techniques.

Three main methods have been described for conventional liquid sclerotherapy—sometimes called "schools"—which are named after their protagonists: the techniques of Tournay,¹⁹ Sigg,²⁰ and Fegan²¹

(consensus conference on sclerotherapy by Baccaglini et al.²²). In everyday practice experienced sclerotherapists combine the features of these schools according to their personal experience.^{23,24}

In foam sclerotherapy, the situation is different at present: There is no “foam sclerotherapy school” providing a well-defined procedure, because the “procedure” itself is not sufficiently well established. Various techniques of foam preparation,^{11,13,16,25–30} different treatment regimens,^{28,31} indications,^{32,33} etc., exist—there is no generally or widely accepted “state of the art” despite the widespread use of this technique.

The idea of highlighting basic principles for sclerotherapy with extemporaneous foam emerged during an expert meeting on sclerotherapy, which took place in Tegernsee, Germany, in 2001. The participants in this meeting decided that it would be useful to prepare guidelines for treatment using foam sclerotherapy. The participants of the second symposium were invited because of their expertise in this field and entitled this symposium “Consensus Meeting on Foam Sclerotherapy.”

Objective

Those who have used foam sclerotherapy have been impressed by the efficacy of this method of treatment. Nevertheless, only limited scientific and experimental data have been published; the purpose of the meeting was to combine expert opinion and experience to make recommendations or practical suggestions or prepare consensus statements on foam sclerotherapy. Any consensus should address important aspects of the technique, such as methods and strategies (1) before the treatment (equipment, diagnosis, indications, contraindications, and patient information); (2) during treatment (body position, concentration of sclerosing solution, foam volumes, injection variables, and duplex guidance); and (3) after treatment (safety criteria, efficacy criteria, compression, and treatment control). General aspects and other topics were also to be discussed.

Methods

The first stage was for the organizing committee to draw up a questionnaire covering all areas of foam sclerotherapy. This was sent to specialists in this area who have published or presented data, who have participated in investigator-initiated clinical studies, or who have otherwise scientifically or medically contributed to extemporaneous foam sclerotherapy. One main aspect of the questionnaire was to clarify any differences between conventional liquid sclerotherapy and foam sclerotherapy. The results of this survey were the basis of the consensus meeting.

The answers were then analyzed, and topics with converging or divergent opinions were identified. When possible, charts representing the experts' initial answers were drawn up with a view to the planned discussions during the meeting. (The charts in this publication do not always therefore represent the final and approved consensus, but rather the results of the survey.)

In cases where there was low or very little divergence of views, a preliminary “Consensus Proposal” was put forward. In other cases, where the answers were more diverse, different consensus proposals were drafted, or the participants' individual answers were prepared for presentation at the meeting. The meeting was held on April 4–6, 2003, in Tegernsee, Germany. In this consensus meeting, the participants' answers and each consensus proposal were presented and discussed. When necessary, the wording of the proposals was modified. New topics arising were also discussed, and a subcommittee was set up with the objective of proposing a definition of “sclerosing foam” (A. Frullini and J. C. Wollmann). All results, changes, and statements made were revised during the meeting sessions and presented online to the participants. Only after acceptance, did a consensus proposal become a “consensus statement.”

After the meeting, a draft consensus document was generated and sent to all participants for discussion and approval. The draft was finalized for publication after approval of all participants.

Results

A number of general statements were proposed, discussed, and approved by the participants in addition to the discussion on the consensus proposals. It was believed that the consensus statements should refer to these “general statements” and that a short description of the most frequently used methods for foam preparation should be included at the beginning of the document, together with the definition of “sclerosing foam”:

General Statements

The use of sclerosing foam is an appropriate procedure in the therapy of varicose veins. It is a powerful tool in expert hands and is in general more effective than the use of a liquid. It is recommended that good skills in conventional liquid sclerotherapy be developed before starting the use of foam sclerotherapy.

Definition of Sclerosing Foam

Sclerosing foam is a nonequilibrium dispersion of gas bubbles in a sclerosing solution, where the sclerosing solution contains surface-active molecules, where the gas is physiologically tolerated at therapeutic doses,

and where the gas fraction is equal to or greater than 0.52. Sclerosing foam is characterized by (at least) the following variables: type and concentration of the tensioactive sclerosing agent, type of gas, ratio of liquid to gas, the method of preparation, the time between processing and use, and bubble sizes. These characteristics mainly determine the foam properties viscosity and stability (or deterioration). It is the characteristics and properties of sclerosing foams that account for their action, that is, their efficacy and safety, with enhancement of sclerosing power. The behavior of sclerosing foam is quite different compared to the action and the properties of liquid sclerosing solutions.

Methods for the Preparation of Extemporary Foam (Figure 1)

The Monfreux method¹⁶

Sclerosing foam is generated using a glass syringe that contains liquid sclerosing solution. The outlet of the syringe is sealed by a rubber or plastic cap. Pulling back the piston generates a subatmospheric pressure, drawing air into the syringe through the gap between the syringe body and the piston. A rather fluid foam with fairly large bubbles is generated. Monfreux foam properties vary with the concentration of the liquid sclerosing solution, the type of syringe, and the mode of pulling back the piston.

The Tessari technique^{11,34,35} and the double-syringe system (DSS) technique^{27,30}

Sclerosing foam is generated with two disposable plastic syringes. One syringe contains the liquid sclerosing solution, and the other contains air. The outlets of the syringes are connected with a three-way-tap or a two-way-connector. Pumping the contents of both syringes backward and forward (approximately 20 times for the original Tessari technique (also known as Tourbillon technique) or 5 times with additional pressure and 7 times without additional pressure for the DSS technique, a variation of the basic technique by Tessari) causes a turbulent flow that generates foam. The liquid-to-air ratio varies from 1:4 (one plus

three) to 1:5 (one plus four) for the original Tessari technique. The double-syringe system version is defined for 3% polidocanol solution, two latex-free 10-mL syringes (one with rubber plunger) and a fixed liquid-to-air ratio of exactly 1:5 (one plus four). Tessari’s technique gives a small-bubbled foam, which is rather fluid if low concentrations of sclerosants are used or viscous if high concentrations of sclerosants are used. The DSS procedure gives small-bubbled viscous foam. Foam properties vary with the concentration of the liquid sclerosing solution, the types of syringes, and the mode of pumping (i.e., the number of movements and any application of additional pressure with the thumb while pumping, as in the double-syringe system).

Consensus Statements

1. Equipment

The question of extra equipment aimed at identifying any devices or tools that are necessary or helpful for foam sclerotherapy, in addition to the devices used in conventional liquid sclerotherapy. In the questionnaire, most participants stated that (color) duplex was necessary for foam sclerotherapy (Figure 2).

During the meeting, the role of emergency equipment was discussed. It was recognized that the use of foam as opposed to liquid sclerosants did not call for any additional equipment. Concerning photoplethysmography, no consensus could be reached. The term “mandatory” of the consensus proposal was replaced by “recommended,” and the use of (color) duplex was limited to large veins only, resulting in the first consensus statement:

Consensus 1 (Equipment):

Besides the device for the production of foam the following equipment is recommended for foam



Figure 1. Methods for the preparation of extemporary foam. Left, Monfreux technique; middle, Tessari technique; right, double-syringe technique.

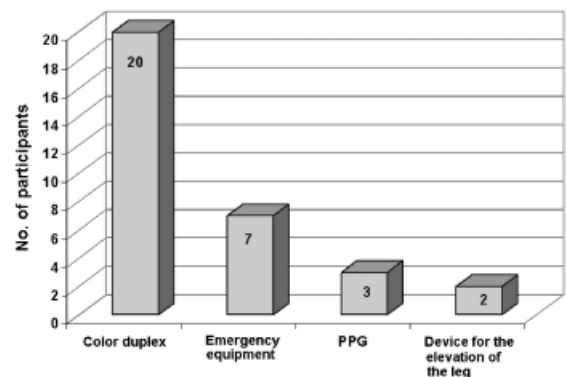


Figure 2. Initial answers to the question: “Besides the devices for the production of foam, what extra equipment is mandatory for foam sclerotherapy?” (more than one answer could be given). PPG = photoplethysmography.

sclerotherapy: duplex ultrasonography (for large veins), a device for elevation of the leg (for large- and medium-size varicose veins, CEAP classification C₂–C₆). The entire equipment that is necessary for conventional liquid sclerotherapy in general is also necessary for foam sclerotherapy. There is no difference between conventional liquid sclerotherapy and foam sclerotherapy concerning the emergency equipment which should be available.

2. Diagnostics

After clinical examination of patients, some diagnostic tools are commonly used to check for treatment indications and contraindications before sclerotherapy.² After treatment, the success of the treatment is usually evaluated clinically and by the use of diagnostic tools:

Consensus 2 (Diagnostics):

There is no difference between conventional liquid sclerotherapy and foam sclerotherapy concerning pre- and posttreatment diagnostics.

3. Indications

The question of indications for foam sclerotherapy comprised two main aspects: sizes of veins to be treated and “new” indications that could probably be (or even have already been)^{32,33} treated with sclerosing foam. During the analysis of the experts’ answers, two features became apparent: First, there was a caliber range that was treated with foam by all of the participants. Second, certain caliber thresholds (limiting vein sizes) were identified. Some of the participants do not use foam for very large veins, whereas others do not use sclerosing foam for small veins (telangiectases). Twenty-nine percent of the participants use foam to treat veins with diameters of 1 mm and below, 96% treat veins from 3 to 6 mm, 84% treat veins from 6 to 8 mm, 60% treat veins up to 15 mm, and 25% treat veins larger than 18 mm. (Some of the participants are in more than one of the “groups” indicated above.)

During the discussion in the meeting, it became clear that the experts had experience mainly with two different foam “qualities”: The one-quarter of all of the participants who treat small veins with foam tended to use fairly liquid foams (Monfreux foam or equivalent), whereas three-quarters of all of the participants who treat large veins used more viscous foams (Tessari/double-syringe-system foam). The following consensus, taking the differences of foam into consideration, was approved:

Consensus 3 (Indications):

In principle all vein calibers are suitable for foam sclerotherapy. Based on the literature and on the

experience of most of the participants, foam gives a better outcome in larger vein calibers (C₂ varicose veins) and recurrent varicose veins (compared to conventional sclerotherapy). Some published data show good results in venous malformations. A minority of the participants use foam in telangiectasia. The following should be taken into account:

The larger the diameter of the vein, the more viscous the foam should be to obtain better results. With “liquid” foams no lower size limit exists, but an upper caliber threshold is recognized. Above this threshold, liquid foams are probably not sufficiently effective.

The smaller the diameter of the vein the more liquid the foam should be for easier injection and to reduce possible tissue damage. With viscous foams a lower caliber threshold exists. Below that, vein-size viscous foams could cause more tissue damage.

Potential new indications for foam sclerotherapy were discussed (Table 1). It must be emphasized that for these theoretical indications there is neither large experience nor sufficient clinical data to confirm efficacy of foam sclerotherapy.

4. Contraindications

It is obvious that the known contraindications for conventional liquid sclerotherapy (e.g., allergy to the sclerosant or acute superficial or deep-vein thrombosis) are also applicable for foam sclerotherapy. The question if (and how) patients with patent foramen ovale (PFO) can be treated with foam sclerotherapy aroused controversial discussions. There is currently no evidence of any increased risk in PFO patients. Nevertheless, consideration of a higher risk and the use of restricted amounts of foam is recommended in symptomatic PFO patients.

For patients with migraine or a history of it, there probably is an increased incidence of transient “visual disturbance.”³⁶ But because no correlation of this finding to foam sclerotherapy has been shown so far, migraine was not considered a contraindication for

Table 1. Possible New Indications for Foam Sclerotherapy

- Interventional angiographic procedures
- Pelvic congestion syndrome
- Varicocele
- Hydrocele
- Angiodysplasia
- Metastatic lesions
- Vascular malignant tumors
- Baker's cyst

foam sclerotherapy in general (see also “Safety Criteria and Adverse Events”):

Consensus 4 (Contraindications):

Contraindications for foam sclerotherapy are the same as for classic liquid sclerotherapy. Patients with known symptomatic patent foramen ovale should be treated with special care (for example, using a smaller amount of foam).

5. Patient information

All participants agreed that the patient must be sufficiently informed about benefits and risks, including possible complications of the approach. In principle sclerotherapy with a sclerosing foam obtained from an approved sclerosing solution and a defined procedure can be used within the limits of “freedom to choose the appropriate treatment.” Additional information should be given to the patient:

Consensus 5 (Patient Information):

Based on the present available patient information on conventional liquid sclerotherapy, the following items should be added in the case of foam sclerotherapy:

Foam sclerotherapy is a development of an already existing method, using a sclerosing agent that has been successfully used for decades.

In experienced hands the results of this method have proved to be superior in some indications although the time of experience is shorter than with conventional liquid sclerotherapy.

With duplex ultrasound guidance there is better control of injection of large varices.

There is no difference between conventional liquid sclerotherapy and foam sclerotherapy with regard to the instructions to be followed after the treatment given to the patient.

6. Body position

The discussion about the optimal body position for foam sclerotherapy revealed several differences of opinion. For treatment of large veins discussion concerned leg elevation and the position of the upper part of the body (some participants preferred slight elevation of the upper body with the legs in the horizontal position, whereas others preferred leg elevation). Several participants stated that leg elevation would be helpful in sclerotherapy in general, because the diameter of the vein to be treated is reduced. Leg elevation would prevent the foam from entering the deep venous system, for example, at the saphenofemoral junction. In the elevated leg position, the foam will ascend to more distal parts of the vein

and eventually be able to close incompetent saphenous side branches or tributaries. No participant suggested that the injection of foam should be given while the patient is standing. Usually the patient is in a supine position, regardless of the indication for foam sclerotherapy. The following consensus was approved:

Consensus 6 (Body Position):

For treatment of larger veins the elevation of the leg is recommended by the majority of the participants. No consensus was reached concerning the position of the upper body (elevated or not elevated).

7. Concentration of sclerosing solution for preparation of sclerosing foam

There was the unanimous opinion that sclerosing foam is in general more effective than the corresponding liquid sclerosing solution. This means that the therapeutic effect can be achieved with a lower concentration and/or a smaller amount of sclerosing agent. Alternatively the same amount and concentration of sclerosant can be used to achieve a stronger effect.

The only prospective, randomized, controlled multicenter trial to date has shown that foam compared to the same amount (2.0–2.5 mL) and same concentration of liquid polidocanol (3%) was superior in eliminating pathological reflux of incompetent long saphenous veins and more powerful in producing vascular spasm, without causing more or different side effects.^{27,37–39} For small veins (telangiectasia and reticular veins) foam of the same concentration (0.25%) and amount as the liquid sclerosant was a little more effective, but had twice the adverse events as liquid.⁴⁰ The following statement was agreed:

Consensus 7 (Concentration of Sclerosing Solution for Preparation of Sclerosing Foam):

It is necessary to take into account the fact that foam is more powerful than liquid in selecting the concentration of the sclerosing solution. There is strong evidence that the end point of therapy can be achieved with foam prepared with lower sclerosant concentrations compared to liquid. There was no consensus concerning the proper concentration of liquid sclerosant used to prepare sclerosing foam.

8. Volume

The discussion about the “correct volume” of foam revealed several different opinions among the experts. Different indications must be taken into account. Foam volumes used by the experts also depend on the treatment strategy; that is, more foam is used in a single (“all-in-one”) session (for example, if a catheter is introduced for endovascular foam delivery) and less

foam is used if several (“step-by-step”) sessions are planned. For the treatment of the greater saphenous veins, the answers of the survey ranged from 2 to 10 mL of sclerosing foam per injection, and for small saphenous veins, from 1 to 4 mL of foam. A consensus was finally reached representing the opinion of the majority. The wording focuses on the maximum safety of patients.

Consensus 8 (Volumes):

The recommendations were prepared principally for safety reasons for different vein calibers and structured according to the CEAP classification:^{41,42}

For C₁ telangiectasia, reticular veins

- Volume per single injection

Not more than 0.5 mL of foam *per injection* should be used with the Tessari and Monfreux techniques.

- Volume per session

A consensus was found: The majority of participants stated that 6–8 mL of foam (Tessari technique) or 4 mL of foam (Monfreux technique) could be injected per session. No consensus was achieved for the opinion of a minority who stated that 12 to 14 mL of foam (Monfreux technique) could be injected per session.

For C₂–C₆ varicose veins

- Volume per single injection

At the moment no clinical data concerning the best amount of foam per injection exist.

- Volume per session

With the Tessari/double-syringe technique: 6 to 8 mL per session;

With the Monfreux technique: approximately 4 mL per session;

In general: not more than 3 mL for small saphenous veins.

9. Injection variables (number, order, and place of injection)

Two recommendations were approved for the injection of foam: for large veins, the injection should be given at a safe location, and fewer injections are generally necessary if foam is used. Most sclerotherapists treat varicose veins from proximal to distal, that is, starting with the larger veins (with reflux) before the smaller veins are treated. There seems to be no reason to change this order when foam is used instead of liquid. Only a few inject in the opposite way, that is, from distal to proximal. After injection of viscous foam into large veins, the foam column may in any case be

directed manually from the point of injection to other areas, by changing the position of the legs or with the duplex probe.

Consensus 9 (Injection Variables):

There are differences between conventional liquid sclerotherapy and foam sclerotherapy. With foam sclerotherapy, the number of injections is rather fewer, and the distance between injection sites can be increased, compared to conventional liquid sclerotherapy. One or two injections (per session) are usually sufficient for large veins. Sometimes it is sufficient to inject a single dose of foam. On the subject of the exact number of injections no consensus could be achieved.

Concerning the best place for injection for telangiectasia and reticular veins, most participants saw no difference between conventional liquid sclerotherapy and foam sclerotherapy. In foam sclerotherapy of long saphenous veins and small saphenous veins with “open-needle” (needle placement without the syringe being connected) and/or “direct puncture” techniques, the puncture should be at the safest and the most accessible location according to the pretreatment duplex examination. The distance to the saphenofemoral junction should be at least 10 cm.

There is no difference between foam sclerotherapy and conventional liquid sclerotherapy concerning the optimal order of injections.

10. Duplex guidance

One major advantage of sclerotherapy of large varicose veins with foam is its easy identification by ultrasonography. The injection itself (correct location of the needle) and the initial effects (spreading of the foam, displacement of blood, and vasospasm) are visible in real time. Therefore, for certain locations and vein sizes, the following statement was approved for consensus:

Consensus 10 (Duplex Guidance):

For saphenous and perforating veins, for veins in the groin or the popliteal fossa, and for recurrent varicose veins, duplex guidance is recommended. For side branches duplex guidance is useful. The ultrasound frequencies most commonly used by the participants are 7.5 to 13 MHz.

11. Safety criteria and adverse events

In general side effects that occur following conventional liquid sclerotherapy may also occur with foam sclerotherapy. The opinion was that adverse events do not occur more frequently when small amounts of foam are used. Theoretical considerations are that

larger amounts of foam or administration in too close a proximity to deep veins may more easily provoke deep venous thrombosis.³¹ Reports in published data show that adverse events do not seem to occur more often if foam is used in a limited volume in large varicose veins,^{27,34,35,38,43} whereas with large (20 mL)⁴⁴ or very large amounts (33 mL and more)⁴⁵ deep venous thromboses have been reported. For liquid foams prepared from diluted liquid sclerosing solutions, there is probably a higher incidence of visual disturbance and migraine in patients predisposed to these conditions.³⁶

Consensus 11 (Safety Criteria and Adverse Events):

Transient visual disturbances and migraine appear to occur more frequently with foam sclerotherapy. This seems to happen more often in patients with a history of migraine. A correlation is not yet apparent.

12. Efficacy criteria

Vascular spasm is seen more frequently after foam sclerotherapy, compared to conventional liquid sclerotherapy.^{31,37,38} For small veins, the clinical outcome is assessed mainly with clinical criteria, and for large veins, diagnostic tools are used additionally. They allow accurate assessment and therefore comparison of the veins before and after treatment.

Consensus 12 (Efficacy Criteria):

There are no differences between foam sclerotherapy and conventional liquid sclerotherapy concerning efficacy criteria. Criteria to evaluate treatment outcomes are:

- Clinical criteria (improvement of symptoms, disappearance of the varicose vein).
- Morphologic duplex criteria (obliteration, fibrotic transformation, caliber reduction). As to vascular spasm, clinical investigations have proven that a relationship between spasm induction and a better efficacy exists; spasm occurs more frequently after foam sclerotherapy.
- Functional duplex criteria.

There probably are different conditions indicating efficacy: a treated vein may be completely obliterated without any residual retrograde flow or may be incompletely obliterated with only minor residual retrograde flow (with improvement of symptoms and disappearance of varicose veins).

13. Compression after treatment

The consensus meeting decided not to make recommendations concerning the use of compression following foam sclerotherapy. The participants have their

personal preferences, and the majority usually apply (eccentric) compression, which is able to keep the injected vein compressed thereby preventing superficial venous inflammation/phlebitis and deep vein thrombosis.⁴⁶ The following recommendation was given:

Consensus 13 (Compression after Treatment):

There is no substantial difference between foam sclerotherapy and conventional liquid sclerotherapy concerning compression treatment after sclerotherapy. To keep a clot as small as possible, the majority of the participants recommend compression after sclerotherapy. It is suggested that one wait a few minutes after injecting foam before the patient stands up or before compression is applied to avoid dislocation of the foam column.

14. Monitoring of treatment

The personal preferences of treatment reviews (time and frequency of follow-up visits) were slightly different, but overall, the differences were minor or minimal. The answers given in the questionnaire ranged from 1 to 4 weeks. Some participants routinely use the first follow-up for retreatment of vein segments with reduced, but persistent intraluminal flow or for treating other varicose veins.

Consensus 14 (Monitoring of Treatment):

No essential difference exists between conventional liquid sclerotherapy and foam sclerotherapy concerning the best time interval before seeing the patient again after the first treatment for review and the best time interval between the treatment visits.

Conclusions

Foam sclerotherapy is a promising variation of a well-established varicose vein treatment that seems to improve the therapeutic outcome. The use of sclerosing foam is an appropriate procedure in varicose vein management. It is a powerful tool in experienced hands and in general more powerful than conventional liquid sclerotherapy. It is recommended that anyone using this technique should have good skills in conventional liquid sclerotherapy before starting to apply foam sclerotherapy. For safety reasons, the volume of foam should not exceed certain amounts per injection and per session. The patient should be informed about possibilities and limitations of foam sclerotherapy.

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Commentary

Although the conversion of a detergent sclerosing solution into a foam is not new, the resurgence in its use is revolutionizing sclerotherapy treatment of varicose veins. A number of European experts, some claiming to develop this procedure, came together from April 4–6, 2003, to “harmonize” their opinions about sclerosing foam. This article provides some guidelines to those performing sclerotherapy to bring them up

Commentary

This seminal article will begin the familiarization process with foam techniques that have been widely used abroad and that may very well revolutionize the American approach to the treatment of lower extremity varicoses. The successes obtained by European practitioners will hopefully sound the death knell

to speed with advanced techniques and caveats regarding care. Most importantly is the realization that foaming a sclerosing solution with air will increase its effective potency fourfold while decreasing its perivascular tissue adverse effects fourfold.

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for mutilative surgical procedures for the treatment of lower extremity venous disease as well as heralding a new era for the treatment of venous malformations and a variety of other venous disorders.

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