

## Invited commentaries

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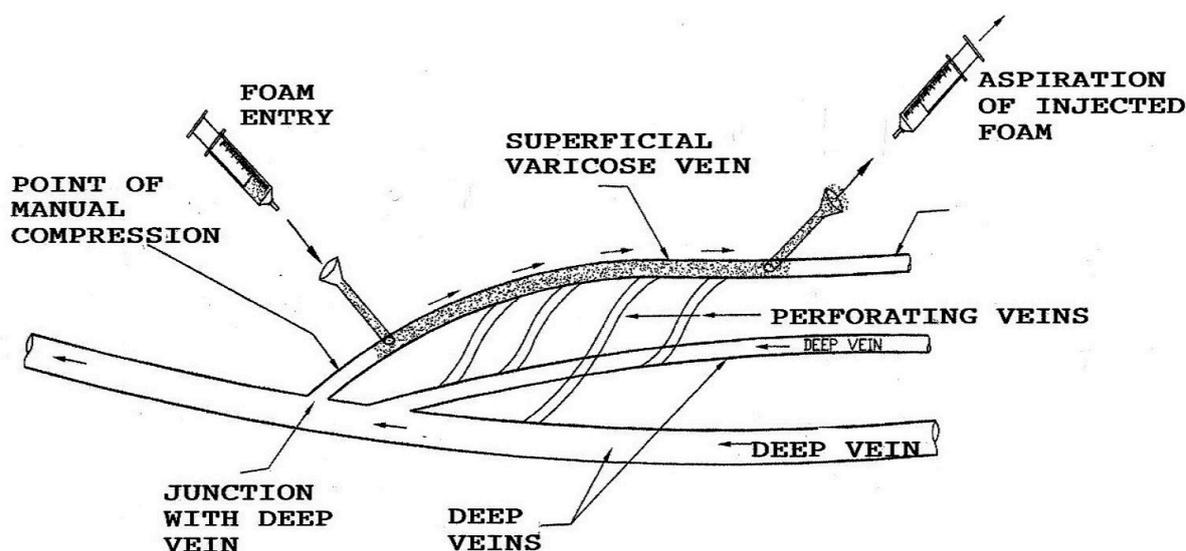


Figure 1 - Foam Washout Sclerotherapy of superficial varicose veins (from Fattahi K. JTAVR 2018;3(2):95-100).

### Invited commentary on 'Foam Washout Sclerotherapy, a single center experience', by K Fattahi

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Dr Fattahi<sup>1</sup> has described his Foam Washout Sclerotherapy (FWS) technique keeping in mind the potential risks of allowing significant volumes of foam

sclerosant to escape from the target veins into the general circulation. The concept definitely has merit. His results demonstrate no inferiority in vein closure rates using this method compared to "standard" foam sclerotherapy, with a lowering of the already low complication rate. The technique implies that only a few seconds of contact between sclerosant and vein endothelial wall is needed for interaction that results in sclerosis, and early foam removal eliminates noxious effects, perhaps by eliminating the endothelins released by that contact. Cannulation of the target vein distally is required.

Those who routinely perform ultrasound guided FS using a long #25 gauge needle attached to a syringe, as well as those who already access the target vein using an iv cannula, would have to add the cannulation down stream for foam withdrawal. An assistant is required while performing FWS, as demonstrated in the video clip. Almost total foam aspiration was shown in the video in treating a short straight segment of SSV.

This technique may be a great advantage in foaming a wide and long segment of refluxing saphenous trunks where the volume of foam can be large and the flow of foam can be significantly controlled using the pressure of the ultrasound probe. Tributaries of the treated vein are receiving little exposure to the sclerosing foam with the FWS technique.

That may be a negative aspect but on the figures presented this does not result in a worse outcome than conventional FS. Phlebitis in the tributaries will be less.

Often the anatomy of the treated vein is more complex and branching so I would assume foam aspiration may not be as successful in many cases and would have less of an advantage. Careful patient selection for using this FWS rather than general use would seem appropriate. Statistical

analysis in this paper is not rigorous but the concept is innovative. Safety using greater volumes of foam may be possible using FWS. Congratulations Dr Fattahi on publishing this technique.

## References

- 1) Fattahi K. Foam Washout Sclerotherapy, a single center experience. JTAVR 2018;3(2):95-100. DOI: <https://doi.org/10.24019/jtavr.82>

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## Invited commentary on ‘Foam Washout Sclerotherapy, a single center experience’, by K Fattahi

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## Answers to the invited commentaries on ‘Foam Washout Sclerotherapy, a single center experience’, by K Fattahi

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Conflict of interest: None

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The author describes an ingenious sclerotherapy technique, that involves the removal of the injected foam in order to prevent the contact between the sclerosant agent and deep veins. But sadly, it also has a problem: this technique involves a manual compression of superficial vein, above (proximally to) the puncture point, during the foam injection. There would have no other way to divert the foam flow into deep veins, through the perforating veins! To avoid this potential (but important) problem it would be better inject about 1ml of sclerofoam, each 7-8 cm of venous vessel (average of 4 injections are necessary for the sclerosis of a whole trunk of GSV), with compression of leg and repeated dorsiflexion of the foot immediately after the injections.

Best regards

Francesco Ferrara

## References

- 1) Fattahi K. Foam Washout Sclerotherapy, a single center experience. JTAVR 2018;3(2):95-100. DOI: <https://doi.org/10.24019/jtavr.82>

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**Keywords** Foam Washout Sclerotherapy, Foam Sclerotherapy, Varicose veins, Sclerotherapy Complications, Chemical Vein Ablation

I would like to thank the authors for their commentaries to the paper on Foam Washout Sclerotherapy, a single center experience (FWS)<sup>1</sup>, as they were able to discover several points which deserve a thorough discussion.

## A common premise

Foam Washout Sclerotherapy (FWS) is a modification of common foam sclerotherapy with the objective to reduce the complications rate, while maintaining same efficacy by removing most or all of the injected foam material from the lumen of targeted varicosity by placing a second IV catheter (exit port) at a distance

distal to foam injection site. FWS is based on creating a pressure gradient between injection and withdrawal point that provides direction flow of foam only within the target segment of a varicosity. Furthermore, the fact that the injected foam can be removed, allows the use of higher volume and concentrations of the sclerosant detergent based medications. Foam washout sclerotherapy was not used to treat small tributary branches in this article.

### Answers to the commentary of Dr. G. Mark Malouf

Dr. Malouf provided very interesting point which deserve answering in details.

*'This technique may be a great advantage in foaming a wide and long segment of refluxing saphenous trunks where the volume of foam can be large and the flow of foam can be significantly controlled using the pressure of the ultrasound probe. Tributaries of the treated vein are receiving little exposure to the sclerosing foam with the FWS technique. That may be a negative aspect but on the figures presented an advantage. Careful patient selection for using this FWS rather than general use would seem appropriate.'*

The Foam Washout Sclerotherapy (FWS) technique as presented in the article only described treatment of incompetent GSV, SSV, and AASV cases and not for sclerotherapy of small side branch varicosities. Yes, FWS technique limits the passage of foam from the injection level (point A) to the withdrawal level (point B). I totally agree with Dr. Malouf that FWS is not intended for sclerotherapy of tributary branches that come off the targeted main. Having said this, in some cases where the physician wishes to ablate certain varicosity segment and leave any small branch tributary vein varicosities to a future re-evaluation visit, FWS finds its relevant place more appropriately. In other words, FWS in many cases can be used as a chemical ablation of specific segment of an incompetent varicosity, as is done in endovenous laser ablation in which the exact segment to be ablated is the preset goal and target of the treatment.

### Answers to the commentary of Dr. F Ferrara

Dr. Ferrara assumes that with FWS technique during the injection of foam, the vein at a point above the puncture point is compressed and with this technique still foam will find its way into the deep venous system through the perforating veins. Dr. Ferrara then suggests a way to split injections into multiple injections to avoid foam flowing into the deep veins through the perforating veins.

*'The author describes an ingenious sclerotherapy technique, that involves the removal of the injected foam in order to prevent the contact between the sclerosant agent and deep veins. But sadly, it also has a problem: this technique involves a manual compression of superficial vein, above (proximally to) the puncture point, during the foam injection. There would have no other way to divert the foam flow into deep veins, through the perforating veins! To avoid this potential (but important) problem it would be better inject about 1ml of sclerofoam, each 7-8 cm of venous vessel (average of 4 injections are necessary for the sclerosis of a whole trunk of GSV), with compression of leg and repeated dorsiflexion of the foot immediately after the injections.'*

I have to respectfully mention it appears that the main mechanism and hydromechanics of FWS was not noted. As it is evident in the diagram-1, and the sample YouTube video ([https://www.youtube.com/watch?v=Usw9\\_d2uTvI&t=4s](https://www.youtube.com/watch?v=Usw9_d2uTvI&t=4s)) and in the article text the compression applied above the injection point is focused on blocking the connection between the targeted superficial varicosity and deep vein (such as SFJ or SPJ) during the active foam inject phase to prevent the foam get into the deep vein at that level. This compression is not applied on the targeted segment of the varicosity itself. And more importantly, while the proximal injection is creating a positive pressure within the injection site, the negative pressure created by the slow aspiration (withdrawal syringe) at the distal port is creating a desired pressure gradient resulting in allowing the flow of the foam only within the lumen of the targeted vein from injection point "A" to withdrawal point "B". Creation of such hydromechanics (pressure gradient) will prevent the foam from entering any other veins such as perforating or tributary veins.

In the discussion section of the article the importance of hydromechanics of FWS is explained: "we consider that the most important factor through which FWS provides safer foam sclerotherapy, appears to be the fact that in the FWS method the application of positive pressure (injection of foam) at the proximal site of injection and negative pressure at the distal foam withdrawal point (out-port) of the same varicose vein provides a desired directional foam flow, which prevents the foam from flowing into unwanted territories such as deep veins through perforating veins".

### References

- 1) Fattahi K. Foam Washout Sclerotherapy, a single center experience. JTAVR 2018;3(2):95-100. DOI: <https://doi.org/10.24019/jtav.82>