

Targeted sclerotherapy for venous diseases by contrast washout technique



Satish Vaidya, Robin Man Karmacharya, Swechha Bhatt, Kajol Kunwar, Sneha Pote, Yashoda Karki, Sarita Duwal, Sudip Ghimire, Binay Yadav, Sanjay Sharma

Satish Vaidya, S. Vaidya, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: satish.vaidya.nep@gmail.com

Robin Man Karmacharya, R.M. Karmacharya, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: reachrobin773@gmail.com

Swechha Bhatt, S. Bhatt, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: swechhabhatt48@gmail.com

Kajol Kunwar, K. Kunwar, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: kajol.kunwar24@gmail.com

Sneha Pote, S. Pote, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: snehapote54@gmail.com

Yashoda Karki, Y. Karki, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: yashodakarki370@gmail.com

Sarita Duwal, S. Duwal, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: duwalsarta67@gmail.com

Sudip Ghimire, S. Ghimire, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: ghimiresudip400@gmail.com

Binay Yadav, B. Yadav, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: binayyadav98@gmail.com

Sanjay Sharma, S. Sharma, Dhulikhel Hospital, Dhulikhel, 45210, Kavre, Nepal, Email: sanjaysg940@gmail.com

Abstract

Sclerotherapy injection is a minimally invasive technique which utilizes chemical irritants to occlude the abnormal targeted vessels. It is used to treat symptomatic cases of chronic venous diseases like telangiectasia, reticular veins and varicose veins that fail to get better by conservative management. Additionally, some patients opt for sclerotherapy due to cosmetic concerns. Depending upon the extent of the disease, a single or serial episode of injection sclerotherapy is recommended to ensure maximal resolution of the signs and symptoms.

Keywords: Contrast radiography, Polidocanol, Sclerotherapy, Telangiectasia, Varicose veins.

Principle of the procedure

The agents used for performing sclerotherapy are grouped into two classes: detergent (Polidocanol and Sodium tetradecyl sulfate) and osmotic (Glycerin and hypertonic saline).¹ Both these agents ultimately lead to irritation of vein's endothelium causing occlusion of dilated and unwanted veins.¹ In our setup, we prefer using foam formulation of 3% Polidocanol as the sclerosing agent, which works by interference with lipid framework of endothelial cell membrane.¹

General Setup

- A detailed history thorough examination of the underlying disease is done in the Vascular Unit of Dhulikhel Hospital.
- Following the examination, ultrasonography (Figure 1) is done to see the extent of the disease, the vessel involved, and flow in the vessel.
 - The superficial veins are grouped as axial (great, small and accessory saphenous vein)

and nonaxial (inter saphenous and lateral marginal veins).

- Venous duplex ultrasound is used to rule out the presence of an axial venous insufficiency, which might be indicative of long standing venous hypertension. This can lead to failure of sclerotherapy. In such patients, venous ablation or phlebectomy should be preferred, with concurrent or interval sclerotherapy.
- The diameter of the non-axial vessel is noted and grouped as:
 - ◆ Telangiectasia (<1 mm diameter)
 - ◆ Reticular veins (1-3 mm)
 - ◆ Varicose veins (> 3 mm)
- Any perforator veins (veins connecting superficial veins with deep veins) are noted.
- Venous malformation (slow flow malformation) is also noted.

- The patient is scheduled for Injection sclerotherapy in the catheterization laboratory.

Preparation of formulation:

- 2 ml Polidocanol is mixed with 2 ml normal saline and 2ml air using Modified Tessari technique. Depending upon size of lesion, more agents are prepared as required.^{2,3}
- Ultrasound guided selection of the cannulation site is done to select superficial, tortuous and straight venous channels.
- The syringe containing sclerosing agent is attached to a 26 G needle (butterfly cannula) (Figure 2).
- A tourniquet is tied higher up to prevent the reflux of the agent to deep venous channels.
- Alcohol is applied to paint the desired area, and the needle is introduced into the targeted vein under guidance of B mode of ultrasound. “Geometry based cannulation technique” is used for cannulation.⁴
- Intraluminal needle placement is confirmed by the loss of resistance, flow of blood into the sidearm of cannula, and curtail fall sign visible on ultrasonography.⁵
- The contrast (10 ml omnipaque +10 ml Normal saline) agent is injected (Figure 4) thereafter to identify the lesion, and note the completion of sclerotherapy. (Figure 3 and 4)
- Sclerosing agent is injected with the same needle. The contrast washout is noted. (Figure 5)
- The needle is withdrawn, and local compression is applied with the help of a cotton ball or gauze piece, which is fixed with a tape before proceeding to proximal veins. This increases the contact time between vein wall and sclerosing agent.
- Sequentially, sclerosing agent is injected from distal to proximal vessels, and the procedure is terminated when all targeted defective veins have been injected with sclerosant.
- Elastocrepe bandages are applied over the treated area. The patients are advised to rest for at least 10 minutes in order to look for excessive pain, bleeding or allergic reaction.
- Tourniquet is removed usually in 3-5 minutes after last injection of sclerosing agent.
- The patient is asked to stay around the hospital area for at least an hour post intervention.
- The patients are advised to wear the elastocrepe bandage for the next 24 hours.

- Next day the bandage is replaced with compression stocking. The same bandage can also be continued. Compression is needed for a minimum of a week.
- The patient is asked to follow up in a week or as soon as possible if any complications develop.
- On follow up, the progress and need of additional sessions of sclerotherapy is determined.

Anticipated adverse reactions ⁶

Within 24 hours

- Pain at the injection site.
- Ulceration
- Allergy to contrast or sclerosing agent

24 hours to 1 week

- Hyperpigmentation
- Thrombophlebitis
- Deep vein thrombosis
- Microembolic events

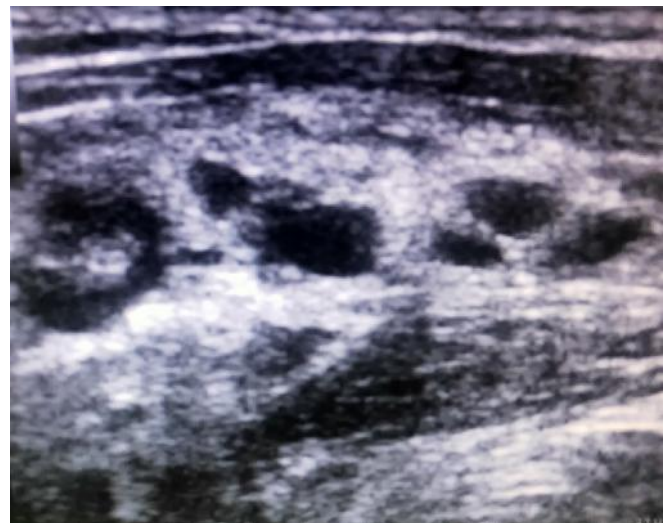


Figure 1. Venous malformation in arm as seen in B mode of ultrasound



Figure 2. Puncture of the lesion and securing the butterfly cannula by one of the vascular surgeons.

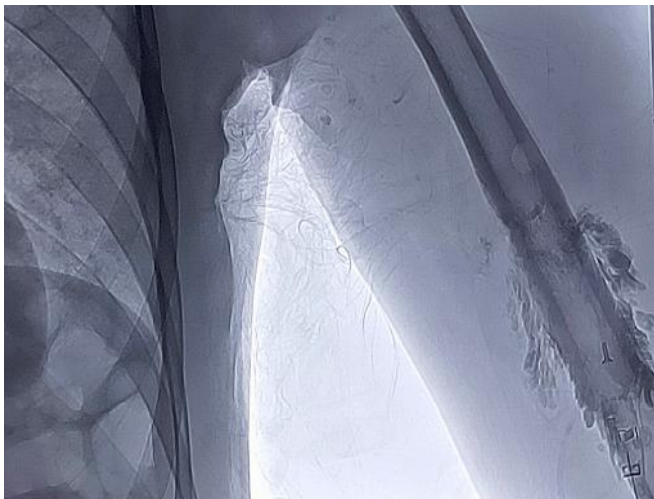


Figure 3. Mapping out of venous malformation in the upper limb by injecting contrast. During sclerotherapy contrast washout in all the mapped out portions need to be observed to ensure completion.

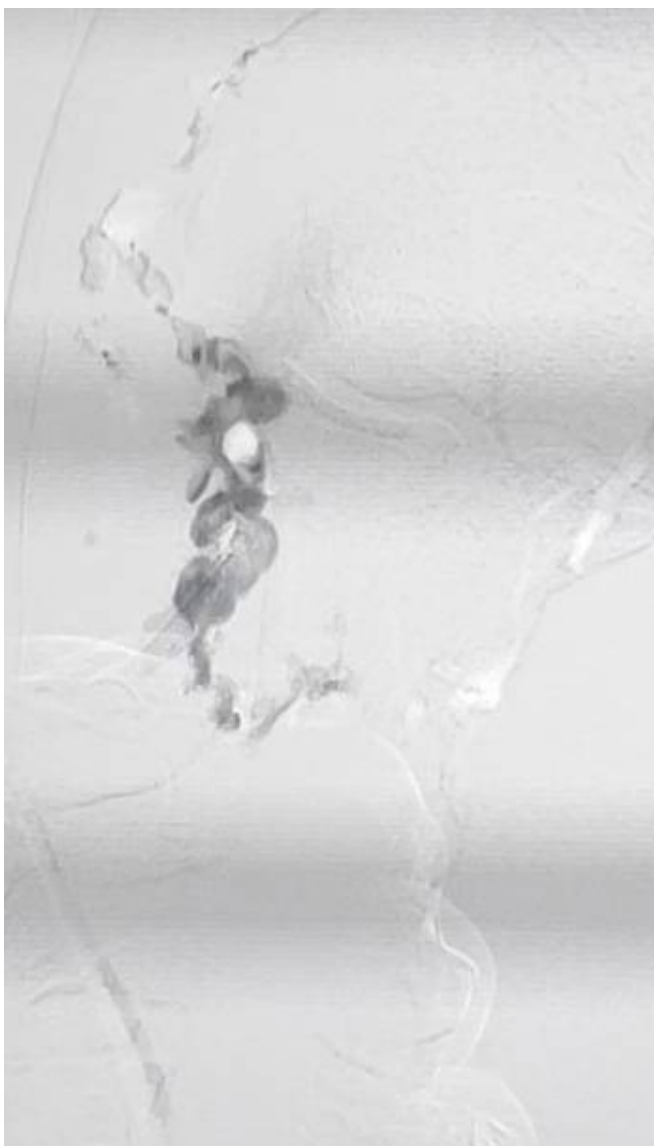


Figure 4. Mapping out of venous malformation in upper arm following contrast injection



Figure 5. Complete washout of contrast noted following sclerotherapy injection in lesion shown in figure 4.

Conclusion

Injection sclerotherapy is a highly effective procedure in treating venous diseases. Most cases of underlying venous disorders have significant resolution of clinical symptoms and signs following serial sclerotherapy injection.

Acknowledgement

We would like to thank Prof. Dr. Michael Malinowski and Prof. Dr. Dean Klinger from Medical College of Wisconsin and Prof. Dr. Florian Thermann from Carl von Basedow Klinikum, Germany for guidance for starting intervention for venous disease in Dhulikhel Hospital.

References

1. Goldman MP. Treatment of varicose and telangiectatic leg veins: double-blind prospective comparative trial between aethoxysklerol and sotradecol. *Dermatol Surg.* 2002 Jan;28(1):52-5. doi: 10.1046/j.1524-4725.2002.01190.x. PMID: 11991271.
2. Rabe E, Breu FX, Cavezzi A, et al. European guidelines for sclerotherapy in chronic venous disorders. *Phlebology* 2014; 29: 338–354.
3. Ghanouni P, Kishore S, Lungren MP, et al. Treatment of Low-Flow Vascular Malformations of the Extremities Using MR-Guided High Intensity Focused Ultrasound: Preliminary Experience. *J Vasc Interv Radiol* 2017; 28: 1739.
4. Karmacharya RM, Others. " Geometry-based cannulation technique" for cannulation of great saphenous vein during radiofrequency ablation of varicose veins at a university hospital of Nepal. *Indian Journal of Vascular and Endovascular Surgery* 2020; 7: 18.
5. Xu J, Wang Y-F, Chen A-W, et al. A modified Tessari method for producing more foam. *Springerplus* 2016; 5: 129.
6. Munavalli GS, Weiss RA. Complications of sclerotherapy. *Semin Cutan Med Surg.* 2007 Mar;26(1):22-8. doi: 10.1016/j.sder.2006.12.009. PMID: 17349559.