

# Percutaneous Sclerotherapy as Therapeutic Option in Benign Vascular Lesions: A Retrospective Study

Panta OB<sup>1</sup>, Adhikari A<sup>1</sup>, Basnet B<sup>1</sup>, Pantha B<sup>2</sup>, Ghimire RK<sup>1</sup>

<sup>1</sup>Department of Radiology and Imaging, Nepal Mediciti Hospital, Lalitpur, Nepal

<sup>2</sup>Department of General Surgery, Post Graduate Institute of Medical Education and Research, Chandigarh. India

Received: September 15, 2023

Accepted: November 6, 2023

Published: November 24, 2023

## Cite this paper:

Panta OB, Adhikari A, Basnet B, Pantha B, Ghimire RK. Percutaneous Sclerotherapy as Therapeutic Option in Benign Vascular Lesions: A Retrospective Study. *Nepalese Journal of Radiology* 2023;13(2):21-5. <http://doi.org/10.3126/njr.v13i2.59967>

## ABSTRACT

### Introduction:

Sclerotherapy, a minimally invasive approach, has gained prominence as a therapeutic modality for the treatment of these lesions. The objective of this article is to assess clinical success, complications and periprocedural pain score of sclerotherapy and their variation with the nature of the lesion and choice of sclerosants.

### Methods:

This was a hospital record-based retrospective study in a tertiary care centre in Kathmandu. Sclerotherapy done in the institute from January 2019 to December 2022 was evaluated for the nature of the lesion, clinical success, number of sessions, periprocedural pain score and complications. All sclerotherapy was performed under combined USG and fluoroscopic guidance by an interventional radiologist. Data was entered in predesigned proforma and data analysis was done using SPSS 25.0.

### Results:

A total of 33 patients underwent 61 sessions of sclerotherapy during the study period. Venous malformation (72.2%) was the most common vascular lesion followed by hemangioma. There was significant resolution of symptoms post sclerotherapy pain relief in 95% complete resolution of swelling in 65.38 % and partial resolution with acceptable cosmetic results in 26.92% of cases. Only minor complications were seen in 6.5% of cases. The median periprocedural pain score was 5 with an interquartile range of 2. Periprocedural pain was significantly less with sodium tetradecyl sulphate than with alcohol (P=0.002). The resolution of swelling was less in hemangiomas than in other lesions, while pain relief was similar for all lesions. Complications were seen only in the alcohol group.

### Conclusions:

Sclerotherapy is a safe and effective procedure for benign vascular lesions. Complications and periprocedural pain are less with sodium tetradecyl sulphate as compared to alcohol.

**Keywords:** Hemangioma; Sclerotherapy; Vascular Malformations; Venous Malformations

**Correspondence to:** Dr. Om Biju Panta

Department of Radiology and Imaging

Nepal Mediciti Hospital

Lalitpur, Nepal

Email: [bijupanta@yahoo.com](mailto:bijupanta@yahoo.com)



Licensed under CC BY 4.0 International License which permits use, distribution and reproduction in any medium, provided the original work is properly cited

## INTRODUCTION

Vascular malformations represent a diverse group of congenital anomalies. Though benign, they significantly impact the quality of life due to pain, disfigurement, and functional impairment. Vascular lesions are broadly divided into vascular tumors i.e. hemangiomas and Vascular malformations which are again subdivided into slow-flow malformations like venous and lymphatic malformations and high-flow malformations like arterio-vascular malformations. The differentiation is essential and also dictates the management of these vascular lesions. Slow-flow vascular malformations respond best to percutaneous sclerotherapy, Hemangiomas though can be treated with sclerotherapy might require surgery due to less effective bulk reduction and high-flow malformations are treated endovascularly with embolization and sometimes endovascular sclerotherapy.<sup>1,2</sup>

Sclerotherapy though a minimally invasive procedure is associated with significant peri-procedural pain and carries a small risk of complications.<sup>3</sup>

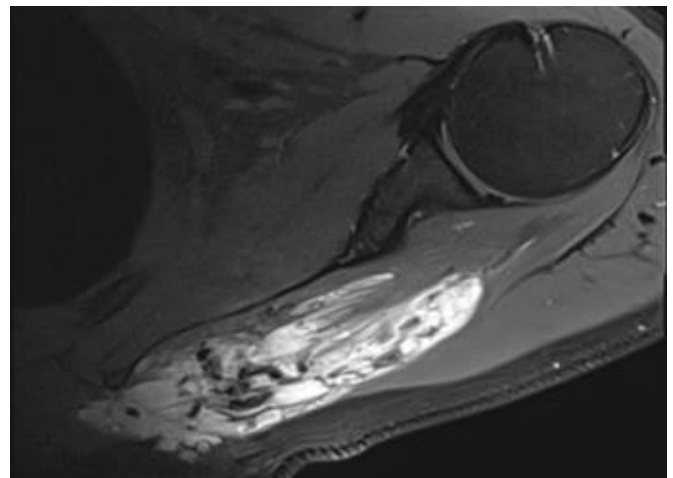
The objective of this article is to assess clinical success, complications and periprocedural pain score of sclerotherapy and their variation with the nature of lesion and choice of sclerosants.

## METHODS

The study was a retrospective, hospital record-based descriptive study conducted at a tertiary hospital in Kathmandu. All hospital records of patients who had undergone sclerotherapy for vascular malformations at our center from January 2019 to December 2022 were included in the study. Demographic details of the patients, diagnosis of vascular lesions, the sclerosing agent used, pain scores during the procedure, complications, and resolution during follow-up were recorded.

All sclerotherapy procedures were performed by interventional radiologists at our center. Preprocedural imaging, preferably MRI was reviewed. (Figure 1) The procedures were performed under combined ultrasound (USG) and fluoroscopy guidance. All the procedure was done using subcutaneous Lignocaine 2% and

intralesional Lignocaine (for IV use) 1% injections. The lesions were localized and punctured using Ultrasound and the needle position was confirmed under fluoroscopy using contrast. Important venous drainage was noted and compression was applied when the flow to deep veins was high. (Figure 2) Selected sclerosants were then injected into the lesion. Absolute alcohol and sodium tetradecyl sulphate (STS) were the two sclerosants used in our practice. Follow-up was scheduled at one month and six months. Repeat sessions were performed for large lesions or incomplete response at one-month follow-up.



**Figure 1:** Fat Suppressed T2 weighted MRI image of right shoulder demonstrating a relatively well-defined lobulated heterogeneous high signal lesion in the infraspinatus muscle with few flow voids suggesting hemangioma



**Figure 2:** Angiographic image of during percutaneous sclerotherapy demonstrating multiple dilated venous channels draining into a muscular vein in the right distal thigh

The primary outcome measured was the resolution of symptoms after the procedure. Secondary outcomes included the presence of complications and intra- and post-procedural pain scores. Intra- and post-procedural pain was assessed using the World Health Organization (WHO) pain score, which ranges from 1 to 10, with 1 indicating no pain and 10 indicating the worst possible pain. Resolution of swelling of more than 80% was considered a complete resolution, 20-80% was considered a partial response and less than 20% was considered no response. Resolution of pain was subjectively assessed based on the patient's perception and considered complete if the patient did not have residual pain at follow-up, partial if there was a persistent reduced level of pain (reduced in severity or frequency), and no resolution if there was a persistence of a similar level of pain.

The levels of pain, resolution of symptoms, and complications using alcohol were compared with STS and recorded.

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize patient demographics and baseline characteristics. Statistical significance was set at  $p < 0.05$ .

## RESULTS

We identified 33 patients who underwent a total of 61 sessions of sclerotherapy during the study period. The average age of the patient was  $22.09 \pm 10.08$  and the median was 23 with an interquartile range of 16.5 years. There were 17(51.5%) males and 16(48.5%) females in the study population. Venous malformation was the commonest clinical and imaging diagnosis among the patients accounting for 24(72.7%) while lymphatic malformation accounted for 2(6.1%) and hemangioma 7(21.2%) of the cases. Among the 31 patients who underwent sclerotherapy, 15 patients (45.5%) required multiple sessions, whereas 18 (54.5%) were successfully treated in a single session. All cases of hemangiomas were treated with a single session of sclerotherapy, one case of lymphatic malformation was treated with a single session and one was treated with two sessions of sclerotherapy. Among 24 patients with

venous malformation, 10 were treated with a single session, six were treated with two sessions, were treated with three sessions and five patients were treated with four sessions.

The choice of sclerosant was dictated by the type of lesion and availability of the sclerosant. Among these 33 patients, 25(75.8%) were treated with alcohol, while the remaining 8(24.2%) received treatment with Sodium tetradecyl sulphate. All hemangiomas were treated with alcohol, while lymphatic malformation and venous malformation were treated with alcohol or sodium tetradecyl sulphate. In total 61 sessions of sclerotherapy, 45(73.77%) sessions were done with alcohol and 16(26.23%) sessions were done with sodium tetradecyl sulphate.

The most common presenting symptoms were swelling and pain. Swelling as a sole complain was seen in 13(39.4%), pain as the sole complain was seen in 7(21.2%) and both pain and swelling were seen in 13(39.4%). Skin discoloration along with pain and swelling was seen in 1(3.2%) and inability to close mouth along with swelling was present in 1(3.2%)

Among 31 patients two patients lost to follow-up, while 29 patients came for follow-up at one and six months. Among 20 patients who had pain and underwent sclerotherapy, 18(90%) experienced complete pain resolution after a single session, while 1(5%) patient lost to follow-up, 1(5%) patient had partial relief, who underwent a second session of sclerotherapy and had complete resolution of pain. Among 26 patients who had swelling and underwent sclerotherapy, 18(69.23%) had complete resolution of swelling, 7(26.9%) had partial resolution of swelling and 1(3.84%) patient lost to follow-up. Among these, 8(30.7%) patients had complete resolution of symptoms and 4 (15.38%) had partial resolution after 1st session of sclerotherapy. All four patients who had partial resolution had hemangioma as the clinical and imaging diagnosis and had accompanying pain as the main complains. They did not undergo further sclerotherapy as their pain had completely subsided. The size of the lesion dictated the number of sessions required for the patients; 4(15.38%)

patients underwent two sessions; among those two had complete resolution of swelling while two had partial resolution of swelling. The partial resolution did not prefer to undergo further sclerotherapy as the result was cosmetically acceptable to them. Similarly, 3(11.54%) patients underwent three sessions, out of which two patients had complete resolution and one had partial resolution and 5 (19.23) patients underwent four sessions and all of them had complete resolution of swelling. There was no significant difference in outcomes with different sclerosing agents (P-value: 0.403).

We evaluated the periprocedural pain score of sclerotherapies in the patients. The mean pain score was  $5.02 \pm 1.44$ , and median pain score was 5 with an interquartile range of 2. The minimum pain score was 0 and the maximum was 7.

The mean pain scale score was higher in sessions using alcohol ( $5.28 \pm 0.28$ ) than those using STS ( $3.5 \pm 0.327$ ) which was statistically significant (P-value: 0.002). However, there was no significant difference in post-procedural swelling, with an odds ratio of 0.909 (95% confidence interval: 0.123-6.715).

Minor complications were seen in 4(6.5%) sessions; 1 (1.6%) had significant post-procedural pain lasting around 3 days which was treated with NSAIDs, 3 (4.9 %) patients had a superficial ulcer which was treated with antibiotic cream and healed within a week without significant scarring. All the complications were seen when alcohol was used as a sclerosing agent.

## DISCUSSION

The results of this retrospective study provide valuable insights into the use of sclerotherapy in the treatment of various vascular malformations.

The patient population in our study is in the younger age group which represents the working population and pain and morbidity due to these vascular lesions have a significant impact on productivity. The patient population male and female representation was similar in our study. The major reason for the visit was pain and swelling. Visiting for cosmetic reasons was less in our population, which may be

because lack of insurance and medical aid system in our country and the poor paying capacity of the patients.

The results of sclerotherapy were encouraging in our study with 90% pain relief and all patients having partial with satisfactory cosmetic results or complete resolution of swelling with one or more sessions. The resolution of swelling with most hemangiomas was partial but with complete resolution of pain. Hemangiomas are vascular tumors rather than vascular malformations and their resolution has been seen to be suboptimal with sclerotherapy. These lesions are usually treated with surgery following sclerotherapy for better cosmetic results.<sup>4,5</sup>

The role of sclerotherapy in these vascular tumors was to reduce intraoperative blood loss and regression in size for better cosmetic results.

The near-total regression of swelling was seen in almost all of the slow-flow vascular malformations.

The size of the lesion dictated the number of sessions required with smaller lesions resolved in a single session and larger lesions requiring multiple sessions. Our results are comparable with other studies done in the past. There was no significant difference between the size reduction of swelling and the resolution of pain between the sclerosing agents. (STS or alcohol). Studies have shown better results with gelified ethanol due to its improved viscosity and longer contact time. In our practice, we used compression of draining veins to prolong contact time for better results.<sup>6,7,8</sup>

We studied the pain score during the periprocedural period which demonstrated significant pain associated with sclerotherapy. The periprocedural pain associated with sclerotherapy has not been widely reported. The periprocedural pain however is well tolerated and controlled with over-the-counter analgesic or Ibuprofen tablets. The pain score was higher with alcohol than with STS, probably due to the high volume of alcohol as compared to STS foam. A small amount of foaming agents can make a large volume of foam to cover a larger area and have better contact time as compared to liquid agents. The safety profile of STS is also believed to be better than alcohol. Complications were



only seen in the alcohol group in our study and were limited to minor complications which were managed and resolved within a week. The rates of complication in our study are comparable to prior studies. Due to the better safety profile of foaming agents meta-analysis by Coban et. al. recommended polidocanol and STS as first line and judiciary use of alcohol due to higher risk. They also recommended general anaesthesia for alcohol sclerotherapy due to periprocedural pain.<sup>5,9,10</sup>

Our study had many limitations. Firstly, the sample size was not adequate. The use of sclerosants in our study was not randomized and not guided by any protocol but based solely upon the preference of the interventional radiologists.

## CONCLUSION

Sclerotherapy is a safe procedure and has remarkable results in vascular malformation in providing symptom relief. Reduction in swelling in hemangiomas is suboptimal and might require surgical option post-sclerotherapy. Periprocedural pain and complication are low with foaming agents and they could potentially be used as first-line agents.

## CONFLICT OF INTEREST

None

## SOURCES OF FUNDING

None

## REFERENCES

1. Boon LM, Ballieux F, Vikkula M. Pathogenesis of Vascular Anomalies. *Clin Plast Surg* 2011;38(1):7-19. <https://doi.org/10.1016/j.cps.2010.08.012>
2. Marshalleck F, Johnson MS. Percutaneous management of hemangiomas and vascular malformations. In *Vascular Embolotherapy: A Comprehensive Approach Volume 2 Oncology, Trauma, Gene Therapy, Vascular Malformations, and Neck* 2006 Apr 18 (pp. 3-20). Berlin, Heidelberg: Springer Berlin Heidelberg. [https://doi.org/10.1007/3-540-33257-X\\_1](https://doi.org/10.1007/3-540-33257-X_1)
3. Odeyinde SO, Kangesu L, Badran M. Sclerotherapy for vascular malformations: Complications and a review of techniques to avoid them. *J Plast Reconstr Aesthet Surg* 2013;66(2):215-23. <https://doi.org/10.1016/j.bjps.2012.09.002>
4. R. Laiding S, S.W. M, Josh F, Prihantono P. Intralesional Sclerotherapy Using Absolute Alcohol for Management of Haemangioma. *Am J Med Sci Med* 2017;5(4):67-70. <https://doi.org/10.12691/ajmsm-5-4-1>
5. Coban YK, Kurt A. Preoperative Ethanol Sclerotherapy for Facial Cavernous Hemangioma. *Can J Plast Surg* 2001;9(4):159-61. <https://doi.org/10.1177/229255030100900404>
6. Nakamura M, Osuga K, Maeda N et al. Percutaneous sclerotherapy for venous malformations in the extremities: clinical outcomes and predictors of patient satisfaction. *Springerplus* 2014;3(1):1-8. <https://doi.org/10.1186/2193-1801-3-520>
7. Van Der Vleuten CJ, Kater A, Wijnen MH, Schultze Kool LJ, Rovers MM. Effectiveness of sclerotherapy, surgery, and laser therapy in patients with venous malformations: a systematic review. *Cardiovasc Intervent Radiol* 2014;37:977-89. <https://doi.org/10.1007/s00270-013-0764-2>
8. Teusch VI, Wohlgemuth WA, Hammer S et al. Ethanol-Gel Sclerotherapy of Venous Malformations: Effectiveness and Safety. *Am J Roentgenol* 2017;209(6):1390-5. <https://doi.org/10.2214/AJR.16.17603>
9. Albanese G, Kondo K. Pharmacology of Sclerotherapy. *Semin Interv Radiol* 2010;27(04):391-9. <https://doi.org/10.1055/s-0030-1267848>
10. Gorman J, Zbarsky SJ, Courtemanche RJM, Arneja JS, Heran MKS, Courtemanche DJ. Image guided sclerotherapy for the treatment of venous malformations. *CVIR Endovasc* 2018;1(1):2. <https://doi.org/10.1186/s42155-018-0009-1>