Original Article

Use of Sodium Tetradecyl Sulphate in the Treatment of Venous Malformation of Oral Cavity

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ABSTRACT

Objective: To observe the efficacy of sodium tetradecyl sulphate as sclerosing agent in venous malformation of oral cavity.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Oral and Maxillofacial Surgery, Jinnah Postgraduate Medical Centre from September 2023 to March 2024 over six months.

Methods: The clinical efficacy of the treatment was evaluated based on the following grades: "No response," indicating no change in size post-injection; "Mild response labeled as 25% reduction in lesion size, moderate response labeled as 50% reduction in lesion size, good response 75% and 100% reduction considered as complete response.

Results: Regarding response of treatment in 8% of patients no response was observed, moderate response was observed in 36% of cases, 23% patients showed good response and in 33% complete response was observed. Edema was the most common complication among the study patients, in 50.8% patients.

Conclusion: Sclerotherapy with sodium tetradecyl sulfate (STS) is widely recognized as an effective treatment for venous malformations (VMs), boasting minimal side effects and yielding favorable results in many cases.

Key Words: Venous malformation, Sodium tetradecyl sulphate, Oral cavity, Sclerotherapy, Treatment response

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INTRODUCTION

Venous malformations (VM) are congenital lesions commonly found in the oral cavity, with prevalence rates ranging from 14% to 65% in the head and neck region, posing challenges for treatment due to the anatomical complexity of this area[1]. These anomalies, which do not regress spontaneously but rather enlarge with body growth, can undergo rapid expansion triggered by factors such as puberty, pregnancy, infections, trauma, or hemorrhage[2]. They manifest along a spectrum, from isolated skin varicosities to complex lesions infiltrating multiple tissue planes, typically presenting as soft, compressible, non-pulsatile masses with quick refilling[3].

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Symptoms vary based on location, size and may include pain, discoloration (blue skin), infection, swelling, bleeding, ulcers, difficulty in speech and breathing, as well as dysphagia[4,5].

Sodium tetradecyl sulfate (STS) was utilized in the treatment of vascular malformation in the soft palate region, aiming for maximal endothelial damage with minimal thrombus formation[6], ultimately leading to fibrosis and shrinkage of the lesion, as per clinical experience described by previous reports. Patient satisfaction and objective evaluation of lesion size were the endpoints assessed in the study[7].

STS utilized as a sclerosing agent since 1946, effectively treats small varicosities of the legs, lymphatic[8], and venous malformations by inducing endothelial damage, resulting in fibrosis and shrinkage of the lesion without significant thrombus formation, offering a safe, minimally invasive alternative to surgical intervention with satisfactory aesthetic and functional outcomes, thus potentially reducing or obviating the need for surgery[9, 10].

The efficacy of sodium tetradecyl sulfate for venous malformation of oral cavity has not been assessed in our local population and setting. The aim of our study was to assess its efficacy in the treatment of oral cavity venous malformations.

METHODS

A study conducted at the Department of Oral and Maxillofacial Surgery, Jinnah Postgraduate Medical Centre from September 2023 to March 2024 over six months included patients with venous malformation of the oral cavity. The sample size of 61 was determined using OpenEpi Online software, based on a prevalence of complete response of 23.8%, an 80% confidence level, and a 7% margin of error. Female and male gender both having age 18-60 years were enrolled in the research.

Venous malformation in the floor of the mouth, characterized by swelling and bluish discoloration, was diagnosed via clinical intraoral examination, and confirmed through either color Doppler ultrasonography or magnetic resonance imaging (MRI). Sclerotherapy treatment involved direct injections of 3% sodium tetradecyl sulfate, with the dosage tailored to the lesion size, administering 1 millimeter of the sclerosing substance per 1 centimeter of lesion. Injections were repeated at 4-week intervals until a 50% reduction in lesion size was achieved, with a maximum of 6 sessions performed. If no reduction was observed after 2 sessions, further injections were discontinued.

The clinical efficacy of the treatment was evaluated based on the following grades: "No response," indicating no change in size post-injection; "Mild response labeled as 25% reduction in lesion size, moderate response labeled as 50% reduction in lesion size, good response 75% and 100% reduction considered as complete response.

Patients who had previously received treatment and those with incomplete records due to loss of follow-up, as well as medically compromised individuals such as those with diabetes, hypertension, or end-stage renal disease, were excluded from the study. Prior to participation, eligible patients were informed about the study purpose, protocol, and the intended use of their data for research. Demographic information including age, gender, and residential status was collected using a validated questionnaire. Additionally, patients were queried about their medical history, any complications experienced post-treatment, and outcomes such as the site of venous malformation in the oral cavity, initial size, and presence of pain, edema, ulceration, and response to treatment, categorized as no response, mild response, moderate response, good response, or complete response according to predefined criteria.

Data entry and analysis were conducted using SPSS version 27. Descriptive statistics were computed for both quantitative and qualitative variables. A significance level of $p \leq 0.05$ was employed, indicating statistical significance.

RESULTS

Overall, 61 patients were included in this study. The age of patients was 41.22±7.65years. There were more males than females as 41 (67.2%) and 20 (32.8%), respectively. According to area of residence, 31 (50.8%) patients lived in urban area whereas 30 (49.2%) lived in rural area. Buccal mucosa was the most common site among the study patients, as 39 (63.9%). (Table. I).

Table No. 1: Demographic and baseline characteristics of the study patients

Characteristic	Presence
Age (years)	41.22±7.65
Gender	
Male	41 (67.2)
Female	20 (32.8)
Area of residence	
Urban	31 (50.8)
Rural	30 (49.2)
Site	
Buccal mucosa	39 (63.9)
Tongue	22 (36.1)
Mean ± SD. N (%)	

Table No.2: Complications and outcome distribution of the study patients

	N (%)
Complication	
Pain	16 (26.2)
Edema	31 (50.8)
Ulcer	14 (23.0)
Outcome	
No response	5 (8.1)
Moderate	22 (36.1)
Good	14 (23.0)
Complete response	20 (32.8)
N (%)	

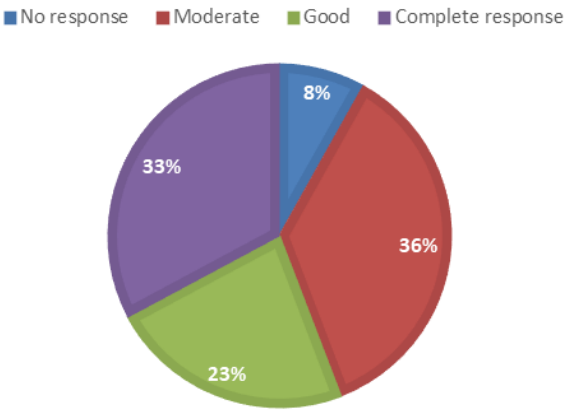

Figure No.1: Outcome

Edema was the most common complication among the study patients, in 31 (50.8%) patients. Regarding response of treatment in 8% of patients no response was observed, moderate response was observed in 36% of cases, 23% patients showed good response and in 33% complete response was observed (Figure. I). (Table. 2).

DISCUSSION

Foam sclerotherapy effectively shrinks venous malformation lesions by inducing temporary or permanent fibrosis of the vessels through damage of endothelial, with little formation of thrombus, ultimately leading to the shrinkage of the lesion[11]. In this study complete response was obtained in 33% of patients with use of STS. Kayalvizhi et al[12] successfully treated a vascular lesion located on tongue towards ventral surface by administering a single injection of STS 1 ml mixed with distilled water 4 ml, resulting in complete reduction of lesion size.

Remarkable response in terms of moderate results was observed in 33% in this study followed by 23% good outcomes. Min et al[13] reported remarkable regression of lesions in two cases of venous malformation in the tongue and left buccal mucosa following treatment with 1% sodium tetradecyl sulfate (STS) injection. Alakailly et al[14] conducted a study on thirteen vascular malformation patients, treating them with 3% STS intralesional injections. Results showed complete resolution in 28.57% patients, good response in 35.7%, moderate response in 14.28%, mild response in 14.28%, and no response in 7.14% patients.

In a case study conducted by Maharjan et al[15] a pyogenic granuloma was successfully treated by administering intralesional injections of undiluted 0.2 ml of sodium tetradecyl sulfate (STS) at a concentration of 30mg/ml. The injections were precisely administered at the base of the pedunculated mass using an insulin syringe. Remarkably, the lesion completely regressed after three treatment sessions, demonstrating no recurrences thereafter. Khaitan et al[16] conducted a study on clinically diagnosed patients with pyogenic granuloma, successfully treating them by administering 0.2-0.5ml of sodium tetradecyl sulfate.

Al-Ghamdi et al[17] successfully treated a case of lymphangioma circumscriptum through intralesional injection of 2 ml of 1% STS, resulting in a remarkable 70% regression of the lesion following two treatment sessions. Shivhare et al[18] have reported that sodium tetradecyl sulfate 3% sclerotherapy demonstrates efficacy in treating various oral lesions, including vascular malformations, pyogenic granuloma, lymphangioma, and mucocele.

Stimpson et al[19] treated 12 patients with venous malformations (VM) in the head and neck region using 3% sodium tetradecyl sulfate (STS) foam sclerotherapy, noting that a single session was generally insufficient for larger lesions, necessitating multiple injections for satisfactory results, while Khandpur et al[20] reported 90-100% regression of venous and lymphatic malformations with direct injection of 3% STS intralesional without radiological guidance.

Limitations: The study might have a small sample size, which could limit the generalizability of the findings to a broader population. Small sample sizes can also reduce the statistical power of the study, making it difficult to detect significant effects.

CONCLUSION

Sclerotherapy with sodium tetradecyl sulfate (STS) is widely recognized as an effective treatment for venous malformations (VMs), boasting minimal side effects and yielding favorable results in many cases.

Author's Contribution:

Concept & Design of Study:	Abubakar Saddique, Jehan Alam
Drafting:	Zubair Ahmed, Shoaib Mirza
Data Analysis:	Gobind Rai, Arsalan Tariq
Revisiting Critically:	Abubakar Saddique, Jehan Alam
Final Approval of version:	By all above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

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REFERENCES

1. Khan MM, Rehman S, Khan TU, Rehman M, Rahat S. Effect of sodium tetradecyl sulphate injection as sclerosing agent in venous malformation of oral cavity. J Khyber College Dentist 2023;13(2):27-30.
2. Saeed MB, Yasin A, Khan UR, Shah IH, Ahmed N. Effectiveness of intralesional cautery in treatment of vascular malformations. Med J South Punjab 2023;4(2):83-9.
3. Ramakrishnan K, Palanivel I, Narayanan V, Chandran S, Gurram P. Management of vascular malformations in the oral and maxillofacial region: a systematic review. J Stomatol Oral Maxillofac Surg 2021;122(6):588-99.
4. Kumar N. Exploring the efficacy of perilisional sclerotherapy with sodium tetradecyl sulfate in the treatment of venous malformations. Intern J Med Sci Dental Health 2021;7(01):01-4.
5. Kaur M, Sachdeva P, Syal R, Singh S. Role of sclerotherapy in management of low flow vascular malformations. Intern Surg J 2021;8(4):1234-8.
6. Chitravelu S, Khanna AK. Medical management of vascular malformations. Vascul Malformat 2021:127-34.
7. Rauf MA, Ahmad S, Muddassar M, Arshad R, Qureshi IS, Hoti KK. The Efficacy of 3% sodium tetradecyl sulphate (sts) injection in management

of intraoral soft tissue vascular lesion. Pak J Med Health Sci 2022;16(09):49.

8. Chang S, Weisse C, Berent AC, Rosen RJ. Use of percutaneous foam sclerotherapy with 1.5% sodium tetradecyl sulfate for treatment of a pelvic limb venous malformation in a dog. J Am Vet Med Assoc 2020;256(12):1368-74.
9. Gaikwad TV, Maini AP, Mishra S, Das S, Gupta S, Shil M. Comparative Efficacy of Polidocanol and Sodium Tetradecyl Sulfate in the Management of Oral Mucoceles–A Comparative Study. J Indian Academy Oral Med Radiol 2023;35(4):501-5.
10. Gupta S, Kumar R, Pandav G, Pandav S, Gulati P. Oral haemangiomas-Series of two case reports and review of management. J Family Med Primary Care 2022;11(6):3308.
11. Frullini A. New technique in producing sclerosing foam in a disposable syringe. Dermatologic Surg 2000;26(7):705-6.
12. Kayalvizhi EB. Success and failure with intralesional 3% sodium tetradecyl sulfate sclerosing agent in two cases of intraoral haemangioma. Int J Pharm Sci Res 2017; 8(7): 3069-74.
13. Min HG, Kim SG, Oh JS, You JS. Sclerotherapy using 1 % sodium tetradecyl sulfate to treat a vascular malformation: a report of two cases. J Korean Assoc Oral Maxillofac Surg 2015;41(6): 322–326.
14. Alakailly X, Kummoona R, Quereshy FA, Baur DA, González AE. The use of sodium tetradecyl sulphate for the treatment of venous malformations of the head and neck. J Maxillofac Oral Surg 2015;14(2): 332338.
15. Maharjan IK et al. Sclerotherapy for Oral Pyogenic Granuloma – A case report. J Coll Med Sci Nepal 2017;13(2):290-292.
16. Khaitan T, Sinha R, Sarkar S, Kabiraj A, Ramani D, Sharma M. Conservative approach in the management of oral pyogenic granuloma by sclerotherapy. J Indian Acad Oral Med Radiol 2018;30:46-51.
17. Al-Ghamdi KM, Mubki TF. Treatment of lymphangioma circumscriptum with sclerotherapy: an ignored effective remedy. J Cosmet Dermatol 2011;10(2):156-8.
18. Shivhare P, Singh V, Singh A. Use of sodium tetradecyl sulphate for the treatment of oral lesions. JCMS Nepal 2019;15(4):282-6.
19. Stimpson P, Hewitt R, Barnacle A, Roebuck DJ, Hartley B. Sodium tetradecyl sulphate sclerotherapy for treating venous malformations of the oral and pharyngeal regions in children. Int J Pediatr Otorhinolaryngol 2012;76(4):569-73.
20. Khandpur S, Sharma VK. Utility of intralesional sclerotherapy with 3% sodium tetradecyl sulphate in cutaneous vascular malformations. Dermatologic Surg 2010;36(3):340-6.