

Use of Sodium Tetradecyl Sulphate for the Treatment of Oral Lesions

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ABSTRACT

Background: Sclerotherapy is defined as the “targeted elimination of small vessels, varicose veins and vascular anomalies by the injection of a sclerosant. This study aimed to analyze the effect of a sclerosing agent 3% Sodium tetradecyl sulfate (STS) on different oral lesions and to evaluate whether sclerotherapy can be a potent alternative to other treatment modalities. **Methods:** A descriptive study was done in the Department of Oral Medicine and Radiology and the Department of Oral and Maxillofacial Surgery, Nobel Medical College Teaching Hospital, Biratnagar between September 2016 and June 2019. **Results:** A Total of 46 patients treated by 3%STS were retrospectively identified. After exclusion, 38 patients were selected for the study. Out of 38 patients 9 belonged to vascular malformation group, 15 to pyogenic granuloma group, 2 to lymphangioma group, 8 to mucocele group and 4 to ranula group. 25 patients (65.79%) showed complete response, 4 patients (10.53%) showed good response, 3 patients (7.89%) showed moderate response, 2 patients (5.26%) showed mild response and 4 patients (10.53%) showed no response. **Conclusions:** Sclerotherapy with sodium tetradecyl sulfate 3% is effective in the treatment of different oral lesions such as vascular malformations, pyogenic granuloma, lymphangioma, and mucocele.

Keywords: lymphangioma; mucocele; pyogenic granuloma; sclerotherapy; sodium tetradecyl sulfate; vascular malformation.

INTRODUCTION

There are varieties of oral lesions such as vascular malformation (VM), pyogenic granuloma, lymphangioma, mucocele which are usually treated by surgical excision, especially for the small lesion. However, there are certain limitations of surgical excision when considering surgery such as bleeding, recurrence, incomplete resection, esthetic concern, and functional impairment.¹ Considering these limitations, alternative methods are mentioned in the literature including laser, cryosurgery, curettage, electrodissection, steroid injections and sclerotherapy.² Sclerotherapy is defined as the “targeted elimination of small vessels, varicose veins and vascular anomalies by the injection of a sclerosant”.³ Sclerosing agent causes marked tissue irritation, endothelial damage with minimal thrombosis and subsequent local inflammation and tissue necrosis. The inflammation and tissue necrosis results in fibrosis with tissue contracture resulting in the disappearance of the lesion.⁴

Vascular malformations are congenital lesions that occur frequently in the oral cavity and head and neck region. They are bluish, compressible, and nonpulsatile.⁵ According to Mulliken and Glowacki, VM are congenital and tend to become more visible over time, even if they are not observed in the early stages. These types of malformations can be

classified into arterial, arteriovenous, venous, capillary, and lymphatic malformations, based on the blood vessel that is associated with the lesion.⁶ Pyogenic granuloma (granuloma pyogenicum) is a common non-neoplastic tumor-like growth of the oral cavity or skin. These lesions are neither pus-producing nor granulomatous, thus symbolizes a misnomer. Although these are reactive hyperplasias, they have a relatively high rate of recurrence after simple excision.⁷

Lymphangioma is benign hamartomatous hyperplasia of lymphatic vessels. Majority of pyogenic granulomas are superficial, but a few have been reported to extend deeply into the connective tissue. Intraoral lymphangiomas occur more frequently on the dorsum of the tongue, followed by palate, buccal mucosa, gingiva, and lips.⁸ Mucocele is the most common oral mucosal lesion, which results from the accumulation of mucous secretion due to trauma and parafunctional habits like lip biting or alterations of minor salivary glands. Mostly they are two types based on the basis of histological features namely extravasation and retention types. Mucocele can appear anywhere in the oral mucosa such as lip, cheeks and the floor of the mouth, but mainly appear in the lower lip. Diagnosis is mostly based

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on clinical findings.⁹ This study aimed to analyze the effect of a sclerosing agent (3% STS) on different oral lesions and to evaluate whether sclerotherapy can be a potent alternative to other treatment modalities.

METHODS

A descriptive study was conducted in the Department of Oral Medicine and Radiology and the Department of Oral and Maxillofacial Surgery, Nobel Medical College Teaching Hospital, Biratnagar between September 2016 and June 2019. After obtaining the Institutional Review Committee approval, medical records and images of patients with oral vascular lesions treated by sclerotherapy were retrieved for the period. All the cases treated by 3% STS in the mentioned study period were included while incomplete cases due to loss of patient follow-ups were excluded. Patient's information like age, gender, type of lesion (clinical diagnosis), location of the lesion, size of the lesion, number of session for treatment, respond

to treatment, any side effect reported and images were collected from previous records. Based on data collected, the response to the treatment was graded as follows: no response (no change in size after injection), mild response (25 % decrease in the size after injection), moderate response (50 % decrease in size after injection), good response (75 % decrease in size after injection), and complete response of the lesion (100 % shrinkage of the lesion with normal-appearing skin and/or mucosa).¹⁰

RESULTS

A total of 46 patients treated by 3% STS were retrospectively identified and arranged in Microsoft excel. Eight patients were excluded due to unavailability of detailed information regarding dose of application or due to incomplete patient treatment. Thus 38 patients with complete information were selected for the study. Out of 38 patients 9 belonged to vascular malformation group, 15 to pyogenic granuloma group, 2 to lymphangioma group, 8 to mucocele group and 4 to ranula group (Table 1). Response of treatment to different groups and response of treatment to individual groups are summarized in Table 2, Figure 1 and Table 3, Figure 2 respectively.

	Frequency	Percent
Gender		
Male	21	55.3
Female	17	44.7
Type of lesion		
Vascular malformation	9	23.7
Pyogenic granuloma	15	39.5
Lymphangioma	2	5.3
Mucocele	8	21
Ranula	4	10.5
Site		
Dorsal surface of tongue	5	13.2
Tip of the tongue	1	2.6
Lateral border of tongue	1	2.6
Ventral surface of tongue	2	5.3
Floor of mouth	4	10.5
Gingival region	8	21
Buccal mucosa	3	7.9
Lower Labial mucosa	9	23.7
Upper labial mucosa	2	5.3
Lower lip	2	5.3
Upper lip	1	2.6
Size of lesion		
Less than 1x1cm	16	42.1
1.1x1.1cm-2.0x2.0cm	16	42.1
2.1x2.1cm 3.0x3.0cm	3	7.9
More than 3.1cm	3	7.9
No. of session		
1 session	26	68.4
2 session	9	23.7
3 session	3	7.9
Side effect		
Pain	38	100
Edema	38	100
Ulceration	3	7.9
Ecchymosis followed by tissue necrosis	1	2.6

	Number of patients	Percentage
Complete response	25	65.79%
Good response	4	10.53%
Moderate response	3	7.89%
Mild response	2	5.26%
No response	4	10.53%
Total	38	100%

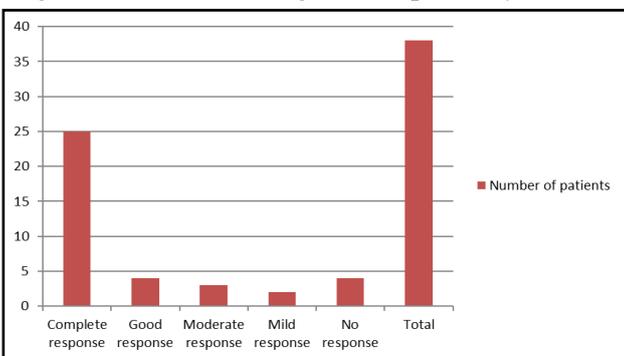


Figure 1. Response of treatment to different groups.

	Vascular malformation	Pyogenic granuloma	Lymphangioma	Mucocele	Ranula
Complete response	5	15	1	2	2
Good response	2	0	1	1	0
Moderate response	1	0	0	1	1
Mild response	1	0	0	1	0
No response	0	0	0	3	1

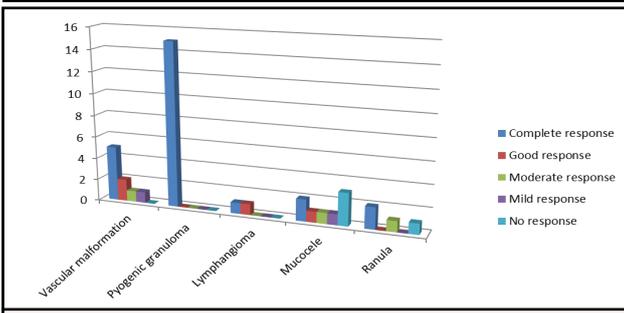


Figure 2. Response of treatment to individual groups



Figure 3. (a) Vascular malformation of lateral border of tongue- Bluish dome shaped swelling in left lateral border of tongue. (b) Complete disappearance of the lesion after 4 weeks.



Figure 4. (a) Pyogenic granuloma- Pedunculated growth with a smooth surface which bleed on palpation. (b) Complete regression of the lesion after 4 weeks



Figure 5. (a) lymphangioma of tongue- Multiple pink to blue papules like pebbly, vesicle-like feature with so-called "frog-egg" or "tapioca-pudding" appearance. (b) Complete healing of the lesion.



Figure 6. (a) Mucocele- Dome shaped swelling in lower labial mucosa. (b) Complete regression of the lesion.



Figure 7. (a) Ranula - Dome shaped swelling in floor of mouth (b) Complete regression of the lesion.

DISCUSSION

Varieties of sclerosing agents are available. These can be classified based on their chemical properties and their mechanism of action; a) Detergents are those which disrupt vein cellular membrane, example sodium teradecyl sulfate, polidocanol, sodium morrhuate, ethanalamine oleate. b) Osmotic agents are those which damage the cell by shifting the water balance, example hypertonic sodium chloride solution, sodium chloride solution with dextrose. c) Chemical irritants which damage the cell wall, includes chromated glycerin, polyiodinated iodine, OK 432 and Bleomycin.¹¹ Polidocanol (POL) and sodium tetradecyl sulfate (STS) are the most commonly used sclerosants for their efficacy and safety profile.¹¹ Sodium tetradecyl sulfate (sodium l-isobutyl-4-ethyl octyl sulfate) is a long-chain fatty acid manufactured synthetically and is commonly used as a synthetic surfactant (soap).⁹ STS is used commonly in the treatment of small varicose veins of the legs, as well as venous and lymphatic malformations.¹²

Kayalvizhi treated a case of a vascular lesion on the ventral surface of the tongue by intralesional injection with 1 ml of 3% sodium tetradecyl sulfate diluted with 4ml of distilled water. The lesion regressed completely in a single injection.¹³ Min et al reported two cases that were treated by injecting 1 % STS in the venous malformation of the tongue and left buccal mucosa. After the injection, the lesions were regressed remarkably.¹⁴ A study was performed by Alakailly et al on thirteen patients of vascular malformations. 3 % STS intralesional injections were used to treat the patients. Of the thirteen patients treated, 4 (28.57 %) patients had complete resolution, 5 (35.7 %) showed a good response, a moderate response in 2 patients (14.28 %), a mild response in 2 patients (14.28 %) and no response in 1 patient (7.14 %).¹⁰

In this study, vascular malformation group (total 9patients) showed complete response in 5 (55.56%) patients, good response in 2(22.22%), moderate response in 1 (11.11%) and mild response in one patient(11.11%).¹⁰ Maharjan et al treated a case of Pyogenic granuloma by intralesional injection of undiluted 0.2 ml of STS (30mg/ml). The injection was given at the base of the pedunculated mass by the use of an insulin syringe. Lesion regressed completely in 3 sessions with no recurrences.¹⁵ A study was performed by Khaitan et al in 40 clinically diagnosed patients of pyogenic granuloma. Patients were treated with 0.2-0.5ml of sodium tetradecyl sulfate. All the patients showed complete regression of the lesions after one to four consecutive shots in weekly interval.⁴ If considering only pyogenic granuloma, this study also showed complete regression of the lesions. AlGhamdi et al treated a case of lymphangioma

circumscribed by intralesional injection of 2ml of 1% STS. Lesion regressed by 70% after two sessions.¹⁶ This study had two cases of lymphangioma involving the tongue. One case involving the dorsal surface of the tongue disappeared completely after treatment. While other cases involving the ventral surface of the tongue showed good response (75% disappearance of the lesion). For mucocele, no literature regarding the use of STS is found. Some literature is available for the use of another sclerosing agent i.e. polidocanol and OK 432.^{17,18} Shah performed a study to evaluate the effect of intralesional injection of polidocanol for treating fifteen clinically diagnosed cases of oral pyogenic granuloma (8 cases) and mucocele (7 Cases). All 15 patients showed complete regression of the lesion after 1–3 consecutive injections in a weekly interval.¹⁷

Ohta evaluated the outcome and complications of the treatment of patients with salivary mucocele by intralesional injection therapy with OK-432 in 20 patients with salivary mucocele. The disappearance of the lesion was observed in 16 of 20 patients. The marked reduction was observed in 4 of 20 patients.¹⁸ In this study intralesional sclerotherapy was done with 3%STS in the patient of mucocele and patient of ranula. Mucocele group (total 8 patients) showed complete response in 2 (25%) patients, good response in 1(12.5%), moderate response in 1 (12.5%) and mild response in 1 patient (12.5%) and no response in 3 (37.5%) patient while Ranula group (total 4 patients) showed complete response in 2(50%) patients and moderate response in 1(25%) and no response in 1 (25%) patient.

The advantages of sclerotherapy are that it is an easily available, simple, non-invasive, economical, safe, reliable and effective drug with minimal side

effects, Causes minimal discomfort to the patient, Negligible blood loss. Moreover, there is no requirement of local anesthesia or postoperative dressings or any specific care. The patient can resume his daily activities immediately. The side effects encountered in all patients were pain and edema after injection. Four patients had superficial ulceration which healed without scarring. One patient had ecchymosis followed by tissue necrosis (Nicaolau syndrome) which healed after a month. Contraindications of sclerotherapy are uncontrolled diabetic patients, in areas of secondary infection and pregnant women.¹⁰

Limitations of the study

The data was collected by the same authors who administered the treatment in their respective departments.

CONCLUSIONS

Sclerotherapy with sodium tetradecyl sulfate 3% is effective in the treatment of different oral lesions such as vascular malformations, pyogenic granuloma, lymphangioma, and mucocele. It offers an alternative to conventional methods like surgery, lasers, radiofrequency ablation and electrodesiccation procedure with success and less chance of recurrences. For small lesions or those located in the areas where esthetical conservation is required, sclerotherapy can be an alternative to surgical treatment.

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