



Review Article

Applications of Polidocanol in Oral and Maxillofacial Surgery - A Literature Review

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Abstract

Head and neck vascular lesions can be classified based on their anatomic structure of origin as arterial, venous, and capillary lesions and malformations. These lesions are usually managed using sclerosing solutions before any surgical intervention. The process of injecting sclerosing agents into the blood vessels is known as sclerotherapy. The commonly used sclerosing agents are Sodium morrhuate, Sodium tetradecyl sulfate, Sodium ethanolamine oleate, and Polidocanol. Polidocanol is a synthetic long-chain fatty alcohol that possesses cytotoxic activity and causes lysis of erythrocytes, leukocytes, and plates. It also induces apoptosis by cell wall injury, calcium release, and nitric oxide production. Polidocanol was first used as an analgesic, but with time its use in the treatment of vascular malformations was observed. It is now considered a cost-effective treatment modality with lesser complications. The literature review aims at analyzing the existing literature evidence on the applications of polidocanol in oral and maxillofacial surgery.

Keywords: Sclerotherapy, Polidocanol, Local Inflammatory Signs, Oral Surgery, Vascular Lesions, Tumors

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INTRODUCTION

Sclerotherapy is the process in which a liquid, mostly a sclerosing agent, is injected into the blood vessels. Sclerosing agents are irritants. They injure the endothelial surfaces and ultimately result in obliteration of the space between these surfaces. Sclerosing agents have been classified into three groups based on the mechanism of action causing the injury to the endothelium.

1. Detergents like sodium morrhuate, sodium psylliate, sodium tetradecyl sulfate, ethanolamine oleate, and polidocanol (aethoxysklerol 3%, 1%, or 0.5%) cause injury to the endothelial cells by changing the surface tens in around these cells.
2. Osmotic agents: Hypertonic saline, hypertonic saline/ dextrose. They act through endothelial damage through dehydration.
3. Chemical irritants include corrosives such as Chromated glycerin, and poly iodinated iodide, which act as a cauterizing action and injure cells by a heavy metal effect [1].

Ethanol is one of the first sclerosing agents used for vascular malformations. However, it is rarely chosen today due to its substantial side effects, such as skin complications (necrosis, pain, and blistering), peripheral nerve injury, respiratory depression, cardiac arrhythmia, seizure, rhabdomyolysis, and hypoglycemia [2]. It has also been reported that the rate of complications was higher after ethanol sclerotherapy (18%) compared to other sclerosing agents (6%) [3]. Sclerotherapy is used because of its effectiveness, ease of application, inexpensive nature, and ability to conserve the surrounding tissues with the esthetic benefit, where surgery could leave unpleasant scarring.

Vascular anomalies are broadly classified into two groups: vascular tumors and vascular malformations. Vascular malformations are subdivided based on the anatomic nature of the vessels involved as capillary, venous, lymphatic, and arterial. These lesions may consist of a single type of vessel anomaly, but combinations of formations occur frequently. Arterial or arteriovenous malformations are termed high-flow lesions, whereas capillary, and venous lymphatic malformations are low-flow lesions [4]. Vascular lesions or malformations pose unique challenges in management to the clinician. This can be attributed to the complex nature of these lesions and hence, regression of these lesions is preferred and is carried out using such pharmacological agents. This literature review aims to elaborate on the applications of Polidocanol solution in Oral and maxillofacial surgery.

POLIDOCANOL

Polidocanol was developed as a local anesthetic in France in the 1950s. Polidocanol is also known as aethoxysklerol or hydroxy-poly ethoxy-dodecane - POL is an alkyl polyglycol ether of lauryl alcohol [5,6]. It is a detergent solution and is a synthetic long-chain fatty alcohol. Polidocanol has endothelial cytolytic properties and even upon injection intradermally it doesn't induce necrosis or any other allergic or inflammatory reaction. Polidocanol is an ionic surfactant that is cytotoxic and causes lysis of erythrocytes, leukocytes, and platelets. It activates intracellular signaling pathways that can cause calcium release and nitric oxide production leading to cell injury and cell death [5]. It can also induce cell death by activation of apoptosis pathways or direct chemical toxicity on the cell membrane, and also by interfering with plasma proteins and membrane protein synthesis. Polidocanol has long been used in different concentrations of 0.5%, 1%, and 3% for sclerotherapy in vascular malformation and varicose veins.

Polidocanol is a mixture of 5% ethyl alcohol and 95% hydroxy poly ethoxy dodecane [7]. It was approved by the USFDA for the sclerosing therapy of small varicose veins of the leg. This combination produces a detergent action that induces rapid overhydration of endothelial cells. This in turn leads to vascular injury, resulting in the regression of vascular lesions.

Proper diagnosis plays an essential role in the success of Polidocanol sclerotherapy. Hence, a proper diagnostic evaluation of the vascular lesion must be carried out which includes proper history taking, clinical examination, and Doppler ultrasound investigation.

APPLICATIONS OF POLIDOCANOL

Shrivastava et al., [1] used Polidocanol intralesional injection for the treatment of hemangioma of Buccal mucosa in a hepatitis B positive patient. 0.4 ml of 2% polidocanol solution was injected slowly into the periphery of the lesion. The patient was put on antibiotic and analgesic therapy for 5 days. During follow up the size of the lesion decreased in size but was not completely resolved hence the procedure was repeated after 2 weeks. Subsequent follow-ups showed the lesion was tremendously reduced and mucosalization was seen over 1 month. In a study [2], Polidocanol was used for both lymphatic and venous, low flow malformations of the head and neck region. They observed that there was a significant parotid swelling after intralesional infection of polidocanol, but resolved in 2-3 days with steroid therapy. No other complications such as intra-lesional bleeding, fever, secondary infections, or neurological deficits were observed. Similarly, Mukul et al., [3] used it for LVFM of the tongue and found it to be a cost-effective, less expensive, and a treatment modality with lesser complications.

Grover et al., [4] used Polidocanol for the treatment of infantile hemangiomas. They observed that combination therapy of IHs with oral corticosteroids and polidocanol sclerotherapy is useful in treating larger and more problematic IHs. It is also useful in effectively reducing pedunculated lesions that may not otherwise have been satisfactorily resolved with steroids alone. The lesser risk of rebound growth upon tapering steroids is another favorable feature of this synergistic combination. Similar effects were also observed by Sangma et al., [5]. Interestingly, Liu et al., [6] point out that Polidocanol sclerotherapy can also be used for the treatment of mucocele, particularly in children, who comprise a major population of mucocele patients, thus reducing the need for invasive surgical procedures. Kikuchi et al., [7] point out the use of polidocanol sclerotherapy for hemangiomas of the pharynx and larynx with the complication being superficial bleeding. Polidocanol was injected into the small space at the surface of the lesion, and the lesions were reduced and bleeding was controlled without any complications. However, some authors also point out that not all vascular lesions can be treated with Polidocanol sclerotherapy and that the success rate also depends on several factors such as proper case selection, the severity of the lesion of malformation, and the number of sessions of sclerotherapy [8-10].

CONCLUSION

The existing literature evidence reveal that Polidocanol sclerotherapy is a promising treatment modality for vascular malformations of the head and neck region, provided proper case selection and properly timed sessions of sclerotherapy are carried out to achieve the best results of polidocanol usage.

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