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REVIEW

Sclerotherapy for low-flow vascular malformations of the head and neck: A systematic review of sclerosing agents☆

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Summary *Background:* Sclerotherapy has become the gold standard for the first-line therapy of most venous (VMs) and lymphatic malformations (LMs) of the head and neck. Numerous sclerosing agents are used to treat these low-flow vascular malformations; however, to date, it remains unclear which sclerosing agent is superior in terms of effectiveness and safety.
Methods: In a systematic review of the literature (1995—present), we compare the effectiveness and complications of the sclerosing agents most commonly used for cervicocraniofacial VMs and LMs.
Results: The literature search yielded 1155 articles, among which 36 (1552 patients) were included in the systematic review. The quality of evidence was low. Pingyangmycin, absolute ethanol, OK-432, ethanolamine oleate, bleomycin, polidocanol, doxycycline, and sodium tetradecyl sulfate (STS) were the most reported sclerosing agents. All agents seem effective, and the mean overall response varies from 71% to 100%. Complications occurred more frequently after ethanol sclerotherapy (18%), compared to other sclerosing agents (0—6%). Cellulitis and ulceration were encountered following sclerotherapy with most sclerosing agents, but skin necrosis was particularly observed after ethanol. Facial nerve paralysis occurred only after OK-432 (0.05%) and ethanol sclerotherapy (6%).

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Conclusions: This systematic review could not identify a significantly superior sclerosing agent in terms of effectiveness, due to the low quality of the available evidence. Until stronger evidence is available, the difference in complication rates is potentially the deciding factor in the choice between sclerosing agents. As a significantly higher complication rate and more severe local complications were encountered after using absolute ethanol, we cannot recommend this agent for sclerotherapy of cervicofacial vascular malformations.

Contents

Introduction

Vascular malformations are congenital lesions of the vascular or lymphatic system, which occur due to an erroneous vascular development during embryogenesis. These abnormal dilated vessels grow proportionally to body size and do not usually show spontaneous regression. Since 1996, the International Society for the Study of Vascular Anomalies (ISSVA) has been providing an up-to-date classification system for vascular anomalies, in which a clear distinction between vascular tumors (such as the common infantile hemangioma) and malformations is made.[1] Vascular malformations can be divided into high- and low-flow malformations: arteriovenous malformations (AVMs) are high flow due to the arterial blood flow pattern; capillary (CMs), lymphatic (LMs), and venous malformations (VMs) are low-flow lesions.

The greatest proportion of low-flow malformations is located in the head and neck region.[2] A multidisciplinary treatment, which involves consultation of various head and neck specialists, such as plastic surgeons, ophthalmologists, craniofacial surgeons and otolaryngologists, is often required.

In general, CMs are superficial and do not usually cause mass effect. Cutaneous CMs, also known as port-wine stains, are therefore mostly treated with laser therapy.[3] For LMs and VMs, surgical excision was traditionally the treatment of choice.[4] However, due to infiltration and expansion of the lesion in adjacent anatomical structures, surgery is not always a feasible treatment option and may lead to severe complications such as nerve damage. For these reasons, many experts currently consider sclerotherapy as the first-line therapy for LMs and VMs, sometimes in combination with surgical debulking. In sclerotherapy, intralesional injections with sclerosing agents damage the endothelium followed by inflammation, thrombotic vascular occlusion, and sclerosis, with regression of the vascular malformation as the intended result.[5]

To date, a wide range of sclerosing agents have been used in daily practice, but it is unclear which sclerosing agent is superior in terms of safety and effectiveness.[6,7] The goal of this systematic review is to investigate and