

Management of palatal vascular malformation using absolute ethanol sclerotherapy

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Abstract

Arteriovenous malformation is treated by variety of techniques over the years. Sclerotherapy is considered an effective and conservative technique for the treatment of benign vascular lesions and replaced the traditional role of surgical therapy, especially for the venous lesions that are surgically difficult or at inaccessible areas. Absolute ethanol was adopted as a new sclerosant agent for this complex form of venous defects to improve overall treatment results with acceptable morbidity and recurrence rates. Sclerotherapy has the advantage of no external scarring, low cost, and few complications in comparison to the surgical treatment.

Introduction

Vascular malformation is known as one of the major therapeutic problem even to the most experienced clinicians. These malformations grow proportionately with age, and may involve multiple anatomical spaces and encase critical neuromuscular structures, associated with nerve damage, massive bleeding, and deformity.¹

Management of arteriovenous malformations (AVMs) remains challenging because of their unpredictable behavior and high recurrence rate if treated by curettage alone without inadequate ligation of the feeder vessels.^{2,3} These lesions are treated by variety of techniques over the years, including surgical excision, irradiation, electrocoagulation, cryotherapy, intravascular magnesium or copper needles, systemic corticosteroids, interferon- α , embolization, cryotherapy, lasers and sclerotherapy.^{4,5,6} Sclerotherapy is an effective, conservative and low cost technique for the treatment of benign vascular lesions, included vascular malformation.³ The sclerosant agents used are 5% sodium morrhuate, sodium psyllate, quinine urethane, 5% ethanolamine oleate, 1% polidocanol, sodium tetradecyl sulfate, and hypertonic saline.⁶

We present our experience in treating palatal vascular malformation using direct ethanol sclerotherapy as a cheap therapeutic modality for treatment of deeply seated vascular lesion.

Case Report

Twenty one-year old Saudi male patient presented to the department of oral and maxillofacial surgery clinic at King Abdulaziz University complaining of swelling on the right side of the face (Figure 1A). He complained of mouth bleeding during chewing or teeth brushing. Extra-oral clinical examination revealed swelling on the right side of the face, which is soft and compressible. Intraoral examination showed a bluish swelling at the junction of soft and hard palate that bleed easily on touch. Aspiration revealed blood content (Figure 1B). Computerized tomography (CT) and magnetic resonance image (MRI) studies revealed that it is a vascular malformation that extends to the infratemporal area (Figure 2). The patient was advised to have ethanol directly injected into the lesion as surgical excision was hazardous and difficult to achieve. Patient disagree with that option and disappear for 18 months and returned back with severe gingival inflammation around the whole right maxillary quadrant which appeared covered by heavy calculus as he could not brush his teeth because of bleeding that he described as extensive (Figure 1C). Advised was given to the patient that the only treatment option we can offer him is the ethanol injection. The procedure and possible complications were explained to the patient and family and they agreed to that option. Under general anesthesia using fiberoptic intubations, as the lesion was approaching the soft palate and there was a fear that routine nasal intubations could be hazardous to the airway, contrast medium was injected toward the engorged vascular lesion using a No. 18 venipuncture catheter (to determine the volume of the growths before treatment), followed by injection of one-third to one-quarter cavity volume of 95% ethyl alcohol into the tumor cavity according to Lee and Chen¹ (Figure 3). The patient was kept intubated for 48 h to guard his airway, as there was edema. Patient was extubated the third day and his recovery was uneventful. Intravenous dexamethasone (0.1 mg/kg) was given for 3 days postoperatively to control inflammation. This was then gradually tapered off over the following 5 days. Patient was discharged from the hospital on the fifth post injection day and kept follow up every week for the first three months, then every 2 weeks for another 3 months. After 6 months, he is followed up once a month. The lesion remarkably shrinks and the hygienist was able to thoroughly scale his teeth without

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any bleeding (Figure 4).

There were no complications reported in this case except some palatal ulceration which is improving with every visit. Treatment success was determined clinically by reduction in lesion size, ability of the patient to chew and to clean his teeth without bleeding, patient experience to pain and by patient satisfaction.

Discussion

There is no agreement on the best treatment method of vascular malformation. Each method has its disadvantages. For example: surgical excision can lead to significant loss of motor function, cosmetic problems, nerve damage, or massive bleeding⁷ and the complicated anatomy of the face and neck, may result in significant loss of motor function, cosmetic problems, nerve damage, or massive bleeding if surgery is adopted.⁸

Laser therapy presents higher costs to the patient and may result in skin atrophy, transient or permanent hyperpigmentation, slight depression of the skin and scarring. Cryotherapy may also result in scarring and hyperpigmentation.^{9,10}

Intralesional injection of corticosteroids may cause adrenal suppression, slowed weight gain, atrophy, and necrosis.¹¹

The use of sclerotherapy in the management of vascular anomalies has increased and replaced the traditional role of surgical therapy, especially for the venous lesions that are surgically difficult or at inaccessible areas. It has the advantage of low cost, no external scarring, and few complications compared to surgical treatment. Varieties of sclerosing agents have been used for the management of various vascular malformations such as 5% sodium morrhuate, sodium tetradecyl sulphate, ethanolamine oleate, OK432, bleomycin,

ethanol, and hypertonic saline, alone or in various combinations.^{7,12} Absolute ethanol was adopted as a new scleroagent for this complex form of venous defects to improve overall treatment results with acceptable morbidity and recurrence rates.¹³

Ethanol is used most of often due to its low cost, antiseptic quality, wide availability and easy of use; however, it requires general anesthesia because the procedure is very painful.⁷

The aim of treatment is to eradicate the lesion nidus completely, which is the fundamental abnormality as even the smallest residual nidus may expand to form a recurrence.¹⁴ In the presented case it was difficult to achieve complete eradication of the lesion by surgical approach because of the possible hazards that are associated with the affected site.

It has been suggested that ethanol cause protoplasm precipitation which subsequently causes permanent obliteration of the vessel lumen.¹⁵ Also Do *et al.*¹⁶ reported that ethanol has shown the ability to induce protein denaturation of the endothelial cells with subsequent vessel wall denudation and interruption, which results in the complete obliteration of the vessel lumen rather than just simple obstruction.

Although various complications were reported to develop during the procedure such as local skin necrosis and fibrosis, haemoglobinuria, anaphylaxis,¹³ and some major complications were rarely reported including blood loss, acute pulmonary hypertension with cardio-pulmonary collapse,⁷ therefore, Lee and Chin¹ used rubber bands to compress the patient's forehead and chin to occlude facial venous return and minimize complications, also

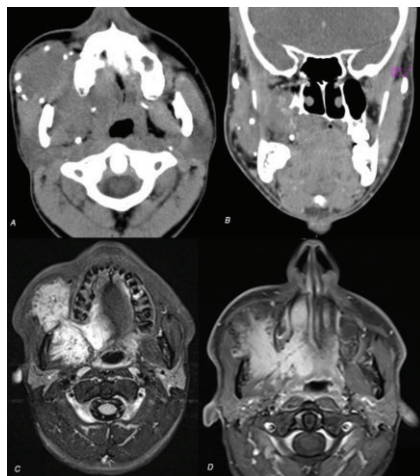


Figure 2. A) Axial and B) coronal computed tomography scan obtained with contrast material shows dilated vessels that extend into the infratemporal area and multiple phleboliths can be seen. C) and D) Axial T2 weighted magnetic resonance image shows high intensity lesion with flow representing vessels of different sizes.

Hammer *et al.*¹⁷ recommended to inject the ethanol slowly, over a period of several minutes and not exceeding 1 cc/kg of body weight while monitoring the pulmonary artery pressure to avoid such a catastrophic situation.

Also, ethanol should only be used in the head and neck region by individuals and centers with professional expertise and experiences including maxillofacial surgeon, general radiology, general medicine, cardiovascular medicine, physical medicine and rehabilitation, dermatology, psychiatry, nuclear medicine, and social services with maximum efficiency to handle or at least minimize various

anticipated complications.¹⁷ Also, careful and routine monitoring of pulmonary arterial pressure are required by the interventional radiologist, and anesthesiologist.¹⁸

Conclusions

Vascular malformations were treated with direct percutaneous injection of absolute ethanol, which resulted in remission, and alleviation of their symptoms, with no major complications. This technique provides a simple,



Figure 1. A) Clinical picture of the patient showing facial asymmetry as result of right zygomatic swelling; B) Intraoral view shows bluish mass extending to the soft palate when the patient presented to the clinic for the first time; C) Intraoral photograph of the same patient 18 months after first presentation. The lesion increased in size, bled easily and appeared darkens with bad oral hygiene and heavy calculus at the right side of the jaw.

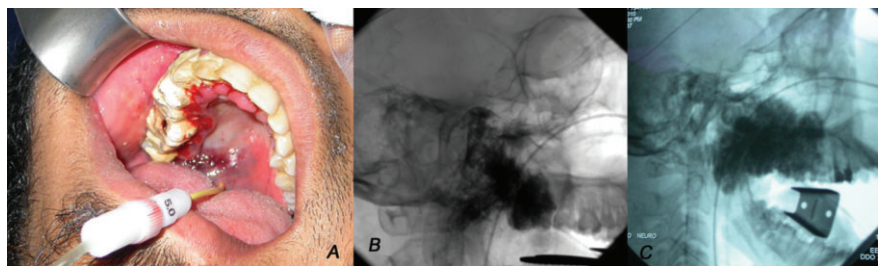


Figure 3. A) The catheter loaded with ethanol in place during injection; B) Contrast medium is injected into the lesion and an X-ray is taken to make sure that the catheter is within the lesion itself; C) An angiogram shows ethanol injection within the lesion.



Figure 4. A) Postoperative picture of the lesion one and B) three months following injection.

low cost and reliable alternative treatment for venous malformation in the face and neck. Absolute ethanol sclerotherapy can deliver excellent results as an independent therapy to the infiltrating type of extra-truncular form of VM. Complications can occur but are rare. The morbidity involved should be clearly understood and accepted by the patient and family, and the risk of acute and chronic complications, either major or minor, should be explained to the patient. Long-term assessment of the complication's sequelae is warranted.

References

1. Lee C, Chen S. Direct percutaneous ethanol instillation for treatment of venous malformation in the face and neck. *Br J Plast Surg* 2005;58:1073-8.
2. Kademani D, Costello BJ, Ditty D, Quinn P. An alternative approach to maxillofacial arteriovenous malformations with transosseous direct puncture embolization. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2004;97:701-6.
3. Orlando JL, Caldas JG, Campos HG, et al. Ethanol sclerotherapy of superficial venous malformation: a new procedure. *Dermatology* 2010;220:376-80.
4. Lewin JS, Merkle EM, Duerk JL, Tarr RW. Low-flow vascular malformations in the head and neck: safety and feasibility of MR imaging-guided percutaneous sclerotherapy - preliminary experience with 14 procedures in three patients. *Radiology* 1999;211:566-70.
5. Li ZP. Therapeutic coagulation induced in cavernous hemangioma by use of percutaneous copper needles. *Plast Reconstr Surg* 1992;89:613-22.
6. Johann AR, Aguiar MF, Vieira do Carmo MA, et al. Sclerotherapy of benign oral vascular lesion with ethanolamine oleate: An open clinical trial with 30 lesions. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005;100:579-84.
7. Rimon U, Garniek A, Galili Y, et al. Ethanol sclerotherapy of peripheral venous malformations. *Eur J Radiol* 2004;52:283-7.
8. Yamaki T, Nozaki M, Sasaki K. Color duplex-guided sclerotherapy for the treatment of venous malformations. *Dermatol Surg* 2000;26:323-8.
9. Drolet BA, Esterly NB, Frieden IJ. Primary care: hemangiomas in children. *N Engl J Med* 1999;341:173-81.
10. Van Doorne L, Maeseneer MD, Stricker C, et al. Diagnosis and treatment of vascular lesions of the lip. *Br J Oral Maxillofac Surg* 2002;40:497-503.
11. Fishman SJ, Mulliken JB. Hemangiomas and vascular malformations of infancy and childhood. *Pediatric Surg* 1993;40:1177-200.
12. Mathur NN, Rana I, Bothra R, et al. Bleomycin sclerotherapy in congenital lymphatic and vascular malformations of head and neck. *Int J Pediatr Otorhinolaryngol* 2005;69:75-80.
13. Lee BB, Kim DI, Huh S, et al. New experiences with absolute ethanol sclerotherapy in the management of a complex form of congenital venous malformation. *J Vasc Surg* 2001;33:764-72.
14. Ethunandan M, Mellor TK. Haemangiomas and vascular malformations of the maxillofacial region: a review. *Br J Oral Maxillofac Surg* 2006;44:263-72.
15. Lee BB, Do YS, Byun HS, et al. Advanced management of venous malformation with ethanol sclerotherapy: Mid-term results. *J Vasc Surg* 2003;37:533-8.
16. Do YS, Yakes WF, Shin SW, et al. Ethanol embolization of arteriovenous malformations: interim results. *Radiology* 2005;235:674-82.
17. Hammer FD, Boom LM, Mathurin P, Vanwijck RR. Ethanol sclerotherapy of venous malformations: evaluation of systemic ethanol contamination. *J Vasc Interv Radiol* 2001;12:595-600.
18. Bae S, Do Y, Shin S, et al. Ethanol Embolotherapy of Pelvic Arteriovenous Malformations: an Initial Experience. *Korean J Radiol* 2008;9:148-54.