DUPLICATION AND INFLAMMATION OF THE SYMPATHETIC VESSELS

Case Report

Title of the article:

Duplex-guided Foam Sclerotherapy for the Treatment of the Symptomatic Venous Malformations of the face: Report of A Case

Brief title
Duplex-guided foam sclerotherapy for venous malformations

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ABSTRACT

Purpose: New sclerosing foam is considered to have the advantage of causing more damage on the intima than liquid form. Therefore, we recently applied duplex-guided foam sclerotherapy in a patient with venous malformations of the face.

Methods: A 20-year-old man was referred to our institute for the evaluation and the treatment of vascular malformations of the face. Preoperative duplex scanning and magnetic resonance imaging (MRI) revealed subcutaneous and intramuscular venous malformations. The sclerosing foam was produced by Tessari’s method using 1% polidocanol, and the duplex-guided foam sclerotherapy was performed under general anesthesia. A 20-gauge plastic needle was inserted into the venous space by the ultrasound guidance, and a total of 5ml of sclerosing foam was infused followed by immediate tie-over dressing.

Results: The venous malformations were successfully reduced in size, and postoperative MRI showed significant reduction of the venous malformations.

Conclusions: Although, further collective study is necessary to ensure the validity of this treatment, duplex-guided foam sclerotherapy could have great promise in the treatment of symptomatic venous malformations.

Key words: Venous malformations, duplex-guided sclerotherapy, foam sclerotherapy
INTRODUCTION

The treatment of venous malformations remains a matter of debate. Traditional aggressive excision of venous malformations often resulted in bleeding, significant loss of muscle and nerve functions when important structures are involved, and even recurrence of venous malformations. Injection sclerotherapy has been accepted for less invasive alternative, and we recently reported duplex-guided sclerotherapy for symptomatic venous malformations and obtained good mid-term results. However, venous malformations with extensive involvement require stronger sclerosing agents and multiple sessions of sclerotherapy since inappropriate therapy and significant recanalization can always lead to recurrence. Numerous sclerosing agents have been developed but none of them were ideal or absolutely safe for the treatment of venous disorders.

Recently, new sclerosing foam have been discussed for the treatment of varicose veins of lower extremities, and appeared to have the advantage of causing more severe damage on the intima compared to the liquid form. Therefore, we have recently applied duplex-guided foam sclerotherapy in a patient with subcutaneous and intramuscular venous malformations of the face.

Case Report

A 20-year-old man was referred to our institution for the evaluation and treatment of vascular malformations of left cheek (Figure.1). Four years prior to the referral, he was diagnosed as vascular malformations of left cheek, and he underwent surgical removal of the malformations by external approach at another hospital. But this procedure immediately completed by bleeding complication, resulting in no significant improvement.

On physical examination, he had a 7 X 6 cm soft, compressible mass in his left cheek, in which no thrills and bruits were observed. The duplex scanning showed subcutaneous and intramuscular low-echoic legion, in which, pulseless blood flow was demonstrated on pulse Doppler flow imaging consistent with venous malformations. The T2-weighted axial magnetic resonance imaging (MRI) showed the focal high-signal venous malformations that documented the involved tissues including subcutaneous tissue and left masseter muscle (Figure.2).

The duplex-guided foam sclerotherapy was performed under general anesthesia. The sclerosing foam was produced by Tessari’s method using 1%
polidocanol (POL). Two syringes were attached by a three-way stopcock, and one syringe was filled with the POL, and another with the air. The stable sclerosing foam was obtained by mixing them through multiple passages between the two syringes. The venous space was identified intraoperatively by duplex scanning, and then venous flow was confirmed again by pulsed Doppler. A 20-gauge plastic needle was inserted into the venous space under the ultrasound visualization, and aspiration of the blood confirmed its intraluminal position. A fine plastic extension tube filled with heparinized saline was attached to the needle (Figure 3). A 20ml syringe containing contrast medium was attached, and intraoperative venography revealed collection of interconnecting venous spaces (Figure 4). Then a 10ml syringe containing sclerosing foam was connected, and a total of 5ml of sclerosing foam was infused slowly, followed by immediate tie-over dressing for promoting endosclerosis. The patient’s postoperative course was uneventful with no prominent complications except for swelling.

Three months after this procedure, the venous malformations were successfully reduced in size (Figure 5), and postoperative MRI showed significant reduction of the venous malformations (Figure 6). The patient had one additional duplex-guided foam sclerotherapy on an outpatient basis to decrease residual venous malformations.

**DISCUSSION**

Venous malformations can be evaluated by several noninvasive tests. MRI provides useful information on the distribution and the extent of venous malformations. MR signal characteristics show decreased signal intensity compared with fat on T1-weighted images, hyperintense signal compared with fat on T2-weighted images, and increased signal intensity compared with skeletal muscle on both T1- and T2-weighted images. The MR venography (MRV) combined with MRI can demonstrates the channel anomalies as well as the superficial and deep conducting veins, and determines the prognosis and individual treatment particularly in patients with the extremity involvement. Color duplex scan can be used to distinguish hemangioma from vascular malformations, and venous malformations can be diagnosed by documented venous flow by color Doppler flow imaging and spectral analysis. Echo-enhancing contrast will be administered to demonstrate low-flow, large-vessel venous malformations.

There is a considerable number of sclerosing solution, and absolute
alcohol and sodium tetradecyl sulfate (STS) are predominantly used for the management of venous malformations of the head and neck. Absolute alcohol is shown to introduce permanent obliteration of vessel lumen, and considered to give the lowest recurrence rate. In contrast, other sclerosing agents provide only palliative effect with high recurrence rate. Svendsen et al used absolute alcohol, and reported excellent or good results in 84%. Later his group reported excellent or good results in 68% of the patients with the use of STS. They concluded that they might use alcohol if treatment with STS failed. Berenguer et al discussed the experience with the use of absolute alcohol and STS, and they used STS for smaller, superficial malformations, and applied alcohol for larger, deeper malformations. Lee et al described the treatment of congenital venous malformations with the use of alcohol and obtained the immediate success rate of the sclerotherapy in 92%.

There are some complications reported using alcohol and Sotradecyl. Lee reported 9 cases with ischemic bullae, 2 with tissue fibrosis, 2 with tissue necrosis, 1 with deep vein thrombosis, 1 with pulmonary embolism, and 5 with nerve palsy in 98 sessions of alcohol sclerotherapy in 30 patients. Berenguer et al showed one patient who had transient bradycardia during the alcohol sclerotherapy. Maison et al studied the relationship between the serum alcohol level and the amount of alcohol administered, and found that patients who receive up to 1.0 ml/kg ethanol during embolization or sclerotherapeutic procedures may have elevated serum ethanol levels that could put them at risk of respiratory depression, cardiac arrhythmias, seizures, rhabdomyolysis, and hypoglycemia. De Lorimier reported anaphylaxis using STS.

In the past, Orbach described the macrobubble foam preparation with sclerosing solution. However, foam form sclerotherapy did not become popular till mid 1990s’ after the introduction of new methods of transforming sclerosing solutions predominantly reported in Latin countries. The advantage of foam form of detergent sclerosing solutions includes the possibility of reducing the amount of the necessary sclerosing liquid as well as the concentration. POL is the detergent solution that is associated with less allergic and inflammatory reactions compared to other sclerosing solutions. Thrombogenic potential of POL could be enhanced by foam sclerotherapy. Although, further collective study is required to ensure the validity of this method, duplex-guided foam sclerotherapy could have great promise in the treatment of symptomatic venous malformations.
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LEGENDS

Figure 1. Preoperative frontal view of the patient.
Figure 2. T2-weighted axial MRI demonstrating focal high-signal venous malformations.
Figure 3. A 20-gauge plastic needle inserted into the venous space under the ultrasound visualization.
Figure 4. Intraoperative venography showing collection of interconnecting venous spaces.
Figure 5. Postoperative frontal view.
Figure 6. Postoperative MRI demonstrating significant reduction of the venous malformations.