Atrial embolism of floating thrombus of the great saphenous vein after microfoam ultrasound-guided sclerotherapy

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Introduction

Microfoam sclerotherapy (MS) is a therapy that has been increasingly used to treat chronic venous disease (CVD) because it is effective, safe and less invasive; nevertheless, severe and life-threatening complications may occur. This paper describes a case of late atrial embolism after microfoam ultrasound-guided sclerotherapy of a varicose greater saphenous vein.

Case report

A 67-year-old male outpatient with symptomatic CVD on the right lower limb classified as CEAP C5 was scheduled for outpatient MS. His past medical history included arterial hypertension and class II congestive heart failure (NYHA classification). Hematological and coagulation examinations and chest radiography were normal. Electrocardiogram showed...
normal sinus rhythm. At physical examination, a dilated and pulsatile greater saphenous vein (GSV) at the saphenofemoral junction (SFJ) on both lower limbs was observed (Figure 1). Preoperative duplex ultrasound showed the right saphenofemoral junction with 15 mm in diameter, dilatation and reflux in all the length of the GSV and in varicose tributary veins, as well as a patent and competent deep venous system.

The procedure was performed in supine position and a tourniquet at the level of the patient’s knee. The greater saphenous vein was punctured with Jelco 18-gauge needle at the distal portion of the thigh using Doppler ultrasound guidance. Microfoam was prepared by mixing polidoca-nol 3% and room air in a 1:4 proportion (Tessari method); afterwards, 8 mL of this solution was injected under real-time ultrasound guidance, while the limb was kept in a 45-degree elevation and the saphenofemoral junction was compressed by an ultrasound transducer. The right lower limb and the saphenofemoral junction were maintained in the same position for ten minutes and, then, the whole limb was wrapped with a compression inelastic bandage for 24 hours. There were no intercurrences during the procedure, and elastic stockings (30-40 mmHg of pressure) were prescribed for 30 days.

The patient returned seven days after the procedure with clear subjective clinical improvement. Follow-up Doppler ultrasound showed total occlusion of the greater saphenous vein in the two distal thirds of the thigh. The proximal segment of the great saphenous vein was partially occluded, and Doppler ultrasound also showed a floating thrombus in the saphenofemoral junction, that fragmented during the ultrasound examination. There were no signs of deep venous thrombosis (DVT). The thrombus was immediately identified ascending the inferior vena cava, and immediately thereafter, transthoracic echocardiogram showed a floating embolus in the right atrium (Figure 2). The patient was placed in left lateral decubitus position and sent to the Intensive Care Unit. The absence of thrombi on the saphenofemoral junction allowed emergency ligationdivision of the greater saphenous vein, under local anesthesia. Anticoagulation therapy with unfractionated heparin was initiated. At repeat transthoracic echocardiogram two days later, the embolus was no longer seen. Arterial blood gas was normal and helical CT scan showed no signs of pulmonary embolism (PE). The patient was found to be asymptomatic and was discharged after five days on warfarin for outpatient follow-up and anticoagulation control. No evidence of DVT or PE was detected six months after the procedure and the anticoagulation therapy was terminated.

Discussion

MS is a promising therapeutic procedure that has been radically changing the management of varicose veins\(^1,2\). The adoption of fast microfoam preparation systems and routine guidance by Doppler ultrasound have increased the interest in the method, which may be performed in outpatient clinics without anesthesia in one or more sessions, besides resulting in a shorter recovering period in comparison to classic surgery\(^3,4\). Virtually all kinds of varicose veins can be treated even when the conventional surgical treatment has limitations, such as patients of functional classifications CEAP C4, C5 and C6, recurrent
varicose veins and high surgical risk patients. The number of publications on the method is increasing, but there is still no consensus regarding indications and contraindications, technical variations and the rate of complications.

The efficacy and safety of the method have been emphasized by many studies, but only a relatively small number of complications, often not severe, has been published. However, the actual incidence of complications is unknown, and potentially severe and lethal events have already been described, including the rare and well-documented case of stroke in a patient with an 18-mm patent oval foramen and left shunt, and a case of cardiorespiratory arrest associated with polidocanol sclerotherapy for venous malformation in a child with Klippel-Trenaunay syndrome.

Extravasation of the sclerosing agent into the deep venous system through perforating veins or at the saphenofemoral junction during the procedure may be responsible for some of these complications. Some ways of avoiding it have been described, including digital compression or ultrasonographic monitoring during sclerosing agent injection. A prospective, controlled and randomized trial suggested that SFJ ligature under local anesthesia prior to the GSV sclerotherapy increases the procedure safety by limiting the extravasation. Recently, Bidwai et al. proposed a clipping ligature of the perforating veins under local anesthesia after locating them by means of Doppler ultrasound and SFJ monitoring by Fogarty balloon catheter.

Delayed major complications are rare and almost exclusively present as venous thrombosis, which is often asymptomatic and diagnosed by Doppler ultrasound within 7 to 14 days after the procedure. DVT is commonly limited to the calf muscular veins or tibial veins. Femoral or popliteal DVT rarely occurs by direct extension of thrombosis from the calf muscular veins or tibial veins. Femoral or popliteal DVT rarely occurs by direct extension of thrombosis from CHF and the difficulty in maintaining compression after the procedure have contributed to non-obliteration of the great saphenous vein and the local floating thrombus formation. Although there are not studies that determine a maximal acceptable diameter of the saphenofemoral junction for use of this method, the present clinical observation may limit its indication for patients with wide SFJ and reduce possible complications.

**Conclusion**

MS is a promising treatment for varicose veins because it is a simple, easily reproducible, less invasive, cost-effective and safe method. However, it can rarely result in severe complications like those reported in this paper. Some precautions such as the patient careful selection, choice of the sclerosing agent and of the puncture site, compressive therapy and the experience of the physician with other methods of sclerotherapy – as well as his ability to diagnose and treat possible complications – may increase the efficacy and safety of this procedure.

**References**


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Final text approval*: RBM, RPFL and OK
Statistical analysis: Not applicable
Overall responsibility: RBM, RPFL and OK

Financing information: Centro de Estudos Ohannes Kafejian, Faculdade de Medicina do ABC.

*All authors have read and approved the final version of the paper submitted to the J Vasc Bras