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Pulmonary embolism provoked after sclerotherapy with polidocanol

***Corresponding Author:** Georgia Hardavella*

Email: georgiahardavella@hotmail.com

Abstract

We hereby present the case of a 29-year-old male with varicose veins who underwent foam sclerotherapy of his right lower extremity with polidocanol. After the procedure he presented to the emergency department with chest pain and dyspnoea. He had increased levels of D-Dimers and pre-test probability for thromboembolic disease and subsequently he was referred for a Computed Tomography Pulmonary Angiogram (CTPA) which confirmed the diagnosis of pulmonary embolism. Following extensive investigations, we excluded any other underlying cause for the confirmed diagnosis. This case brings to the attention of practicing clinicians the possibility of thromboembolic event secondary to clinically tested and approved substances for surgical procedures through a proprietary dispensing system.

Georgia Hardavella*; Vasiliki Skordia; Georgia Dionysopoulou; Ioannis Dimitroulis

6th Department of Respiratory Medicine, ''Sotiria'' Athens' Chest Diseases Hospital, Greece.

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Keywords: Pulmonary embolism; Sclerotherapy; Polidocanol; Foam.

Introduction

Chronic venous insufficiency of the lower extremities is a common clinical entity in adults. Sclerotherapy is a standard of care method for the non-invasive treatment of spider veins, varicose veins, and venous malformations diagnosed with duplex ultrasound [1]. Sclerotherapy is often performed under ultrasound guidance to ensure optimal targeting of abnormal vessels with the injected sclerosing agent (liquid or foam form) [2]. Foam sclerotherapy is a technique that involves injecting foamed sclerosant drugs within a blood vessel using a pair of syringes- one with sclerosant in it and one with gas (originally air) [3]. The original Tessari method which included connecting syringe of liquid sclerosant to a syringe of air by a three-way stopcock valve [4], has now been modified by the Whiteley-Patel modification which uses 3 syringes, all of which are silicone-free [4]. The sclerosant drugs (sodium tetradecyl sulfate, bleomycin or polidocanol) are mixed with air or a physiological gas (carbon dioxide) in a syringe or by using mechanical pumps. This increases the surface area of the drug. The foam sclerosant drug is more efficient than the liquid form in causing sclerosis, as it does not mix with the blood in the vessel and it displaces it instead, thus avoiding dilution of the drug and causing maximal sclerosant action [5]. The injection of sclerosing agents in varicose vessels can be associated with thromboembolic events [2]. We hereby present the case of a pulmonary embolism following foam sclerotherapy with polidocanol.

Case presentation

A 29-year-old male with no past medical history underwent foam sclerotherapy of his right lower extremity with polidocanol 2% due to varicose veins. Before this procedure he underwent a Doppler ultrasonography of his lower extremity vessels which confirmed venous insufficiency in a superficial branch of the right popliteal vein without valvular insufficiency and it excluded Deep Venous Thrombosis (DVT). This was a day case procedure; no immediate complications were noted, and the patient was mobilized rights after the procedure as per local protocols. Ten days later he presented with pain in his left hemithorax and dyspnoea and therefore he attended the emergency department. A thorough clinical examination did not re-

veal any abnormalities. Blood tests revealed increased d-dimer levels and subsequently due to the increased clinical probability for thromboembolic event he was referred for a CTPA which confirmed the diagnosis of pulmonary embolism in the left lower, right middle and right lower lobes (Figures 1,2). The patient was admitted to the hospital and was treated initially with fondaparinux as per local protocols. He had an uneventful hospital admission. Thorough imaging and coagulation tests did not reveal any underlying abnormality. Five days later he was discharged on Non- Vitamin-K Oral anticoagulants (NOACs) for a minimum of 3 months subsequent to clinic review and follow up.

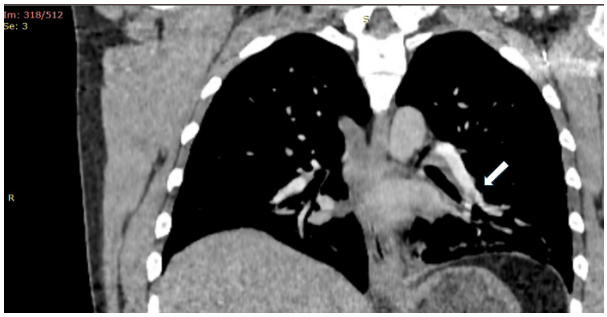

Figure 1: PE in left lower lobe.

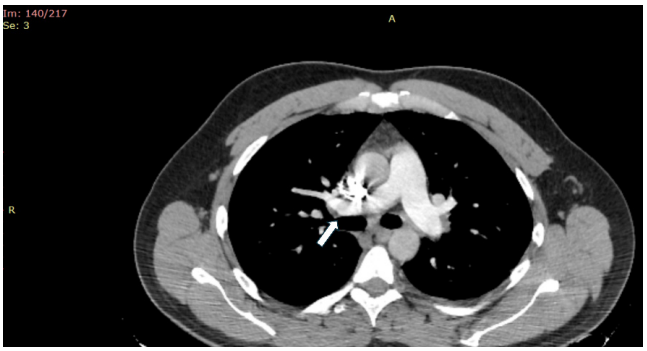

Figure 2: PE in right lung.

Discussion

Injection sclerotherapy (liquid or foam) is a minor non-invasive procedure offered by vascular surgeons or trained nurse practitioners to treat varicose veins and haemorrhoids. An irritating solution is injected into a varicose vessel to damage the vessel endothelium, induce collapse followed by inflammation with scarring and subsequently the vessel is destroyed [6,7]. Sclerosing agents applied in these therapeutic interventions vary and they include polidocanol, hypertonic saline, sodium tetradecyl sulfate and chromated glycerin [8]. There is no solid evidence suggesting whether foam or liquid sclerotherapy is more efficient against varicose veins or whether various concentrations of sclerosing agents have different efficiency in treatment [9]. Current practice indicates the use of a single sclerosing agent rather than combinations of multiple. The administration is usually performed under duplex ultrasonographic guidance which offers real-time guidance of the target vessel [10]. In our case we offered duplex-guided sclerotherapy i.e. we used duplex ultrasonography to guide the injections of polidocanol 2%. Polidocanol is a nonester local anaesthetic, popular in Europe, that was approved in March 2010 by the FDA for use in the United States [11]. The maximum daily dosage is 2 mg/kg. Suggested sclerosant concentrations are 0.5-1.0% for reticular veins (2-4 mm) and venulectasias (1-2 mm) and 0.25-0.75% for telangiectasias (< 1 mm) [12]. It can be used in liquid or foam for varicose vein sclerotherapy however it is unclear which form is more efficient [13]. Foam is formed by mixing a detergent sclerosing agent with a gas (commonly air). The foam is obtained after repeated alternate passages from one syringe to another through a connector. It is believed that air embolism can be caused when using the product foamed with room air [14].

To the best of our knowledge our patient is a rare case of pulmonary embolism following Polidocanol 2% injections. Other possible causes of PE have been excluded through thorough investigation including coagulation disorder screen and abdominal imaging. Due to the extent of our patient's varicose veins, 2% polidocanol was used, although 2% concentrations do not seem to be the overall standard of care [15].

Compared to traditional liquid sclerotherapy, foam sclerotherapy has certain advantages including a smaller volume of the sclerosing agent needed for injection, lack of dilution with blood (dilution decreases efficacy), homogeneous effect along the injected veins, and ultrasound echogenicity. In the treatment of varices of the lower limbs, foam shows much greater efficacy compared to liquid [14].

Concerning the side effects, no statistical significant differences were found between liquid and foam agent [14]. Incidence of VTE (DVT or PE) after sclerotherapy is low, however few cases have been reported, including our case which is the first one to report a PE following injection of polidocanol 2% [16].

In our case, the clinical symptoms, the recent history of sclerotherapy and the increased d-dimer levels in blood triggered the decision to offer a CTPA. Increased d-dimer levels can be identified following a sclerotherapy procedure and their levels seem to be able to differentiate between deep vein sclerosis and thrombosis with a cut off value of 1 μg/mL; levels between 0.5-1 μg/mL exclude embolism and are more likely to indicate vascular sclerosis while >1 μg/mL raise concerns for embolism [17]. Our patient was not offered a d-dimer test prior to the sclerotherapy as there were no indications at the time, however the increased d-dimer values upon presentation in the emergency department (2 μg/ml) can be retrospectively attributed to the pulmonary embolism. In either case, the increased d-dimer levels in combination with the referring symptoms and the preceding sclerotherapy history would not have altered our decision to offer a CTPA.

In a case series of 2616 patients who underwent ultrasound guided foam sclerotherapy with polidocanol, only 5 experienced symptomatic PE without limb DVT. The average time between treatment and diagnosis was 44.0 +/- 42.2 days [16]. Stroke, TIA (transient ischemic stroke), MI (Myocardial Infarction), and impaired cardiac function have been associated with polidocanol administration [18]. Compared to other cases of reported pulmonary embolism due to polidocanol sclerotherapy, our patient presents with similar alarming symptoms (dyspnoea and chest pain), in a shorter period of time after the sclerotherapy (10 days) as compared with other cases in the literature (44 +/-42.2 days) and with similar findings in lung imaging (CTPA) [16]. The shorter interval between sclerotherapy and the diagnosis of PE can mainly be attributed to the higher polidocanol concentration. Our patient is younger than the other reported cases (mean age of presentation was 50.7+/-0.86) and he did not present with DVT which was detected in 8 out of 2616 patients of the case study [16].

Conclusion

This case proves that pulmonary embolism can be a rare, yet serious complication of sclerotherapy that may be linked with increased concentrations of the sclerosing agent. It illustrates the need of high index of suspicion in any patient who presents with signs and symptoms of deep vein thrombosis or pulmonary embolism following a procedure.

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