

4. Hill H, Srinivasa RN, Gemmete JJ, Hage A, Bundy J, Chick JF. Endolymphatic ethiodized oil intranodal lymphangiography and cyanoacrylate glue embolization for the treatment of postoperative lymphatic leak after robot-assisted laparoscopic pelvic resection. *J Endourol Case Rep* 2018;4:66-71.

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Reply



We would like to thank Fisher et al for their comments in response to our article regarding the use of isosulfan blue for treatment of lymphatic complications.¹ Dr Fisher et al have correctly pointed out that there are other techniques used for treatment of lymphatic complications. They have highlighted two endovascular procedures for treatment of lymphatic complications: aspiration or drainage of a lymphocele with injection of a sclerosing agent into the cavity² and cannulation and embolization of the lymphatic vessel.^{3,4} Both would potentially avoid an operative intervention and general anesthesia. In responding to these comments, we would make the following observations.

The authors note that the majority of lymphatic complications cited in our original paper occurred after femoral or saphenous vein harvests or femoral artery exposure. A key difference between our population of patients and that cited by the authors is the anatomic location of the index intervention. The lymphatic complications treated in our study were peripheral, primarily involving the groin, whereas those in the three studies they cite all involve what may be described as central lymphatic complications, located in the pelvis, abdomen, or thorax. Thus, the endovascular approaches cited target intracavitary lymphatic complications, whereas our report is limited to extremity lymphatic complications.

The techniques and treatment options for central lymphatic complications, although they appear promising in the series and case reports cited, may not necessarily apply to peripheral wound complications and may not confer the same advantages over operative intervention. Intranodal injection of dye, as described, involves injection of dye into groin lymph nodes to visualize more centrally located lymphatic vessels that are then subsequently cannulated for embolization. The lymphatic complications that we treated were located at or distal to the groin, and it is doubtful that injection of a groin lymph node would visualize the culprit lymphatic vessel caudal to the groin. Therefore, this technique would require injection of methylene blue or isosulfan blue between the toes to identify a lymphatic, followed by a cutdown on the dorsum of the foot to cannulate the identified lymph vessel,³ an approach similar to the technique we described except we did not create a foot incision.

As noted, our cases were performed in the operating room under general anesthesia. Because the technique

we describe involves opening the skin over the lymphatic complication, we continue to believe that an operating room environment is important to maintain sterility, especially since a vessel or graft could be exposed at the base of the wound. We chose to use general anesthesia primarily for the patient's comfort but think that the procedure could be done under regional or local anesthesia. The authors also suggest that one argument for avoiding the operating room is the associated cost. As we highlighted in our report, the identification of the disrupted lymphatics usually occurs quickly, thus limiting the operative time. Based on review of the studies referenced for endovascular treatment, it would appear that intranodal injection of ethiodized oil—done to identify the abdominal or thoracic lymphatic channels—takes significant time (intranodal injection of ethiodized oil every 5 minutes or pedal injection, followed by spot images every 10 to 30 minutes).³ Although the procedure duration is not specifically recorded, additional time is then needed to cannulate the intra-abdominal or intrathoracic duct.

There are other factors that we think favor the technique we have employed. The majority (two-thirds) of our patients had lymphocutaneous fistulas. As such, we think that the technique of aspiration and sclerotherapy in these cases would not be applicable. The reported success rate for the cited procedures was 92% for aspiration and sclerotherapy and 79% for embolization. This compares with the 94% success rate we report. Finally, the technique that we describe is not associated with radiation exposure to the patient.

Treatment of lymphatic complications can be challenging, and we would agree with Fisher et al that a multidisciplinary approach is valuable. The technique we describe is simple, safe, and effective for extremity lymphatic complications, and as such, we believe it to be the preferred approach. Whereas isosulfan blue could potentially identify an intracavitary injured lymphatic, we have no experience with this application of the technique. We would concur that intracavitary lymphatic complications may be better treated with an endovascular approach. Percutaneous methods clearly provide a less invasive intervention than open thoracic, abdominal, or pelvic surgery and would be similar to percutaneous drainage of abdominal abscesses or seromas that obviates the need for potentially morbid and high-risk operative interventions in reoperative fields. We appreciate the comments and issues raised and thank the *Journal* for giving us the opportunity to respond to this letter.

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Regarding “Retrograde administration of ultrasound-guided endovenous microfoam chemical ablation for the treatment of superficial venous insufficiency”



We read with interest Dr Deak's case series¹ of 250 patients treated with U.S. Food and Drug Administration (FDA)-approved polidocanol microfoam 1% consisting of 65% oxygen and 35% carbon dioxide (O₂CO₂FS) containing <0.8% nitrogen. The absence of neurologic or cardiac adverse events (NCAEs) in Dr Deak's community practice case series is consistent with the absence of clinically important neurologic events in the Efficacy and Safety Study of Polidocanol Injectable Foam for the Treatment of Saphenofemoral Junction Incompetence (VANISH-1) and Polidocanol Endovenous Microfoam Versus Vehicle for the Treatment of Saphenofemoral Junction Incompetence (VANISH-2).^{2,3} We recently reviewed leg vein sclerosant-associated NCAEs to see whether foamed preparation contributed to postmarketing reports of NCAEs. We searched the FDA Adverse Event Reporting System database and MEDLINE for NCAEs using any formulation of polidocanol or sodium tetradecyl sulfate (STS) for leg vein sclerotherapy. Search dates were from March 30, 2010, for all polidocanol products (U.S. approved date for Asclera) and from January 1, 1968, for STS (introduction of the FDA Adverse Event Reporting System database) through September 19, 2017, for these products. We included only NCAEs with onset within 24 hours of the sclerotherapy procedure so as to exclude secondary or cascade events not directly attributable to sclerotherapy.

NCAEs attributable to pulmonary embolus, deep venous thrombosis, and anaphylaxis were excluded, as these have previously been labeled in the polidocanol and STS package inserts. Cases reported as vasovagal reactions were also excluded.

We retrieved 83 reports of polidocanol and 57 reports of STS. After applying the inclusion and exclusion criteria, we identified 23 leg vein sclerotherapy NCAE cases (Table). Patent foramen ovale or right to left shunt was documented in 11 cases, including all but one STS neurologic case. Physician-compounded foamed sclerosant, generally with room air, was documented in 10 patients. Twelve cases did not report the presence or absence of foam. One case documented liquid formulation associated with lumbar ischemia and spinal vein occlusion without brain involvement. NCAE onset occurred within 30 minutes after the sclerosant injection in 18 cases. Of the 13 patients with brain ischemia, 9 patients had complete clinical recovery within 3 days, and 6 patients had documentation of intracranial intra-arterial air. Coronary artery imaging showed no hemodynamically significant coronary artery disease in any of our cardiac cases. One cardiac arrest case reporting death before hospital arrival did not provide coronary artery information.

Our case series, which excluded pulmonary embolus and deep venous thrombosis, found no NCAEs for O₂CO₂FS (Varithena; BTG International Ltd, London, UK), although global market authorizations and approval date differences likely contributed to less O₂CO₂FS use. Polidocanol is available as Varithena O₂CO₂FS to treat incompetent great saphenous veins, accessory saphenous veins, and visible varicosities of the great saphenous vein system above and below the knee.⁴ The liquid formulation of polidocanol is available as Asclera to treat uncomplicated spider veins and uncomplicated reticular veins.⁵

Mitigation potential exists for NCAEs associated with leg vein sclerotherapy paradoxical embolism of room air. The safety and efficacy of polidocanol or STS foamed with room air has not been established and its use should be avoided. This statement was recently included in the Asclera⁵ and Sotradecol⁶ product labels under the heading Arterial Embolism.

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