Neurologic Complications of Sclerotherapy for Varicose Veins

EDWARD G MACKEY MD
VEITH 2015

Disclosures
- Medtronic: speaker trainer
- EndoVane: stock
- Analytics 4 Life: stock
- Vascular Device Partners: partner

Foam in general has low complications
- 10 deep vein thrombosis (DVT) but only five in symptomatic patients, and one pulmonary embolism all in air based foam
- migraine (n = 8, 4 with visual disturbance), visual disturbance alone (n = 7), chest pain alone (n = 7)
- One transient ischaemic stroke, with complete clinical recovery in 30 minutes with O2 based foam

Foam vs Liquid Complications
- Some review found no statistically significant differences in complications
- There were a few reports of visual changes in the foam group and none in the liquid group
- Some reports of paresthesias in both groups and more frequently with foam

Bad Press
- 2% incidence of serious neurological complications
Cerebral Vascular Incidents

- Phlebology. 2008;23(1):189-92, Buch KG, Orenic M, Martynoy D. Report describes two complications of severe neurologic alterations (TIA, CVA) after foamed sclerotherapy injection


More PFO’s in Patients with Varicose Veins


Right to Left Shunt are common

- Bubbles in the Left Heart in a third of patients who were excluded from having a PFO and 2/3 of those suspected of having a PFO
- Positive HITS on transcranial doppler in 4 of 7 patients with positive TEE

What Causes the Neurologic Problems?

- Bubbles passing through Right to Left Shunts
- Bubbles size
- Vasospasm from the sclerosant
- Endothelin?
- Paradoxical emboli

Gas composition

- Air mostly nitrogen same oxygen
- Nitrogen doesn’t dissolve in blood
- CO2 O2 are physiologic gases and dissolve rapidly in blood
**CO2 vs CO2/O2 vs Air**

- Density: CO2 > CO2/O2 > Room Air
- Increased density leads to smaller bubbles
- Foam stability: Room Air > CO2/O2 > CO2

**Bubble Size**

- Smaller bubble size of Polidocanol Microfoam (Varithena®) proprietary foam compared to air foam did not occlude arteries and cleared rapidly in the rat cremasteric muscle model

**Does Changing Gases Help?**

- Overall, the proportion of patients describing side effects decreased from 39% (19/49) to 11% (14/128) as CO2 replaced air for foam preparation (P < .001).

**Visual Disturbances as Migraine Auras**

- MRI's performed on symptomatic patients after air based foam sclero all negative
- Suggest a pathophysiological hypothesis resting on the release of endothelin that would reach the cerebral cortex through a patent foramen ovale

**Aminaphtone**

- Aminaphtone cell exposure caused a statistically significant reduction in ET-1 release, both before and after in vitro sclerotherapy.
- Rats fed with aminaphtone showed a trend toward reduced mortality and a significant decrease of ET-1 release after sclerotherapy.

**Three cases of stroke following peripheral venous interventions**

- Ma RW, Pholette A, Paraskevas P, Pardi R.
- Phlebology. 2011 Mar;21
- Immediate to two days after treatment
- Bubbles seen in MCA on CT angi in immediate case
- The case two days post op also had calf vein DVT and suspect paradoxical emboli
- All with IP+L shunts
Conclusions

- Foam Sclerotherapy is very efficacious in the treatment of varicose veins and is very safe even with air.
- There is a risk of neurologic events especially in patients with R>L shunts.
- The use of physiologic gases may reduce symptoms and therefore may lessen the risk.
- Other theories as to the cause of the symptoms include paradoxical emboli and endothelin release.