



# IATROGENIC VENOUS AIR EMBOLISM (VAE) MANAGED BY ASPIRATION OF AIR FOLLOWED BY HYPERBARIC OXYGEN THERAPY (HBOT)

Derek R. Cooney, MD, FACEP, UHM; Norma L. Cooney, MD, FACEP, UHM; Khan Z. Shirani, MBBS†

*Division of Hyperbaric Medicine, Department of Emergency Medicine, SUNY Upstate Medical University, Syracuse, New York*



**Introduction:** We report the management of a massive preventable VAE in a young male. Two prerequisites for the VAE are a vascular entry point and lower gas pressure in the involved vessels. VAE is a type of gas embolism due to the entry of atmospheric gas into systemic venous circulation, is usually an iatrogenic complication of invasive surgical and diagnostic procedures and besides requiring a high index of suspicion it generally requires no specific therapy.

**Materials and Methods:** A 20 year old Hispanic male with SLE, cardiac myopathy, incompetent mitral and aortic valves, and requiring positive pressure ventilation for respiratory insufficiency sustained sudden cardiac arrest during the removal of right central venous trans-jugular (CVJ) catheter. Immediately instituted cardiopulmonary resuscitation returned a normal cardiac rhythm, however, the patient became unresponsive and developed hypotension and tachycardia. An EKG showed right heart strain and an echocardiogram revealed dilated right atrium and relatively empty left ventricle. Aspiration through left CVJ catheter removed sufficient air to raise the patient's systolic pressure by 20 points. An EEG and brain MRI were normal. With a clinical diagnosis of VAE the patient was treated with three 90-minutes HBOT sessions at 2.8 atmospheres absolute.

**Results:** Manual aspiration of the CVJ catheter improved hemodynamic stability acutely. At the completion of first HBOT session he became responsive to painful stimuli and his hemodynamic status significantly improved. Following two additional HBOT sessions the patient became responsive to verbal commands and was completely weaned of the vasopressors support.

**Summary:** VAE is a known complication of central lines and hemodialysis catheters and has been reported with the use of CO<sub>2</sub> and nitrous oxide during medical procedures and is also a complication of nitrogen burden during SCUBA diving accidents. In severe cases, manual aspiration of air may provided stability and allow for HBOT.

## Clinical Approach:

- Identify the condition based on clinical features
- Place patient in left lateral decubitus position (+/- Trendelenburg)
- Place patient on 100% oxygen
- May consider Ultrasound / Echocardiography
- Provide IV fluid hydration
- Consider Intubation for hypoxia, respiratory distress, or AMS
- Aspiration of central line / vascular catheter (+/- advance to right atrium/ventricle)
- Consider CPR (may break up large bubbles and improve CO)
- Pressors for hemodynamic stability and cardiac output
- HBOT at 2.8 ATA (USN TT6) - repeat up to 5 times as needed

- Monitor for neurological changes and consider AGE

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