Do You Even Dive?

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Chief Complaint:

Cardiac Arrest

History of Present Illness:

A 68-year-old male with a history of clear cell renal cell carcinoma underwent a scheduled outpatient computed tomography (CT) guided needle biopsy of a pulmonary nodule. During the procedure, the patient had an episode of ventricular tachycardia leading to cardiac arrest, and a code blue was called. When the code team arrived, the patient was pulseless and underwent five minutes of CPR on the CT scanner table. Once ROSC was achieved, a CT of the chest, abdomen and pelvis was immediately performed, and the diagnosis was made.

Pertinent Physical Exam:

Elderly male appeared stated age. Completely unresponsive with absent femoral pulses initially. Equal rise and fall of the chest with bagging. He had no lower extremity edema. The rest of his physical exam was unremarkable.

Questions:

1. What is the cause of this patient's cardiac arrest?
2. What is the treatment for this condition?

Answers:

1. Coronary artery air embolism
2. Hyperbaric oxygen therapy

Case Discussion:

The patient was taken directly to the ICU while arrangements were made to transfer him to the dive chamber at an outside facility. Cardiology was also consulted while in house and performed a transthoracic echocardiogram as there was consideration for direct aspiration of the ventricular free air; however, by that time, the air

Case Discussion (continued):

had embolized from the ventricle. In addition to his large air embolism, a small pneumothorax was noted on CT, and a pigtail chest tube was placed in preparation for his dive. The patient was transferred and underwent a six-hour dive upon arrival to the chamber followed by an additional four-hour dive the following morning. He was extubated on day 3 and had a complete neurologic recovery.

Pearls:

- Clinically apparent systemic air embolism (SAE) is an extremely rare but potentially fatal complication of interventional radiology-guided biopsies, with an incidence of 0.061%. Introduction of as little as 0.5ml of air can be fatal if it embolizes to the coronary arteries.
- The management of SAE involves supplemental oxygen with 100% FiO2, placing the patient in Trendelenburg position to minimize the risk of embolism to the brain, supportive care, and, in severe cases, hyperbaric oxygen therapy.
- Hyperbaric oxygen therapy works by decreasing the size of the air bubbles in circulation by increasing ambient pressure. It also helps oxygen to defuse into the nitrogen rich bubbles which aids in absorption of the bubbles. As was seen in this case, patients often have excellent outcomes if hyperbaric oxygen therapy is initiated within five hours.
- Patients with systemic air embolism are often at risk of having a concomitant pneumothorax. If left untreated, patients can easily develop tension physiology during a dive as ambient pressure increases. Even trace pneumothoraces require a chest tube prior to hyperbaric oxygen therapy.