Massive Systemic Air Embolism During Aortic Root Angiography
A Dire Complication

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Air embolism (AE) is an uncommon but potentially catastrophic complication of angiography. Although coronary AE is a well-known complication of coronary angiography, which occurs in 0.27% of cases, incidence and consequences of systemic massive AE are largely unknown. However, case reports are important to discuss reasons, management, and consequences of this complication.

Case Reports
A 46-year-old woman with uncontrolled hypertension, thoracic aortic aneurysm, and anginal episodes at rest was referred for coronary angiography. The procedure was uneventful until the aortic root angiogram, during which 40 mL of contrast agent was intended to be injected with 14 mL/s flow and a maximum pressure of 1200 psi. On injection of contrast media into aortic root, a massive influx of air bubbles was observed (Figure and Movie I in the online-only Data Supplement). Instantly, the patient collapsed with pulseless electric activity. Meanwhile, it was realized that a large amount of air was injected into aortic root. Shortly after cardiopulmonary resuscitation, her blood pressure and pulse recovered. She became conscious, with good cooperation and orientation. However, she had a garbled speech, left hemiplegia, and partial weakness and paresthesia in right leg and arm. Under oxygen administration with mask in the 15th minute there was significant weakness in the left arm and shallow weakness in the left leg. Serial electrocardiograms revealed transient ST segment elevation of 0.05 mV in inferior derivations. Brain CT scan revealed no air bubbles, and the patient was emergently transferred to the nearest center with facility of hyperbaric oxygen chamber treatment (HBOT). At the 5th hour of the event, HBOT was started. After HBOT, left lower extremity motor and sensory functions recovered and her speech had become fluent with persisting slight paresthesia in left arm. In the next day neurological examination was completely normal. Electroencephalography and brain CT control in the third day of event were normal.

Initially troponin I showed acute elevation at 0.363 ng/mL, not accompanied by creatine kinase-MB elevation, which declined on subsequent tests. Her left ventricular wall motion was normal after HBOT. No deterioration in function of other organ systems was found. In the third year of the event, her neurological examination was still normal.

This is the first case reporting accidental injection of massive air during aortic root angiography effecting both coronary and cerebral vasculature. There are hardly few reports of AE during aortography or ventriculography. Our report differs from previous cases by presenting the largest amount of air injected into aortic root during angiography (20–25 mL).

Immediate treatment aims to interrupt the intervention that caused the embolic event. It was our only experience of massive AE ever, and nobody in the team was familiar with the image of massive AE. Unfortunately, AE was not noticed...
immediately, and therefore, with consternation, neither the catheter was pulled back nor the injection was stopped. The movie of this case (Movie I in the online-only Data Supplement) may provide an educational tool for staff in catheterization labs to recognize and interrupt the procedure when AE occurs.

Massive systemic AE can have devastating clinical sequelae, including myocardial infarction, cerebral ischemia, permanent neuronal injury, and death. Operators should be prepared for the immediate recognition and emergent management of such complications. HBOT is the first-line treatment of choice for systemic AE.4,5 Catheterization laboratories should be in contact with the nearest center with an HBOT facility.

Disclosures

None.

References
