Pneumocephalus Associated with Massive Cerebral Air Embolism

Jiu-Haw Yin\(^{1,2}\), Yi-Jung Chuang\(^{1}\), Han-Hwa Hu\(^{3,4}\)

A 61-year-old man with critical aortic stenosis underwent aortic valve replacement. Mechanical ventilation was applied because of postoperative acute pulmonary edema accompanied by poor ventilation and poor oxygenation, and the patient was also recannulized to an extracorporeal membranous oxygenator. Bilateral pneumothorax was found 2 days later, and the right upper and left lower chest quadrants were drained with pigtail catheters. The patient did not regain consciousness 5 days after cessation of propofol. He remained in a deep coma; anisocoric pupils without light reflex and left upward eyeball deviation were observed.

The brain computed tomography (CT) scan revealed cerebral air embolism that caused extensive cerebral infarction accompanied by a hypodense lesion located in the bilateral cerebral and cerebellar hemispheres, mainly on the right side; mass effect and midline shifting were observed (Figs. 1 and 2). The bone window image of brain CT scan

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From the 1Section of Neurology, Department of Medicine, Cheng-Hsin General Hospital; 2Department of Neurology, Tri-Service General Hospital, National Defense Medical Center, Taipei City, Taiwan; 3Section of Neurovascular Disease, Department of Neurology, Veterans General Hospital-Taipei; 4Institute of Brain Science, Yang-Ming University, Taipei, Taiwan.

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Correspondence to: Jiu-Haw Yin, MD. Department of Medicine, Cheng-Hsin General Hospital, No. 45, Cheng-Hsin Street, Peitou, Taipei, Taiwan 11220.

E-mail: ch9135@chgh.org.tw

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revealed no evidence of fracture or bony lesion over the skull base or ethmoid sinus. The patient expired later and an autopsy was not obtained.

Cerebral air embolism is mostly due to invasive vascular procedure like cardiosurgical procedure\(^1\), angiography\(^2\) or central venous catheterization\(^3\). Besides, neurosurgeries, barotraumas, basilar skull fractures, sinus fractures, congenital skull defects, neoplasm, gas producing organism infections, epidural anaesthesia or even lumbar puncture had been reported\(^4\)\(^-\)\(^6\). Massive cerebral air embolism is rare within most of the reported cases. Our case demonstrated an air embolism associated with large air pockets in the cerebral parenchyma and Virchow-Robin space. The interesting aspect of this case lies in the image of a peculiar pattern of massive cerebral air embolism with air in the carotid artery, as well as in the small cerebral arteries and leaking into the brain parenchyma. The latter is likely the result of breakdown of the blood-brain barrier after cerebral infarction.

**REFERENCES**