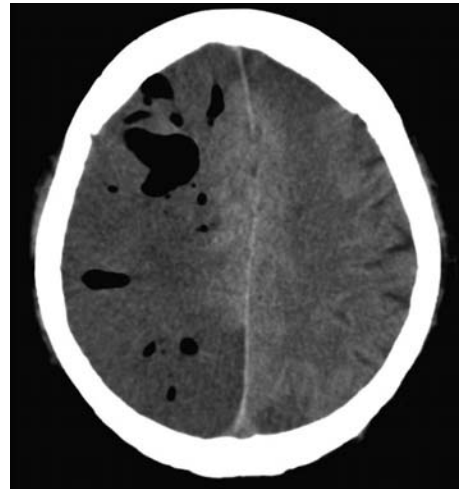


## Pneumocephalus Associated with Massive Cerebral Air Embolism

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**Figure 1.** Axial CT scan without contrast shows an air emboli (arrow) trapped in the cavernous portion of the right internal carotid artery.



**Figure 2.** CT scan shows extensive cerebral air embolism with air bubbles in the arteries and pneumocephalus with air that leaked into and became trapped in the perivascular space (Virchow-Robin space) of the right cerebral hemisphere.

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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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<sup>(1)</sup>, angiography<sup>(2)</sup> or central venous catheterization<sup>(3)</sup>. 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<sup>(4,5)</sup>. 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.

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## REFERENCES

1. Griese H, Seifert D, Koerfer R. Cortical Infarction following Cardiosurgical Procedures - Air Embolism as a Probable Cause. *European Neurology* 2009;61:343-349.
2. Soderman M, Bystam J. Cerebral air emboli from angiography in a patient with stroke. A case report. *Acta Radiol* 2001;42:140-143.
3. Inamasu J NY, Saito R, Ichikizaki K, Shiei K. Cerebral air embolism after central venous catheterization. *Am J Emerg Med* 2001;19:520-521.
4. Yildiz A, Duce MN, Ozer C, Apaydin FD, Egilmez H, Kara E. Disseminated pneumocephalus secondary to an unusual facial trauma. *Eur J Radiol* 2002;42:65-68.
5. Sharifabad MA, Gianatiempo C, Gharibshahi S. Pneumocephalus: a case report and review of article. *Int J Clin Pract* 2007;61:74-76.