

Cerebral air embolism during endoscopic retrograde cholangiopancreatography: treatment with therapeutic hypothermia

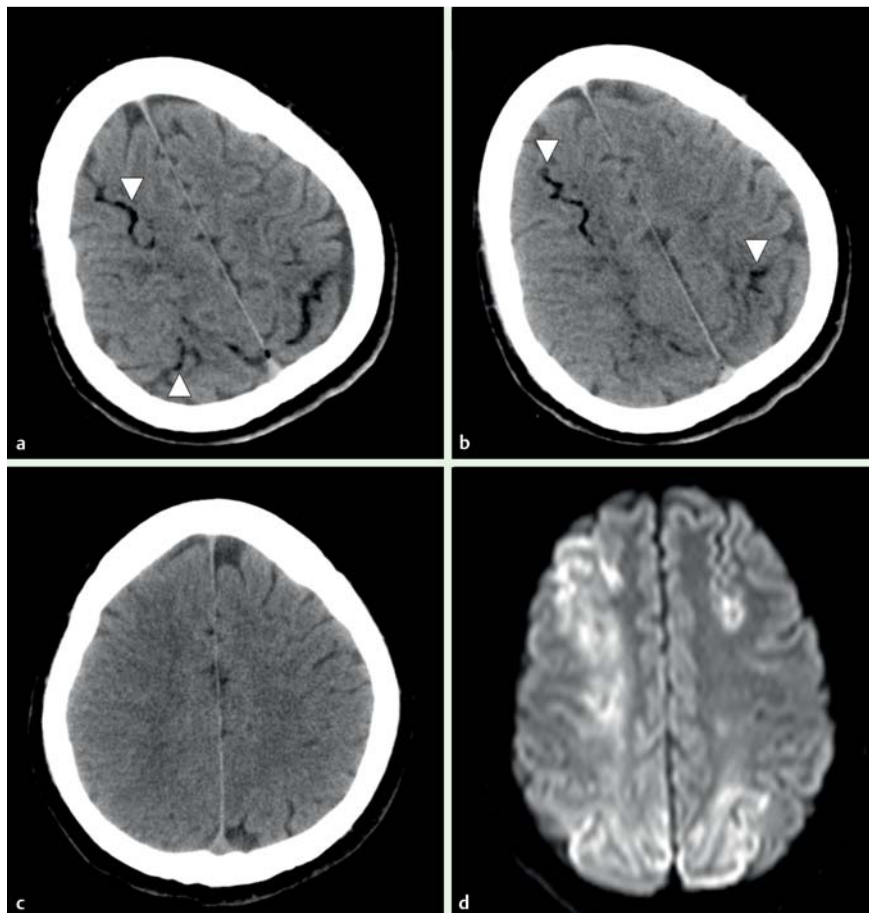


Fig. 1 Cerebral air embolism images in a patient who underwent endoscopic retrograde cholangiopancreatography. **a, b** Computed tomography (CT) of the brain 1 hour after symptom onset revealed multiple cerebral air emboli (arrowheads). **c** 24 hours later, CT brain showed complete resolution of the air bubbles and sulci effacement. **d** Diffusion weighted magnetic resonance imaging of the brain confirmed areas of acute ischemia involving middle and posterior cerebral arteries bilaterally.

Cerebral air embolism (CAE) during endoscopic retrograde cholangiopancreatography (ERCP) is an uncommon complication, but of the nine previously reported cases, seven had fatal outcomes and one was left with severe hemiparesis [1–3].

A 36-year-old man who was admitted with gallstone pancreatitis underwent two unsuccessful ERCPs and a successful percutaneous transhepatic cholangiogram. At subsequent ERCP for stent removal 5 days later, he suddenly became unresponsive with left conjugate eye deviation. Computed tomography (CT) of the brain confirmed CAE (Fig. 1a, b, arrowheads), which had completely resolved on imaging

24 hours later (Fig. 1c). Due to a lack of facilities, hyperbaric oxygen (HBO) therapy was not administered and he underwent therapeutic hypothermia for 24 hours. Subsequent examination revealed quadraparesis, which was worse on the left side. CT chest and transthoracic echocardiography were normal. Magnetic resonance imaging of the brain confirmed bilateral ischemic infarctions (Fig. 1d). However, he made a progressive recovery, and was discharged with a mild left hemiparesis on Day 36.

Mechanical irritation or damage to the bile ducts by the endoscope, stent or high pressure air insufflated during ERCP are

proposed mechanisms of communication between the biliary system and the circulation [2,4]. Air can reach the arterial circulation via retrograde flow or shunt through the venous system or large volumes (>30 mL) can directly transverse the pulmonary vasculature [5].

Risk factors include previous interventions or inflammation to the biliary tree, trauma to the liver, sphincterotomy, metal stent placement, hepatic tumors, and high pressure air insufflation. Using CO₂ for insufflation can reduce the risk of air emboli, postprocedural pain, and flatus [6].

If embolism is suspected, immediate high flow oxygen and volume expansion should be initiated and the patient placed in the Trendelenburg position. Based on previous case series, early treatment with HBO has been recommended to improve outcomes [7].

HBO was unavailable for the current case and our patient underwent therapeutic hypothermia, which has been shown to improve outcomes in patients after global ischemia following cardiac arrest [8,9]. The first case of its use in a patient with CAE has been reported with good outcomes [10].

Focal neurological deficits during ERCP should alert physicians to the possibility of CAE. HBO remains the recommended treatment. Therapeutic hypothermia may have improved the prognosis for our patient, but further studies are needed.

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Competing interests: None

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