'MILE HIGH EMBOLI'

A rare case of spontaneous air embolism at 10,000 feet

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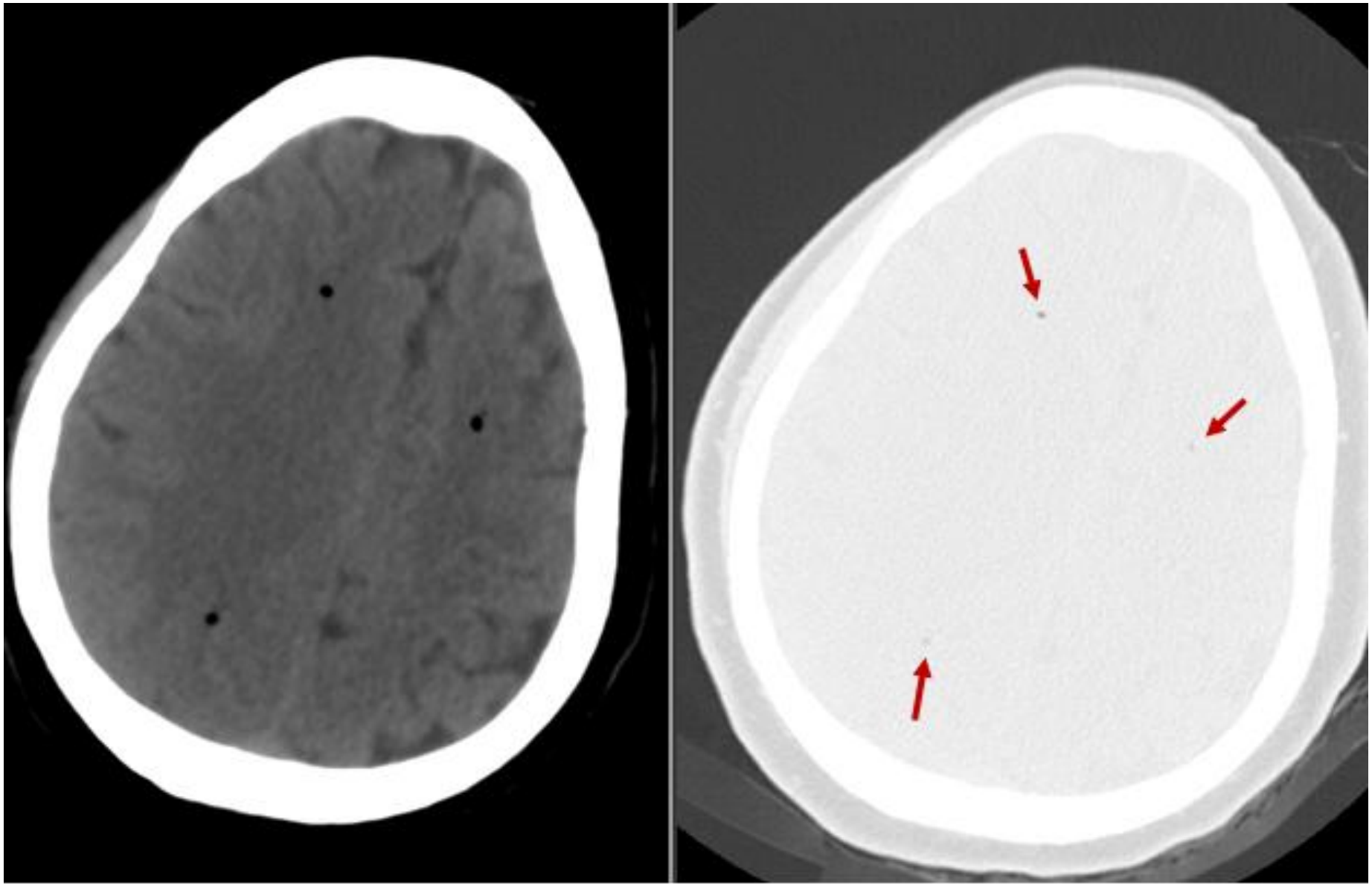
CLINICAL PRESENTATION

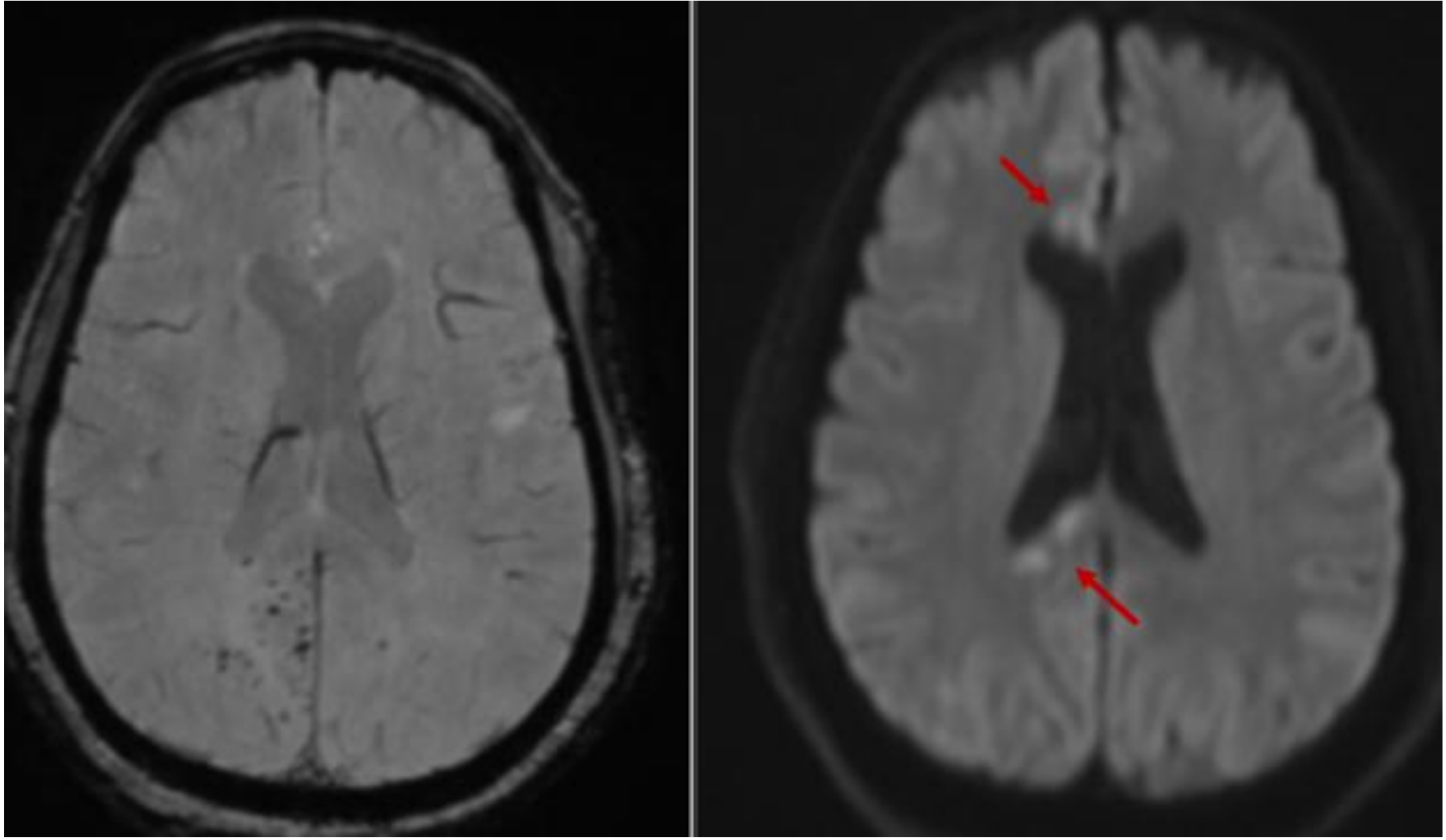
58-year-old woman was on a flight when she experienced left facial droop, left sided weakness, right gaze preference, and became unresponsive.

The plane was diverted and landed emergently. In the emergency room, she demonstrated seizure-like activity and was intubated.

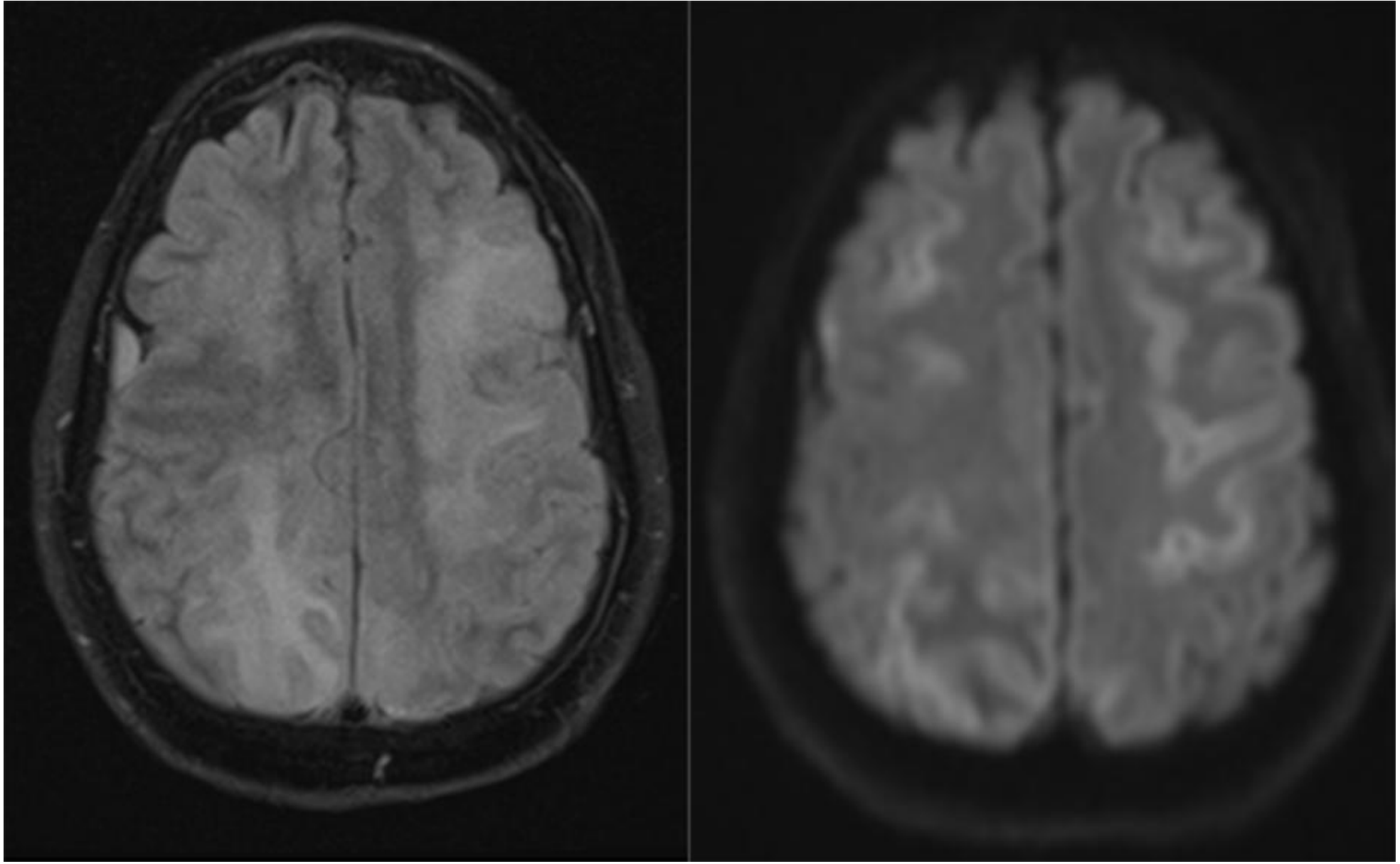
According to her spouse, she had a similar but less severe episode which spontaneously resolved while on a previous flight.



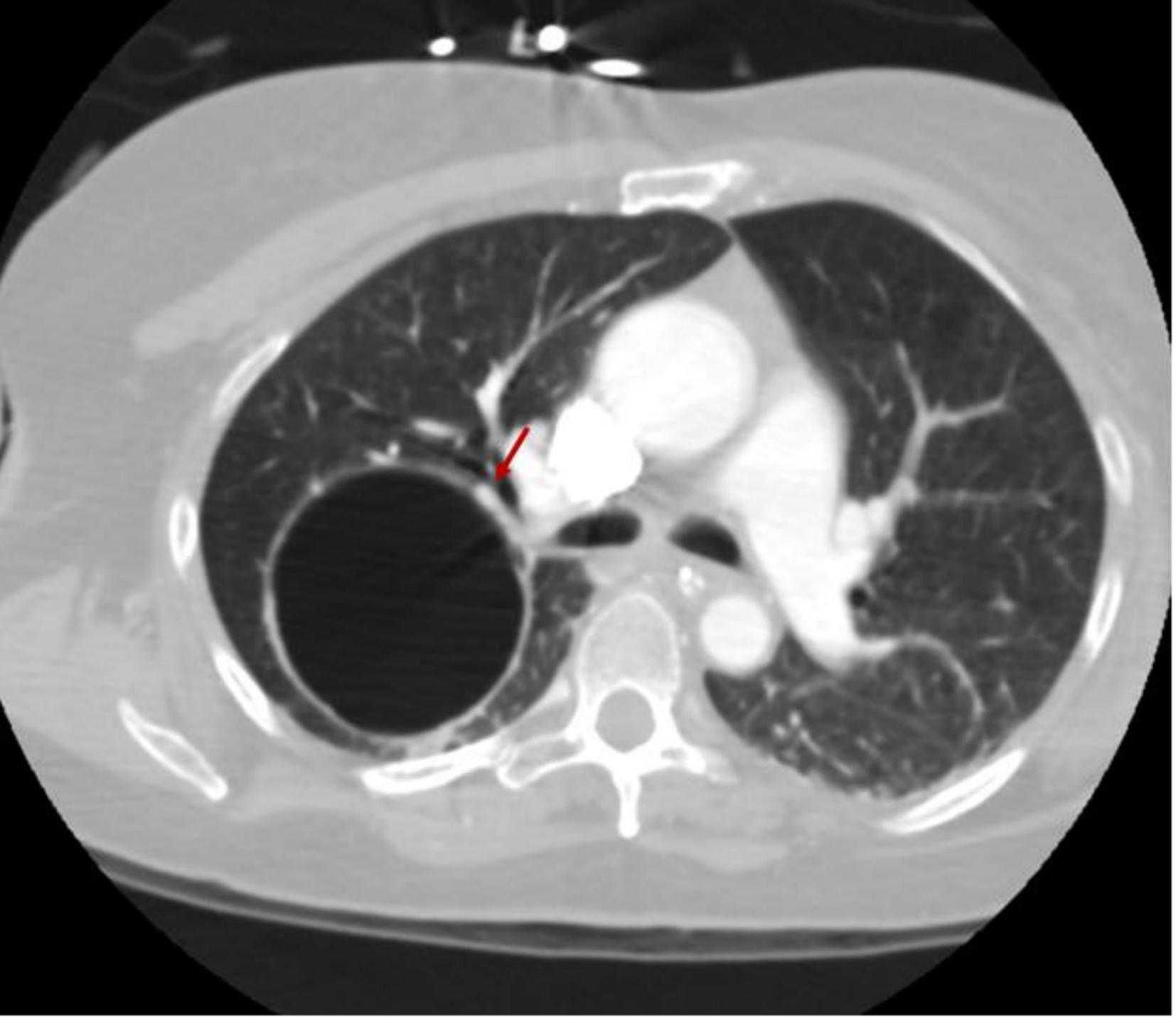
Initial non contrast head CT at a local community hospital showed punctate low-density lesions within the periphery of the brain (left), which were initially misinterpreted as fat. However, when viewed on lung windows (right), these exhibit attenuation more consistent with small foci of air.



Subsequent MRI demonstrates scattered foci of susceptibility artifact corresponding to air on CT (left). There were also small, scattered areas of diffusion restriction indicating infarction (right).



MRI several days later showed development of multifocal vasogenic edema throughout the cerebral white matter (left). There are also now sizeable new regions of cortical diffusion restriction which could reflect ischemic injury, seizure-related signal changes, or a combination thereof (right).



CT chest with contrast showing large right upper lobe lung cyst with thin walls and closely adjacent branch of the right pulmonary vein (arrow). This was the presumed source of spontaneous air embolism.

MANAGEMENT AND OUTCOME

- Treatment was supportive
- Unsuccessful attempts to transfer to a center with hyperbaric capability (first line therapy for air embolism)
- Bubble transthoracic echocardiogram was negative for right to left shunt

- Patient had profound deficits which required tracheostomy placement
- On discharge had spontaneous but not purposeful extremity movement

TAKE HOME POINTS

- Vast majority of air emboli are iatrogenic (e.g., post-surgical, lung biopsy, catheter placement or removal), where clinical history can be helpful in aiding diagnosis
- Spontaneous air emboli are extremely rare but can occur when:
  - A collection of air is in immediate proximity to a vessel, and
  - There is a pressure gradient favoring entry into the circulation
- Few case reports of large lung cysts near pulmonary vessels being implicated in causing air emboli in settings of changing atmospheric pressure (e.g., diving, air travel)
- Reported cases in the literature are nearly always fatal

TAKE HOME POINTS

- On non-contrast head CT, presence of air in cortical vasculature is diagnostic of cerebral air embolism
- Diagnostic challenges include:
  - Air is quickly resorbed and may not be visible
  - Air can easily be mistaken for fat due to its low density. Utilizing lung windows and thin slice thickness (5 mm or less) improves sensitivity for characterization

TAKE HOME POINTS

- MRI findings of air embolism are non-specific, watershed infarcts and vasogenic edema most common
- Air results in artifact on susceptibility sensitive sequences which can be misinterpreted as hemorrhage or calcification
- Air is low signal on all pulse sequences due to low proton content, potentially differentiating it from blood products