

Mesial bifrontal stroke presenting as isolated spontaneous confabulations

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ABSTRACT

A 52-year-old man with paroxysmal atrial fibrillation presented with spontaneous confabulation, working memory deficits, and frontal release signs. MR scan of brain showed bifrontal mesial ischaemic strokes and angiography demonstrated that both anterior cerebral arteries were supplied by the left internal carotid artery. Isolated spontaneous confabulation is a rare presentation of stroke and may be associated with orbitofrontal cortex lesions. Interestingly, functional imaging during rapid-eye-movement sleep may show bilateral medial frontal lobe hypometabolism, suggesting anatomical overlap between dreaming and the bizarre content of this patient's spontaneous confabulation.

CLINICAL CASE

A 52-year-old man was admitted with the sudden onset of altered mental status. There was no previous psychiatric illness, but he had a history of paroxysmal atrial fibrillation. His wife reported that, during breakfast, he suddenly stared at her with a blank, motionless face. When asked what was wrong, he replied that he was 'concerned about the soldiers at the beach'. The patient then walked around the house, calling for the family's dog using incorrect names. His wife, frightened by this unexpected confusion, called for an ambulance and the patient was admitted to the local emergency department about 1 hour later. The patient himself had no complaints. Although he gave correct answers to short questions, his spontaneous verbal production had a bizarre, dreamlike content. For instance, he stated, that neighbouring 'Sweden leaves taxes on mineral water according to the bottles' colour', and that he had been served 'a huge piece of borreliosis meat' for dinner.

Neurological examination identified hypomimia and working memory deficits with spontaneous and bizarre confabulations. Snout and palmomental reflexes

were present. Speech and semantic production, cranial nerve examination, sensory-motor examination and vital signs were unremarkable.

On the first day of admission, laboratory results, CT scan of the head and cerebrospinal fluid examination were normal. He was transferred to neurology for further evaluation. On the third day of admission, an MR scan of the brain showed bifrontal ischaemic lesions (figure 1). This led to further evaluation with digital subtraction angiography, which identified aplasia of the A1 segment of the right anterior cerebral artery. Both anterior cerebral arteries were supplied via the left internal carotid artery (figure 2), suggesting there had been an embolic stroke. Following neurorehabilitation, he was able to return to work part-time 6 months later without major cognitive sequelae except for mental fatigue.

DISCUSSION

Isolated anterior cerebral artery stroke is uncommon, and simultaneous bilateral frontal stroke is particularly rare.¹ About 1% to 2% of cases have a unilateral anterior cerebral artery A1 aplasia, an anatomical variation resulting in bihemispheric anterior blood supply from a common internal carotid artery trunk.² Frontal stroke is associated with various symptoms, and the most common ones include motor dysfunction, hypobulia, apathy, urinary incontinence, aphasia and frontal release signs.¹ Acute treatment options for ischaemic stroke include thrombolysis and endovascular thrombectomy in cases with large vessel occlusions. In this patient, these possibilities could have been an option because he was admitted 1 hour after onset of symptoms, and occlusion of the common trunk of both anterior cerebral arteries was consistent with the observed infarct pattern of a large proximal vessel occlusion. Retrospective assessment of his initial stroke severity gave a National Institute of Health Stroke



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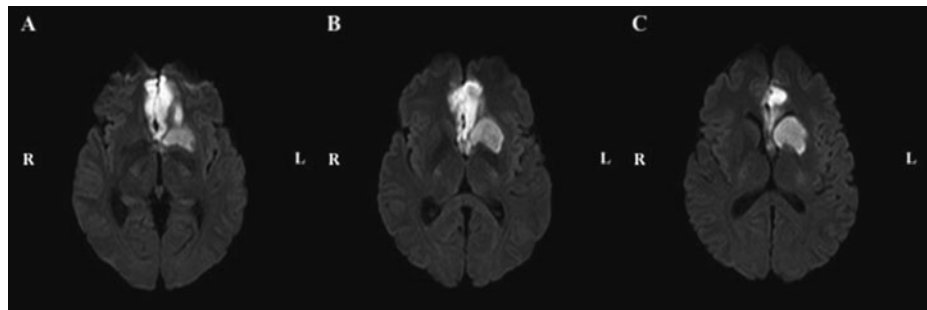


Figure 1 MR scan of the brain (diffusion-weighted imaging) showing lesions at the mesial bifrontal region and the left caudate nucleus and putamen (A–C). R, right; L, left.

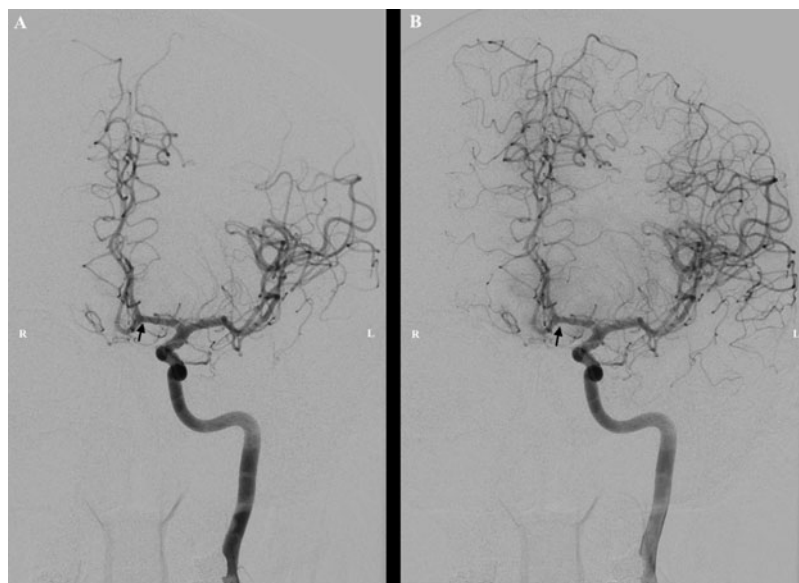


Figure 2 Digital subtraction angiography of the left internal carotid artery (coronal view). Images A and B show early and late contrast filling, respectively. The arrow points at the common trunk with both anterior cerebral arteries supplied by the left internal carotid artery.

Scale (NIHSS) score of 2 (disorientation). The benefit of thrombolysis and endovascular thrombectomy in patients with mild or non-disabling stroke symptoms (NIHSS <5) remains controversial, and recent studies have shown few, if any, data to favour treatment when compared to periprocedural risks.^{3 4} However, the NIHSS is poor at detecting cognitive deficits in acute stroke,⁵ and given the patient's severely disabling symptoms, he might have benefitted from thrombolysis and/or thrombectomy.

Spontaneous confabulation, rarely associated with stroke, is defined as amnesic dysfunction with the production of fictitious stories.⁶ Although not fully understood, the mechanisms may include the inability to distinguish between memories and factual content of real and ongoing experiences. Failure to suppress irrelevant memory traces distorts the patient's view of their perceived reality, leading to reports of fictitious and sometimes bizarre stories.⁶ The anatomical substrate that enables us to distinguish between memories and

ongoing real events probably originates in the posterior medial orbitofrontal cortex, which is connected with the striatum, basal ganglia and thalamic nuclei in a frontal-subcortical loop.⁷ In lesion studies of the orbitofrontal cortex, confabulations as well as personality and behavioral changes were reported.⁸

These observations are in line with the ischaemic lesion as depicted in [figure 1](#), involving the posteromedial orbitofrontal cortex and resulting in the patient's isolated spontaneous confabulations. Of note, the bizarre and dreamlike content of the confabulations mirrors that which is commonly experienced during rapid eye movement (REM) sleep. In this state, positron emission tomography shows evidence of hypometabolism of medial frontal lobes, the hypothesis being that loss of frontal inhibition may lead to unrepressed activity of irrelevant memory traces and the characteristic bizarre dream content of REM sleep.^{9 10} We suggest this patient's symptoms occurred through a similar mechanism, although owing to ischaemic damage to the medial frontal areas.

Key points

- ▶ Spontaneous confabulation is a rare symptom in stroke.
- ▶ Sudden and otherwise unexplained confabulation should trigger neuroimaging to look for cerebrovascular disease.
- ▶ Ischaemic lesions of the orbitofrontal cortex may lead to spontaneous confabulations that have some similarities with the bizarre dreamlike content associated with REM sleep.

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