



## Bilateral fornix infarction as a cause of acute amnesia

Kshitij Thapa<sup>1</sup> · Stella Setyapranata<sup>1</sup> · Philip M. C. Choi<sup>2,3</sup> · Ian Clare<sup>4</sup>

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A 37-year-old male courier driver presented to the emergency department of a regional hospital with 2 days history of sudden onset memory deterioration complaints. His past medical history included ulcerative colitis for which he was on balsalazide 750 mg twice a day. His wife noted the patient was unable to recall places, events and was confused regarding his daily travel itinerary on the day before his presentation to hospital. He had received a mRNA coronavirus booster vaccine 4 days prior to onset of his symptoms. On examination, his vital signs were normal. He was able to recall personal information, oriented to year and month but not day of the week with a Mini-Mental State Examination score of 22/30. His general physical exam is otherwise unremarkable. Full blood counts, other biochemistries and cerebrospinal fluid examination were normal. Computed tomography (CT) and magnetic resonance imaging (MRI) of the brain, neck and cerebral vessels were normal apart from bilateral symmetrical foci of diffusion restriction and fluid attenuated inversion recover (FLAIR) hyperintensity lateral to the foramina of Munro. The cause and significance of this was uncertain.

Patient was then transferred to a tertiary center for further work-up. The initial MRI brain imaging was reviewed only 3 days later due to logistical issues. The non-specific diffusion-weighted imaging (DWI) lesions in the bilateral fornix is thought to be in keeping with acute ischemic infarctions causing the patient's clinical symptoms. Transcranial Doppler with bubble study performed was strongly suggestive of patent foramen ovale and the patient was referred for further cardiac investigations.

### Imaging findings

CT scan on admission showed no abnormality. Non-contrast MRI brain obtained 2 days after symptoms onset showed symmetrical diffusion restriction with corresponding low apparent diffusion coefficient (ADC) signal and FLAIR hyperintensity of the anterior body of the right and left fornix (Fig. 1A, B and C). No other abnormality was identified.

### Discussion

The clinical differential diagnosis of acute memory loss is wide and most commonly include delirium, posterior circulation strokes, encephalitis, and metabolic disorders such as Wernicke encephalopathy. Small bilateral fornix infarction is a rare but recognised cause of acute memory impairment with the first case described in 2000 by Shyam et al. [1]. The fornix is the major white-matter efferent and afferent tract of the hippocampus which has a significant role in cognitive and memory function [2, 3]. The bilateral columns of the fornix, the genu of the corpus callosum and other basal forebrain structures are supplied by the unpaired subcallosal artery that mostly originates from the anterior communicating artery (ACoA). The unpaired nature of the artery most likely explains the bilateral infarctions seen in some patients with amnesia after surgical repairs of ACoA aneurysms [4]. Along with bilateral fornix infarctions, small bilateral thalamic infarcts due to occlusion of the artery of Percheron,

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The patient and his next-of-kin have consented to this publication.

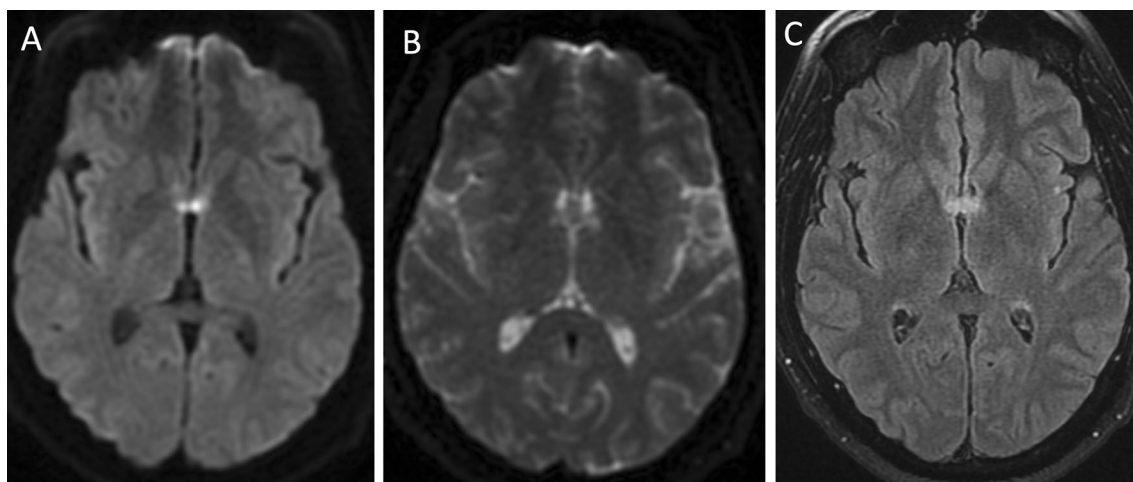
✉ Kshitij Thapa  
kstjthapa47@gmail.com

Stella Setyapranata  
ssetyapranata@erh.org.au

Philip M. C. Choi  
Philip.choi@monash.edu

Ian Clare  
iclare1959@gmail.com

- <sup>1</sup> Department of Medicine, Echuca Regional Health, 226 Service St, Echuca, VIC 3564, Australia
- <sup>2</sup> Department of Neuroscience, Eastern Health, Melbourne, Australia
- <sup>3</sup> Eastern Health Clinical School, Faculty of Medicine, Nursing and Health Sciences, Monash University, Clayton, Australia
- <sup>4</sup> I-MED Radiology Network, Victoria, Australia



**Fig. 1** MRI brain two days post symptom onset. (A) DWI, (B) ADC and (C) T2 FLAIR

and bilateral reversible DWI lesions in the hippocampi in transient global amnesia, have also been associated with acute amnesia.

Previous case series suggest iatrogenic injury after clipping ACoA aneurysm and microangiopathy are the two main causes of bilateral fornix infarctions [5]. The aetiology of the stroke remains uncertain in our patient at the time of discharge. He does not have any conventional vascular risk factors, such as diabetes, hypertension, smoking or dyslipidemia. Despite the topography of his stroke, in the absence of other risk factors, apart from the likely presence of a patent foramen ovale, cardioembolism seems the most likely aetiology. Regardless of the aetiology, it is important to recognize isolated infarctions in the bilateral fornix can cause acute amnesia. For our patient, a lumbar puncture, electroencephalography, and inter-hospital transfer may have been avoided if more attention was paid to the significance of initial MRI findings.

## Declarations

**Conflict of interest** None.

**Data availability statement** All relevant data on this case report is available from the corresponding author upon reasonable request.

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