BRITISH JOURNAL OF HOSPITAL MEDICINE

CASE REPORT

Catch of the day: hippocampal lesions on magnetic resonance imaging in transient global amnesia

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Introduction

Transient global amnesia is a syndrome characterised by prominent antegrade amnesia and repetitive questioning. Retrograde amnesia can sometimes be seen. Exertion and emotional stress can precipitate transient global amnesia (Arena and Rabinstein, 2015).

Hodges and Warlow (1990) formulated diagnostic criteria for transient global amnesia. These highlight that the episode must be witnessed and antegrade amnesia must be present. Cognitive impairment is limited to amnesia. Attack resolution occurs within 24 hours. No clouding of consciousness, loss of personal identity, focal neurology or features of epilepsy should be present. Important exclusions are recent head injury or active epilepsy (Table 1).

This case report describes transient global amnesia precipitated by physical exertion during angling. Magnetic resonance imaging demonstrated a lesion in the left hippocampus on diffusion-weighted imaging consistent with transient global amnesia.

Case report

A 65-year-old man presented to the emergency department after catching a 15.9 kg fish. After posing for a photograph, he began to repeat sentences. Witnesses did not report a facial droop, dysarthria, limb weakness or loss of consciousness.

In the emergency department, a memory gap of 4 hours was noted. The patient remembered listening to the first half of a radio football commentary, and the next thing he remembered was a fellow angler calling an ambulance.

There was no history of similar episodes, epilepsy or migraine. Past medical history consisted of hypertension and hypercholesterolaemia. He was taking amlodipine 5 mg and atorvastatin 20 mg. He was a non-smoker and drank 10 units of alcohol weekly.

Observations were normal: pulse rate was 98 beats per minute, blood pressure 128/85 mmHg, blood glucose 7.3 mmol/litre. He was alert and orientated. Beyond the 4-hour memory gap, no other cognitive impairment was detected. Physical examination of the neurological system was normal.

The working diagnosis was transient global amnesia. The stroke service recommended a computed tomography scan of the brain to exclude ischaemic stroke given the hypertension and hypercholesterolaemia. No acute intra-cranial event or space-occupying lesion was seen on imaging, but a focal area of low attenuation in the anterior limb of the left internal capsule was reported. This 'age indeterminate ischaemic change' was not believed to correlate with symptoms, but a magnetic resonance imaging scan of the brain was suggested. A clinical diagnosis of transient global amnesia was made and the patient discharged with neurology follow up.

An outpatient magnetic resonance imaging with diffusion-weighted imaging was performed within 36 hours; it showed an ischaemic lesion within the anterior limb of the internal capsule. The initial report also noted: 'a tiny dot of signal on the diffusion weighted sequence within the tail of the left hippocampus must be considered to be somewhat equivocal'.

The scan findings were discussed at a neuroradiology meeting and it was re-reported: 'although the described abnormality within the original report affecting the posterior left hippocampus is tiny it is felt that this lesion is the most likely cause of the patient's presenting clinical symptoms' (Figure 1a and b).

The evidence of an infarct in the internal capsule prompted secondary prevention with clopidogrel and investigation for atrial fibrillation with a 72-hour tape (which demonstrated sinus rhythm).

How to cite this article:
Poffley LE, Parikh R, James N, Moore D. Catch of the day: hippocampal lesions on magnetic resonance imaging in transient global amnesia. Br J Hosp Med. 2022. https://doi.org/10.12968/hmed.2021.0129

Table 1. Criteria for transient global amnesia
1. Witnessed
2. Anterograde amnesia
3. No clouding of consciousness or loss of personal identity
4. No focal neurology
5. Epileptic features absent
6. Attack resolved within 24 hours
7. No recent head injury or active epilepsy

Adapted from Hodges and Warlow (1990)

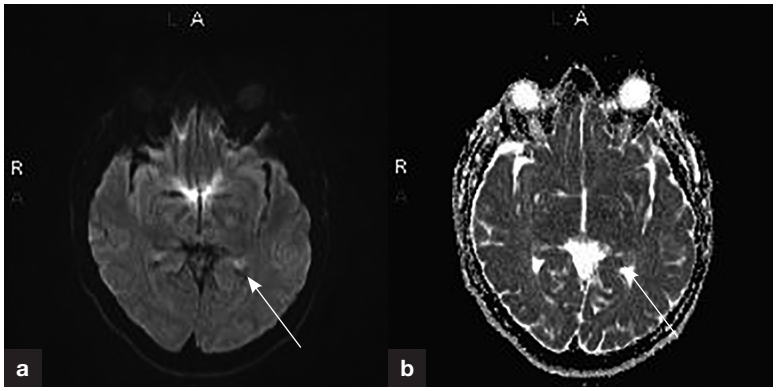

Figure 1. Magnetic resonance imaging shows (a) a tiny diffusion weighted sequence change in the left hippocampus (b) associated with a low apparent diffusion coefficient lesion.

Discussion

This case fits Hodges and Warlow's (1990) criteria for transient global amnesia. Amnesia can last up to 24 hours, but typically lasts 4–6 hours. Patients may report triggers including abrupt temperature change, emotional stress or physical exertion (as in this case). Transient global amnesia is not associated with risk factors such as hypertension, hypercholesterolaemia, diabetes and atrial fibrillation (Quinette et al, 2006). Migraine is more prevalent in those affected by transient global amnesia. The differential diagnosis includes transient ischaemic attacks or stroke and transient epileptic amnesia. However, transient ischaemic attacks or stroke rarely cause an isolated memory problem and transient epileptic amnesia tends to recur (Arena and Rabinstein, 2015; Spiegel et al, 2017).

Anterograde amnesia suggests medial temporal lobe dysfunction: cellular stress affecting the cornu ammonis (CA1) within the hippocampus is thought to be key (Spiegel et al, 2017). Szabo et al (2020) noted that the 'structural abnormality consistently reported' is hippocampal lesions on magnetic resonance diffusion-weighted imaging. The pathophysiology is unknown, with theories including:

- Venous flow changes impairing temporal lobe drainage precipitated by the Valsalva manoeuvre if jugular valves are incompetent. This could explain the association with exertion, but not why only the temporal lobe is affected
- Arterial ischaemia, causing an infarct. However, diffuse magnetic resonance imaging changes would normally be expected when an arterial territory is affected. Additionally, magnetic resonance imaging findings are frequently seen 24–48 hours after symptom onset and resolve in case series. Thus, such findings are atypical for ischaemic stroke (Arena and Rabinstein, 2015; Spiegel et al, 2017; Pearce et al, 2018).

Thus, hippocampal changes are consistent with transient global amnesia. However, in isolation they should not prompt secondary prevention for ischaemic stroke. Indeed, fulfilling Hodges and Warlow's (1990) criteria appears to 'designate a group with a good prognosis' and symptom recurrence is low.

Learning points

- Migraine, physical or emotional stress are associated with transient global amnesia.
- Patients who meet the Hodges and Warlow criteria for transient global amnesia have a good prognosis.
- Transient global amnesia is a clinical diagnosis. However, lesions in the hippocampus seen on diffusion-weighted magnetic resonance imaging can help support the diagnosis.
- Hippocampal lesions observed on magnetic resonance imaging are unlikely to represent ischaemic stroke and alone should not prompt secondary stroke prevention.

So, what is the role of magnetic resonance imaging in transient global amnesia? Transient global amnesia remains a clinical diagnosis but if there is diagnostic uncertainty, the presence of 1–3 mm punctate hippocampal lesions on diffusion-weighted imaging can aid diagnosis (Pearce et al, 2018; Szabo et al, 2020).

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