When ischaemia is not ischaemia

Introduction

Transient global amnesia is a mysterious clinical phenomenon characterized by the abrupt onset of severe anterograde memory loss, with resolution of symptoms within hours. This article presents a case of transient global amnesia, demonstrating the changes on neuroimaging which are providing new insights into the aetiology of this enigmatic syndrome.

Discussion

Transient global amnesia is an enigmatic clinical syndrome; well described, but poorly understood, for over 50 years. It is characterized by abrupt onset of severe anterograde amnesia with rapid return to normal function. As in this case, the patient remains alert and communicative and will perform normally on cognitive tasks not involving memory (e.g. spelling WORLD backwards). There is no clouding of consciousness or distractability, as seen in acutely confused patients. Classically patients repeat questions, usually relating to orientation. This insight into their condition can cause significant stress.

The event typically lasts between 2–8 hours, although it can last up to 24 hours, and is followed by a rapid return of apparent full anterograde memory. On follow up, however, many patients have subtle retrograde and anterograde memory impairment for months (Pantoni et al, 2005). The patient will never be able to recall the attack itself.

While consensus on the aetiology of transient global amnesia is still lacking, changes seen on neuroimaging have provided insight into the anatomical site of the pathology. Diffusion-weighted imaging is used in clinical practice to detect cytotoxic oedema secondary to acute cerebral ischaemia. In many studies, and in this case, diffusion-weighted imaging in transient global amnesia shows a 1–3 mm punctate area of signal abnormality in the lateral portion of the hippocampus (Felix et al, 2005), an area critically involved in memory consolidation.

Consistent mapping of lesions to this area has, for some, supported the theory that the mechanism is ischaemic. The hippocampal arterial supply consists of an upper and lower artery with an internal anastomosis, making the lateral hippocampus a hypoxia-susceptible vascular watershed (Sedlaczek et al, 2004).

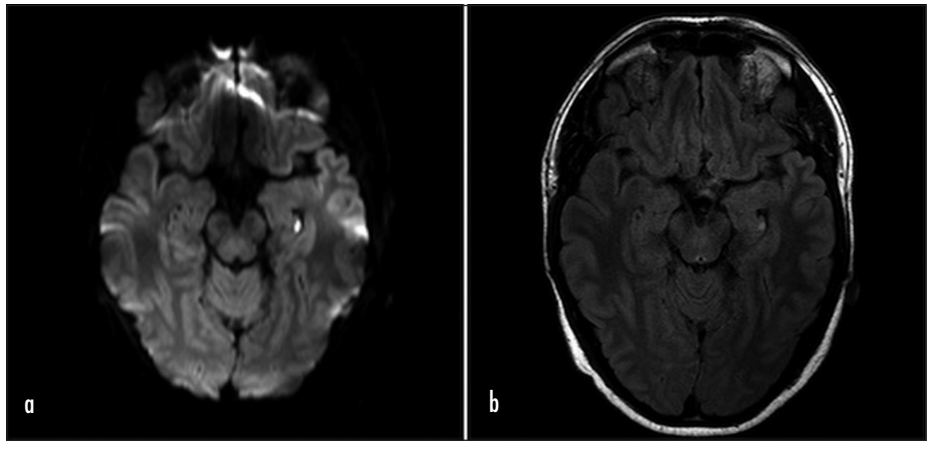
However, several differences exist between findings in transient global amnesia and those in acute focal ischaemia, transient ischaemic attack for example. A study assessing the timing of the development of these diffusion-weighted imaging visible lesions in transient global amnesia frequently demonstrated delay of 24–48 hours (Bartsch et al, 2007). This is distinct from the temporal evolution of acute ischaemia, which typically exhibits diffusion-weighted imaging changes very soon after onset. In addition, signal changes in transient global amnesia are rarely present on follow-up imaging, indicating no post-ischaemic damage. Further refuting the ischaemic hypothesis, studies show no association with transient global amnesia and vascular risk factors (Quinette et al, 2006) nor increased risk of stroke (Zorzon et al, 1995).

The onset of transient global amnesia is frequently observed to be in moments of

Dr Grace McMacken *is Senior House Officer in Neurology in the Department of Neurology,* **Dr Enda Kerr** *is Consultant Stroke Physician and Geriatrician in the Stroke Unit, and* **Dr Paul Burns** *is Consultant Neuroradiologist in the Radiology Department, Royal Victoria Hospital, Belfast BT12 6BA*

Correspondence to: Dr G McMacken (gmcmacken@gmail.com)

Figure 1. a. Diffusion-weighted and (b) axial fluid-attenuated inversion recovery (FLAIR) magnetic resonance imaging performed 42 hours after symptom onset showing a punctate area of diffusion restriction within the left hippocampal region. This corresponds to a focus of FLAIR signal abnormality.



Case Report

A 56-year-old man was brought to the emergency department with acute memory disturbance. The morning of the day of admission he had set off on a bicycle ride. On arriving home he began asking repetitively 'Where are we?' and saying 'I don't remember being here'. On examination in the emergency department he was alert and cooperative. Memory was intact for date of birth, recognizing family members and for current events, but he was disorientated in place and time. He had no focal weakness or sensory loss and systematic examination was unremarkable.

Fluid-attenuated inversion recovery (FLAIR) and diffusion-weighted magnetic resonance imaging performed 42 hours after symptom onset showed a tiny focus of diffusion restriction within the left hippocampus (*Figure 1*).

Over the following 24 hours the patient's symptoms gradually resolved. On review 2 weeks later he described no further episodes of memory impairment. He had no recollection of the events of the attack itself.

emotional or physical stress and this has led to theories that the mechanism is metabolic. Emotional and behavioural stress has been shown to lead to an increase in glutamatergic transmission in CA1 neurons in the hippocampus (Calabresi et al, 2003). It has been suggested that this stress response, which is specific to this area, could trigger a pathological cascade leading to an acute disruption in CA1 synaptic mechanisms, and the clinical syndrome of transient global amnesia (Bartsch and Deuschl, 2010). However, the reason for the vulnerability of the CA1 region of the hippocampus remains unclear.

Transient global amnesia is a management problem for clinicians faced with what would appear to be an episode of acute cerebral ischaemia. Neuroimaging has indicated the site of the pathology, but the pathophysiological mechanisms leading to this dramatic syndrome remain unclear. Despite its benign prognosis, transient global amnesia leads to extensive investigation and significant stress for patients and families. Patients should be reassured that there is no risk of recurrence and no associated risk of cerebral ischaemia. **BJHM**

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Calabresi P, Centonze D, Pisani A, Cupini L, Bernardi G (2003) Synaptic plasticity in the ischaemic brain. *Lancet Neurol* **2**: 622–9 (doi: 10.1016/S1474-4422(03)00532-5)

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Pantoni L, Bertini E, Lamassa M, Pracucci G, Inzitari D (2005) Clinical features, risk factors, and prognosis in transient global amnesia: a follow-up study. *Eur J Neurol* **12**(5): 350–6 (doi: 10.1111/j.1468-1331.2004.00982.x)

Quinette P, Guillery-Girard B, Dayan J, Sayette V, Marquis S, Viader F (2006) What does transient global amnesia really mean? Review of the literature and thorough study of 142 cases. *Brain* **129**: 1640–58 (doi: 10.1093/brain/awl105)

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Zorzon M, Antonutti L, Masè G, Biasutti E, Vitrani B, Cazzato G (1995) Transient global amnesia and transient ischemic attack: natural history, vascular risk factors, and associated conditions. *Stroke* **26**: 1536–42 (doi: 10.1161/01.STR.26.9.1536)

LEARNING POINTS

- There is no increased risk of cerebrovascular disease in patients with transient global amnesia.
- The changes seen on magnetic resonance imaging in transient global amnesia cannot simply be explained by cerebral ischaemia.
- Differentiating transient global amnesia from other causes of memory disturbance can reduce unnecessary investigation and treatment.

Hand trauma always requires ring removal

Figure 1. Clinical photograph showing swelling in the fingers with rings in situ and severe skin maceration around the ring on the right middle finger.

Mr AR Hunter *is Specialist Registrar in Trauma and Orthopaedics,* **Mr MD Horwitz** *is Consultant Hand Surgeon and* **Mr TJ Halsey** *is Locum Consultant Hand Surgeon in the Hand Unit, Department of Plastic Surgery, Chelsea and Westminster Hospital NHS Foundation Trust, London SW10 9NH*

Correspondence to: Mr AR Hunter (hunteralistair@hotmail.com)

A 62-year-old woman attended the emergency department 2 days after trapping both hands in a heavy wardrobe. She had been wearing multiple rings on all fingers of both hands and was unable to remove them herself. On examination, the fingers with rings in situ were swollen and had altered sensibility. There was maceration of the skin under the rings on two of her fingers (*Figure 1*). Removal of her rings ultimately required a general anaesthetic and use of a reinforced ring cutter.

This image serves as a reminder to doctors in all specialties that all rings should be removed immediately after any hand trauma (Kalkan et al, 2013). Early referral for specialist review is required if removal is not possible with simple methods. **BJHM**

Kalkan A, Kose O, Tas M, Meric G (2013) Review of techniques for the removal of trapped rings on fingers with a proposed new algorithm. *Am J Emerg Med* **31**(11): 1605–11 (doi: 10.1016/j.ajem.2013.06.009)