

# Transient global amnesia like syndrome associated with acute infarction of the corpus callosum: a case report

R. Beyrouti<sup>1</sup> · M. Mansour<sup>1</sup> · A. Kacem<sup>2</sup> · J. Zaouali<sup>1</sup> · R. Mrissa<sup>1</sup>

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## Introduction

The corpus callosum (CC) constitutes the largest white matter bundle and it connects the two cerebral hemispheres [1]. Infarction of the CC is rare. The clinical picture varies from an acute onset to slow evolving symptoms, frequently with poor localizing signs; however, the location of the infarct in the callosum often correlates with a specific etiology [2]. In previous studies, lesions in the CC caused permanent, but not transient global amnesia (TGA) by involving the thalamocortical portion of the Papez' circuit. We present a patient with TGA like syndrome after a corpus callosum infarct to highlight its involvement in cognitive impairments. We discuss the pathophysiology of this rare entity and the more important clinical symptomatology.

## Case report

A 62-year-old right-handed man with 5-year history of hypertension and 20-year history of diabetes presented with sudden onset of disorientation. On examination, the patient was alert, with blood pressure of 120/70 mmHg, a regular

heart rate and a temperature of 36.7 °C. Neurological examination showed dysarthria with decreased volitional speech output, visuospatial disorientation, anterograde and recent retrograde memory loss with preservation of alertness, attention and self identity without any other neurological deficits especially no sign of callosal disconnection syndrome. He scored 22/30 on mini-mental status examination (MMSE). A brain CT-scan performed 6 h after the attack was normal. Magnetic resonance imaging (MRI) studies (Fig. 1) showed high signal intensity in the genu and the body of the corpus callosum, the internal capsule and in periventricular regions on T2-weighted, FLAIR and diffusion-weighted images with restriction of the apparent diffusion coefficient (ADC) (Fig. 1). Multivoxel magnetic resonance (MR) spectroscopy also demonstrates a significant lactate peak. Magnetic resonance angiography (MRA) showed both anterior cerebral arteries arising from one stenotic stem of the internal carotid (Fig. 2). In laboratory studies, blood cell counts; renal function, serum cholesterol and blood glucose levels, and coagulation systems were normal. Electrocardiogram, holter examination, transthoracic echocardiography findings were normal. Carotid ultrasonography showed extensive atherosclerosis without stenosis.

The patient's amnesia gradually resolved. After 1 week of hospital stay, he was well oriented and recovered anterograde and recent retrograde memory except for that during the attack. MRI performed at the 6-month follow-up demonstrates atrophy and cavitation in the genu and the anterior part of the body of the CC (Fig. 3).

Although the lesion resembled a tumor in our patient, the acuity of onset of symptoms, clinical course with consistent improvement, absence of vasogenic edema on imaging, and ACA pathology made infarction much more likely.

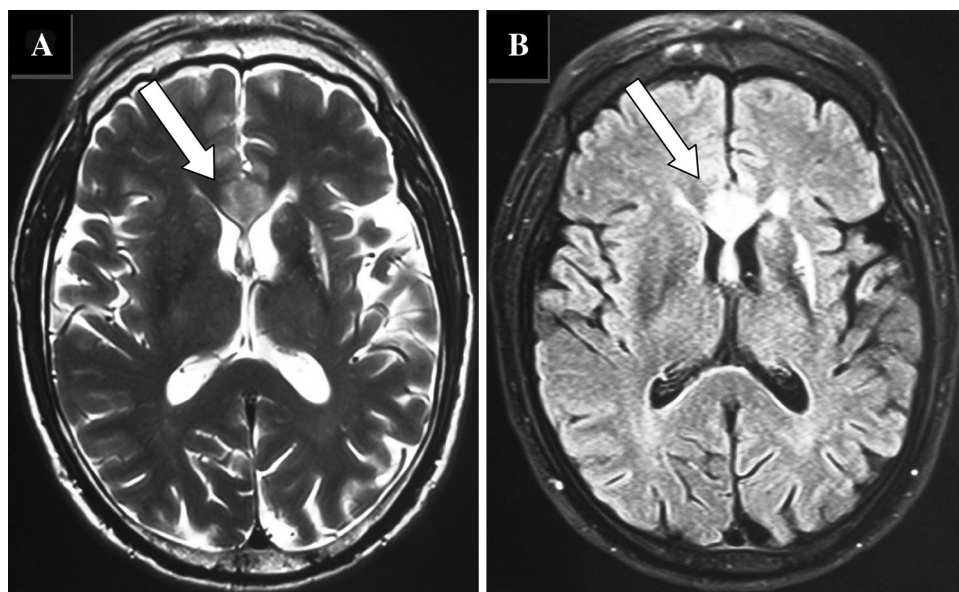
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✉ R. Beyrouti  
mb\_rahma@yahoo.fr

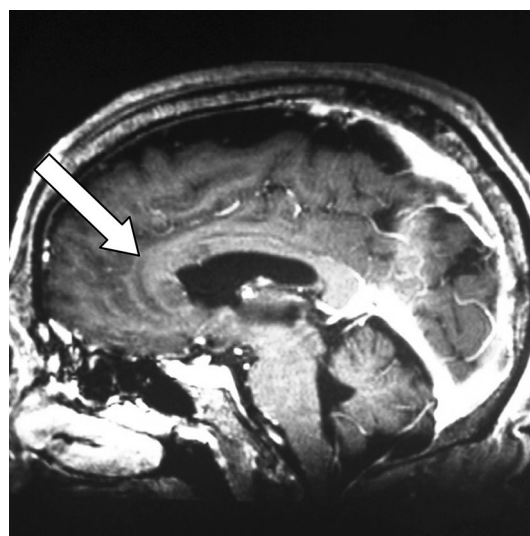
<sup>1</sup> Department of Neurology, Military Hospital of Tunis, Tunis, Tunisia

<sup>2</sup> Department of Medicine, Hospital of Jendouba, Jendouba, Tunisia

**Fig. 1** Axial MRI showing high signal intensity in the genu and the body of the corpus callosum, the internal capsule and in periventricular regions on T2-weighted (a) and FLAIR (b) images



**Fig. 2** Magnetic resonance angiography (MRA) showed both anterior cerebral arteries arising from one stenotic stem of the internal carotid



**Fig. 3** Sagittal MRI performed at the 6-month follow-up, demonstrates atrophy and cavitation in the genu and the anterior part of the body of the corpus callosum on T1-weighted images

## Discussion

The CC connects both the cerebral hemispheres and plays a vital role during their independent processing. It integrates information between both the hemispheres and is responsible for interhemispheric communication [1, 2]. The CC derives its vascular supply from both the anterior and posterior cerebral circulations. The body of the CC receives blood supply from the pericallosal artery, rostrum from the subcallosal artery, and the genu from medial callosal artery, all branches of the anterior cerebral artery (ACA).

The splenium derives vascular supply from a branch of the posterior cerebral artery (PCA), the posterior pericallosal artery [1, 2]. Because of this rich blood supply, stroke of the CC occurs only rarely. The splenium has been reported to be more commonly involved in embolism, while atherothrombotic infarcts are reported to be more frequent in the genu and body [1]. This association held true for our case as well with a particular anatomic variation of both anterior cerebral arteries arising from one stenotic stem of the internal carotid.

Injury to CC fibers can result in impaired transfer of interhemispheric information and can cause heterogeneous

neurologic manifestations, including alien hand syndrome (AHS), apraxia, tactile anomia, agraphia, visual anomia, neglect, and alexia. A combination of these neurologic manifestations is defined as callosal disconnection syndrome (CDS).

Injury of the CC can also lead to transient global amnesia which is a well-known syndrome characterized by an acute and transient loss of anterograde and recent retrograde memory, with preservation of alertness, attention and self-identity and without any other neurological deficits [3, 4]. Because our patient's clinical symptoms were richer than a pure TGA, we considered that he suffered from a TGA like syndrome.

The retrosplenial cortex provides an alternative route for reciprocal connections between the anterior thalamus and the medial temporal structures involved in memory (Papez' circuit). Lesions in the retrosplenial cortex may disrupt connection between the anterior thalamus and hippocampus, and thus may cause memory disturbance [4]. Valenstein et al. [5] reported a case of retrograde and anterograde amnesia following hemorrhage from an arteriovenous malformation situated close to the retrosplenium of the corpus callosum.

On the other hand, anterograde amnesia due to infarction of the genu and the anterior part of the body of the cc is rare, with only few cases reported to date. In all cases, brain MRI demonstrated infarction involving the anterior fornix and genu of the cc [6]. The originality of our case is that the lesion is located in the anterior part of the CC including the genu and the body without affecting the fornix, the splenium or the hippocampus. Furthermore, Saito et al. [6] reported a case of anterograde amnesia associated with infarction of the anterior fornix and genu of the corpus callosum, initially diagnosed and treated as an acute psychiatric disorder, to highlight the importance of recognizing this rare syndrome.

## Conclusion

The low incidence of CC infarcts, in combination with confusing clinical and radiologic presentations, poses a challenge to diagnosis. A detailed assessment for signs of callosal disconnection or amnesia is vital in diagnosing CC infarcts. This case emphasizes the importance of suspecting this syndrome and performing brain imaging immediately in the patients presenting with anterograde amnesia of sudden onset.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed consent** For this type of study formal consent is not required.

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