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# Transient Global Amnesia: A Case Report

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## Key Words

Transient global amnesia · Short-term memory · Repetitive questioning

## Abstract

**Introduction:** Transient global amnesia is a syndrome of temporary and reversible disruption of short-term memory accompanied by repetitive questioning. Although the etiology is unknown, the prognosis usually benign, and no particular treatment is required, it is important for all involved clinicians to recognize the diagnosis and possess knowledge about the evaluation of these affected patients.

**Case Presentation:** A middle-aged Caucasian woman presented for neurologic evaluation for acute forgetfulness. Neurologic examination disclosed repetitive questioning with preserved orientation and no focal motor, speech, sensory, coordination, or cranial nerve deficits. Neurologic investigations did not reveal any pathologic findings. Her memory improved and reverted to normal baseline over the course of a 24-hour hospital stay.

**Conclusion:** Transient global amnesia is an interesting syndrome of reversible anterograde amnesia associated with repetitive questioning that occurs with an unclear etiology in middle-aged and elderly individuals. Due clinical diligence is required in the investigation of these patients. Treatment is generally not required, and the condition usually does not recur. Clinicians, including neurologists, internists, family practice physicians, and psychiatrists, need awareness of this condition.

## Introduction

Transient global amnesia (TGA) is a syndrome of temporary disruption of short-term memory accompanied by repetitive questioning. Affected patients exhibit no other signs of impaired cognitive functioning and have no focal deficits. Treatment is generally not required. Although various pathophysiologic explanations have been offered, the etiology remains unknown.

## Case Presentation

A 65-year-old Caucasian woman presented to our emergency department with a chief complaint of confusion and forgetfulness. She was enjoying her baseline state of generally good health when, according to her husband, suddenly sometime around mid-afternoon on the day of admission, he found her confused, disoriented, and asking 'bizarre questions'. The patient stated that she was in a 'dream-like' state where she was in the company of President Obama and her deceased mother. She remained confused and kept asking repetitive questions. There was no history of any prior similar episodes. She complained of a minimal frontal headache that was pulsating in quality, but there were no associated light aversion, visual auras, nausea or vomiting, nor did she have any past history of migraines. There was no history of any seizure disorder, nor were there any complaints of strange smells, tastes, epigastric rising, or sensations of depersonalization. There were no complaints of any numbness, weakness, tingling, vertigo, slurred speech, double vision, lapses of consciousness, chest pain, shortness of breath, fevers, chills, nausea, vomiting, abdominal pain, or changes in bowel or urinary function.

The patient's past medical history was significant only for well-controlled hypertension and hypercholesterolemia. Her medications were Vytorin® and an unknown antihypertensive, and there were no recent changes in the dosage of these. She carried no previous surgical history, nor did she have any medication allergies or adverse habits. The patient was married, retired, living with her husband, and had three children. She carried no family history of any neurologic disease.

General physical examination revealed a blood pressure of 176/84 mm Hg, a heart rate of 79 beats per minute, and a temperature of 98.5 °F. She appeared well-developed and well-nourished without any distress. Her neck was supple, and no carotid bruits were appreciated. Her oropharynx was clear. Cardiovascular examination revealed a regular rate and rhythm without murmurs, rubs, or gallops. Her lungs were clear to auscultation bilaterally, and her breathing was without retractions or accessory muscle use. No wheezes, rhonchi, or rales were appreciated. Her abdomen was soft, nontender, and nondistended with normoactive bowel sounds. No guarding, rigidity, or hepatosplenomegaly was noted. Her extremities revealed no clubbing, cyanosis, or edema.

Neurological examination demonstrated that her mental status was quite intact. She was awake, alert, and oriented to person, place, and time. She kept asking repetitive questions such as 'what happened?'. Long-term memory was intact (she was able to state her birth date) and she was aware of current events, but short-term memory was impaired. No active hallucinations or delusions were noted. She was easily able to recognize family members. Her speech was fluent without evidence of dysarthria or aphasia. Cranial nerve examination showed intact visual fields, papillary symmetry and appropriate light reaction, and no evidence of papilledema. All extraocular eye muscles were full and intact bilaterally. No nystagmus and no ptosis were noted. Her face was symmetric and facial sensation normal. Hearing was intact and her tongue protruded midline. Her motor examination was normal with intact symmetrical strength and tone and reflexes of 2/4 throughout. Coordination, sensation, and gait were all intact and no long-tract findings were seen.

Laboratory investigations revealed a normal complete blood count, chemistry panel, thyroid stimulating hormone, and coagulation profile. Urinalysis showed trace leukocytes without bacteria or casts. An electrocardiogram demonstrated normal sinus rhythm, and a chest X-ray was within normal limits. Head computed tomography showed mild atrophy but no acute findings. Magnetic resonance imaging of the brain revealed no acute abnormalities, and a magnetic resonance angiogram of the brain was normal. Carotid duplex findings were consistent with less than 30% stenosis of the bilateral internal carotid arteries, and a transcranial Doppler study was normal. An electroencephalogram study was also normal.

The patient returned to her baseline normal neurologic state over the course of a 24-hour hospitalized observation period and has not had any further recurrences.

## Discussion

TGA is a syndrome of temporary disruption of short-term memory accompanied by repetitive questioning. An individual in a state of TGA exhibits no other signs of impaired cognitive functioning and has no focal deficits [1]. While the etiology remains unknown, TGA most commonly presents in middle-aged and elderly individuals, with the incidence among those  $\geq 50$  years to be estimated at 23.5 to 32 per 100,000 per year [2]. The majority of afflicted patients are between the age of 50–80 years, with an average age of approximately 60–65 years [2]. Risk factors causing an increased risk of stroke such as hypertension, diabetes, and hypercholesterolemia are not believed to be associated with TGA, while migraines have been found to be strongly associated with TGA [3, 4]. The annual recurrence rate is approximately 2.5 to just over 5.0% [1, 5].

Clinical symptoms of TGA suggest that the site of neurologic involvement would be the medial temporal lobe and hippocampus as this area is involved in the formation and retrieval of new episodic memories [6]. Neuroimaging studies, specifically diffusion-weighted magnetic resonance imaging studies, show indicated lesions in the CA1 Sommer's sector of the hippocampus, most often on the left side [7].

The etiology of TGA remains unknown, but hypotheses include both an arterial and a venous etiology; phenomena similar to migraines, epilepsy, and psychogenic disorders [5]. Arterial ischemia has been proposed as one mechanism as transient ischemic attacks via arterial thromboembolism and TGA share certain features such as duration of less than 24 h and occurrence in older patients. However, TGA episodes usually last longer and patients with TGA tend to have a lower atherosclerotic risk burden [1, 5]. Additionally, neuroimaging studies have provided conflicting data regarding arterial ischemia as a pathogenesis for TGA [5, 8]. A venous congestion theory has been proposed in which Valsalva maneuvering impedes venous return via the superior vena cava, thus allowing transient retrograde transmission of elevated venous pressure to the cerebral venous system which may result in venous ischemia of the mesial temporal lobes [8, 9]. However, it is unclear exactly why venous congestion is so anatomically selective and why TGA is not seen more commonly in patients with cerebral venous thrombosis if this were the sole explanation. A migrainous etiology has also been proposed in which TGA may be similar to an aura via cerebral spreading depression (a self-propagating wave of neuronal and glial depolarization) perhaps triggered by hippocampal glutamate release [5, 8]. In argument against this theory is that migraines, as opposed to TGA, tend to present in younger individuals and have a recurrent nature. Epileptiform etiologies have also been proposed as a cause of TGA, given the transient amnesia may manifest some seizures [3]. However, like migraines, seizures are recurrent and cases of electroencephalogram monitoring during TGA episodes have not revealed any epileptiform activity [3, 10]. Psychogenic causes have also been proposed based on findings that subgroups of TGA patients have certain phobic and other personality traits such as anxiety and depression; however, this has not been substantiated across all studies [8]. Perhaps the thinking that TGA is a multifactorial disorder is the most plausible [8]. Interestingly, there are certain precipitating triggers that have been identified, including alcohol use, severe nightmares, sexual activity, emotional distress, intense pain or cold, high altitude [11], myocardial ischemia [12], and strenuous physical activity along with Valsalva maneuvers [8, 13].

The diagnosis of TGA is clinical and based on the following diagnostic criteria [8, 14]: (a) information about the beginning of the attack is available from an observer in order to exclude head trauma or loss of consciousness at the onset, and clouding of consciousness or loss of personal identity should be absent; (b) the patient should be examined during the attack to be certain that there are no accompanying neurologic signs or symptoms besides antegrade amnesia; (c) the memory loss should resolve within 24 h; (d) epileptic features must be absent, and (e) patients with active epilepsy are excluded.

It is important to note that the diagnosis of TGA is one of exclusion and an appropriate work-up must be conducted including obtaining oxygenation status, serum electrolytes, glucose, and a toxicology screen. It is also recommended that patients be given thiamine 100 mg i.v. (to cover the possibility of Wernicke's encephalopathy) and admitted for observation until the amnesia resolves [8]. If there is suspicion for epilepsy, an electroencephalogram should also be obtained. Furthermore, neuroimaging is important to additionally exclude pathologies such as trauma and acute ischemia [8].

The differential diagnosis of TGA also includes head injury, anoxia, hypoglycemia, intoxication, drug withdrawal, aortic dissection [15], encephalitis, metabolic derangements, and Wernicke's encephalopathy. Usually, with these other entities, patients exhibit more global impairment with the exception of Wernicke's encephalopathy in which amnesia may be the predominant manifestation [8].

There is no treatment that is required for TGA. Interestingly, the condition does not usually recur (although, as previously mentioned, the annual recurrence rate varies from 2.5 to just over 5%) and the patients do not have an increased risk of mortality, epilepsy, or stroke following TGA [16]. Thus, the appropriate management, as was performed in the present case, is to observe the patient as an inpatient until the amnesia resolves. Although our patient suffered mild cephalgia (as is seen in 10–40% of all patients with TGA [8]), she had no localizing symptoms or history suggestive of migraines, nor was there any history of cerebrovascular disease or seizures. If our patient's memory lapse had not resolved within 24 h, then the other aforementioned etiologies would have continued to be explored and we would have reimaged her, repeated the electroencephalogram study, and considered a lumbar puncture.

## Conclusion

TGA is an interesting entity of reversible anterograde amnesia associated with repetitive questioning that occurs with an unclear etiology in middle-aged and elderly individuals. Due clinical diligence is required in the investigation of these patients. Treatment is generally not required, and the condition usually does not recur. Clinicians, including neurologists, internists, family practice physicians, and psychiatrists, need awareness of this condition.

## Disclosure Statement

R.A.R. serves as deputy editor for the *Journal of Medical Case Reports*, associate neurology editor for *Case Reports in Neurology*, *Grand Rounds*, and formerly *Cases Journals*.

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