Recognition Memory without Awareness during Transient Global Amnesia

Pierre Mégevand Theodor Landis

Department of Neurology, Geneva University Hospitals and Medical Faculty, University of Geneva, Geneva, Switzerland

Dear Sir,

Transient global amnesia (TGA) is a fascinating syndrome of unknown etiology where anterograde episodic memory transiently ceases to function, together with a variable degree of retrograde episodic amnesia [1, 2]. Whereas transient retrograde amnesia must be caused by a reversible deficit in memory recall, the pathophysiology of transient anterograde amnesia appears less homogeneous. Patients examined during TGA were shown to display difficulties either in immediate recall of previously presented items, suggesting impairment in the encoding of memories, or in delayed recall together with an inability to recognize target items when presented with distractors, suggesting a deficit of memory storage [3]. However, some TGA patients show better performance in recognition memory than in spontaneous delayed recall, suggesting that some memories can be encoded and stored during TGA, but that their retrieval is impaired [4, 5].

Here, we report a patient examined during TGA who performed significantly above chance in a forced multiple-choice recognition task despite being unaware that he did, suggesting that TGA may include a deficit in the retrieval of stored memories to consciousness.

Case Report

A 55-year-old banker was brought to the hospital by his wife because of temporal disorientation and repetitive questioning that had started 2 h before. His past medical history included an episode of TGA 11 years previously. Evaluation took place 3 h after the beginning of the episode. The Mini-Mental State Examination was 22/30, with mistakes on temporal orientation and word recall; the Frontal Assessment Battery was normal with 18/18 [6]. The remainder of the neurological examination was normal.

The patient had difficulty recalling events of his personal life from the past 20 years and could not recall current news events. Visuospatial anterograde memory, tested by hiding 3 objects from the patient's view in the examination room, was abolished. Auditory-verbal anterograde memory was tested using a 5-word list. Immediate recall was 5 both spontaneously and upon categorical cueing. After a distracting task of serial subtractions, delayed recall was nil. Neither categorical cueing nor providing the target word with two distractors induced recognition. However, upon forced choice, the patient correctly selected the target word 4 times out of 5,

even though he reported answering at random at each trial. Fifteen minutes later, he performed identically upon retesting with the same words.

Cerebral computed tomography and electroencephalography were normal. Twelve hours after the beginning of the episode, delayed recall was normalized. One month later, the patient had recovered both anterograde and retrograde memory, except for an amnesic gap covering the episode.

Discussion

Our patient, tested during TGA, selected the correct word 4 times out of 5 in a forced 3-choice recognition task even though he reported answering at random. According to the binomial distribution, the probability of performing at least as well in such a test by answering at random equals 11/243 ($p = 0.0453$). The patient therefore performed significantly better than chance, suggesting that he had acquired some form of memory of the words which was sufficient to drive his behavior.

Could implicit memory drive this recognition without awareness? Priming and other forms of implicit memory are intact

during TGA [7, 8]. There is evidence that priming can improve performance in recognition tasks in the absence of awareness in healthy subjects [9] and in patients with amnesia due to medial temporal lobe damage [10]. However, these effects depend on strictly controlled experimental conditions. Additionally, amnesic patients with medial temporal lobe damage display intact priming, yet perform at chance level in recognition tasks similar to that used here [11].

We therefore hypothesize that our patient acquired an episodic memory of the words, but that retrieving this memory to conscious awareness was impaired. This implies that a retrieval deficit may participate in anterograde amnesia during TGA

in addition to the previously described encoding and storage deficits [3]. It must be noted, however, that a retrieval deficit cannot be the only mechanism involved as it does not account for the aforementioned encoding and storage deficits, nor for the persistent amnesia for the episode observed in all patients [2].

Interestingly, using the binomial distribution to calculate performance probabilities in a study of TGA patients by Quinette et al. [12] suggests that 2 out of 7 (see table 4 in [12]) performed above chance at forced-choice recognition despite answering at random. Therefore, recognition without awareness might not be exceptional during TGA and should be investigated further.

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Disclosure Statement

The authors declare that they have no conflicts of interest.

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