Retrosplenial Amnesia without Topographic Disorientation Caused by a Lesion in the Nondominant Hemisphere

Shinichiro Maeshima, MD, PhD,* Aiko Osawa, MD, PhD,* Fumitaka Yamane, MD, PhD,† Tomoyuki Yoshihara, MD, PhD,† Ryuzaburo Kanazawa, MD, PhD,† and Shoichiro Ishihara, MD, PhD†

We report the case of a 68-year-old right-handed man who was admitted to our hospital because of sudden onset of headache. On admission, he presented with left homonymous hemianopsia, disorientation, and recent memory disturbance; however, he had normal remote memory and digit span. He was able to recall the room layout of his house and describe the route from the nearest station to his home on a map. However, at the hospital, he sometimes lost his way because of amnesia. Computed tomography (CT) and magnetic resonance imaging revealed a subcortical hematoma in the right occipital forceps and the parietal lobe, involving the cingulate isthmus. Single-photon emission CT imaging showed reduced perfusion not only in the retrosplenial region but also in the right thalamus. These findings suggested that the retrosplenial amnesia might have been caused by the interruption of hippocampal input into the anterior thalamus. **Key Words:** Memory impairment—amnesia—cerebral hemorrhage—thalamus—retrosplenial region.

Introduction

Lesions of the limbic system, particularly the hippocampus or anterior thalamus, are well known to cause memory impairment. Retrosplenial cortex also plays an important role in the human memory by connecting the hippocampus with other structures involved with memory, including the anterior thalami, septal nuclei, and mammillary bodies.[1] Amnesia, resulting from lesions involving the retrosplenial region, has been attributed to the damage of this vital link. Valenstein et al[1] reported a case of retrograde and anterograde amnesia after hemorrhage because of an arteriovenous malformation situated close to the retrosplenium of the corpus callosum. They termed this amnesia "retrosplenial amnesia." Lesions in the left hemisphere are common; however, lesions in the right hemisphere are rare.[2,3] A lesion in the same location in the right hemisphere as that in the left hemisphere produces topographical disorientation.[4,5] We report a case of amnesia without topographical disorientation because of intracerebral hemorrhage in the right retrosplenial region.

Case Report

A 68-year-old man with an educational history of 9 years was admitted to our hospital. He was completely right handed with a laterality quotient of +100 when formally assessed by the Edinburgh Handedness Inventory,[6] and all members of his immediate family are right handed. He presented with a 3-day history of headache and had developed untidy behavior and memory disturbance over a couple of days. He had no neurological deficits except left hemianopsia and amnesia.

From the *Department of Rehabilitation Medicine, Saitama Medical University International Medical Center, Hidaka, Saitama, Japan; and †Department of Endovascular Neurosurgery, Saitama Medical University International Medical Center, Hidaka, Saitama, Japan.

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Address correspondence to Shinichiro Maeshima, MD, PhD, Department of Rehabilitation Medicine II, School of Medicine, Fujita Health University, 424-1 Oodori-cho, Tsu, Mie 514-1295, Japan. E-mail: maeshima@fujita-hu.ac.jp.

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Table 1. *Results of neuropsychological tests*

	3 d	6 wk	Cutoff score
Mini-mental state examination (/30)	21	22	23/24
Digit span (forward/backward)	4/3	4/3	
Auditory verbal learning test (/15)			
Immediate	1, 5, 7, 8, 7	4, 5, 6, 5, 6	
Recognition	12	13	
Delayed	0	4	
Raven's progressive matrices (/36)	17	23	24/25
Frontal Assessment Battery (/18)	11	16	12/13
Trail-Making Test			
A	2'15"	221"	
B	Not done	3'23"	
Wechsler Adult Intelligence Scale, Third Edition			—*
Verbal IQ	72	80	
Performance IQ	57	72	
Full IQ	62	74	
Verbal comprehension	76	82	
Visual perception	54	75	
Working memory	65	76	
Process speed	66	75	
Wechsler Memory Scale-Revised			—*
Verbal memory	70	87	
Visual memory	55	88	
General memory	61	86	
Concentration/attention	72	78	
Delayed recall	59	71	
The Rivermead Behavioral Memory Test			
Screening score (/12)	4	5	5/6
Profile score (/24)	9	15	15/16
Behavioral Assessment of Dysexecutive Syndrome	44	69	
Age matched score (classification)	Impaired	Impaired	

Abbreviation: IQ, intelligence quotient.
*The median of Wechsler Scale is centered at 100, with an SD of 15.

He was alert and cooperative to a series of neuropsychological examinations, although he was in an amnesic state, with disorientation and recent memory loss.

Retrograde episodic memory concerning both personal and public remote events was nearly intact, but he had anterograde amnesia. For instance, he had no memory of whether he had received his meals and repeatedly asked for them. He even kept forgetting the most recent conversations. He did not show confabulation. His speech was fluent and not aphasic. Objective naming, letter reading, verbal comprehension, and dictation were normal. He showed constructional apraxia, but ideomotor or ideational apraxia and unilateral spatial neglect were not noted. He had no signs of callosal disconnection such as apraxia or tactile anomia in his left hand. He could recall the room layout of his house and describe the route from the nearest station to his home on a map. However, he sometimes lost his way at the hospital because of amnesia without topographic disorientation.

Table 1 shows the results of neuropsychological tests in this patient. On the Wechsler Adult Intelligence Scale, Third Edition, his verbal intelligence quotient (IQ) was 72; performance IQ, 57; and full IQ, 62. His verbal memory was 70 and visual memory was 55 on the revised Wechsler Memory Scale. The score on the Frontal Assessment Battery was 11/18, and the word fluency test where the patient was required to produce exemplars from given categories resulted in scores of 9, 3, and 5 for the categories "animal," "fruit," and "vehicle," respectively, and where he was required to produce words that begin with given letters resulted in scores of 2, 5, and 3 for the letters "shi," "i," and "re," respectively. The level of executive functioning was classified as "impaired" on the basis of the scores of Behavioral Assessment of the Dysexecutive Function, that is, overall profile, 5, and age-corrected score, 44 (impaired).