Unilateral spatial neglect due to a haemorrhagic contusion in the right frontal lobe

Introduction

Unilateral spatial neglect occurs when a patient disregards objects existing in the contralateral hemispace. This symptom is usually associated with lesions in parieto-occipital lobes of the non-dominant hemisphere [5], but rarely involves lesions in the frontal lobe [2-4, 6, 7, 10, 13], thalamus [8, 15], putamen [11], or left hemisphere [9]. Heilman and Valenstein [4] reported six cases of unilateral spatial neglect associated with frontal lobe lesions, naming the syndrome “frontal lobe neglect”. However, the causative lesions of the unilateral spatial neglect in their patients could not be precisely identified since their series was studied before the introduction of computed tomography (CT). Damasio et al. [3] reported five patients with frontal lobe neglect, two of whom demonstrated lesions in their basal ganglia and the other three manifesting left frontal lobe lesions. Meanwhile, Vallar and Perani [14] failed to demonstrate unilateral spatial neglect in 110 patients with right hemispheric strokes confined to the frontal lobe. Therefore, they suggested that frontal lobe neglect was a rare condition.

Unilateral spatial neglect is also thought to reflect a disturbance in the spatial distribution of directed attention [12]. Proposed mechanisms for unilateral spatial neglect include impairments of spatial processing, selective attention, mental representation, and awareness and/or premotor planning. However, the precise nature of such lesions and underlying mechanisms remains matter of debate. We describe two patients who each demonstrated unilateral spatial neglect caused by a right frontal lobe lesion.

Case reports

Case 1

A 64-year-old, right handed man, with an educational history of 12 years was admitted to our hospital on 19 July 1994, the day following a closed head injury. CT demonstrated a right, unilateral, frontal haemorrhagic contusion.

On admission, he was unconscious, responding only to painful stimuli, and demonstrated a left hemiparesis (Glasgow Coma Scale score: 11). He rapidly regained his normal level of consciousness within 24 h with conservative treatment. He had full visual fields by confrontational testing, as well as normal extraocular movements, but manifested a mild left hemiparesis. Perception of pain,
Unilateral spatial neglect of his left side was demonstrated on line bisection and figure copying tests (Fig. 1). An exploratory-motor neglect of his left side was noted by the exploratory-motor task; he was asked to move the 16 marbles on a board (43 x 34 cm) to the right edge and off using his right hand with eyes closed. On a perceptual-sensory task, extinction due to bilateral simultaneous stimulation was observed for all visual, auditory and tactile modalities. Aphasia, ideomotor apraxia, ideational apraxia and anosognosia were not observed, but there was severe motor impersistence.

CT revealed a right, frontal haemorrhagic contusion surrounded by oedema (Fig. 2). A 99mTc-hexamethyl-propylene-oxime (HM-PAO) single photon emission CT (SPECT) study was performed that same week, revealing a decrease in the regional cerebral blood flow around the haematoma in the frontal lobe (Fig. 3a).

Clinical course

The patient's left hemiparesis resolved within several days of its onset. Disorientation to time and place and task evidence of unilateral light touch, vibration, proprioception, graphaesthesia, and stereognosis was intact.

Neuropsychological examination

The patient was disoriented with respect to time and place, and his total score on the Mini-Mental State Examination was 17/30; word fluency (animal naming) was 5/min, and his digit span retention was 6 for forward recall and 3 for reverse recall. On the WAIS-R, his verbal intelligence quotient (IQ) was 85 and his performance IQ was below the limit of assessment with this test. Raven's coloured progressive matrices score was 11/36.

CT scan showing a right, frontal haemorrhagic contusion surrounded by oedema (Fig. 2). A 99mTc-hexamethyl-propylene-oxime (HM-PAO) single photon emission CT (SPECT) study was performed that same week, revealing a decrease in the regional cerebral blood flow around the haematoma in the frontal lobe (Fig. 3a).

Fig. 1 Unilateral spatial neglect seen in some neuropsychological tasks

Fig. 2 A CT scan showing a right, frontal haemorrhagic contusion surrounded by oedema

Fig. 3 a 99mTc-hexamethyl-propylene-oxime (HM-PAO) single photon emission CT (SPECT), performed in the first week after the injury, shows a decrease in the regional cerebral blood flow around the haematoma in the frontal lobe. b SPECT 3 weeks following the injury shows improvement in regional cerebral blood flow to the frontal lobe around the haematoma.