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Leftward gaze shift in recovery process after unilateral spatial neglect —Eye tracker-based behavioral test and task-related EEG activity—

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【Purpose】

While symptom of unilateral spatial neglect (USN) gradually improve with time in many cases, most of therapists empirically know once a patient recognizes own neglect behavior, they intentionally tend to pay attention toward the neglect space. In this study, we aimed to characterize visual attention capacity in patients with right hemisphere lesion based on eye tracker-based behavioral and EEG data.

【Methods】

41 patients with right hemisphere lesion participated in this study. The patients were divided into three subgroups based on the score of the behavioral inattention test (BIT) : USN (n = 12), USN improved (IMP, n = 10), and non-USN right hemisphere damage group (CONT, n = 19). Participants seated at the chair in front of eye tracker mounted PC display (Tobii TX60 Tobii inc., Sweden) and asked to perform eye pursuit-driven choice reaction task. The task consists of 25 trials of eye pursuit motion toward a one of five randomly flashed circular objects those are horizontally located on the display. The onset and velocity of eye movement were calculated. We additionally conducted EEG measurement during the task to discuss cortical mechanism underlying behavioral result (n = 9).

【Results】

Onset of eye movement in USN group was significantly delayed specifically in the left target. While the onset and velocity of eye movement in IMP group was similar to those in CONT group, the gaze distribution before the onset of eye movement in IMP group showed leftward-shift as compared to CONT group ($p < 0.01$). The result of EEG measurement revealed that theta band power at Fz was significantly larger in IMP group than CONT group, suggesting that those patients requires an attentional demand for the task.

【Discussion】

The present results suggest that the patients who recognize the presence of USN intentionally pay attention to neglected space as a compensatory strategy.