MOTOR AND LANGUAGE DEFICITS CORRELATE WITH RESTING STATE FUNCTIONAL MAGNETIC RESONANCE IMAGING NETWORKS IN PATIENTS WITH BRAIN TUMORS (FAB)

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Abstract

OBJECTIVE: Evidence of preoperative resting state functional magnetic resonance’s (RS-fMRI) validation by correlating it with clinical preoperative status in brain tumor patients is scarce. Our aim was to validate the functional relevance of RS-fMRI by investigating the association between RS-fMRI and preoperative motor and language function performance in patients with brain tumor.

MATERIAL-METHOD: 69 patients with brain tumors were prospectively recruited. Patients with tumors near pre-central gyrus (n=49) underwent assessment for apparent (paresis) and subtle (finger tapping) deficits. Patients with left frontal tumors in the vicinity of the inferior frontal gyrus (n=29) underwent assessment for gross (aphasia) and mild language (phonological verbal fluency) deficits. RS-fMRI results were extracted by spatial Independent Component Analysis (ICA).

RESULTS: Motor group: paretic patients showed significantly (P=0.01) decreased BOLD-signal in ipsilesional pre-central gyrus when compared to contralesional one. Significantly (P<0.01) lower BOLD-signal was also observed in ipsilesional pre-central gyrus of paretics when compared with the non-paretics. In asymptomatic patients, a strong positive correlation (r=0.68, P<0.01) between ipsilesional motor cortex BOLD-signal and contralesional finger tapping performance was observed. Language group: patients with aphasia showed significantly (P=0.01) decreased RS-fMRI BOLD-signal in left BA 44 when compared with non-aphasics. In asymptomatic patients, a strong positive correlation (r=0.72, P<0.01) between BA 44 BOLD-signal and phonological fluency performance was observed.

CONCLUSIONS: Our results showed significant affection of RS-fMRI BOLD-signal of motor and language networks in the vicinity of tumors implying the usefulness of the method for assessment of the underlying functions in brain tumors patients.