

Event-related functional magnetic resonance imaging of sensory system by using cold and scrubbing stimulation in normal volunteers

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목적(Objective): To evaluate the feasibility of event-related functional MRI in sensory system by cold and scrubbing stimulation and compare their activation patterns

대상 및 방법(Materials and methods): Event-related functional MRI of sensory system was performed on a 1.5T MR unit in six normal volunteers (men=6, mean age: 27 years). A single-shot GRE-EPI sequence (TR/TE/flip angle = 1000ms/50ms/90, FOV = 240 mm, matrix= 64x64, slice thickness/gap = 5mm/0mm, 7 axial slices) was used for fMRI. Cold and scrubbing stimulation of laying ice on right fingers and scrubbing four right fingers excluding thumb by rough nylon cloth were carried out. Two tasks consisted of 135 phases including 7 activation and 8 rest periods. Short cold and scrubbing stimulations were performed during 2 seconds and rest periods were 15 seconds. The model-driven correlation method of time courses with reference vector defined by a given paradigm was applied to all raw EPI data. Reference vector was preprocessed by 4 secs-delay and Gaussian convolution. The threshold in p value for the activation sites was set to be 0.001. We evaluated the feasibility of event-related fMRI of sensory system using cold and scrubbing stimulations and their activation patterns were compared.

결과(Results): Event-related functional MRI using cold and scrubbing stimulation showed the successful activation of large left somatosensory cortices in all volunteers. Two different stimulations did not show large spatial differences in the activation sites, but their activation extents was found to be variable (cold>scrubbing: 3, scrubbing>cold: 3). Also, supplementary motor areas and cingulate gyri were activated in two different stimulations.

결론(Conclusions): Our results showed event-related functional MRI may be feasible for detecting the sensory system and suggest two senses of touch and coldness may be controlled by nearly similar somatosensory areas.