Imaging Dysfunctional Hyperemia in Ischemic Stroke Patients

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Background

- Functional hyperemia causes an increase in regional cerebral blood flow (rCBF) in relation to neural activity
- This process is altered in neurological disease
- Imaging functional hyperemia may contribute to early identification of vascular disease

Theory

- Blood oxygen level-dependent (BOLD) MRI measures in part rCBF and is used to observe the hemodynamic response to event-related stimuli
- Exploratory pattern recognition algorithms are used to find responding voxels in the BOLD image series
- Voxels having correlated time signals are clustered, and the contiguous clusters in physiologically relevant areas are analysed

Methods

- Enrolled 3 normal subjects and 4 ischemic stroke patients (9 normal scans, 11 stroke scans)
- Acquired 1.5 Tesla BOLD image series during event-related task
- Visual stimuli were synchronised and physical responses were recorded

Results

- Aggregate results are shown for normals, and stroke patients’ non-paretic and paretic hands
- Images of responding voxel-maps and BOLD event-response signals are shown

Conclusion

- Stroke responses do not follow linear correlative models
- The results demonstrate the potential of the method to monitor the state of functional hyperemia during stroke recovery trials

Brief References:


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