

Functional MRI assessment of hemispheric specialization and mapping language in epileptic patients

The assessment of the hemispheric predominance for language and mapping eloquent regions are necessary in some categories of patients, such as patients with focal and drug-resistant epilepsy. This information is useful in order (a) to avoid post-surgical sequels such as aphasia and (b) to detect patterns of language reorganization (plasticity) with respect to healthy subjects. Functional MRI is a method of choice to ask these questions.

On this purpose, we realized several fMRI studies in epileptic patients compared to healthy subjects. The quantification of the hemispheric predominance was performed by using an original approach, the “flip method”. The advantages of this method are discussed with respect to more classical methods used on this purpose.

Several phonological and semantic tasks and paradigms were used for mapping language operations and determining patterns of the possible cerebral reorganization (plasticity) of language in epileptic patients with respect to controls. Furthermore, the influence of some factors (i.e. age of seizures onset, associated hippocampal sclerosis) on language plasticity has been assessed and the results are discussed in this presentation. Overall, statistical analyses show significant differences between patients and controls in terms of cerebral representation of language and the reorganisation patterns detected in patients would be highly dependent on these factors.

Although fMRI became a robust method for assessing hemispheric dominance and mapping language in epileptic patients, we also discuss the limits of this method. New possible approaches for exploring the cerebral representation of language in these patients are presented.