

## **Can we rely upon fMRI to localize language and memory when planning epilepsy surgery? – No**

### **I.Blatt**

*Department of Neurology, Sheba Medical Center, Israel*

Epilepsy surgery success can be compromised by postoperative memory decline, particularly verbal memory decline after dominant temporal lobe resections. It is therefore essential to reliably evaluate memory functions pre-operatively, identify pre-surgical memory deficits and predict post-operative memory outcomes. Neuropsychological testing and intra-carotid amobarbital procedure are helpful, but have their shortcomings. Direct cortical stimulation is very helpful when necessary. fMRI is a promising non-invasive imaging procedure of brain activity, but has pitfalls and limitations. Memory-fMRI has is still not sufficiently reliable for pre-operative individual patient counseling and decision making. fMRI is not a direct measure of cortical neuronal activity, but an indirect tool which images the time course of BOLD signal changes, analyzing a vascular response of neuronal activity. Although several fMRI paradigms have been developed to assess memory functions, they are predictive of post-operative memory outcome at the group level, comparing groups of patients to groups of controls. To be clinically relevant memory fMRI needs to be predictive on a single-subject basis. Memory-fMRI paradigm development is challenging, and has not yet produced robust activation which can be reliable in single patients. Normal functioning patients may show poor memory fMRI activation. Post-surgical memory-fMRI changes have been observed without verbal memory function decreases. The reproducibility of memory-fMRI results has been assessed in Alzheimer`s disease but not in epilepsy patients. Other technical problems include tissue-air interfaces and draining veins in the mesial temporal regions that interfere with the BOLD signal. Memory-fMRI is still not ready to be relied upon when planning epilepsy surgery.