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Methoden und Klinische Ergebnisse funktioneller Neuronavigation im Bereich des sprachrelevanten Kortex

TECHNIQUES AND RESULTS OF FUNCTIONAL NEURONAVIGATION OF TUMORS ADJACENT TO LANGUAGE RELATED AREAS.

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Objective

To evaluate the relevance and clinical outcome of functional neuronavigation in surgery of tumors adjacent to the Broca's and Wernicke's area in general anesthesia.

Material and Methods

We used functional magnetic resonance tomography (fMRI) and magnetoencephalography (MEG) for localization of primary language areas in left and right handed patients. The functional data were co-registered with MR volume data sets and transferred to a Neuronavigation system. All patients were examined by MEG and in addition 35 patients were investigated by fMRI. All regions of risk were segmented for intraoperative visualization with a navigation microscope. We have operated on 82 patients with tumors around eloquent brain areas. Among these were 9 low grade astrocytomas, 42 high grade gliomas, 7 cavernomas, 14 benign tumors and 10 other lesions.

Results

A gross total resection could be achieved in 44 %, a subtotal resection in 39% and a biopsy was performed in 17%. No patient experienced a permanent deterioration of language, 3 patients had a transient aphasia due to postoperative edema. In 30 % fMRI alone could not contribute to reliable identification of language areas.

Conclusion

Language-MEG in combination with neuronavigation is a safe and reliable tool for surgery around language related cortex. This method has the potential to substitute the traditional used method of surgery in awake patients. However, fMRi alone is not sufficient for mapping eloquent cortex as also stated by recent publications (Roux et al.; Neurosurgery, 2003).