Reviewer's report

Title: MRI-negative PET-positive Temporal Lobe Epilepsy (TLE) and Mesial TLE differ with Quantitative MRI and PET: a case control study

Version: 1 Date: 1 February 2007

Reviewer: matti vapalahti

Reviewer's report:

The problem of MRI negative TLE is an important issue in the treatment of temporal epilepsy generally and in epilepsy surgery especially, many centres do not operate those patients at all. This epilepsy surgery group has been doing research with MRI-PET+ patients prospectively using (18F)FDG PET, operating and following-up. With temporal hypometabolia the finding was often lateral temporal focus, why operation in half of the patients spared the HC (without a strict protocol), however with equal outcome (Carne et al, Brain 2004). In a study on 26 surgical TLE cases postoperative MRI was correlated to praeoperative FDG-PET to find the maximal hypometabolic area and the resected volume was measured. The extent of resection predicted the outcome p=0.02 (Vinton et al Brain 2007). In third paper the authors compared the FDG-PET patterns of TLE patients with and without HS using statistical parametric mapping of MRI that seemed to be better than visual analyses; in patients with HS hypometabolism was more mesial and without HS mainly lateral supporting the first study (Carne et al, Mol Imaging Biol, 2007).

In present metodological study the authors try to improve the analyses of differences in cerebral cortical volumes in MRI and regional hypometabolism in FDG-PET with hypothesis, that the ep focus is in HS-ve patients more lateral compared to clear mesial focus of HS+ve pat. The patients are the same cohort as in earlier study (Brain 2004) but the method here was to use a detailed quantitative assessment of MRI and PET scans instead of visual analyses. A three-dimensional volume acquisition sequence was used in semi automated segment data protocol. Co-registration of MRI and FDG-PET was performed using a surface matching technique. The cerebral volumes were marginally smaller ipsilateral to ep side on both groups. Relative volume deficits were seen in HS+ve group in insular and temporal lobe and hypometabolism was marked (p<0.001) in temporal cortex in both groups. Mean hypointensity was more marked in epileptogenic-to-contralateral HC in HS+ve group. The results show a structural and functional difference between these groups of TLE and according to authors support the theory of two different syndromes. The aetiology is unclear, there is no structural histopathology available and authors suggest a different timing of possible early insult. Clinical consequences were not the goal of the research here, and are not discussed; should patients be operated at all, should resection be large, follow the hypometabolic area, exclude the HC are the possibilities. The follow-up of present operated series may give one answer. This has been laborious work, with a clear protocol, what has been followed strictly. The answers are not yet clinical, and have been given carefully.

I have no Major Compulsory Revisions

The 4 figures and 7 tables are clear

no discretionary revisions

What next?: Accept without revision

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interest