SUMMARY

Background: Mesial temporal lobe epilepsy (MTLE) is the most surgically amenable epilepsy diagnosis and the results of epilepsy surgery are clearly superior to prolonged medical therapy. Stereotactic radiofrequency amygdalohippocampectomy (SAHE) is an alternative therapy of MTLE to the open neurosurgery approaches. In our hospital SAHE has been used since 2004. We produced lesions from the occipital access with a single trajectory in the long axis of amygdalohippocampal complex (AHK) using the probe with a flexible active tip. The aim of this study was to correlate the morphological changes after different neurosurgical approaches including volume reduction of the target structures / the hippocampus, the amygdala, entorhinal (EC) and perirhinal (PRC) cortices/ with the clinical seizure outcome.

Methods: We included 26 consecutive patients, who underwent SAHE using Leksell stereotactic system and 10 patients treated by microsurgical amygdalohippocampectomy (AHE). MR volumetry of hippocampus, amygdale, EC and PRC was performed 1 year after the procedure. The clinical outcome was assessed 2 years after the procedure according to Engel's Classification.

Results: No serious adverse events occurred after both procedures. One year after SAHE, the hippocampal volume decreased by 55.5 ± 18.0% ($p<10^{-4}$), the amygdalar volume decreased by 49.2 ± 16.8 % ($p<10^{-4}$), PRC volume decreased by 45.9 ± 16.7% ($p<10^{-12}$) and the size of EC decreased by 55.5 ± 19.6 % ($p<10^{-10}$). Clinically, in 2 patients after SAHE treatment failed and these 2 patients were re-operated and excluded from the second year of the clinical follow-up. Two years after SAHE, 24 patients were evaluated; 19 (79%) of them were classified as Class I and only 5 (21%) patients as Class II. In subjects, who underwent microsurgical AHE, 81.7±7.9% of the hippocampal volume and 48.4±29% of the amygdalar volume were surgically removed. Two years after the operation, 50% of subjects were classified as Class I, 30% as Class II, 10% as Class III and 10% as Class IV. No statistically significant relation of target structures volume reduction and of the clinical outcome was found.

Conclusions: According to our study, SAHE is a safe alternative method to microsurgical AHE for the treatment of MTLE. SAHE caused only partial destruction of the target structure, but the clinical seizure outcome is very promising, two years after the procedure is comparable with classical surgical approaches.We have not found any significant relation between morphological changes and clinical outcome. According to our data, it seems that the

attempt to make (stereotactic) MTLE surgery as radical as technically possible must not be tenable. We believe that our results support the theory of a neural network, but the network, which any part are not equally importance. We believe that the hippocampus, the amygdala and EC are the most important part of the network in TLE and it is necessary to interrupt connections between these three parts.