PET IN PATIENTS WITH REFRACTORY TEMPORAL LOBE EPILEPSY – CONTRIBUTION TO SURGERY DECISION-MAKING

Dr sc Sunčana Divošević, MD

Medikol Outpatient Clinic, PET/CT Centre, Zagreb, Croatia

Temporal lobe epilepsy is the commonest form of medically refractory epilepsy in adults, in whom surgery treatment is superior to prolonged and ineffective drug therapy. For reliable diagnostics, it is advisible to consider altogether the results of different neuroimaging structural and functional studies.

^{18}F FDG PET shows regional brain glucose hypometabolism ipsilaterally to the seizure focus, and hypometabolic region is usually larger than the structural pathologic abnormality on MRI, because of the dysfunctional neural network.

PET is of paramount importance in MRI negative patients, and in the cases of incorcordant MRI and EEG results, because it localizes and lateralizes the epileptogenic region, thus improving the diagnostic accuracy and success of surgical treatment. With PET, beside visual analysis, we can evaluate glucose brain metabolism quantitatively, which enables objective assessment of the registered changes in glucose metabolism.

We have analyzed qualitatively and quantitatively regional brain glucose metabolism by ^{18}F FDG PET, and interconnection between changes in brain glucose metabolism and overall BDI, EEG localization of epileptogenic zone and brain MRI, in 73 patients with refractory temporal lobe epilepsy divided into two groups, with BDI<15, without clinically significant depressive symptoms, and those with BDI≥15, with pronounced symptoms. An exceptionally high level of correspondence between PET findings and EEG and MRI findings was perceived, with pathological PET in 90,1% of examinees with normal brain MRI findings, which is extremely important for surgery decision-making. A total of 30.1% of examinees had depressive symptoms. We have established the highest frequency of reduced glucose metabolism in temporal region. Examinees with depression have statistically significant lower values of brain glucose metabolism in the anterior and posterior medial temporal region, with right-left asymmetry and correlations between frontal and temporal regions, while examinees without depression show no correlation between those regions. Correlations between frontal and temporal regions were different depending on EEG localization of temporal focus, MRI findings and depressive symptoms.

By using ^{18}F FDG PET, we have established a clear correlation between individuals, mostly frontal and temporal regions, depending on diverse structural brain changes and localization of epileptogenic zone, as well as correlation with existence of depressive symptoms.

Considering the fact that in patients who are candidated for epilepsy surgery depression comorbidity significantly reduces the quality of life in postsurgical period, PET, regarding localization, size and intensity of regional cerebral glucose metabolism changes, contributes to early recognition, timely choice of optimal treatment, and prognosis of postoperative outcome and life quality in these patients.