

Abnormal findings of interictal ^{18}F -FDG PET-CT scan in children with refractory epilepsy: Case series and early institutional experience

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ABSTRACT

Introduction: Refractory or intractable epilepsy could be challenging to manage with precise underlying disease mechanism is not completely understood. Literatures and prior studies have described that basal ganglia-thalamic metabolism can also be affected in epilepsy cases. Area of reduced tracer uptake or hypometabolism on interictal fluorodeoxyglucose positron emission tomography-computed tomography (FDG PET-CT) may suggest the possibility of epileptic focus. Our centre started to offer FDG PET-CT services in September 2020 including paediatric nuclear neurology. Thus, we aimed to primarily describe abnormal findings observed on interictal FDG PET-CT scan done among the initial cohort of paediatric refractory epilepsy cases and secondly investigate any altered basal ganglia-thalamic metabolism as reflected by reduction in maximum standardised uptake value (SUVmax). **Materials and Methods:** Case series and retrospective review done for intractable epilepsy patients aged below 18 years old who had abnormal FDG PET-CT scan (October 2020 – January 2021). Brain protocol with image acquisition performed from vertex to skull base in all cases. Consensus reporting done by nuclear medicine physicians and paediatric neurologist. Demographic, clinical parameters, prior brain EEG/MRI and FDG PET-CT scan findings including SUVmax readings of bilateral thalamus and basal ganglia (BG) were compiled. Descriptive and statistical analysis were applied accordingly. **Results:** Study sample consisted of 13 patients (6 males; 7 females). Mean age was 8.77 (4 – 17) years. Semiology and duration of seizure varies according to patients. Abnormal EEG observed in all patients while indeterminate or abnormal MRI findings were noted in only 9 patients. FDG PET-CT revealed hypometabolism involving unilateral cerebral hemisphere in 9 patients (69%) while bilateral cerebral involvement seen in 4 patients (31%). Most common region affected with hypometabolism was the temporal lobe in 8 cases (62%). Cerebellum diaschisis seen in 2 patients. Average SUVmax readings for right thalamus, left thalamus, right BG, and left BG for patients with epileptogenic foci in bilateral cerebral hemisphere were lower compared to those with unilateral cerebral involvement but not statistically significant (5.65, 5.43, 7.68 and 7.48 vs. 8.32, 8.37, 11.32 and 10.96 respectively, $p > 0.05$). **Conclusion:** Among our early cohort of paediatric refractory epilepsy cases with abnormal interictal FDG PET-CT findings, majority had hypometabolism suggestive of epileptogenic foci involving unilateral cerebral hemisphere. Most common region affected was temporal lobe. Those with bilateral cerebral hemisphere involvement appeared to have altered basal ganglia-thalamic metabolism though not statistically significant. Future research recommended to validate these findings.