A magnetoencephalographic study of patients with Panayiotopoulos syndrome

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Background and Objective: Recently, a new type of benign childhood epilepsy with ictal vomiting and eye deviation as the main symptoms has been distinguished as early onset benign childhood occipital epilepsy or Panayiotopoulos syndrome (PS). Although PS usually accompanies occipital spike discharges, many cases show shift of the location, multiplication and propagation with aging. We report the results of a magnetoencephalographic study of patients with PS.

Methods: Thirteen PS patients with mean age 5 (3 to 14) years were studied. Magnetoencephlography (MEG) was done using whole-head 204-channel "Neuromag" with simultaneous EEG. The estimated locations of equivalent current dipoles (ECDs) of each peak of spike discharges were plotted on MRI images.

Results: Most patients (84.6%) showed ECD concentrations in the areas alongside parieto-occipital sulcus (8/13, 61.5%) or calcarine sulcus (4/13, 30.8%), except two in rolandic areas only. Despite Fp-O synchronization of spike discharges in EEG in five patients, no frontal locations of ECD were found. All five patients (all males) with sylvian seizures, who also showed ECD concentrations in rolandic areas, had relatively earlier age of onset (3-4 years) and higher seizure-frequency (mostly >10 times). The directions of each ECD were almost regular, except one, the oldest patient (14 years), showing irregular and dispersed ECDs alongside bilateral calcarine sulci. In one patient, who has had frequent momentary atonic seizures in addition to several sylvian seizures, ECD concentrations in bilateral rolandic areas were relatively broad.

Discussion and Conclusion: According to our results, occipital spikes in scalp EEG seem to be originating from the restricted cortical areas alongside parieto-occipital sulcus or calcarine sulcus. In addition, more patients (61.5%) showed ECD concentration in the areas alongside parieto-occipital sulcus. Therefore, it may be inappropriate to classify this clinical entity as occipital epilepsy. Five patients (38.5%) had both sylvian seizures and rolandic discharges, which were also confirmed in MEG. This evidence suggests that PS has a quite high affiliation with benign childhood epilepsy with centro-temporal spikes (BCECTS). One of these five patients was diagnosed as having atypical type of BCECTS by Aicardi. Although Panayiotopoulos proposed the concept of age-dependent diffuse cortical hyper-excitability, these results seem to suggest localized cortical hyper-excitability in the areas alongside major cortical sulci or fissures such as parieto-occipital sulcus or calcarine sulcus. However, the reason is unknown why those inter-ictal discharges from the areas alongside parieto-occipital sulcus or calcarine sulcus do not cause directly typical seizure phenomena, while rolandic discharges themselves cause sylvian seizures. Thus, occipital spikes in scalp EEG in PS seem to be originating from the restricted cortical areas alongside parieto-occipital sulcus or calcarine sulcus. It may be inappropriate to classify PS as pure occipital epilepsy.

References

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