

Spatiotemporal profiles of focal and generalised spikes in childhood absence epilepsy

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ABSTRACT The EEG in childhood absence epilepsy (CAE) may contain focal and generalised spike-wave discharges (SWDs) with focal, mainly frontal, "lead-in". The term "frontal absence" has been used to imply fast, secondary, 3-Hz generalisation from occult frontal foci with potential impact on clinical EEG interpretation and syndrome classification. The aim of this study was to investigate the relationship between focal and generalised SWDs. We studied five children with CAE and examined a sufficient number of focal ("interictal") and generalised SWDs in order to obtain reliable analysis. All generalised SWDs with focal lead-in were "decomposed" into their "pre-generalisation" focal and "generalised" constituents, which were studied separately. Two types of focal SWD ("interictal" and "pre-generalisation") and generalised SWD were visually clustered into groups, waveform-averaged, and plotted in the 2D-electrode space. Spatiotemporal analysis demonstrated a variety (mean: 4.2 per child; SD: 2.12) of mainly frontal and occipital locations for pre-generalisation focal SWDs with propagation along the longitudinal axis in either direction and across homologous sites. Interictal focal SWDs demonstrated similar spatiotemporal characteristics. In contrast, the topography and propagation patterns of the first generalised spike of the SWD showed less variability (mean: 2.5 per child; SD: 2.07), mainly involved the fronto-temporal/temporal areas, and correlated poorly (<10%) with that of the pre-generalisation focal SWD. Our findings suggest that the process of generalised epileptogenesis in genetic epilepsies with electrographic "frontal absences" is far more complex than that proposed by the model for occult frontal focus with fast secondary generalisation. (*Published with Supplemental data*)



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