

Research abstract for HFO workshop Freiburg 2016.

Ripples on Rolandic spikes: a marker of epilepsy severity

Nicole E.C. van Klink¹, Maryse A. van 't Klooster¹, Frans S.S. Leijten¹, Julia Jacobs², Kees P.J. Braun¹, Maeike Zijlmans^{1,3}

¹ Brain Center Rudolf Magnus, Dept. of Neurology & Neurosurgery, UMC Utrecht, The Netherlands

² Department of Neuropediatrics and Muscular Diseases, University of Freiburg, Germany

³ SEIN-Stichting Epilepsie Instellingen Nederland, Heemstede, The Netherlands

Rational: Children with Rolandic spikes may or may not have seizures, ranging from benign Rolandic epilepsy to severe, atypical Rolandic epilepsy. We investigated if ripples, between 80 and 250Hz, in surface EEG, can differentiate between different clinical phenotypes.

Methods: We analyzed surface EEG of children with Rolandic spikes without other EEG or MRI abnormalities. They were divided into four groups: 1) Rolandic spikes but no epilepsy, 2) Typical Rolandic epilepsy, 3) Symptomatic epilepsy, 4) Atypical childhood epilepsy with centrottemporal spikes. Ripples superimposed on spikes were marked in 10 minutes of EEG or at least 30 spikes. ROC curves were constructed to determine the predictive value of ripples and spikes for having epilepsy (groups 2 to 4) and for differentiating benign courses (groups 1 or 2) from others (group 3 or 4).

Results: Ripples were found in 13 out of 22 children. Children without epilepsy showed no ripples, except for one child with one ripple. Ripples were positively correlated with seizures ($r = 0.70$, $p < 0.001$), while spikes had a borderline significant correlation ($r = 0.43$, $p=0.05$). Presence of more than 2 ripples predicted having seizures (AUC 0.84), while spikes could predict this (AUC 0.53). More than 5 ripples predicted the difference between benign courses and others (AUC 0.91, sensitivity 63%, specificity 100%).

Discussion: Absence of ripples superimposed on Rolandic spikes predicts a benign clinical entity, while in presence of several ripples, the child is likely to have more seizures than classical Rolandic epilepsy, and pharmacologic treatment might be needed.