小波能量评价EEG的不同成分对癫痫发作预报的价值

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　　癫痫是一种严重危害人类健康的常见疾病，对癫痫发作进行预报具有重要的临床意义。通过对3例部分性继发全身性发作的癫痫病人在发作前最长约30 min的8导EEG进行小波分解，将EEG中的棘波、尖波成分与慢波成分分别突出到不同的尺度上，并计算相应尺度上这些成分的能量，考察这些不同成分在发作前的变化趋势。发现在发作前的若干分钟，8导EEG的慢波能量都有显著增大，而与棘波/尖波有关的快波能量基本上没有什么变化趋势，说明EEG慢波成分的增大对部分性继发全身性发作的预报具有重要价值，EEG的"慢波过大"可能是癫痫从发作间状态转变为发作的重要因素。

THE ROLES OF DIFFERENT COMPONENTS OF EEGS FOR SEIZURE PREDICTION —WAVELET ENERGY EVALUATION

　　Epilepsy, a chronic disorder of the nervous system affecting 1% of the population, is characterized by the abnormal synchronized firing of a large number of neurons. Alerting a patient and/or his attending staff to an impending epileptic seizure has obvious clinical importance. A lot of attempts at epileptic prediction have been made, some based on sharp-transient detection and some tracked changes in background activity.

　　Wavelet transform was applied to 8 channel scalp EEGs recording from 3 epileptic patients of partial seizures secondarily generalized seizures. The data were sampled a couple of minutes or tens of minutes prior to the seizure onset. For each record and channel, the data was decomposed at 7 scales. Spike/sharp and slow wave components of EEGs can be highlighted at different scales. Energy of the spike/sharp and slow wave components was calculated from detail signal at different scales, respectively. Result: The energy of slow waves increased among 8 channels ahead of seizure onset several minutes in all the 3 patients, but the energy of spike/sharp components had no trends. Conclusion: Slow wave components of EEGs are well suited for seizure prediction in partial type secondarily generalized seizures. High-amplitude slow waves of EEGs may be an important factor for seizure transition.

关键词

癫痫(Epilepsy)；发作(Seizure)；预报(Prediction)；EEG；小波变换(Wavelet transform)