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局灶性脑缺血损伤无创检测中EEG近似熵研究

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　　局灶性脑缺血的早期无创诊断在临床实际中有着非常重要的意义。采用SD(Sparague-Dawley)大鼠建立了局灶性脑缺血的动物实验模型，记录了缺血前后缺血区域和正常区域的脑电信号EEG。由于近似熵复杂度算法所需时间序列长度较短，大大减少了脑电信号非平稳所带来的困难，且无需粗粒化，采用近似熵对局灶性缺血动物实验模型的脑电信号的复杂度进行了分析。结果发现缺血前后缺血与非缺血区域的近似熵均有着易于区分的特征，因此EEG信号的近似熵分析可以用于对局灶性缺血的脑损伤程度进行诊断，并区分损伤区域和非损伤区域，有望在临床中加以应用。

APPROXIMATE ENTROPY ANALYSIS IN THE STUDY OF NONINVASIVELY DETECTING FOCAL ISCHEMIC CEREBRAL INJURY

　　The early noninvasively detection of focal ischemia cerebral injury is significant for the clinic. An experimental model of focal ischemia cerebral injury for SD(Sparague-Dawley) rat is presented. EEG signals of ischemic region and normal region are recorded during the ischemia. The approximate entropy (ApEn) analysis of EEG signal of focal ischemia cerebral injury is studied. As the algorithm of ApEn can be used for short time series so that some difficulties owing to the signal nonstationarity could be overcome. In addition, no coarse graining preprocessing is needed. Results show that the ApEn of EEG can be clearly distinguished. Therefore the ApEn analysis of EEG signal can be used to detect both the extent and location of focal ishcemic cerebral injury.

关键词

　　局灶性缺血(Focal ischemia)；脑损伤(Cerebral injury)；脑电图(EEG)；复杂度(Complexity)；近似熵(Approximate entropy)