

健康早产儿24小时脑电图的定量评价

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早产儿的生物学行为主要以睡眠为主,因此了解各个睡眠阶段的脑电图模型,对临床客观评价早产儿的大脑发育特点及健康状况具有重要的临床意义。本文旨在探讨健康早产儿不同睡眠阶段脑电图特点,进而为其睡眠阶段的自动判定提供标准。应用多导生理记录仪对24例健康早产儿进行了41次Fp1-C3双电极连续24小时脑电图记录,同时用两台摄像机同步记录眼球运动及肢体运动。依据呼吸、眼球及肢体运动视觉判定睡眠阶段。应用自回归分析系统对脑电图记录的最适赤池信息量准则(Min-AIC)、总功率(TP)、 δ 功率(δP)、 θ 功率(θP)、 α 功率(αP)、 β 功率(βP)及不连续性(Dis)进行分析。结果显示Min-AIC、TP、 δP 及Dis四个变量依睡眠阶段不同有显著性差异($p < 0.01$)。多变量判别分析亦显示联合这四个变量可对睡眠阶段进行判定。联合Min-AIC、TP、 δP 及Dis四个变量适于对胎龄大于30周的健康早产儿的睡眠阶段进行判定。

QUANTITATIVE EVALUATION OF 24-HOUR EEG IN HEALTHY PRETERM INFANTS

Since sleep is the major biological behavior of the preterm infants, the researches about preterm infants' sleep model are of important significance both in brain development and diagnostics. The aims of the present study were to find EEG parameters that appropriately represented the EEG in different sleep states and to find quantitative criteria for an automatic system of sleep-state classification in preterm infants. Continuous 24-hour EEG was performed in 24 normal preterm infants for whom 41 EEG records (Fp1-C3) were obtained. Based on respiratory activity, body movements and eye movements, the different sleep states were determined visually in 30 s epochs. Seven EEG parameters, Minimum Akaike Information Criterion (Min-AIC), total power (TP), component power (δ , θ , α and β), and the discontinuity were calculated by means of autoregressive and component analysis in 30 s epochs. The student's t test was performed independently for each parameter. The results showed that four of the seven parameters (Min-AIC, TP, δP and the discontinuity) showed significant differences in different sleep states ($p < 0.01$). The results of multi-variate discriminant analysis revealed that the combination of Min-AIC, TP, δP and the discontinuity of EEG defined the EEG sleep states well. The combination of Min-AIC, TP, δP and the discontinuity of EEG defined the EEG sleep states well and might be used to predict sleep state changes in preterm infants of conceptional ages of more than 30 weeks.

关键词

24小时脑电图(24-hour EEG); 早产儿(Preterm infants); 睡眠阶段(Sleep states)