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活体质子磁共振波谱观察戊四氮慢性致癫痫大鼠海马损伤

In vivo ^{1}H magnetic resonance spectroscopic observation of hippocampal injury subjected to chronic administration of pentylenetetrazol in rats

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中文摘要:

目的 观察戊四氮(PTZ)慢性致癫痫过程中大鼠海马代谢的变化及其与癫痫行为学表现之间的相关性。方法 30只雄性SD大鼠随机分为模型组(*n*=20)与对照组(*n*=10),模型组每48 h腹腔注射一次PTZ(35 mg/kg体质量),对照组每48 h腹腔注射一次生理盐水(5 ml/kg体质量),共14次。对每次注射后模型大鼠的抽搐行为进行评分。在PTZ第7次给药(2周)后隔日及第14次给药(4周)后第7天进行海马质子磁共振波谱采集,对模型组大鼠两次采集所测得的NAA/tCr值以及对照组大鼠与模型组大鼠的NAA/tCr值进行统计分析,并对行为评分与NAA/tCr值进行相关性分析。实验结束后对海马取材,进行HE染色。结果 PTZ给药2周模型组大鼠与对照组相比无明显变化。给药4周后,模型组大鼠海马NAA/tCr值较对照组大鼠明显降低,大鼠海马CA1区出现明显神经元损伤。模型组大鼠的总发作级数和≥3的发作次数均与给药4周后海马NAA/tCr值呈明显负相关。结论 海马可能是PTZ致癫痫重要部位,其损伤可能与抽搐行为反应强度相关。

英文摘要:

Objective To investigate metabolic changes in the hippocampus of rats subjected to chronic administration of pentylenetetrazol (PTZ), and to find whether there is correlation between hippocampal metabolic changes and PTZ-induced seizure activities. **Methods** SD rats were randomly divided into model group (*n*=20) and control group (*n*=10). PTZ 35 mg/kg and nomal saline 5 ml/kg were given into the rats of model group and control group every 48 h by intraperitoneal injection respectively. The model rats convulsant responses to each PTZ injection were scored. Localized in vivo ^{1}H spectra were acquired from the hippocampus on the next day of the 7th injection (2 weeks) and 7 days after the 14th injection (4 weeks). Hippocampal NAA/tCr ratio was measured, the statistical analysis about NAA/tCr ratios was made between the two results of the model rats, and between the model group and control group. The correlation analysis was made between the total seizure score and the NAA/tCr ratio at 4 weeks. The brain tissue was removed for HE staining at the end of the experiment. **Results** Compared with the controls, PTZ-injected animals showed little change of hippocampal NAA/tCr ratio at 2 weeks, but significantly reduced at 4 weeks. For the injected animals, the hippocampal NAA/tCr ratio measured at 4 weeks correlated negatively with the sum of seizure scores obtained at 4 weeks of PTZ treatment. **Conclusion** Chronic PTZ administration can induce neuronal injuries and decrease NAA/tCr ratio in the hippocampus, the extent of which is influenced by the intensity of PTZ-induced seizures.

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