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3.0T MR DTI及^{1}H-MRS评价急性百草枯中毒中枢神经系统毒性

Evaluation of central nervous system damage of acute paraquat poisoning with 3.0T MR-DTI and ^{1}H-MRS

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中文摘要：

目的 利用磁共振弥散张量成像(DTI)及氢质子磁共振波谱(^{1}H-MRS)技术研究急性百草枯(PQ)中毒后的神经影像学改变。 **方法** 收集急性PQ中毒患者26例(病例组)及与其年龄、性别、职业相匹配的对照者26名(对照组),行MR T1WI、T2WI、DTI和^{1}H-MRS检查。DTI数据分析选择额叶、壳核、苍白球、尾状核头、黑质致密带、黑质网状带、红核、海马等兴趣区,采用配对*t*检验比较两组患者各兴趣区各向异性分数(FA)值和平均弥散系数(DCavg),Pearson相关分析法分析组间差异与血毒物浓度的关系。^{1}H-MRS选择基底节、海马、中脑、额叶4个兴趣区,分析主要代谢产物氮-乙酰天门冬氨酸(NAA)、胆碱复合物(Cho)、肌醇(MI)和脂质(Lip)与肌酸及磷酸肌酸(Cr)的比值变化。 **结果** 病例组黑质网状带DCavg值下降,与对照组差异有统计学意义($t=-2.52$,$P=0.03$),下降绝对值与血毒物浓度间无明显相关性($r=0.30$,$P=0.16$)。FA值组间差异无统计学意义。病例组基底节区的MI/Cr比值及海马区Lip/Cr比值较对照组增加($P=0.02$、0.03)。 **结论** 急性PQ中毒患者中枢神经系统^{1}H-MRS和DTI参数的改变,可能反映PQ中毒后大脑的某些区域处于轻度的水肿状态,微观代谢也受到了一定程度的影响。

英文摘要：

Objective To explore the brain imaging changes of acute paraquat (PQ) poisoning with diffusion tensor imaging (DTI) and hydrogen proton magnetic resonance spectroscopy (^{1}H-MRS) at 3.0T MR system. **Methods** Twenty-six patients (patients group) with acute PQ poisoning and 26 age-, sex- matched controls (control group) were enrolled in this study. All the subjects were scanned with multiple sequences including T1WI, T2WI, DTI and ^{1}H-MRS. Regions of interest (ROI) were set at frontal lobe, putamen, globus pallidus, head of caudate nucleus, substantia nigra compacta, substantia nigra par reticulate (SNr), red nucleus and hippocampus. The fractional anisotropy (FA) and average diffusion coefficient (DCavg) in both groups were compared with paired sample *t*-test. The relationship between different values of the two groups and blood poison concentration were analyzed with Pearson correlation analyses. ROIs of ^{1}H-MRS were set at basal ganglia, hippocampus, midbrain and frontal lobe. The ratios of four main metabolites to Cr were analyzed including NAA, Cho, MI and Lip. **Results** DCavg value decreased significantly at SNr ($t=-2.52$, $P=0.03$) in patient group compared with control group, which was not correlated with blood poison concentration ($r=0.30$, $P=0.16$). No significant difference of FA was found between both groups. Ratios of MI/Cr in the basal ganglia ($P=0.02$) and Lip/Cr in the hippocampus ($P=0.03$) were found significantly increasing in patients group. **Conclusion** The changes of DTI and ^{1}H-MRS parameters reflect that mild edema exist in certain brain areas, and the micro metabolism in brain changes after acute PQ poisoning.

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