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磁共振弥散张量成像定量分析复发-缓解型多发性硬化患者表现正常的脑干白质纤维束

Quantitative diffusion tensor imaging of normal-appearing white matter fiber tracts of the brainstem in patients with relapsing-remitting multiple sclerosis

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中文摘要:

目的 应用磁共振弥散张量成像(DTI)定量分析复发-缓解型多发性硬化(RRMS)患者表现正常的脑干白质纤维束的改变。方法 对50例RRMS患者(RRMS组)及25名年龄和性别相匹配的健康志愿者(对照组)行磁共振扫描,获取常规MR图像和DTI图像。比较两组脑干主要纤维束(皮质脊髓束/皮质脑桥束、小脑上、中、下脚纤维束和内侧丘系纤维束)的部分各向异性分数(FA)和平均弥散系数(MD)的变化。结果 排除年龄、性别等因素影响后,经ANCOVA协方差分析,RRMS组患者皮质脊髓束/皮质脑桥束(L: $P=0.030$;R: $P=0.020$)、小脑下脚(L: $P=0.030$;R: $P=0.037$)、小脑上脚(L: $P=0.036$;R: $P=0.041$)、内侧丘系(L: $P=0.014$;R: $P=0.035$)的FA值较对照组明显降低。RRMS组患者皮质脊髓束/皮质脑桥束(L: $P=0.004$;R: $P=0.046$)、小脑下脚(L: $P=0.047$;R: $P=0.011$)、小脑上脚(L: $P=0.021$;R: $P=0.011$)、内侧丘系(L: $P=0.002$;R: $P=0.044$)的MD值较对照组明显增高。小脑中脚的MD值及FA值两组间差异均无统计学意义($P>0.05$)。RRMS患者表现正常脑干白质纤维束的MD值及FA值与脑实质分数(BPF)、T2病灶容积之间均无相关性。结论 RRMS患者表现正常脑干白质纤维束DTI的异常发现,提示上述纤维束存在微观病变,推测病变可能是局部隐匿性病灶导致的髓鞘脱失、轴突破坏。

英文摘要:

Objective To assess the changes in normal-appearing white matter fiber tracts of the brainstem in patients with relapsing-remitting multiple sclerosis (RRMS) quantitatively with diffusion tensor imaging (DTI). **Methods** Fifty patients with RRMS were recruited, and twenty five healthy volunteers with the same gender and age were selected as controls. Conventional magnetic resonance imaging and DTI was performed. Quantitative indexes as fractional anisotropy (FA) and mean diffusivity (MD) values in the brainstem fiber tracts, including corticospinal tract/corticospinal tract (cpt/cst), superior cerebellar peduncle (scp), middle cerebellar peduncle (mcp), inferior cerebellar peduncle (icp), and medial lemniscus (ml) were measured and analyzed. **Results** In comparison with controls, decreasing FA values in cpt/cst (L: $P=0.030$; R: $P=0.020$), icp (L: $P=0.030$; R: $P=0.037$), scp (L: $P=0.036$; R: $P=0.041$) and ml (L: $P=0.014$; R: $P=0.035$), as well as increasing MD values in cpt/cst (L: $P=0.004$; R: $P=0.046$), icp (L: $P=0.047$; R: $P=0.011$), scp (L: $P=0.021$; R: $P=0.011$) and ml (L: $P=0.002$; R: $P=0.044$) were found in patients with RRMS. No significant difference of FA and MD values was found in mcp between patients with RRMS and controls ($P>0.05$). None of the MD or FA values in fiber tracts of the brainstem in patients with RRMS was correlated with brain parenchymal fraction (BPF) or T2 lesion volume. **Conclusion** The relevant abnormalities which were found in normal-appearing white matter fiber tracts of the brainstem in RRMS patients by DTI scanning suggested pathological changes. It is presumed that the changes may be due to demyelination caused by hiding lesions.

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