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不同回波时间氢质子磁共振波谱多体素技术检出多发性硬化病灶和看似正常脑白质区

Application of multivoxel ^1H -magnetic resonance spectroscopy with different echo times in lesions and normal-appearing white matter of multiple sclerosis

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作者	单位	E-mail
陈璇	重庆医科大学附属第一医院放射科,重庆 400016	
李咏梅	重庆医科大学附属第一医院放射科,重庆 400016	lymzhang70@yahoo.com.cn
欧阳羽	重庆医科大学附属第一医院放射科,重庆 400016	
吕发金	重庆医科大学附属第一医院放射科,重庆 400016	
曾春	重庆医科大学附属第一医院放射科,重庆 400016	
王忠平	重庆医科大学附属第一医院放射科,重庆 400016	

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中文摘要:

目的 探讨二维氢质子磁共振波谱(2D ^1H -MRS)中多体素长、短两种不同回波时间(TE)在检出多发性硬化(MS)各种病灶和看似正常脑白质(NAWM)方面的价值。方法 对50例复发-缓解型MS(RRMS)患者(MS组)和20名健康志愿者(对照组)行常规MR扫描,并采用多体素长、短TE ^1H -MRS分析,测定各感兴趣区代谢物氮-乙酰天门冬氨酸(NAA)、胆碱(Cho)、肌酸(Cr)、脂质(Lip)、乳酸(Lac)和肌醇(mi)的浓度,分析NAA/Cr、Cho/Cr、NAA/Cho、(Lac+Lip)/Cr和mi/Cr在病灶和NAWM区中的变化。结果 多体素长TE显示NAA/Cr、Cho/Cr、NAA/Cho在非强化病灶、强化病灶与对照组相应脑白质(WM)区比较差异均有统计学意义($P<0.01$),NAA/Cr、NAA/Cho在非强化病灶、强化病灶间差异无统计学意义($P>0.01$)。多体素短TE显示MS组NAA/Cr、Cho/Cr和(Lac+Lip)/Cr在强化病灶、非强化病灶、病灶对侧NAWM区与对照组相应WM区比较差异均有统计学意义($P<0.01$)。比较多体素长、短TE检测NAA/Cr和Cho/Cr无明显差别,但短TE能检测到病灶内的Lip、Lac及mi峰。结论 多体素长、短TE均能检测MS患者病灶及NAWM区的代谢异常,长TE能得到主要代谢物的波形,短TE能检测到更多代谢物,二者均可为MS的病理研究提供重要信息。

英文摘要:

Objective To explore the value of multivoxel two-dimensional proton magnetic resonance spectroscopy (2D ^1H -MRS) with long and short echo time (TE) sequences in the lesions and normal-appearing white matter (NAWM) of patients with multiple sclerosis (MS). **Methods** Both 50 patients with relapsing-remitting MS (RRMS) and 20 healthy volunteers underwent conventional MR as well as long TE and short TE sequences of multivoxel ^1H -MRS. The N-acetylaspartic acid (NAA), choline (Cho), creatine (Cr), lipid (Lip), lactic acid (Lac) and myo-inositol (mi) peaks were measured in each region of interest, and the changes of NAA/Cr, Cho/Cr, (Lip+Lac)/Cr and mi/Cr in the lesions and NAWM were analyzed. **Results** Long TE sequence showed that NAA/Cr, Cho/Cr and NAA/Cho were significantly different among the enhancing lesions, no enhancing lesions and the white matter (WM) of controls ($P<0.01$). NAA/Cr and NAA/Cho were not significant different between the enhancing and no enhancing lesions ($P>0.01$). Short TE sequence showed that NAA/Cr, Cho/Cr and (Lac+Lip)/Cr were significantly different among enhancing lesions, no enhancing lesions, NAWM of MS patients and WM of the controls ($P<0.01$). There was no significant difference in NAA/Cr and Cho/Cr of the lesions between long TE and short TE sequences ($P>0.01$), but short TE sequence was superior to detect the Lip, Lac and mi peaks. **Conclusion** Both long and short TE sequences can detect metabolic abnormalities in the lesions and NAWM of MS patients. Long TE can be used to detect the main metabolites, while short TE can detect more metabolites than long TE, both of them can provide important information for pathology of MS.

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地址:北京市海淀区北四环西路21号大猷楼502室 邮政编码:100190 电话:010-82547901/2/3 传真:010-82547903

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