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失神经骨骼肌修复的MR定量与肢体功能相关性分析

Correlation between MR quantitation in reinnervation muscle and functional recovery

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中文摘要:

目的 探讨兔急性失神经骨骼肌退变与修复的T2值-时间曲线变化与肢体功能恢复的关系。方法 对44只新西兰兔采用挤压右侧坐骨神经的方法建立腓肠肌退变及修复模型。于造模后不同时间段行双侧小腿(失神经侧、假手术侧)MR扫描,分别测量不同时间段失神经腓肠肌T2值及横截面积,观察展趾反射、Tarlov坐骨神经评分,并行病理学检查。结果 失神经侧腓肠肌T2值48h开始升高,48h至9周T2值与假手术侧差异有统计学意义($P < 0.05$),失神经侧腓肠肌T2值均高于假手术侧。T2值-时间曲线为逐渐上升-缓慢下降型。失神经侧后肢横截面积于术后1周开始缩小,6周萎缩最明显,7周逐渐恢复,10周后肢横截面积基本恢复正常。失神经侧腓肠肌T2值与同侧后肢功能评价指标之间呈负相关($r = -0.84, -0.48, P < 0.05$)。结论 定量测量失神经骨骼肌的T2值可预测肢体功能的变化趋势;随着T2值升高,肢体功能障碍加重,T2值开始缩短时,肢体功能逐渐恢复;动态测量T2值可作为早期、无创检测失神经骨骼肌退变及修复的客观指标。

英文摘要:

Objective To evaluate the correlation between the time course of T2 value in rabbit models of reinnervation muscle and functional recovery. **Methods** Acute denervated muscle models were created by crushing the right sciatic nerves in each of 44 rabbits. MR examination were performed at different time points. T2 relaxation time and circumference of the lower leg were measured; toe-extention reflex and Tarlov sciatic nerve function were evaluated. Histologic examinations were performed at regular intervals. **Results** The denervated gastrocnemius muscle showed slight hyperintense signals on T2 maps as early as 48 hours. There was significant difference between T2 value of the denervated gastrocnemius muscle and the sham-operated sides. T2 values were higher in denervated sides than in the sham-operated sides from 2 day to 9 week (all $P < 0.05$). The patterns of T2 value-time curve rose slowly and then reduced gradually. The circumference of denervated leg began to become slight smaller than that of the control leg seven days after surgery, reached a minimum at 6 week; began to increase at 7 week and recover to normal at 10 week. T2 values of gastrocnemius muscles were negatively correlated with the parameters of the functional evaluations ($r = -0.84, -0.48, P < 0.05$). **Conclusion** Dynamic T2 values measurement of denervated muscles can evaluate functional changes of the rabbits' leg. As T2 value gets higher, the damage degree of the leg gets more serious. While T2 value starts to reduce, the function of leg recover gradually. Dynamic T2 value measurement is a sensitive and reliable method to monitor the change of denervated muscles.

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