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基础研究

甲强龙、电针联合羊膜上皮细胞移植对脊髓损伤大鼠轴浆运输功能及GFAP表达的影响

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摘要：

目的：探讨甲强龙(MP)、电针与羊膜上皮细胞（AECs）联合治疗对脊髓损伤（SCI）大鼠轴浆运输功能的影响，为临床治疗脊髓损伤寻找一种更为有效的方法。 方法：将60只成年雌性Wistar大鼠随机分成5组，每组12只。脊髓损伤对照组：做脊髓损伤模型，不进行治疗；甲强龙组：脊髓损伤后，用大量甲强龙药物冲击治疗，共3d；甲强龙+电针组：在甲强龙治疗基础上，脊髓损伤后4h，行华佗夹脊穴电针治疗；甲强龙+电针+AECs组：在甲强龙+电针组基础上，脊髓损伤后第7天，在脊髓损伤处移植大鼠AECs联合治疗；假手术组：只打开椎板，暴露脊髓，不造成脊髓损伤。各组每隔6 d进行行为学观察（BBB评分），术后30d行荧光红(FR)顺行示踪和GFAP免疫荧光组织化学观察。 结果：BBB评分显示，脊髓损伤后经过治疗各组都有不同程度的后肢功能恢复，其中以甲强龙+电针+AECs组恢复最为明显，第30天，BBB评分可恢复到15.23±1.01。荧光红（FR）顺行示踪，甲强龙+电针+AECs组可见大量有序的FR阳性神经纤维，神经示踪剂能被运输到脊髓损伤区远侧端较远的距离；100倍荧光显微镜下观察，损伤区FR阳性神经纤维数为312.67±34.06，与其他治疗组比较差异有显著性(P＜0.01)；GFAP表达结果，各组GFAP阳性细胞较假手术组均明显增高，而甲强龙+电针+AECs组的表达量低于其他损伤组，200倍荧光显微镜下观察，损伤区GFAP阳性细胞数为633.61±54.4，与其他治疗组比较差异有显著性（P＜0.01）。 结论：甲强龙、电针与AECs联合治疗脊髓损伤能够有效地抑制星形胶质细胞的过度增生，恢复脊髓轴浆运输功能，促进神经纤维再生。

关键词： 甲强龙；电针；羊膜上皮细胞；轴浆运输；胶质纤维酸性蛋白

Effects of methylprednisolone,electro-acupuncture and amniotic epithelial cells transplantation on axon-plasma transporting function and expression of GFAP in spinal cord injury rats

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Abstract:

Objective

To explore the combined effect of methylprednisolone (MP),electro-acupuncture and amniotic epithelial cells (AECs) transplantation on axon-plasma transporting function in rats with spinal cord injury (SCI),and provide a more effective method to clinical therapy for SCI.Methods Sixty female Wistar rats were randomly divided into to 5 groups (n=12).SCI control group: no treatment after SCI was created.MP group: MP pulse treatment after SCI,for 3 d.MP and electro-acupuncture group: electro-acupuncture treatment on Hua Tuo Jiaji acupoint 4 h after SCI,based on MP group.MP,Electro-acupuncture and AECs group: rat AECs transplantation treatment in SCI region 7 d after SCI based on MP and electro-acupuncture group.Sham group: neural scute was opened and spinal cord was exposed without SCI.Ethological observation (BBB scores) was performed every 6 d.Fluorescein red (FR) anterograde tagging and GFAP immunofluorescence histochemistry observation were performed on the 30th day after operation.Results BBB scores revealed that functional recovery diversity of the hind limb was seen in every therapy group after SCI,and the MP,electro-acupuncture and AECs group was the best and the score was 15.23±1.01 on the 30th day.As revealed by FR anterograde tagging,MP,electro-acupuncture and AECs group contained numerous ordinary FR-positive axons,and neural labelled compound could be transported to the far distant area of SCI region distal end,the number of FR-positive axons of SCI region were 312.67±34.06 under fluorescence microscope（×100）,the differences between MP,electro-acupuncture and AECs group and other therapy groups were statistically significant（P＜0.01）.GFAP revealed that the quantity of GFAP positive astrocytes in each injured group was increased obviously than sham operation group and MP,electro-acupuncture and AECs group listed the least,the number of GFAP positive astrocytes of SCI region was 633.61±54.4

under fluorescence microscope（×200）,there were significant differences between MP,electro-acupuncture and AECs group and other therapy groups（P＜0.01）.Conclusion A combination of methylprednisolone,electro-acupuncture and AECs transplantation can restrain hyperplasy of horizontal cells,promote the recovery of axon-plasma transporting function and the regeneration of axons in SCI rats.

Keywords: methylprednisolone；electro-acupuncture；amniotic epithelial cells axon-plasma transporting；glial fibrillary acidic protein

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