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靶向微泡造影剂促进兔心肌梗死骨髓干细胞移植后血管新生及心肌力学改变

Targeted microbubbles in promoting angiogenesis and changes of myocardial mechanics after stem cell transplantation in rabbit models of acute myocardial infarction

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作者	单位	E-mail
曾倩倩	新疆医科大学第一附属医院超声医学中心, 新疆 乌鲁木齐 830011	
曹桂秋	新疆医科大学第五附属医院老年病科, 新疆 乌鲁木齐 830011	
穆玉明	新疆医科大学第一附属医院超声医学中心, 新疆 乌鲁木齐 830011	mym1234@126.com
唐琪	新疆医科大学第一附属医院超声医学中心, 新疆 乌鲁木齐 830011	
王春梅	新疆医科大学第一附属医院超声医学中心, 新疆 乌鲁木齐 830011	

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中文摘要:

目的 应用斑点追踪技术评价靶向微泡造影剂注射后兔心肌梗死区域骨髓干细胞移植疗效。方法 制备靶向微泡超声造影剂(携CD34单克隆抗体)。将36只新西兰大白兔随机分为对照组(单纯移植组)、普通造影剂组(移植+C组)及靶向造影剂组(移植+T组),分别于急性心肌梗死(AMI)前、AMI后3天、干细胞移植术后4周行心肌超声造影(MCE),采用彩色编码参数量化(PQ)技术对比各组干细胞移植前后梗死区域心肌灌注参数,同时对3组动物心肌梗死干细胞移植区域心肌的径向应变率(SrR)、圆周应变率(SrC)、旋转率(RotR)、收缩期S峰值及心肌扭转角度(Rot)进行斑点追踪分析,并于移植4周后检测血管密度。结果 干细胞移植后各心肌节段的A、 β 和 $A \times \beta$ 值均较本组内移植前改善,移植+T组改善最为明显($P < 0.05$)。各组左心室前壁的SrR、SrC、RotR及Rot均较本组内移植前增高($P < 0.01$),并与左心室射血分数相关。结论 靶向微泡造影剂对兔骨髓干细胞移植后微血管新生具有一定作用。

英文摘要:

Objective To assess the efficacy of bone marrow mesenchymal stem cells (BMSCs) being transplanted into rabbit models of acute myocardial infarction (AMI) after injected targeted microbubbles by two-dimensional ultrasound speckle-tracking imaging (STI). **Methods** CD34-targeted microbubbles were prepared. Thirty-six healthy rabbits were randomly and equally divided into three groups, i.e. control group (simply transplant group), common microbubbles group (Transplant +C) and CD34-targeted microbubbles group (Transplant +T). Then myocardial perfusion parameters of pre- and 3 days post-ligation and 4 weeks after stem cell transplantation were compared. Two-dimensional strain images were acquired from left ventricular (LV) short-axis view (at the levels of mitral annulus, muscle papillary and apex), and radial strain rate (SrR), circumference strain rate (SrC), rotation rate (RotR) and rotation (Rot) of three levels in short-axis views were measured by STI. Microvessel density was assessed at last. **Results** Compared to before stem cell transplantation, A, β and $A \times \beta$ values of Transplant+C and Transplant+T group increased, especially in transplant+T group (all $P < 0.05$). SrR, SrC, RotR and Rot of left ventricular anterior regional myocardial function of three levels in short-axis views increased (all $P < 0.01$) than before transplantation, and showed correlation with left ventricular ejection fraction. **Conclusion** Targeted microbubbles probably have certain value for angiogenesis after stem cell transplantation.

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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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