

[gw22-e0569]

OUTCOME OF TRANSPLANTED MESENCHYMAL STEM CELLS LABELLED WITH SUPERPARAMAGNETIC IRON OXIDE AFTER MYOCARDIAL INFARCTION IN SWINE

Yang Ke¹, Xiang Peng², Zhang Chengxi¹, Zou Liyuan¹, Wu Xiao¹, Gao Ya¹, Kang Zhuang¹, He Keke¹, Liu Jinlai¹ ¹The Third Affiliated Hospital Of Sun Yat-sen University, Guangzhou, China; ²Center For Stem Cell Biology And Tissue Engineering, Sun Yat-sen University, Guangzhou, China

10.1136/heartjn-2011-300867.207

Objectives To trace and evaluate intracoronary transplanted mesenchymal stem cells (MSCs) labelled with superparamagnetic iron oxide (SPIO) by using magnetic resonance imaging (MRI) in a swine model of myocardial infarction (MI).

Methods After isolated by density gradient centrifugation, autologous MSCs were transfected with green fluorescent protein (GFP) by lentiviral vector and labelled by superparamagnetic iron oxide (SPIO). Two weeks after MI, swine were randomised to intracoronary transplantation of dual-labelled MSCs (n=10), MSCs-GFP (n=10) and saline (n=5). MRI examination was performed with a 1.5T clinical scanner at 24 h, three weeks and eight weeks after cells transplantation. Signal intensity (SI) changes, cardiac function and MI size were measured using MRI. Correlation between MR findings and histomorphologic findings was also investigated.

Results It was demonstrated that when MSCs were labelled with SPIO (25 µg Fe/ml plus 0.8 µl/ml lipofectamine) the labeling efficiency reached 95%~100%, with no effects on GFP expression. Multipotentiality was not affected especially for cardiomyocyte-like cells differentiation. SI on T2*WI decreased substantially in the interventricular septum 24 h after injection of MSCs. Changes in SI at 24 h, three weeks and eight weeks were (52.98±10.74)%, (21.53±5.40)% and (6.23±2.01)%,

respectively ($p < 0.05$). Both dual-labelled and MSCs-GFP could dramatically reduce the size of MI and improve cardiac function. Histological data revealed that Prussian blue stain-positive cells were found mainly in the border zone which also showed green fluorescence but negative for macrophage marker (CD68). The number of iron-positive cells per HPF in the border zone and infarct zone were 36.2 ± 3.8 and 9.7 ± 2.1 , respectively ($p < 0.05$).

Conclusions In vivo long-term tracing of dual-labelled MSCs can be achieved by MRI. Intracoronary transplantation of dual-labelled MSCs can increase cardiac function and reduce the size of MI.