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THE EXPERIMENTAL STUDY OF PROTECTIVE EFFECTS OF ATRIAL NATRIURETIC PEPTIDE (ANP) INJECTION ON THE CULTURED HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS INJURED BY HYPOXIA-REOXYGENATION

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Objective To study the protective effects of Atrial Natriuretic Peptide (ANP) Injection on the cultured human umbilical vein endothelial cells injured by hypoxia-reoxygenation.

Methods Hypoxia-reoxygenation group (n=6): cells were cultured in the hypoxia box for 6 h, then reoxygenation for 6 h; 3. hypoxia-reoxygenation+different concentrations of ANP Group: 0.001 µg/ml (n=6); 0.005 µg/ml (n=6); 0.01 µg/ml (n=6); 0.05 µg/ml (n=6); 0.1 µg/ml (n=6), and also hypoxia cultured for 1 h and reoxygenation 6 h; the cells in the cell morphology were observed under inverted microscope, cell culture supernatant obtained in each group were measured {malondialdehyde (MDA), lactate dehydrogenase (LDH), nitric oxide (NO) and endothelin (ET) content, the final results of statistical analysis conducted.

Results The dehydrogenase (LDH) activity in hypoxia-reoxygenation group was significantly higher compared with the control group (69.35 ± 5.66 vs 31.04 ± 3.43 , $p < 0.01$); LDH activity in drug intervention group was significantly decreased compared with hypoxic reoxygenation ($p < 0.01$). MDA content in hypoxia-reoxygenation group was significantly higher

than that in the control group (5.94 ± 0.58 vs 1.69 ± 0.16 , $p < 0.01$), but MDA content in drug intervention group was significantly lower than that in hypoxia-reoxygenation group ($p < 0.01$), during the range of ANP concentration from $0.001 \mu\text{g/ml}$ to $0.05 \mu\text{g/ml}$, MDA content in the culture medium concentration showed negative correlation with ANP concentration in the ANP group ($p < 0.01$). Levels of intracellular SOD in hypoxia-reoxygenation group were significantly lower than that in the control group (15.74 ± 2.17 vs 47.08 ± 4.23 , $p < 0.01$) and was significantly higher in drug treatment group than in hypoxia-reoxygenation group ($p < 0.01$). When ANP concentration range from $0.001 \mu\text{g/ml}$ to $0.05 \mu\text{g/ml}$, each sub-group correlation analysis showed medium concentration of SOD content was positively correlated with ANP concentration in ANP intervention group ($p < 0.01$); Nitric oxide (NO) levels in cell culture medium in hypoxia group was significantly lower than that in the control group (36.81 ± 3.78 vs 89.78 ± 7.01 , $p < 0.01$), ET-1 content was significantly higher than that in the control group (1368.64 ± 99.07 vs 305.52 ± 35.30 , $p < 0.01$); Correlation analysis showed that: ANP concentration ranged from $0.001 \mu\text{g/ml}$ to $0.05 \mu\text{g/ml}$, in each sub-group of ANP intervention group, NO levels were positively correlated with ANP ($p < 0.01$), while the concentration of ET-1 concentration was negatively correlated with ANP concentration ($p < 0.01$).

Conclusion ANP could reduce the concentration of LDH and MDA content in the culture medium and increased human umbilical vein endothelial cell SOD content; ANP improved the content of NO and reduced the content of ET-1 after human umbilical vein endothelial cells undergoing hypoxia-reoxygenation injury, thus playing an important role in protecting the endothelial function.