



Protective effects of remifentanyl preconditioning on cerebral injury during pump-assisted coronary artery bypass graft

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ABSTRACT. The protective effects of remifentanyl preconditioning on serum superoxide dismutase (SOD) and malondialdehyde (MDA) during pump-assisted coronary artery bypass graft (CABG) were investigated. Forty pump-assisted CABG patients were randomly divided into a remifentanyl preconditioning group (R group) and a control group (C group, N = 10; normal saline). The R group was further divided into 3 sub-groups (R1, R2, and R3; N = 10 per group) according to the remifentanyl dose (0.6, 1.2, and 1.8 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, respectively). A venous blood sample was taken at anesthesia induction (T_0), before cardiopulmonary bypass (CPB) (T_1), CPB 30 min (T_2), and after CPB (T_3), and protein concentrations were measured. Patients were tested 24 h before and after the operation with the Mini-Mental State Examination (MMSE), and the difference was calculated. The MMSE score difference in the R3 group was lower than those of the other 3 groups ($P < 0.05$). At T_2 and T_3 , the R3 group showed a significant decrease in S-100 β protein and MDA and an increase in SOD ($P < 0.05$) compared with the other groups, and S-100 β was negatively correlated with SOD activity (T_2 : $r = -0.76$, -0.80 , $P < 0.01$; T_3 : $r = -0.795$, $P <$

0.01), and was positively correlated with MDA density (T_2 : $r = 0.71$, $P < 0.01$; T_3 : $r = 0.71$, $P < 0.01$). In conclusion, high-dosage remifentanil preconditioning played a protective role on brain damage, possibly through inhibition of the oxidative stress response.

Key words: Extracorporeal circulation; Coronary artery bypass graft; Superoxide dismutase; Malondialdehyde; Remifentanil