中南大学学报(医学版) 2010, 35(10) 1099- DOI: 10.3969/j.issn.1672-7347.2010. ISSN: 1672-7347 CN: 43-1427/R

论著

肢体缺血预处理对脂多糖诱导大鼠急性肺损伤的保护作用

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摘要：

目的：研究非创伤性肢体缺血预处理(non-wounded limb ischemic preconditioning，N-LIP)对脂多糖诱导大鼠急性肺损伤（acute lung injury, ALI）的保护作用。方法：将15只SD雌性大鼠随机分为对照组、急性肺损伤组（ALI组）、急性肺损伤+非创伤性双下肢缺血预处理组(ALI+N-LIP组)，检测N-LIP后ALI大鼠肺功能的变化、支气管肺泡灌洗液(bronchoalveolar lavage fluid，BALF)中白细胞数量和乳酸脱氢酶(lactate dehydrogenase，LDH)水平，血清中超氧化物歧化酶(superoxide dismutase，SOD)活性和丙二醛(malondialdehyd，MDA)含量，免疫组织化学方法检测肺组织内肺泡表面活性物质-A（pulmonary surfactant-associated protein A，SP-A）表达水平, HE染色观察肺组织病理改变。结果：乙酰甲胆碱（methacholine，Mch）激发后ALI+N-LIP组大鼠气道阻力(airway resistance，AR)的增高程度（P<0.01）、动态顺应性（dynamic compliance，Cdyn）的减弱程度(P<0.01)均明显小于ALI组； ALI+N-LIP组BALF中的白细胞数和LDH含量均明显小于ALI组(P<0.05)； ALI+N-LIP组血清中SOD活力高于ALI组(P<0.05)，MDA含量明显小于ALI组(P<0.05)；免疫组织化学显示：ALI+N-LIP组肺组织中SP-A含量最高，其次为对照组，ALI组肺组织内SP-A含量最低；肺部HE染色显示：ALI+N-LIP组损伤程度明显轻于ALI组，但较对照组要严重。结论：N-LIP对脂多糖诱导的ALI有保护作用，其作用机制可能与其促进SP-A表达和抗氧化作用有关。

关键词： 急性肺损伤 脂多糖 非创伤性肢体缺血预处理 肺保护 肺泡表面活性物质相关蛋白-A

Protective effect of limb ischemic preconditioning on acute lung injury induced by lipopolysaccharide in rats

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Abstract:

ObjectiveTo explore the protective effect of noninvasive limb ischemic preconditioning (N-LIP) on acute lung injury (ALT) induced by lipopolysaccharide (LPS) in rats. MethodsFifteen female SD rats were randomly divided into a control group, an acute lung injury group (ALI group), an acute lung injury and noninvasive limb ischemic preconditioning group (ALI+N-LIP group). After ALI rats were treated with N-LIP, the changes of airway resistance (AR) and dynamic compliance (Cdyn) were tested by invasive pulmonary function system and recorded. Blood samples and bronchoalveolar lavage fluid (BALF) were collected, the amounts of white blood cell (WBC) in BALF were counted by cytometry, and the level of lactate dehydrogenase (LDH) in BALF was also examined by automatic biochemistry analyzer. The level of serum superoxide dismutase (SOD) and malondialdehyd (MDA) was examined by chromatometry. The lung tissues were acquired to observe the expression of pulmonary surfactant-associated protein-A (SP-A) and pathological changes. ResultsAfter being stimulated by methacholine (Mch), the increasing rate of AR and decreasing rate of Cdyn in the ALI+N-LIP group were less than those in the ALI group (P<0.01). The levels of WBC and LDH in BALF in the ALI+N-LIP group were much lower than those in the ALI group (P<0.05). Meanwhile, the activity of serum SOD in the ALI+N-LIP group was higher, and the level of serum MDA was lower than that in the ALI group (P<0.05). The expression of SP-A in the lung tissue in the ALI+N-LIP group was the highest in the 3 groups, while that in the ALI group was the weakest (P<0.01). Injury of the lung tissue in the ALI+N-LIP group was less than that in the ALI group, but more severe than that in the control group.Conclusion N-LIP has protective effect on acute lung injury induced by LPS in rats. The possible mechanism is related to improving the secretion of SP-A and antioxidation.

Keywords: acute lung injury；lipopolysaccharide；noninvasive limb ischemic preconditioning；pulmonary protection；pulmonary surfactant-associated protein-A

收稿日期 2009-10-29 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1672-7347.2010.

基金项目:

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