Physical exercise partially prevents protein damage in rats submitted to lung injury, as well as increases antioxidant defenses in lung


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INTRODUCTION: Acute respiratory distress syndrome is characterized by a disturbance of the alveolar-capillary barrier, which results in fluid accumulation and gas exchange impairment. It is known that oxidative stress plays an important role in pulmonary injury. It is believed that physical exercise improves defense systems against reactive species and induces an adaptive response. The objective of the study was evaluate the effects of physical exercise on oxidative damage to protein and antioxidant defenses (superoxide dismutase, catalase, glutathione peroxidase, non-enzymatic antioxidant capacity, glutathione content) in lung of rats submitted to lung injury. The effect of physical exercise was also evaluated on the alterations in alveolar-capillary barrier (total cell count, lactate dehydrogenase and total protein) in bronchoalveolar lavage fluid (BALF) and on the inflammatory infiltration in pulmonary parenchyma.

MATERIALS AND METHODS: Wistar rats were submitted to two months of exercise and after this period, lung injury was induced by intratracheal instillation of lipopolysaccharide (dose of 100 µg/100 g body weight). Twelve hours after injury, animals were sacrificed and lung and BALF were collected.

RESULTS: Results showed an increase in oxidative damage to protein in lung of rats submitted to lung injury, and physical exercise partially prevented such effects. Superoxide dismutase and catalase were not changed in lung injury group, but the activities of these enzymes were increased in lung injury plus exercise group. Animals subjected to lung injury presented a decrease in non-enzymatic antioxidant capacity, glutathione content and glutathione peroxidase in lung that was totally prevented by exercise. It was also observed an increase in total cell, lactate dehydrogenase and total protein; exercise partially prevented only the increase in lactate dehydrogenase.

CONCLUSION: These findings show that physical exercise may partially prevent the oxidative damage caused by experimental lung injury, suggesting that exercise may have an important role as protector in this condition.

Keywords: Lung injury; Acute respiratory distress syndrome; Physical exercise; Oxidative stress.

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