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A SHORT OXYGEN EXPOSURE ENHANCES THE NEWBORN PULMONARY VASOCONSTRICTION RESPONSE IN MALE AND CAUSES THE OPPOSITE EFFECT IN FEMALE RATS

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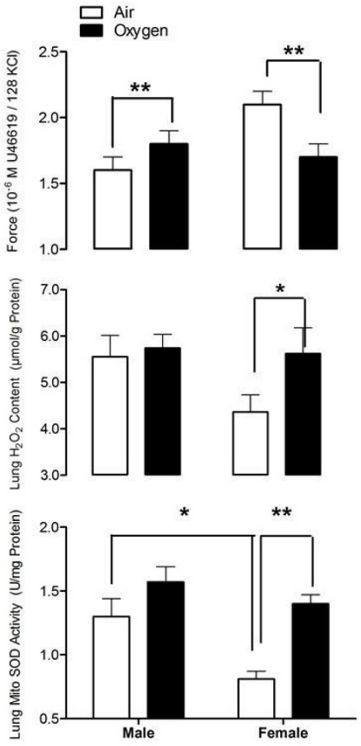
Background and aim: Supplemental oxygen is often used to resuscitate newborns. The aim of this study is to examine the effect of a short oxygen exposure (100% O_2 for 1 h) in male and female newborn (< 7 days) rat lung, since sex is one of determinant factors in the prognosis of neonatal diseases.

Methods: Lungs were retrieved for H_2O_2 content and superoxide dismutase (SOD) activity measurements, and the intrapulmonary arteries were dissected for isometric evaluation of thromboxane A_2 analog (U46619)-induced force normalized to KCl stimulation. Air-treated rats served as controls.

Results: Oxygen exposure enhanced contraction of male, but not female pulmonary arteries. Catalase, a H_2O_2 scavenger, abolished the force-difference in females. Tiron, a superoxide scavenger, eliminated the force-difference in males. The H_2O_2 content and SOD activities were significantly increased in the O_2-treated female, but not male lungs. A similar oxygen exposure had no effect on the contraction of older rats.

Conclusions: A short oxygen exposure in newborn, but not older rats induces reactive oxygen species generation that amount to a predominance of superoxide in males resulting in increased pulmonary arterial contraction. In contrast, the SOD activation in female lungs generates H_2O_2, resulting in reduced arterial contraction. This sex-difference may play a role in the increased morbidity/mortality of male newborn exposed to supplemental oxygen at birth.



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