

Surfactant and corticosteroid effects on lung function in a rat model of acute lung injury

方嘉郎

Chung-Ming Chen; Chia-Lang Fang; Chien-Hsi Chang

摘要

Abstract

Objectives: To evaluate pulmonary responses to intratracheal administration of surfactant with and without dexamethasone in rats with paraquat-induced lung injury. Design: Prospective, randomized, controlled study. Setting: University research facility. Subjects: Adult male Sprague Dawley rats. Interventions: Rats were anesthetized and underwent a tracheostomy and arterial catheter insertion 3 days after intraperitoneal injection of paraquat (35 mg/kg). The rats were ventilated for 90 mins after sequential designation as controls or as recipients of intratracheal surfactant alone (50 or 100 mg/kg) or surfactant (50 or 100 mg/kg) plus dexamethasone (0.5 mg/kg). Measurements and Main Results: Arterial blood gases were determined at 15, 30, 60, and 90 mins. After 90 mins of ventilation, a static pressure-volume curve was performed, and inflammatory cells, total protein content, and cytokines were measured in bronchoalveolar lavage fluid. Postmortem histology was then examined. Treatment with 50 mg/kg dexamethasone/Survanta and 100 mg/kg Survanta with and without dexamethasone significantly increased oxygenation shortly after instillation when compared with the control group, with the response maintained throughout the study period. Static pressure-volume curves showed that the group receiving 100 mg/kg dexamethasone/ Survanta had significantly higher lung volumes than the control group. Total cell, neutrophil, and macrophage counts were decreased significantly in the animals treated with 100 mg/kg dexamethasone/Survanta compared with untreated control rats. Total protein recovered from bronchoalveolar lavage fluid in the animals treated with 100 mg/kg Survanta with and without dexamethasone was decreased significantly compared with control animals. The histologic appearance of the lungs was markedly better in the groups treated with surfactant with or without dexamethasone. Conclusions: Results suggest that the combined administration of high doses of intratracheal surfactant and dexamethasone improves gas exchange, ameliorates lung inflammation, and alleviates lung damage after paraquat-induced lung injury. Surfactant alone and lower doses of surfactant plus dexamethasone had a lesser effect on these measures.