Abstract

Several experimental studies of pulmonary emphysema using animal models have been described in the literature. However, only a few of these studies have focused on the assessment of ergometric function as a non-invasive technique to validate the methodology used for induction of experimental emphysema. Additionally, functional assessments of emphysema are rarely correlated with morphological pulmonary abnormalities caused by induced emphysema. The present study aimed to evaluate the effects of elastase administered by tracheal puncture on pulmonary parenchyma and their corresponding functional impairment. This was evaluated by measuring exercise capacity in C57Bl/6 mice in order to establish a reproducible and safe methodology of inducing experimental emphysema. Thirty six mice underwent ergometric tests before and 28 days after elastase administration. Pancreatic porcine elastase solution was administered by tracheal puncture, which resulted in a significantly decreased exercise capacity, shown by a shorter distance run (-30.5%) and a lower mean velocity (-15%), as well as in failure to increase the elimination of carbon dioxide. The mean linear intercept increased significantly by 50% in tracheal elastase administration. In conclusion, application of elastase by tracheal function in C57Bl/6 induces emphysema, as validated by morphometric analyses, and resulted in a significantly lower exercise capacity, while resulting in a low mortality rate.

Keywords

Pulmonary emphysema, Ergometric test, Porcine elastase, C57Bl/6.