Evaluation of the pathological effects of ozone exposure on a mouse model of allergic asthma and acute respiratory distress syndrome

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Ozone has a strong oxidation effect and has been used for disinfection and sterilization. Currently, frequent disinfection is carried out in medical institutions as an infection control against COVID-19. A regulatory concentration for ozone has been set for the attended environment, and residual ozone must be kept below 0.1 ppm. However, this safety standard is regulated based on healthy people, and the adverse effects of ozone on patients with respiratory disorders such as asthma and pneumonia have to be examined. Therefore, this study aimed to clarify the effect of 0.1 ppm ozone on the development of immune and inflammatory responses in a mouse model of allergic asthma and acute respiratory distress syndrome. The evaluations include pathological analysis of lung tissue, changes in the number of activated immune cells in hilar lymph nodes and bronchoalveolar lavage fluid, serum IgE levels and proinflammatory cytokines, and SpO₂ using pulse oximeter in each mouse model, divided into ozone exposure and control groups.

Our findings provide new information on the adverse effects of low concentration ozone on high-risk patients with a respiratory disorder, including asthma and pneumonia. It suggests that it may serve as a standard for indoor residual concentrations and leakage control measures in ozone disinfection.