

## Estimation of Respiratory Parameters in Pressure Controlled Ventilation System with Double Lungs on Secretion Clearance

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**Abstract :** A new mechanical ventilator with automatic secretion clearance function can improve the secretion clearance safely and efficiently. However, in recent modeling studies on various mechanical ventilators, it was considered that human had one lung, and the coupling effect of double lungs was never illustrated. In this paper, to expound the coupling effect of double lungs, a mathematical model of a ventilation system of a bi-level positive airway pressure (BiPAP) controlled ventilator with secretion clearance was set up. Moreover, an experimental study about the mechanical ventilation system of double lungs on BiPAP ventilator was conducted to verify the mathematical model. Finally, the coupling effect of double lungs of the mathematical ventilation was studied by simulation and orthogonal experimental design. This paper adds to previous studies and can be referred to optimization methods in medical researches.

**Keywords :** double lungs, coupling effect, secretion clearance, orthogonal experimental design

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