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Virtual Mechanical Ventilation Protocol - A Model-based Method to determine MV Settings

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Abstract

Intensive care mechanical ventilation (MV) therapy is a lifesaving intervention for a patient with respiratory failure. MV supports patients breathing by maintaining positive airway pressure and airflow to the lung. However, there is currently little clinical consensus protocol to set the best MV setting . Hence, it is important to provide an objective and patient-specific MV settings to support patient recovery. This study presents a model-based method to find optimal MV settings using clinical bedside data. A mathematical model of the respiratory system is first used to estimate patient-specific respiratory mechanics. These mechanics are then incorporated with significant clinical findings from the literature to simulate a series of MV settings . The simulation of MV settings is performed using the single compartment lung model using the MATLAB software. From this series of simulated MV settings , optimal MV settings can be determined objectively by the clinician. This model-based method potentially provides decision support for the clinician to set optimal MV settings .

Author keywords

Mechanical Ventilation Settings ; Model-based Methods; Respiratory Mechanics

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