



Variable Peak Pressure Ventilation

Invention: This invention is an improvement in the way of enhancing mechanical ventilation, termed variable peak pressure. In addition, an algorithm and software have been developed to convert a commercial ventilator from volume controlled ventilation to pressure controlled ventilation.

Introduction: Mechanical ventilators are used to provide life support for patients with respiratory failure. But over the long term, these machines can damage the lungs, causing them to collapse and the partial pressure of oxygen in the arteries to drop to abnormally low values. In conventional mechanical ventilation, the respiratory rate and volume of air inspired per breath are fixed, although during natural breathing these parameters vary appreciably.

The inventors have developed a novel ventilation control scheme that mimics the biological variability in breathing. This mode of ventilation provides variability in peak airway pressure such that the end-inspiratory pressure value is varied from inflation to deflation. The inventors have discovered that this mode of ventilation can increase recruited lung volume as much as 200% while utilizing less airway pressure. This method has the potential to lead to a vast improvement in blood oxygenation while avoiding the high pressures that have been shown to cause lung damage during long term ventilation.

Features and Benefits:

Preliminary data suggest the following benefits may occur using this method compared to conventional ventilation:

- Improved (lower) lung elastance – as a consequence respiratory muscle fatigue may be less of an issue so that earlier weaning of the patient from ventilation would be possible (cost effective)
- Short term improvement on blood oxygenation – As a consequence positive end-expiratory pressure may be lowered with decreased risk of barotraumas
- Long term benefits may include less shear stress on the alveolar walls and hence minimization of ventilation induced injury
- **Easily integrated into current infrastructure** - Algorithm and software have been developed to convert commercial ventilators already in place in hospitals and clinics

Intellectual Property: Utility Patent No. 6,907,881 Issued 6/21/2005

Publications: Life Support Systems Benefit from Noise. Suki B, et al Nature 393:127-128, 1998

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