

**Assessment of Regional Lung  
Ventilation by Electrical Impedance  
Tomography in Different Modes of  
Mechanical Ventilation**

*Thesis*

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# ABSTRACT

**Background:** the assessment of how different lung regions respond to therapeutic interventions over time is reduced to guess work. The Electrical Impedance Tomography, PulmoVista 500 lets you continuously and directly observe ventilation in different lung regions, facilitating the development of individualized therapy.

**Objectives:** Evaluation of regional lung ventilation by electrical impedance tomography in different lung pathologies undergoing mechanical ventilation and monitoring differences in regional lung ventilation during different modes of ventilation: assisted volume controlled, assisted pressure controlled and pressure support.

**Patient and method:** mechanically ventilated Patients were randomly connected on the following modes of mechanical ventilation as assisted volume and pressure control in initial/maintenance phase and three levels of pressure support (20cmH<sub>2</sub>O, 10cmH<sub>2</sub>O and 5cmH<sub>2</sub>O), then assess regional lung ventilation by EIT in ROI EELI change, then compare between A/VC and A/PC in ROI EELI change, and also compare between the 3 level of pressure support in ROI EELI change.

**Intervention:** no intervention.

**Results:** EELI changes in the Rt upper quadrant were significantly higher in A/VC than A/PC (mean  $\pm$  SD  $.97 \pm 3.79$  vs.  $-1.48 \pm 4.53$ ,  $p$  **.015**), while there were no statistically significant difference between both modes regarding other lung quadrants and EELI changes in the Rt lower quadrant and left lower quadrants were significantly higher using PS (15 cmH<sub>2</sub>O) than PS (20cmH<sub>2</sub>O) and PS (10cmH<sub>2</sub>O) (mean  $\pm$  SD  $1.68 \pm 1.93$  vs.  $1.15 \pm 3.91$  vs.  $-.88 \pm 4.41$ ,  $p$  **0.007**) (mean  $\pm$  SD  $1.35 \pm 1.90$  vs.  $.68 \pm 3.01$  vs.  $18 \pm 4.37$ ,  $p$  **< 0.001**) respectively.

**Conclusions:** Assisted volume control (A/VC) had better ventilation distribution in upper lung quadrants( ventral ) although assisted pressure control (A/PC) and pressure support PS (15 cmH<sub>2</sub>O) in lower lung quadrants(dorsal ).

**Key Words:** Regional lung ventilation, Electrical impedance tomography, Modes of Mechanical ventilation, Respiratory failure