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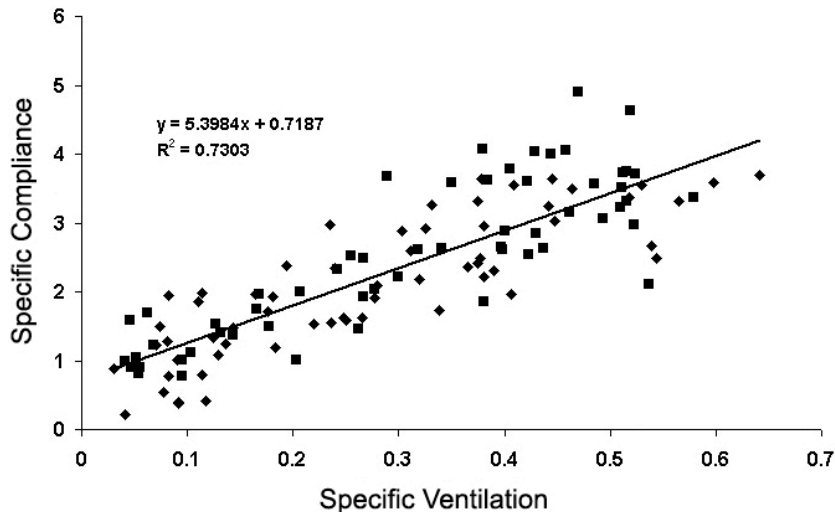
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Title: REGIONAL SPECIFIC COMPLIANCE AS A SURROGATE MEASURE FOR REGIONAL SPECIFIC VENTILATION IN SUPINE SHEEP.

M. K. Fuld, BS<sup>1</sup>, R. B. Easley, MD<sup>1</sup>, O. I. Saba, MS<sup>2</sup>, D. Chon, BS<sup>2</sup>, K. C. Beck, PhD<sup>2</sup>, E. A. Hoffman, PhD<sup>2</sup> and B. A. Simon, MD, PhD<sup>1,1</sup> Johns Hopkins Medical Institutions, Baltimore, Maryland and <sup>2</sup> University of Iowa, Iowa City, IA .

In order to fully understand the factors affecting ventilator induced lung injury we have developed CT imaging techniques for the non-invasive measurement of regional lung function. Regional lung specific compliance (sC) may be measured from the changes in tissue density (H) of lung regions with changes in inflation pressure ( $\Delta P$ ), using the relationship:  $sC = (1000 * (H_2 - H_1)) / (H_1 * (1000 + H_2) * \Delta P)$ . **Methods:** Anesthetized, intubated, supine mechanically ventilated sheep were imaged on a multi-slice CT scanner to obtain end-inspiratory and end-expiratory gated images. For comparison, end-expiratory Xe-CT image series were obtained and analyzed for regional specific ventilation (sV) using the Xe-CT method. Distinct anatomical markings were used to define corresponding lung regions of interest (ROI) between inspiratory, expiratory, and Xe-CT images, with an average ROI size of  $1.6 \pm 0.7$  ml. Changes in ROI density with tidal breathing were measured with the public domain program Image J and used to calculate sC. Corresponding regional Xe-CT sV was measured with TSIA software from the Univ. of Iowa. **Results:** A linear relationship between sC and sV was demonstrated over a wide range of regional sV found in the normal supine lung ( $R^2 = 0.73$ ). **Conclusions:** Regional sC, which involves significantly reduced exposure to radiation and Xe gas compared to the Xe-CT method, represents a safe and efficient surrogate for measuring regional ventilation in experimental studies and patients.



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