

**PULMONARY SPECT VOLUME MEASUREMENT: PHANTOM VALIDATION**

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Introduction: Single-photon emission computed tomography (SPECT) allows the quantitation of organ volume. The determination of lung volume from functional images could give quantitative information on lung function in pulmonary embolism and other diseases. Objective: The purpose of this study was to evaluate a tool for lung perfusion SPECT volume measurement using an automated algorithm (ImageJ macro). We performed SPECT studies on a phantom in order to compare the measured volumes with actual phantom volumes. Methods: The phantom study was conducted in the Department of Clinical Physiology of the Lund University Hospital on October 2010. Lung volume measurement was performed on a thorax phantom filled with 7867 ml of labelled cork (121.5MBq of Tc<sup>99m</sup>) simulating a normal lung distribution of radioactivity at appropriate density (32 g/dl). The same phantom was measured at baseline (normal) and while filled with 122.3 ml and 244.6 ml of non-radioactive cork (small and large segmental defects). Results: The threshold parameters that more precisely measured the phantom's volume were mean pixel value plus 1.0 standard deviation. The measured phantom volume was 7.802 ml (actual phantom volume was 7.867 ml). The measured phantom volume with a 122.5 ml defect in place was 7,680 ml (so the measured defect was 187 ml) and the measured phantom volume with a 245 ml defect in place was 7,559 ml (measured defect 308 ml). Conclusion: We found the best threshold level to detect lung edges on the phantom study and successfully measured lung perfusion defects as small as 125 ml. The scintigraphic improvement on pulmonary perfusion detected by subjective evaluation of SPECT images was also detected by the proposed threshold technique.