

## Quantitative study of the difference in pulmonary perfusion in different respiratory phases in healthy volunteers

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**Objective:** The purpose of this study is to investigate the physiological pulmonary perfusion pattern in different respiratory phases by calculating the normalized volume center of perfusion intensity. **Methods:** Four nonsmoking volunteers underwent single photon emission computed tomography (SPECT) of maximum inspiration and expiration after the injection of Tc-99m-MAA in each respiratory phase at a week's interval. Quantitative analysis by calculating the normalized volume center of perfusion intensity was performed. **Results:** Quantitative measurement of the normalized volume center of perfusion intensity showed that the percentage averages of ventrodorsal (Y) shift in maximum respiration were 16% (left) and 15% (right) in the upper part, 15% (left) and 14% (right) in the middle part, 17% (left) and 18% (right) in the lower part, 18% (left) and 16% (right) in each total lung. These readings indicated that the normalized center of pulmonary perfusion activity at maximum expiration moved in the ventral direction in contrast to that at maximum inspiration. In horizontal (X) and craniocaudal (Z) directions, the shift in the normalized center of pulmonary perfusion activity at maximum expiration indicated no agreement in movement direction. **Conclusion:** The normalized center of the pulmonary perfusion activity in maximum expiration moved in the ventral direction compared to that in maximum inspiration. This phenomenon might be caused by the increase in physiological intrathoracic pressure and by a definite reserve of pulmonary perfusion.

**Key words:** pulmonary perfusion, Tc-99m-MAA SPECT, quantitative measurement, respiratory phase