ORIGINAL ARTICLE

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Quantification of regional pulmonary flow with ^{99m}Tc-MAA SPECT and cine phase contrast MR imaging

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The purpose of this study was to evaluate the relationship between left and right pulmonary arterial flow measured by cine phase contrast magnetic resonance imaging (cine PCMRI) and the distribution of perfusion on ^{99m}Tc-MAA SPECT and to determine whether the regional pulmonary flow quantification was feasible with the combined use of these techniques. Twenty patients with different pulmonary diseases were evaluated. Left and right lung counts on ^{99m}Tc-MAA SPECT images were separately summed and the left-to-total count ratio was calculated. The left-to-total pulmonary flow ratio was calculated from the left and right main pulmonary flows measured with cine PCMRI. We evaluated the correlation and agreement between the ratio determined with ^{99m}Tc-MAA SPECT and cine PCMRI by linear regression analysis and Bland-Altman analysis. The left-to-total ratios obtained by ^{99m}Tc-MAA and cine PCMRI were 52.0 ± 22.1% and 52.2 ± 20.8%, respectively, and showed a strong correlation ($r = 0.99$, $p < 0.001$). The mean difference between the two methods in the ratio was 0.25 ± 2.3% with a 95% confidence interval from –0.84 to 1.34. The results showed that the regional pulmonary flow was calculated with both the left and right pulmonary flow measured with cine PCMRI and the ratio of regional distribution on ^{99m}Tc-MAA SPECT images.

Key words: ^{99m}Tc-MAA, SPECT, regional pulmonary flow, MRI