

Extravascular lung water measured with ^{99m}Tc -RBC and ^{99m}Tc -DTPA is increased in left-sided heart failure

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Extravascular lung water (EVLW) was quantitatively measured in 81 patients consisting of 10 subjects with normal cardiac function and 71 patients with left-sided heart diseases, using ^{99m}Tc -RBC as a non-diffusible indicator and ^{99m}Tc -DTPA as a diffusible indicator in the equilibrium phase. EVLW averaged 3.0 ± 1.4 (ml/kg, mean \pm SD) in subjects with normal cardiac function (n=10), 4.3 ± 1.7 in New York Heart Association functional class I patients (n=30), 4.8 ± 2.4 in NYHA functional class II patients (n=33) and 9.4 ± 5.4 in NYHA functional class III (n=8) patients. EVLW was greater in NYHA class III than in normal controls or NYHA classes I or II ($p < 0.01$).

Lung thermal volume (LTV) was also measured in 31 of the 81 patients using a double indicator dilution technique with sodium and heat. LTV averaged 6.0 ± 1.2 (ml/kg) in normal subjects (n=4), 8.6 ± 2.0 in NYHA functional class I patients (n=11), 9.7 ± 3.0 in NYHA functional class II patients (n=13), and 15.9 ± 8.2 in NYHA functional class III patients (n=3). The correlation between EVLW and LTV was significant ($\text{EVLW} = 0.79 \times \text{LTV} - 72.8$, $r = 0.80$, $p < 0.01$). There were significant differences in EVLW/LTV ratio between NYHA class III (0.93 ± 0.16) and NYHA class I (0.62 ± 0.22) or class II (0.60 ± 0.23). Thus, it was shown that EVLW was increased in left-sided heart failure and that LTV overestimated the EVLW.

Key words: extravascular lung water, lung thermal volume, RN-angiocardigraphy, ^{99m}Tc -RBC, ^{99m}Tc -DTPA