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±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 (EVLW=0.79×LTV-72.8, r=0.80, p<0.01). There were significant differences in EVLW/LTV ratio between NYHA class II (0.52±0.22) and NYHA class III (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-angiocardioigraphy, $^{99m}$Tc-RBC, $^{99m}$Tc-DTPA