

Relationship between regional severity of emphysema and coronary heart disease

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We analyzed the relationship between regional severity of emphysema, which was evaluated by three-dimensional fractal analysis (3D-FA) of Technegas SPECT images, and coronary heart disease (CHD). For 22 patients with emphysema who underwent Technegas SPECT, we followed up CHD events. The follow-up period was 5.4 ± 0.5 (mean \pm SD) years. We defined the upper-lung fractal dimension (U-FD) and lower-lung fractal dimension (L-FD) obtained with 3D-FA of Technegas SPECT images as the regional severity of emphysema. FD became greater with the progression of emphysematous change. During the follow-up period, CHD events occurred in 6 (27%) of the 22 patients. The ratio of U-FD to L-FD for patients with CHD events (0.87 ± 0.22) was significantly smaller than for patients without CHD events (1.52 ± 0.38) ($p = 0.0015$). These findings suggest that severer emphysema in the lower lung indicates a higher risk of CHD than that in the upper lung.

Key words: Technegas, fractal analysis, pulmonary emphysema, coronary heart disease, SPECT