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ANALYSIS OF PULMONARY CIRCULATION BY Tc-99m-HSA. K.Higashiya, K.Kuno, M.Nakagawa, K.Yamada, M.Mishima, H.Yasui, Y.Inamoto, and Y.Sagawa. Department of respiratory disease Tsukaguchi Hospital. Department of clinical physiology of lung, institute of chest disease, Kyoto University.

Assuming that pulmonary circulation is a single compartment system, we developed the method for calculation of its time constant (T_p) from PVDC which was acquired from 1st pass of RI-angiogram injected from cubitus vein. This time constant increased in COPD patient and had a good correlation with other data of pulmonary function tests. Then we assumed pulmonary circulation to be multi parallel transit tube system or multi parallel dilution system, and calculated the variance assuming them to be gamma distribution. This variance which is indicator of unevenness of pulmonary circulation, also increased in COPD patient. T_p had good correlation with this variance, and we reached the conclusion that unevenness of pulmonary circulation increase T_p .

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EVALUATION OF THALLIUM-201 ACCUMULATION IN THE LUNG FIELD. T.Fujii, J.Hirayama, S.Kusama, K.Yano and M.Takizawa. The 1st Dept. of Internal Medicine and Div. of Radiology, Shinshu University, Matsumoto.

In order to evaluate the visualization of the right ventricle and accumulation of Tl-201 in the lesion or lung field, Tl-201 scintigraphy was performed using a scintillation camera coupling to a small digital computer. The visualization of the right ventricular myocardium was shown in 83/206 (40.3%) with various lung diseases and 58/111 (52.2%) with various heart diseases. Positive accumulation of Tl-201 was shown in 14/16 (87.5%) with diffuse interstitial pneumonia, 2/3 (66.7%) with hypersensitivity pneumonitis and so on. Diffuse accumulation of it was observed in 61/111 (55.0%) with various heart diseases, that was related to the findings of left ventricular failure, pulmonary venous hypertension and peak to peak time between the right and left ventricle on the nuclide angiogram. In order to obtain the image of Tl-201 in the extravascular space, a subtraction technique was performed by subtracting the normalized image of Tl-201 in the intravascular space from the original one of Tl-201. This subtraction image was nearly equal to the original one as regard to the radioactivity of Tl-201 in the lung field. It was suggested that the grade of accumulation of Tl-201 in the lung field was correlated with the volume of the extravascular space.

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LUNG UPTAKE OF Tl-201 ON RESTING MYOCARDIAL IMAGING IN ASSESSMENT OF PULMONARY EDEMA. N.Tamaki, H.Maeda, Y.Yomekura, K.Yamamoto, T.Mukai, K.Minato, T.Fujita, H.Ito, Y.Ishii, and K.Torizuka. Dept. Radiology and Nuclear Medicine, Kyoto University Hospital, Kyoto.

Lung uptake of Tl-201 on resting myocardial imaging was examined in order to evaluate pulmonary edema. In 328 cases studied, increased lung uptake was observed in 117 cases (78%) with myocardial infarction, 32 (37%) with angina, 7(30%) with hypertrophic cardiomyopathy, 6(100%) with congestive cardiomyopathy, 11(100%) with valvular heart disease, and 7(71%) with congenital heart disease, however, only one of normal subjects revealed increased uptake. Left ventricular ejection fraction studied in 32 cases with ischemic heart disease was significantly decreased as the Tl lung uptake increased. This phenomenon seems to be one of the indices of left ventricular function. Lung uptake was well correlated with the degree of pulmonary congestive signs on chest X-ray, and relatively correlated with pulmonary wedge pressure. Therefore, this finding will demonstrate pulmonary interstitial edema, since Tl may be extracted to the increased interstitial distribution space of the lung. We obtained the extraction fraction ratio (E) and washout ratio (T_{1/2}) of the serial counts of Tl activity in the right lung. These indices were valuable to evaluate pulmonary edema in various cardiovascular disorders.

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ANALYSIS OF XE-133 VENTILATORY STUDIES. A.Ebina, T.Isawa, T.Teshima, T.Hirano and K.Konno. The Research Institute for Chest Diseases and Cancer, Tohoku University, Sendai.

In order to get a functional image of the lungs regarding regional clearance of inhaled radioactivity, the Xe-133 ventilation studies by single breath wash-in and wash-out with air were analyzed on 23 patients with various chest diseases. The wash-out curves were subjected to analysis between 10 and 130 sec after wash-out began. Three different clearance time indexes were calculated on overall and regional bases; real half time (T_{1/2R}), half time estimated from exponential curve fitting (T_{1/2exp}) and the area under the clearance curve divided by the difference in count-rate between 10 and 130 sec (T_{A,H}).

There was a statistically significant correlation between FEV_{1.0} and each of the three indexes calculated on overall bases (p<0.001). The correlation coefficients were 0.74, 0.82 and 0.81, respectively. There was also a good correlation between T_{1/2R} and T_{A,H} (r=0.96, p<0.001), but the correlation between T_{1/2R} and T_{1/2exp} was less good (r=0.88). It didn't appear justified, therefore, to use T_{1/2exp} instead of T_{1/2R}.

When a single matrix was selected out of 32 x 32 matrixes as a region of interest in the lungs, the wash-out curve in the single matrix usually fluctuated so much that it was difficult to get the genuine regional T_{1/2R}. However, it was not concluded yet at the present moment which of the two remaining indexes better reflected genuine regional clearance of inhaled radioactivity.