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THE EVALUATION OF REGIONAL PULMONARY BLOOD FLOW MOVEMENT USING Xe-133 PULMONARY VENTILATION SCINTIGRAMS.
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Xe-133 pulmonary ventilation scintigrams were used to estimate the regional pulmonary blood flow movement of 3 groups: (1) partial pulmonary artery obstruction and stenosis group (pulmonary tumor, aortitis); (2) coronary artery disease group; and (3) normal control group. The count for 2 minutes of washin from inhalation of Xe-133 gas, followed by the count for 8 minutes of wash out was measured in sequence over a period of time. This data was divided into four lung regions (left, right, upper and lower) and plotted on a time activity curve. The wash-out curve was divided into the beginning part first component and later part second component; the logarithmic function of the components were obtained; and the decision coefficient (r^2) and $Tl/2$ was derived. In regions of reduced pulmonary blood flow, r^2 value in second component was low. Part of the coronary artery disease group exhibited a high value for r^2 in the upper lung, suggestive of pulmonary blood flow redistribution. The second component thus participates in the regional pulmonary blood flow, and the decision coefficient can be considered to be useful as an objective evaluation of blood flow movement.

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CLINICAL EVALUATION OF AEROSOL SCINTIGRAPHY, ON VARIOUS PULMONARY DISEASES - COMPARISON WITH OTHER PULMONARY NUCLEAR STUDIES -
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We evaluated the clinical usefulness of the aerosol scintigraphy compared with other pulmonary nuclear studies. Materials are 62 cases of various pulmonary diseases. The aerosol scintigrams were roughly compared with other nuclear studies about the detectability of the abnormal findings. The aerosol study was superior to MAA image in 13 out of the 23 cases. In only one out of the 23 cases, MAA is superior to the aerosol study. This is a case of pulmonary fibrosis. In 11 out of the 27 cases the aerosol study was superior to the Kr study, and in 2 of the 27 cases the Kr study was superior. In one of the 4 cases, Xe-study was superior to the aerosol study. This case is a severe emphysema, whose aerosol shows a large inhalation defect and Xe wash out image shows marked retention of the activity. Aerosol study gives a physiological state of bronchiol opening during spontaneous breathing without effort. And the aerosol study has high detectability for COPD and chronic bronchitis as compared with other nuclear studies. However, it is difficult to differentiate between the COPD and chronic bronchitis for aerosol study.

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DETECTION OF THE ALVEOLAR EPITHELIAL DAMAGE IN PATIENTS WITH INTERSTITIAL LUNG DISEASE USING Tc-99m DTPA AEROSOL INHALATION
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We estimated alveolar epithelial permeability in patients with interstitial lung disease and assessed clinical significance of the method. Tc-99m DTPA aerosol was inhaled on normal breathing for 5 minutes. The anterior chest was imaged by gamma-camera sequentially for 25 minutes. The chest external counts were decreased linearly on semi-logarithmic scale. Clearance of Tc-99m DTPA from the alveolar lining layer was represented by a rate constant "kep" as a parameter for permeability. 1. The mean kep for healthy subjects was $8.7 \pm 2.0 \times 10^3 \text{ min}^{-1}$ (n=12), for idiopathic interstitial pneumonia 34.0 ± 7.8 (n=8), sarcoidosis 15.0 ± 5.7 (n=5) and other interstitial lung disease 33.0 ± 7.8 (n=4), respectively. 2. The high kep values were observed in the patients with idiopathic interstitial pneumonia who showed ground glass or reticulo-nodular shadows on chest x-ray or who were in the early stage of the disease. 3. A prospective study was performed in patients with radiation pneumonia, who showed the high kep values before the abnormalities were observed either in chest x-ray or Pao₂. This method may enable us to estimate disease activity of interstitial lung diseases in its early stage.

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STUDIES ON EXUDATION SCINTIGRAPHY OF LUNG.
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In the cases of acute respiratory failure, the diagnostic method of pulmonary edema which will be able to detect it more easily in earlier phase, has been needed clinically.

A computerized scintigraphic technique using Tc-99m-HSA had been reported at 23rd Annual Meeting of The Japanese Society of Nuclear Medicine.

The lung to heart ratio (L/H) was plotted vs time for about 60min. and the slope indexes of each lung fields were obtained. Furthermore, the functional image on L/H ratio of the whole lung field was displayed. The intensity and extension in a leak of fluid and protein of the lung should be displayed on the functional image of regional L/H ratio. And this technique will be an approach for calculation of an increase in the amount of extravascular lung water. As to the choice of scanning agent for this exudation scintigraphy, animal studies have been performed.