UNEVENNESS ON AEROSOL INHALATION LUNG IMAGES HAS NOT BEEN KNOWN AND PATIENTS SHOWING UNNEVENNESS PROPOSED BY US PREVIOUSLY HAS NOT BEEN KNOWN.

The purpose of the present study was to simplify our original method of radioaerosol inhalation lung cine-scintigraphy and its quantification to evaluate mucociliary clearance function of the lungs.

The original method of measuring radioactivity for 2hrs after inhalation of aerosol could be shortened to 1hr without sacrificing the cine-scintigraphic evaluation and the repeat measurement at 24hrs could be dispensed with; instead, the alveolar deposition ratio (ALDR) which was defined as the amount of aerosol in the lungs at 24hrs could be estimated by the multiple linear regression function ALDR = 47.03 + 0.44 x FEV1.0% + 0.59 x LRR60; here, FEV1.0% was forced expiratory volume in 1 sec divided by forced expiratory volume in percent and LRR60, the lung retention ratio (LRR) at 60min. This formula could be applied to both patients and normals with r = 0.813 (p<0.0001). In normals simply the amount of smoking with or without LRR60 could also give a good estimate of ALDR.

Once ALDR was derived, airway clearance efficiency and airway deposition and retention ratio could be easily calculated.

Thus the present revision seems to have facilitated a wider use of this method in clinical practice.

The purpose of this study was to evaluate the characteristics of the distribution of regional ventilation in the lungs. Xe gas was inhaled with a semi-equilibrium method and washed out with air. T1/2exp's and T(A/H)'s were calculated in the whole and regional lungs. We also calculated and ideal half time (rT1/2R) by dividing the real half time by the ideal half time to use as an index of unevenness of ventilation.

The distribution of the regional clearance indexes, T1/2exp's and T(A/H)'s, followed a log normal distribution (p<0.01). The geometric means of regional T1/2exp's and T(A/H)'s correlated well with those in the whole lung, respectively (r = 0.91 - 0.98, p<0.001). The geometric standard deviation had no correlation with lung function data and rT1/2R.

In conclusion, clearance indexes calculated in the whole lung would be the geometric mean of the regional clearance index. Geometric standard deviation of regional clearance index, would not be different between the normal subjects and the patients with various lung diseases or COPD. Decrease in ventilation seems to begin from the lung base and go toward the apex with the progress of the obstructive changes of the lungs.

A study on accuracy of $V/V$ distribution analysis of Xe-133 washout test.

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We had reported a new program of $V/V$ distribution analysis by Xe-133 washout test to the 22nd meeting of this society. It consists of a new counting unit, measuring of ventilation volume required to wash out 50% of Xe-133, VI/V2, presentation of $V/V$ distribution by histogram. This time, accuracy of this program was examined as follows.

1) Xe-133 washout curves of whole lung, right lung, left lung, upper, middle and lower region of the lung by ordinary method were compared with predicted washout curve that was the summation of exponential washout curves manifested as each counting unit. These were correspond eachother. This suggest the accuracy of counting unit of our program.

2) VI/V2/FRC were compared with L.C.I., a parameter of Nitrogen washout test. These correlation coefficient was 0.77. The value of VI/V2/FRC and L.C.I. was more than 4.5 and 14.0 respectively in patient with C.B., pneumoniaeosis etc, and less than 4.0 and 14.0 respectively in normal subject.