NUMERICAL EVALUATION OF AEROSOL DEPOSITION PATTERNS

"Unevenness" on aerosol inhalation lung images has been numerically evaluated. Pathological lung images range from peripheral to central patterns corresponding to chronic bronchitis and emphysema, respectively, but how these patterns are numerically expressed by the indexes of "unevenness" proposed by us previously has not been known. 9 normals, 7 patients showing peripheral and central patterns were selected. 15 indexes from averaged count profiles and 6 from shape were obtained for each subject. The mean and other basic statistical values were calculated for each index and a comparison was made between the 3 groups of subjects. The results obtained are shown in the following figure and table.

SIMPLIFICATION OF AEROSOL INHALATION LUNG CINE-SCINTIGRAPHY AND ITS QUANTIFICATION.

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 2 hrs after inhalation of aerosol could be shortened to 1 hr without sacrificing the cine-scintigraphic evaluation and the repeat measurement at 24 hrs could be dispensed with; instead, the alveolar deposition ratio (ALDR) which was defined as the amount of aerosol in the lungs at 24 hrs could be estimated by the multiple linear regression function ALDR = -47.03 + 0.44 \times FEV1.0% + 0.59 \times LRR60; here, FEV1.0% was forced expiratory volume in 1 sec divided by forced expiratory volume in per cent and LRR60, the lung retention ratio (LRR) at 60 min. This formula could be applied to both patients and normals with \( r = 0.813 \text{ (p<0.0001).} \) 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.