were increased compared with other three groups. However, it made little difference between them.

PGF2α-MUM levels in pulmonary tuberculosis were decreased markedly compared with other three groups (0.01 < p < 0.02).

4. There were significant correlation between plasma PGF2α levels and PGF2α-MUM levels (r = 0.65).

The Evaluation of the Index about the Ventilation Disturbance with the Xenon-133 Washout Process

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It is very difficult to make a differential diagnosis between the COPD and the normal lung with the chest-Xray and the ordinary spirometry, but it is easy to do it by detecting the delay of the Xenon-133 washout process.

We analysed the Xenon-133 washout curves, which were bi-exponential, comparing time constants and intercepts about each compartment in about fifty cases, but could not find out the significant difference between the COPD and the normal Lung, with regard to each parameter. As the Xenon-133 washout process by the ventilation, is affected with the respiratory rate, the height, the minute volume and the dead space, we analysed the washout curves, paying attention to those factors. Then we calculated 70% washout ventilation volume, 3 minutes clearance rate by the H/A method, TI/2 by the initial slope method, the ventilation index (φ = Vt/RFC), and the compartment analysis with the background subtraction by the least square curve fitting. We compared them with the functional images of the regional ventilation time constant distribution.

The best significant index was the ventilation index, which was calculated by the clearance rate of the initial slope method and the respiratroy rate. Significant differences (P < 0.01) between the COPD and the normal lung were found. The functional image of the regional ventilation was showed by the initial slope method. The good index next to the ventilation index was 3 minutes clearance rate by the H/A method, and it was very simple, but the H/A method masks the pathological delay of the Xenon-133 washout process by the background subtraction. This index was compared with the functional image by the H/A method.

The compartment analysis with the background subtraction by the least square method was very complicated but the parameters given by it had no significant confidecne.

Analysis of 133Xe Wash Out Curve

—Supposing the Curve as an Impulse Response of the Regional Pulmonary System—

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In order to grasp the physiological condition of the regional pulmonary ventilation, 133Xe wash out curve is obtained with a scintillation camera-Minicomputer on line System. To find out a good index, which represents the regional pulmonary ventilation system itself, the curve is analyzed and simulated as a transfer function of the tenth order IIR digital system,

\[ H(Z) = \frac{1}{1 + a_1 z^{-1} + \cdots + a_{10} z^{-10}} \]

We select the value, \(|a_1| = (|a_2| + |a_3| + |a_4|)\), as an index, which represents the regional