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CLASSIFICATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) BY Xe-133 FUNCTIONAL IMAGE. K.Kimura, T.Rikitake, T.Hasegawa, S.Hasegawa, M.Oshima, M.Akisada and M.Hosoba. Institute of Clinical Medicine, University of Tsukuba and Shimazu Seisakusho. Ibaraki-ken and Kyoto.

The steady state measurement with Xe-133, using Ventilcon and a large area scinticamera (Searle, LFOV) combined with computer (Shimazu, Scintipac 230) analysing technique has been employed to evaluate regional lung function of 43 patients with COPD and 40 patients with other lung diseases. The functional images of V, $\dot{V}$, $\dot{Q}$, MTT (mean transit time calculated from wash out curve for equilibrated gas in the steady state) and $\dot{V}/\dot{Q}$ have been made in each cases. Beside, the regional ratios of V, $\dot{V}$, $\dot{Q}$ and $\dot{V}/\dot{Q}$ indices were calculated for each lung fields divided into 6 zones (bilateral upper, middle and lower lung fields). The MTT calculated by the height over area method were markedly prolonged in the patients with COPD (m 128.3 sec.) compared with MTT of other patients (m 86.2 sec.). These parameters seemed to correlate with the data of FEV1.0%, RV/TLC, %TLC and PaO_2. The findings of regional emphysematous change in the chest roentgenogram seemed to have a relation with these parameters. On the basis of the clinical course, lung function data, chest roentgenogram and Xe-133 functional image, the 26 patients with COPD (FEV1.0% $\leq$55%) could be classified into 4 groups.

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EFFECT OF INTRAPULMONARY GAS DISTRIBUTION ON APPEARANCE OF THE PHASE IV IN CLOSING VOLUME CURVE. K.Kawakami,N.Katsuyama,S.Kubota, and T.Shimada. Department of Raiology and Department of Internal Medicine, Jikei University School of Medicine. Tokyo.

We aim to study the relationship between intrapulmonary distribution of the gas and appearance of the phase IV.

Method:Xe-133 gas was used as the tracer gas. After seven minites of rebreathing of Xe-133 gas in closed circuits, regional distribution of lung volume(LV) was measured at TLC level during 10 sec. of breath holding. Following this manuplation, the subject asked to inspire the air from RV level to TLC, and hold his breath during 10 sec. at the level. This represents the distribution of Xe-133 at RV level. The RVr /TLCr was calculated by a computer and longi tudinal distribution of the RVr/TLCr was displayed.

Results:In normal cases, the RVr/TLCr is higher in upper lung fields, minimum in middle lung fields (corresponding to the airway closure at RV level) and gradually increased toword lower lung fields, but never exceeds that in the upper fields. In the cases with no phase IV, the difference of Xe-133 density between upper and lower fields was small in high compliance cases, and higher in the lower lung fields in low compliance cases.

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REGINAL PULMONARY VENTILATION AND PERFUSION USING Kr-81m DURING ASTHMATIC ATTACK AND SUBSEQVENT RECOVERY. S.Ito,Y. Matsui,M. Sawaki,M.Kunimatsu,H.Kasuqa and S.Hamada. The 2nd Department of Internal Medicine and The Cancer Center of Nara Medical University . Kashiwara.

In 40 asthmatic subjects, the relationship between regional pulmonary ventilation and perfusion was investigated using Kr-81m which had a very short half-life of 13 seconds and could be produced in the gaseous form or in solution. 11 asthmatic subjects in attack were studied before and after inhalation of bronchodilator(salubutamol hemisulfate)and 29 asthmatic subjects in remission were studied before and after inhalation of acetylcholine. In both asthmatic attack and invoked attack by acetylcholine, areas of hypoventilation generally showed decreased perfusion but perfusion was less affected than ventilation . These relationships were also found in the course of recovery from attack. These findings support that perfusion abnormalities are secondary to ventilation abnormalities in asthmatic sbjects.

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STUDIES ON THE CHANGES OF REGIONAL VENTILATION BY INHALATION OF ANTIGENS AND/OR BRONCHOCONSTRICTIVE DRUGS IN ASTHMATIC PATIENTS USING KRYPTON-81M. O.Kitada, R.Shigemoto, K.Umegaki, A.Kishimoto, M.Sugita. Department of Internal Medicine, Hyogo College of Medicine. K.Tachibana, K.Hyodo, M.Fukuchi. Department of R.I.Center, Hyogo College of Medicine (Hyogo)

Pulmonary regional changes with asthmatic attack could be estimated as sequential images of Krypton. Krypton images obtained in patients with asthmatic attack were divided into two types; one showed mainly a regional defect pattern and another mainly spotted defect patterns. The differences in Krypton images did not depend on the differecne of bronchoconstrictive substances but of pulmonary function of subjects. In the cases revealing a regional defect pattern it was observed that $FEV_{1.0}$,FVC and MMF decreased greatly decreased but V_{25} decreased slightly. On the other hand, in cases revealing spotted defect patterns it was observed that V_{25} decreased greater than $FEV_{1.0}$ and MMF.