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A STUDY FOR THE PREDICTION OF POSTOPERATIVE RESPIRATORY FUNCTION AFTER PNEUMONECTOMY BY USING  $^{99m}\text{Tc}$ -MAA PERFUSION SCINTIGRAM AND  $^{133}\text{Xe}$  GAS VENTILATION SCINTIGRAM. T.Sasazawa, S.Katagiri and A.Koyama. The research Institute of Tuberculosis Hospital, Kiyose.

We measured each right and left distribution of respiratory function by  $^{99m}\text{Tc}$ -MAA perfusion scintigram and  $^{133}\text{Xe}$  gas ventilation scintigram to predict the postoperative respiratory function, and compared such predicted values with actual postoperative respiratory function (VC and  $\text{FEV}_{1.0}$ ). 36 patients who had received pneumonectomy for various diseases (12-lung cancer, 16-pyothorax, 5-pulmonary tuberculosis and 3-lung aspergillosis) were included in this study. The predicted postoperative respiratory function (VC and  $\text{FEV}_{1.0}$ ) was calculated from the spirometric respiratory function data and the count ratio of right and left lung obtained by both scintigrams. The values calculated as above for the healthy side of the lung were considered as the predicted postoperative values. Excellent correlation ( $r=0.9$ ) was observed between the predicted values obtained by perfusion with  $^{99m}\text{Tc}$ -MAA or ventilation with  $^{133}\text{Xe}$  gas scintigrams and actual postoperative values on either VC or  $\text{FEV}_{1.0}$ . There was no significant difference between the results obtained by perfusion and ventilation scintigrams. From these results, it was concluded that both  $^{99m}\text{Tc}$ -MAA perfusion scintigram and  $^{133}\text{Xe}$  gas ventilation scintigram were useful for the prediction of postoperative respiratory function.

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THE USEFULNESS OF AIRWAY HYPERREACTIVITY TEST BY ASTOGRAPH WITH CONTINUOUS Kr-81m INHALATION. M.Kawasaki, S.Shinohara, K.Ohno, H.Tsushima and J.Ohno. Mimihara General Hospital, Sakai. O.Kitada, K.Yamada, M.Yorifuji and M.Sugita. Hyogo Medical College, Amagasaki.

We tried to compare airway hyperreactivity test by Astograph with continuous Kr-81m inhalation with that by Astograph only. 29 bronchial asthma patients from 18 y.o. to 60 y.o., 3 volunteers and some chronic bronchitis patients were studied. We used Astograph TCK 6100H by CHEST co. and made inhalation test by methacholine from 0.049mg/ml to 25.0mg/ml, when Kr-81m inhalation were also performed. We tried to classify the patterns of Astograph curves in 3 types. We could see the unexpected changes of the ventilation by this method. This method was also thought very safe.

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STUDIES ON PULMONARY VENTILATION AND PERFUSION CHANGES DURING METHACHOLINE CHALLENGE TEST IN ASTHMATIC PATIENTS. O.Kitada, M.Yorifuji, K.Yamada, M.Sugita, M.Kawasaki, S.Shinohara, H.Thushima, K.Ono and J.Ono<sup>2)</sup>. 1) Hyogo College of Medicine, Nishinomiya. 2) Mimihara General Hospital, Sakai.

Kr-81m ventilation scintigrams and perfusion scintigrams with Tc-99m MAA were obtained during methacholine challenge test in adults with bronchial asthma. After inhalation of saline aerosol, the subjects were asked to inhale methacholine solution from the lowest concentration of 0.049 mg/ml up to a maximum concentration of 25 mg/ml stepwise at intervals of 1 minute. At same time the Kr-81m ventilation scintigrams performed: the gas was added to a mouthpiece at a flow of 0.6 l/min and posterior views of radioactivity distribution were recorded with a gamma camera. The Tc-99m MAA were injected into an antecubital vein. The correlation between the Kr-81m ventilation and Tc-99m MAA perfusion scan was less good. The distribution of Tc-99m MAA perfusion was less uneven than that of Kr-81m ventilation during methacholine induced asthmatic attack. The perfusion defects were recovered more quickly than ventilation defects following bronchodilator inhalation. Poor correlation was found between the correlation with ventilation and perfusion in lower lung field assessed on a quantitative basis and the partial oxygen pressure of the arterial blood.

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EVALUATION OF ALVEOLAR DEAD SPACE ON FUNCTIONAL IMAGE IN PULMONARY EMBOLISM. I.Narabayashi, K.Sugimura, T.Suematsu, R.Matsui, T.Hamada, T.Fukugawa, M.Matsuo, Y.Inoue, S.Kimura and R.Onishi. Kobe University School of Medicine and Kakogawa National Hospital, Kobe and Kakogawa.

Ventilation studies with Xe-133 gas and Kr-81m gas, and perfusion imaging with Tc-99m MAA were performed on patients with pulmonary embolism.

Alveolar dead space on functional image was studied.  $\dot{V} / \dot{Q}$  ratios were greatly increased in the embolic regions within the lungs, in which ventilation persisted despite no blood flow. Therefore, functional image of  $\dot{V} / \dot{Q}$  ratios could determine areas of wasted ventilation optically. We could make laminal display of  $\dot{V} / \dot{Q}$  image by reconstruction of SPECT with continuous inhalation of Kr-81m gas and intravenous injection of Tc-99m albumin microsphere. Few cases showed reduction of  $\text{FEV}_{1.0}$  and many cases were hypoxic hypocapnia. Size and number of alveolar dead space on functional image were not always related to the results of arterial blood gas analysis. It is considered that these findings resulted from intrapulmonary shunts. We demonstrate computer display of digital subtraction radiography with nonradioactive Xe gas in comparison with Xe-133 ventilation study.