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EVALUATION OF REGIONAL VENTILATION AND PERFUSION BY COMPUTER DISPLAY IN PATIENTS WITH BRONCHOGENIC CARCINOMA STUDIED BEFORE AND AFTER RADIATION THERAPY. R. Onishi, I. Narabayashi, K. Sugimura, K. Nabeshima, Y. Inoue, S. Nishiyama, T. Fukukawa, C. Sugimura, S. Kimura and M. Matsuo Department of Radiology, Kobe University School of Medicine and Hyogo Prefectural Nishinomiya Hospital. Kobe and Nishinomiya

The purpose of this study is to evaluate an improvement of regional ventilation and perfusion after radiation therapy in bronchogenic carcinoma. Initially Xe-133 ventilation study consisting of single-breath, equilibrium and sequential washout images was carried out in the sitting position. This was followed immediately by Kr-81m ventilation and Tc-99m MAA perfusion imaging. Pulmonary functional images of Kr-81m ventilation / Tc-99m MAA perfusion ( $\dot{V}/\dot{Q}$ ) and Xe-133 ventilation study before radiation therapy were compared with those after the treatment in 15 patients with lung cancer. Both  $\dot{V}$  and  $\dot{Q}$  were usually recovered after radiation therapy in the lung affected by the tumor,  $\dot{V}$  being often more improved than  $\dot{Q}$ . The values of %  $\dot{V}$  with Kr-81m during tidal breathing expressed as percentages of the tumor-bearing lung for the total lung were not always related to the mean value of transit time with Xe-133. The distribution of  $\dot{V}/\dot{Q}$  ratios in the affected lung before irradiation showed a wide range between 0.51 and  $\infty$ , and after the therapy it ranged from 0.93 to 1.67.

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RADIOAEROSOL INHALATION LUNG CINE-SCINTIGRAPHY IN LUNG CANCER. T. Hirano, T. Isawa, T. Teshima, A. Ebina and K. Konno Department of Medicine, The Research Institute for Chest Diseases and Cancer, Tohoku University. Sendai

In patients with cancerous protrusion into the lumen of either the trachea or the bronchi, an excessive accumulation of inhaled aerosol ("hot spot") took place at the site of protrusion and mucus transport was stopped there. Coughing and/or hawking were the only propellant forces to get rid of the "hot spot" but a complete detachment of the mucus was not feasible, and further accumulation ensued. When the airway mucosa were studded with metastases or cancerous infiltration, normal mucociliary transport mechanism which was cephalad in direction and steady in transport, was deranged to cause a random up and down motion, stagnation or stasis and/or regurgitation. When obstructive airways disease was associated with cancer, these abnormalities became more marked. When there was a recurrence at the site of sleeve or lobar resection of the bronchi, a "hot spot" appeared at the site of recurrence and didn't disappear in due course. Radioaerosol inhalation lung cine-scintigraphy was very useful in the evaluation of mucus transport function in lung cancer. Coughing and hawking were important in preventing from accumulation of mucus in the diseased sites. Derangement of mucociliary clearance could easily be a cause of secondary infections.

## 1316

PREDICTION OF POST-OPERATIVE PULMONARY FUNCTION USING PERFUSION AND INHALATION SCINTIGRAMS OF LUNG. Y. Takeda, K. Satoh, M. Tanabe, T. Tamai, K. Mizukawa, M. Yamamoto, H. Konishi\* and N. Shimizu\* Department of Radiation Medicine and \*Second Department of Surgery, Okayama University Medical School.

Thirty-nine patients who under went resection for primary lung carcinoma, were performed pulmonary perfusion and inhalation studies using Tc-99m macroaggregated albumin (MAA) and Tc-99m microsphere albumin (MISA) before the operation. The radioactivity of affected lung field was calculated as a percent of the total lung activity. Post-operative forced expiratory volume (FEV) and FEV in the first second (FEV<sub>1.0</sub>) were predicted according to Wernly's equation.

The results showed good correlation between the pre-operative and post-operative determinations. The perfusion and inhalation studies seemed to have same value for the prediction of post-operative pulmonary function.

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A RELATION BETWEEN THE EXTENT OF PULMONARY PERFUSION DEFECTS AND ARTERIAL HYPOXEMIA IN PULMONARY EMBOLISM. H. Ohmine, T. Nishimura, K. Hayashida, T. Uehara, T. Kozuka. Department of Radiology, National Cardiovascular Center. Suita, Osaka.

We studied to elucidate the relationship between arterial blood gases during room air breathing and size of pulmonary perfusion defects in 22 patients with pulmonary embolism for this two years. Cardiac catheterizations and radionuclide cardiac angiographies were performed in eight patients. The severity of arterial hypoxemia was affected by the extent of perfusion defects. That is, if the size of defects was small, arterial oxygen tension was higher in patients with large cardiac index than in those with small one, but two cases with lobar sized defects were exceptions to this trends. In these two cases arterial oxygen tension was rather low in patient with large cardiac index and also increase of right ventricular ejection fraction calculated with our previous method decreased arterial oxygen tension. We speculated that this phenomenon resulted from intrapulmonary shunts and V/Q mismatches.