EVALUATION OF REGIONAL VENTILATION AND PERFUSION BY COMPUTER DISPLAY IN PATIENTS WITH BRONCHOCARDIAC 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, 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 Xe-133 ventilation / Tc-99m MAA perfusion (V/Q) and Xe-133 ventilation study before radiation therapy were compared with those after the treatment in 15 patients with lung cancer. Both V and Q were usually recovered after radiation therapy in the lung affected by the tumor, V being often more improved than Q. The values of % 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 V/Q ratios in the affected lung before irradiation showed a wide range between 0.51 and ∞, and after the therapy it ranged from 0.93 to 1.67.


Thirty-nine patients who underwent 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 (FEV₁) 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.


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 trend. 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.