We tried to analyze the local pulmonary function in healthy group and pulmonary disease group by using Kr-gas one ventilation method. And we compared this results with conventional pulmonary function test, using functional image and phase image analysis. This functional image was significantly related to pulmonary functional test. To obtain the functional image, over inspiration Kr gas and expire with maximum effort and acquired the expiration rate. By this analysis we acquired not only total pulmonary function but also regional pulmonary function.

As a result VC% increased and RV% decreased significantly after the therapy, due to improvement of weakness of respiratory muscle. No significant changes were recognized on FRC, TLC, CV, DLco, V25, V50 after the therapy. Carotid artery blood flow recovered to normal range after the therapy. Perfusion shifted to the upper lung fields in 70% of the patients. There was no significant change of ventilation after the therapy. Therefore V/Q ratios in upper lung fields decreased in hyperthyroid state. After the therapy, according to normalization of T4 value and carotid artery blood flow, perfusion in upper lung fields recovered to normal pattern. Shift of perfusion to upper lung fields was considered to be one of the significant index, as well as T4 value and carotid artery blood flow.

In order to investigate the regional pulmonary functions, a scinticamera with Kr-81m was employed. 10 patients were selected as control subjects, 15 patients with chronic obstructive pulmonary disease, 5 patients with interstitial pulmonary disease, and 10 patients with other pulmonary disease were examined. The regional pulmonary functions evaluated by this method were compared to the overall pulmonary functions. Through this study, clinical superiority of this method was suggested.