function, the washout curves of each regional area after the attainment of equilibrium with a closed circuit using xenon-133 were analyzed by the backward projection method. As soon as the examination with xenon was over, the spirometry was performed.

Abnormal regional ventilatory function values were found in ten out of thirteen patients with FEV1.0% over 70, that is, the radioactive technique was more sensitive than routine spirometry. Morphologically mosaic patterns were found in the attack phase of bronchial asthma. Sometimes the similar mosaic patterns were seen even in the non-attack phase.

The following conclusions were obtained as compared with two asthmatic and non-asthmatic conditions.

1) Regional ventilatory function in all regions was increased in one case with asthmatic condition, that is, hyperventilation was found in the attack phase.

2) Region ventilatory function in all regions was decreased in one case with asthmatic condition, that is hypoventilation was found in the attack phase.

3) In the majority, regional ventilatory function in some regions were increased and in other regions were decreased in asthmatic phase. The unevenness of regional ventilatory function was markedly found.

4) As a general rule regional residual capacity as well as total residual capacity were increased in asthmatic phase. However the increasing rates of the regional residual capacity were strikingly uneven.

Studies on Correction of Xenon-133 Uptake by Chest Wall for Analysis of a Washout Curve

Y. NISHIMOTO, A. KISHIMOTO, O. KITADA, T. TAKEDA, M. SUGITA, K. HYODO, A. NISHIKAWA and K. TACHIBANA

Department of Internal Medicine and Radioisotopes, Hyogo Medical College, Nishinomiya

It is necessary to correct the xenon-133 uptake by the chest wall for analysis of a washout curve after the equilibrium of xenon concentration was obtained in a closed circuit.

In this paper, to evaluate the effect of xenon uptake by the chest wall, a patient with right pneumonectomy, a patient with bronchial asthma and healthy subjects were studied. The subjects were instructed to rebreathe in a closed circuit until the concentration of xenon was stable. Then, the subjects were switched over to an open circuit system and xenon in the lungs was washed out by room air. The xenon washout curve was obtained from the decay of time-sequential counts and the backward projection method was used for analysis of the curve.

In the patient with right pneumonectomy one of interesting areas was supposed to be composed of the chest wall alone, another was of the chest wall with lung. Only one component was found from the washout curve in the interesting area of the chest wall alone. The slope of the curve equal to that of the slowest component of the washout curve in the interesting area composed of the chest wall with lung.

In the washout curve of the patient with bronchial asthma, it was recognized that the xenon in an extremely slow space of the lungs had remained at 12–13 minutes after washout began.

From the above data it was concluded that in patient with a very slow space it was inadequate for correction the effect of chest wall uptake to use the washout curve for 5–7 minutes after washout.