spectively with the emphysematous and bronchitic categories described by Burrows and others. In patients with bronchogenic carcinoma, the "hot" spot is seen at the site of bronchial compression or endobronchial tumor. When a tumor grows larger so that the bronchial lumen is occluded, the "hot" spot disappears with no aerosol deposited in the distal part of the lung, indicating the absence of an effective airflow.

Aerosol inhalation scanning is also useful in the estimation of differential ventilation in the animal experiments such as in the dogs. In the assessment of postoperative lung function in the canine lung transplants, partial bronchial obstruction at the bronchial anastomotic site was indicated on the aerosol inhalation scan as a "hot" spot. The "hot" spot occurred transiently in allografts and autografts in the immediate postoperative period as a result of edema, at the time of rejection in allografts, and many months postoperatively in autografts as a result of bronchostenosis by scar formation.

In summary, a "hot" spot on aerosol inhalation scan is a useful sign indicating the presence of partial obstruction in the airway.

Lung Scintigram with ^{133}Xe

H. Hishida, Y. Koga and H. Simura

Department of Radiology, School of Medicine, Showa University, Tokyo

Dynamic study of pulmonary function was performed with ^{133}Xe by scinticamera.

Breathing with a closed circuit and injecting ^{133}Xe gas in its circuit, after a single deep breath, scintiphoto was took during breath holding for 30 minutes (inhalation scintiphotogram). Then, after rebreathing for 3 to 5 minutes (rebreathing photograms), gas was washed out (wash-out photos). During all these phases, radioactivity of each lung was recorded as wash-in and wash-out curve.

Abnormal pulmonary function were observed with these techniques and compared with perfusion scintiphotos and X-P.

This technique is especially useful for observation of cases with poor ventilation by means of obstructive disturvance in spite of normal X-P. (e.g. bronchral asthma, emphysema, lung cancer etc.)

A Study of ^{99m}Tc Aerosols and ^{133}Xe Gas Inhalation Scintigraphy

H. Inoue, Y. Matsuda, S. Hamano, R. Izuchi and M. Iio

National Hospital Nakano, Tokyo

Pulmonary inhalation scintigraphy was done, using ^{99m}Tc albumin and ^{133}Xe gas. ^{99m}Tc albumin aerosols were produced with ultrasonic nebulizer and were inhaled about 8 minutes. Immediately after completion of the inhalation procedure, scintigraphy was done.

^{133}Xe gas was inhaled with O_2 in spirometer.

Inhalation scintigrams of 90 patients were done, 47 tuberculosis, and 43 non-tuberculosis.

^{99m}Tc aerosols inhalation scintigram patterns were classified four categories, Lung-field type, Bronchial type, Madara type, and Mixed type. The lung-field type, ^{99m}Tc aerosols deposition is homogenous in lung field. The bronchial type, aerosols deposite only in trachea and major bronchi. The madara type shows geographical

deposition in lung field. The mixed type is madara + bronchial type.

Pulmonary function tests were perceived, the lung-field type is normal, the bronchial type is % F E $V_{1.0}$ reduced and respiratory resistance increased, the mixed type is as same as the bronchial type, the madara type is % F E $V_{1.0}$ reduced but respiratory resistance is normal or increased.

Normaly aerosols easily pass through air ways, but increasing respiratory resistance and decreasing % F E $V_{1.0}$ make the madara type and bronchial type.

By comparison, ^{99m}Tc aerosols and ^{133}Xe gas inhalation scintigram are similar each others, in the lung-field Type, but are different in the rests. These differences are supposed to be made by stratifiction of ^{133}Xe gas and viscosity of ^{99m}Tc aerosols particles.

Dynamic Pulmonary Function Study Using a Simultaneous Double Tracer Method

T. Maeda, I. Narabayashi, A. Matsumoto, K. Ito and K. Narabayashi

Department of Radiology, Kobe University, School of Medicine, Kobe

We used a simultaneous double tracer technique with ^{133}Xe-solution and ^{131}I-MAA in detecting various pulmonary diseases in a total of 37 cases.

From serial scintiphotographic images and VTR computor on line system we detected different pulmonary function disorders.

We discussed the significance of this double tracer technique.

With the patient in a supine position, 300 μCi ^{131}I-MAA and 3 mCi ^{133}Xe-solution with a one-shot-injection technique was injected simultaneously.

The lung images were obtained from the Anger camera with diverging collimator of 1000 holes, storing the findings on the computor system in a form of 128 × 128 matrix.

From the image of ^{131}I-MAA perfusion scan, ^{131}I-MAA uptake curve and perfusion index (K pa) were calculated.

Moreover from the computor scintiphoto (50 × 50 matrix), the distribution of the radioactivity was known using the histogram display method.

On the other hand, ^{133}Xe images were obtained in a form of perfusion and ventilation.

Using the "region of intrest" technique, regional pulmonary ventilation function was calculated from the regional ^{133}Xe wash out half time.

Compared with the single injection method of ^{133}Xe, this simultaneous double isotope tracer technique with ^{131}I-MAA has the advantage of detecting the regional pulmonary diffusion function.