

CLINICAL STUDY ON PULMONARY HEMODYNAMICS BY RADIO-NUCLIDE ANGIOCARDIOGRAPHY (FUNCTIONAL IMAGING OF THE LUNG)

Masayuki Hamada*, Kenji Abo*, Takeshi Nakano*,
Hideo Takezawa*, Hisato Maeda**, Tsuyoshi Nakagawa**
and Nobuo Yamaguchi**

*The 1st Department of Internal Medicine and

**Department of Radiology, Mie University School of Medicine, Tsu.

Regional pulmonary hemodynamics was reevaluated in patients with mitral valve disease by means of right ventricular-pulmonary mean transit time (RV-Lung MIT) calculated from time-activity curve in routine radionuclide angiocardiology.

The patients included 32 with mitral stenosis (MS), 7 with mitral insufficiency (MI), 5 with congestive heart failure without mitral lesion (CHF) and 5 control subjects. All patients with heart diseases underwent cardiac catheterization.

The patient was placed in supine position and 10 mCi of ^{99m}Tc -HSA was injected into an antecubital vein as a bolus. Sequential images were recorded on a TOSHIBA GCA-202 gamma camera coupled with DAP-5000N computer system. Regions of interest were selected at upper, middle and lower areas of the right lung and the right ventricle respectively, and time-activity curve of each region was obtained. Descending limb of each curve was fitted to the exponential function and RV-Lung MIT was calculated, and functional imaging of the lung was performed using a parameter of RV-Lung MIT.

In 5 control subjects, mean RV-Lung MIT value in upper and lower areas showed 2.2 sec. and 2.6 sec. respectively. In MS, the value showed prolongation in the lower area (4.0 sec.) in accordance with severity and resulted in decrease of U/L ratio, but in 6 patients with long history, the value both in upper and lower areas showed marked prolongation (4.4 sec.), and U/L ratio was nearly unity. In patients with MI and CHF, the value ranged in between MS and control groups.

It is suggested that the estimation of the severity of MS may be possible by routine radionuclide angiocardiology.

The lung scintigraphy and pulmonary function studies in chronic obstructive pulmonary disease and other cardiopulmonary diseases

Teruyasu Suzuki, Yasushi Ishii, Yoshiharu Yonekura, Daizaburo Hamanaka, Harumi Itoh,
Toru Fujita, Kanji Torizuka

Kyoto University School of Medicine, Kyoto.

Conventional spirometric tests give the average of the total lung function, but fails to demonstrate the regional lung function. On the other hand the lung scintigraphy can give the information about the regional lung function. And so, we evaluated the regional lung function shown in the scintigraphy, by comparing with conventional spirometric tests, which were VC, FEV1.0%, R.R. by oscillation method and flow volume curve. Chronic obstructive pulmonary disease (COPD) and other cardiopulmonary diseases were selected for this study.

The decrease of FEV1.0% and the increase of R.R. were very characteristic in COPD with expiratory failure, but lung scintigraphy with ^{133}Xe showed irregular inhalation distribution and the regional washout delay. In the findings of aerosol scintigraphy in COPD, the irregular distribution, central hot spot formation and inspiratory defects were characteristic. The grading criteria according to these findings, was well correlated with FEV1.0% and R.R. Early pathological changes in the peripheral airway, was detected as closing volume formation by the RV-bolus images slowly inhaled a bolus of radioactive gas from reserve volume (RV) and it was presented as the ^{133}Xe washout delay, too.

In conclusion, lung scintigraphy had a merit that as the geographical disorder of the lung, it can detect pathophysiological changes in the airway which the conventional spirometric tests failed to demonstrate.