381

SLOW DYNAMIC SPECT
-PHANTOM EXPERIMENT AND ITS CLINICAL APPLICATION TO PULMONARY DISEASES-

N. Ishidou, I. Narabayashi, T. Suematsu, O. Aoki.
Hyogo Medical Center For Adults, Akashi.
Y. Inoue, R. Matsui, T. Hamada, K. Yamazaki,
K. Sugimura, S. Nishiyama and Y. Kanzawa.
Kobe University Hosp., Kobe

A software for slow dynamic SPECT was developped, which is expected to examine the local dynamics of viscerals. The slow dynamic SPECT technique was then utilized for phantom experiment and seven clinical cases. The following conclusions were drawn.

1. Slow dynamic SPECT technique more sensitively detected inner part dynamics of phantom, than planer technique.
2. Seven lung cancer cases were examined; Xe-133 wash-out curve was presumed to be 3-phase exponential by planer and 2-phase by SPECT.
3. In blood-flow defected lesion, delayed beginning of wash-out was observed, which presumably is due to Xe-133 gas by-pass like inflow through trachea.
4. Slow dynamic SPECT technique will be available for the quantitative local dynamic analysis.

382

APPLICATION OF FACTOR ANALYSIS TO WASHOUT CURVES OF PULMONARY VENTILATION SCINTIGRAM.

K.Terakawa, T.Kakae, S.Fujimoto, N.Kurihara, T.Takeda, H.Shimonishi, M.Hata and H.Ochi. Osaka City University of Medical School, Osaka.

Factor Analysis, which Di. Paola et al introduced to nuclear medicine in 1975 is now gradually used in cardiac nuclear medicine. We applied this technique to the analysis of washout curves of Xe-133 ventilation study. The subjects were healthy males and patients with COPD and bullous lung diseases. Data were stored from posterior view in every 10 second (frame mode) for about 5 to 7 minutes. Factor Analysis of dynamic scintigraphic data was performed for the search of the number of factors. In healthy males washout curves were divided into two factors. One was normal washout curve and the other was background. In patients washout curves were divided into three factors. One was better washout curve, one was poor washout curve and the other was background. It was not necessary to circle the ROI by this method. It was probably possible to divide the superimposed areas. So Factor Analysis was useful for the evaluation of pulmonary washout curves.

383

THE EVALUATION OF REGIONAL PULMONARY VENTILATION AMONG PATIENTS WITH CORONARY ARTERY DISEASE.

T.Shiraishi, S.Natsuzumi, K.Matsumoto, A.Kobayashi, M.Nakazawa, T.Hasegawa, H.Koito and Y.Kimura. Kansai Medical Univ. Kori Hospital, Osaka.

Xe-133 pulmonary ventilation scintigrams were used to examine the regional pulmonary ventilation of a prior myocardial infarction group and a control group. The prior myocardial infarction group was divided into 2 groups according to the level of pulmonary congestion determined by plain chest X-rays.

The Xe-133 wash-in time was 2 minutes; wash-out time was 8 minutes. One logarithmic function for the wash-in time, and two for the wash-out time, were derived from the pulmonary time activity curve. The regression coefficients and determinant coefficients were then computed and used as an index for regional pulmonary ventilation.

The cause of reduced left heart function due to pulmonary congestion was evaluated from the upper lung wash-out second component value, r^2. This was also evident from the spectrum of the pulmonary perfusion scintigram.

Stenosis or obstruction of the terminal airway at the pulmonary congestion was presumed according to the upper/lower lung ratio of the wash-out first component slope, b. This indicated that hemodynamic changes due to heart disease affect regional pulmonary ventilation.

384

PULMONARY VENTILATION AND PERFUSION STUDIES IN REFERENCE TO PATIENTS WITH LUNG CANCER BEFORE AND AFTER LUNG OPERATION.

I.Narabayashi, N.Ishidoh, T.Suematsu, S.Aoki, T.Sakamoto, T.Komiyama, A.Yoshino and N.Tsubota. Hyogo Medical Center for Adults, Akashi.

In 28 patients, the ventilation and perfusion studies were examined before and after lung surgery. Imaging of ventilation and perfusion were done during tidal breathing with Kr-81m gas and Tc-99m MAA. Scintigrams were automatically analysed by software using GPL on a GMS-55A computer system. The functional loss in per cent of total pretreatment function were calculated from scintigraphic data of ventilation and perfusion. The mean values and the standard deviations of the percentage of $\dot{V}$ and $\dot{Q}$ were $\dot{V}$: 45.1±24.3% and $\dot{Q}$: 52.1±26.3%. There are some differences between segmental resection and lobectomy in the functional loss. The anatomical loss in per cent of the total pretreatment capacity were 45.5±24.1%. The functional images of $\dot{V}/\dot{Q}$ ratio and $\dot{Q}/\dot{V}$ ratio in the sitting position showed that no gravitational effect of operated lung had been seen in 7 of 28 cases. Six months later after operation ventilation and perfusion has improved relative to those in 1 month later in 11 of 14 cases.