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Tl-201 TO Ga-67 CRUDE UPTAKE RATIO (CUR) AND PROGNOSIS IN PRIMARY LUNG CANCER : RELATION BETWEEN CUR AND ACTUAL SURVIVAL TIME (AST). T. Togawa, K. Hoshi*, K. Kato, Y. Higuchi, A. Suzuki & K. Kimura*. Dept. of Nucl. Med. & *Radiol., Fukushima Medical College, Fukushima.

We have been reported the usefulness of Tl-201 to Ga-67 crude uptake ratio (CUR) in primary lung cancer. The present study was undertaken to evaluate whether CURs are closely related with the survival of the host. CURs were measured before treatment in 53 patients with primary lung cancer (stage I-II 10, stage III 20, stage IV 23; adenocarcinoma 20, epidermoid carcinoma 19, small cell carcinoma 11, adenosquamous carcinoma 3), and were compared with the actual survival time (AST). Among 40 patients, 3 stage I-II and 37 stage III-IV, who received radiotherapy and/or chemotherapy, 32 patients had already died. Twenty-six patients with CUR less than 1.0 showed a AST of 6.3 ± 4.1 months, whereas the others with CUR more than 1.0 indicated a AST of 16.2 ± 9.1 months, significantly longer than that of the former group ($p < 0.05$). Furthermore, there was a statistically significant linear correlation between CUR and AST in these 32 patients ($r = 0.70$, $p < 0.001$), i.e., the higher the CUR, the longer was the AST. AST was well correlated with CUR especially in adenocarcinomas ($r = 0.88$, $p < 0.01$). The results show that CUR is a possible factor for predicting the prognosis of primary lung cancer.

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CLINICAL EVALUATION OF GATED PULMONARY STUDY USING FLOW METERIC SENSOR ON RESTING VENTILATION.

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A respiratory gated pulmonary ventilation study using Kr-81m and/or Xe-133 was performed. Data were acquired with a list mode, then dealt with Butter Worth Filter and Spacial Temporal Filter. As harmonic phase analysis, the 3rd Fourier expansion was used, which was best fitted on a time activity curve (TAC). Using a phase image, local pulmonary function in the cases with COPD (10), restrictive disease (3) and normal volunteers (8) were evaluated. Variations in the phases of local respiration was remarkable in COPD than normal. Mean SD of abnormal cases was 29.3 ($n = 26$), while that of normals was 17.4 ($n = 16$). The difference was statistically significant to a P value of 0.01. On TACs, plateau in the expiratory phase and late-in late-out were noticed. These findings indicated changes of pulmonary compliance. The plateau meant early air way closure resulted from increased level of closing volume. Moderate increase of the compliance resulted in late-in late-out.

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FUNDAMENTAL STUDY OF GATED VENTILATION EXAMINATION USING FLOW METRIC SENSOR N. Katsuyama, H. Moromizato, M. Ozaki, H. Sueyama, Y. Hokama and M. Nakano, Ryuky University, School of Medicine, Okinawa, K. Kawakami, Y. Mori, Jikei Med. School, Tokyo.

A newly-developed flow metric sensor gives a good trigger signal at the beginning of the expiration. Using this sensor, we estimated a fundamental study of ventilation gated examination in order to evaluate regional pulmonary function. The trigger signal is input to a Scintipac 2400 through an interface of ECG. This examination was performed during 10-15 min. on spontaneous breathing. The ventilation data using Kr-81m or Xe-133 were also input to the computer with 64×64 matrices. The data were acquired with list and frame modes. Because of scattering of the respiratory intervals, the respiratory volume curve acquired by frame mode did not represent a true volume curve. Data were dealt with Butter Worth filtering and spatial and temporal smoothing. Without these deals, the volume curves were irregular. Several Fourier expansion of the volume curves were performed as harmonic phase analysis. The third expansion was best fitted on the volume curves. By these methods, phase and amplitude images were obtained. Furthermore, functional images of time of peak expiration and inspiration were obtained.

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EVALUATION OF RESPIRATORY MOTION AND PHASE ANALYSIS OF NON-GATED SHORT-TIME ACQUISITION TRANSMISSION LUNG IMAGING. M. Seto, K. Nakajima, H. Oba, K. Terada, N. Shuuke, M. Taniguchi, Y. Shiire, T. Takayama, H. Bunko, T. Aburano, N. Tonami, K. Hisada. Kanazawa University, Kanazawa.

Although transmission lung imaging can not provide exact information of ventilation, it can provide similar information without administering radionuclides into the patients. Purpose of this study is to evaluate whether non-respiratory gated can offer enough information according to respiratory function. Transmission image is obtained using 20 mCi of Tc-99m point source placed at the distance 4 meters from gamma camera without collimator. Every 500 msec data are acquired for 24 sec during tidal breathing. Usually data of 4 to 5 respiratory cycles are obtained. Because of the low count of the images, compensate algorithm is applied. When dose of point source is increased from 5 to 50 mCi, observed counts are increased at first then decreased. 20 mCi is the maximal dose to retain count linearity. Multiplication or addition of raw data give similar results in phase images and expiration fraction (EF). These are obviously inferior to respiratory gated images. EF delivered from non-gate study is lower than gated study or spirometry ($r = 0.67$ and 0.61 , respectively). In conclusion, gated study is better than non-gated study.