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PHASE ANALYSIS OF RESPIRATORY MOTION BY RESPIRATORY GATED LUNG IMAGING: COMPARISON OF Kr-81m VENTILATION AND TRANSMISSION 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

In the case of transmission lung imaging, change of activity according to the respiratory cycle is influenced by the change of density per unit volume of the lung but not by the change of lung volume. Purpose of this study is to evaluate whether phase analysis of gated transmission lung imaging can provide same information as that of Kr-81m gated ventilation imaging. Posterior view gated transmission imaging is obtained during tidal breathing using 10 mCi of Tc-99m as a transmission source and gamma camera without collimator. Source-camera distance is 4 meters. 24 images per cycle is obtained by gating with thermister placed at the nostril. Kr-81m gated ventilation image is obtained with scintillation camera with collimator. Expiration fraction (EF) is calculated from both methods and spirometry. Change of counts during respiratory cycle is greater by Kr-81m than transmission. However similar images are obtained. This is likely due to very short half life of Kr-81m. In order to correct this effect, correction formula by respiratory frequency is applied. Corrected EF by Kr-81m significantly correlated with spirometry ($r=0.70$).

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PERIPHERAL AIR TRAPPING SEEN IN PATIENTS WITH BRONCHIOLITIS. K.Murata, H.Itoh, M.Senda, Y.Yonekura, H.Saji, T.Fujita, and K.Torizuka. Kyoto University, Kyoto.

Using positron emission tomography (PET) with N-13 and X-ray CT, we have studied the relationship between ventilation abnormalities and morphological changes of the lung. Twenty-one patients including 9 with diffuse panbronchiolitis (DPB), 1 with silicosis, 1 with allergic bronchopulmonary aspergillosis (ABPA), 1 with rheumatoid lung (RA), and 9 with pulmonary emphysema, underwent PET and CT. In all of the 9 patients with DPB, who showed the centrilobular nodules and bronchiolar dilatation on CT, characteristic "peripheral" air trapping or air trapping distributed in the outer portion of the lung was demonstrated with PET and N-13. In addition, the same peripheral air trapping was revealed in patients with silicosis, ABPA, and RA. However, no patient with pulmonary emphysema, who showed areas with low attenuation value accompanied by a simplified vascular tree on CT, demonstrated peripheral air trapping. Thus, our results suggest the intimate relationship between the peripheral air trapping and bronchiolitis, although its mechanism and significance have not been clarified.

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LUNG CANCER IMAGING USING C11-GLUCOSE. Mikihiro Matsuda, Akio Nishimura (JSW Memorial Hospital), Masayori Furudate (Dpt. of Nuclear Medicine, Hokkaido University), Shigenori Iida (Accelerator group, Japan Steel Works)

In the present study we attempted to use photosynthesized C11-glucose for the diagnosis of pulmonary cancer. C11-glucose was obtained by photosynthesis of C11-O₂ in spinach chlorophyll. The C11-glucose thus synthesized was administered through a previously intubated catheter into duodenum. We utilized the conventional gamma camera equipped with high energy collimator and the data were collected and processed in Scintipac 2400. The peak time of the uptake of C11-glucose was fastest in liver followed by heart and lung. The uptake of C11-glucose in tumor attained its plateau in 15 minutes and this plateau continued up to 44 minutes after the administration. The uptake of C11-glucose in various organs was proportional to the administered dose. C11-glucose accumulated in the tumor tissue more than intact lung and good tumor imaging could be obtained by the conventional gamma camera. The uptake was lower in subjects receiving cancer chemotherapy and irradiation. In the inflammatory tissue, Ga67 was taken up but there was no uptake of C11-glucose by inflammatory tissues.

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

Tl-201 to Ga-67 crude uptake ratio (CUR) was measured in 53 patients with primary lung cancer, and the survival calculated by Kaplan-Meier's method was compared with clinical stage, histological type and CUR. The 18 months survivals after therapy were 90% in stage I & II, 48% in stage III and 14% in stage IV. When these 53 patients were also classified into low-, intermediate- and high-CUR groups, the 18 months survivals were 9% in low-, 34% in intermediate- and 76% in high-CUR groups. Namely, the more advanced the clinical stage or the lower the CUR, the poorer was the survival. Even in the same clinical stage or same histological type, the prognosis of the patients with CUR less than 1.0 was poorer than that of the others with CUR more than 1.0. Moreover, the survival in inoperable patients was well correlated with CUR rather than with clinical stage. CUR was suggested to be a useful factor for evaluating the prognosis of primary lung cancer.