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RADIONUCLIDE VENOGRAPHY IN LUNG CANCER: PRELIMINARY REPORT. T.Hirano, T.Isawa, T.Teshima, A.Ebina and K.Konno. Tohoku University, Sendai.

A 55 yr-old man with lung cancer (LC) of the right upper lobe showed a hot spot or a focus of increased radioactivity in the left upper mediastinum. The tracer was injected into the left antecubital (AC) vein. Although injection of the tracer into the right AC did not show any evidence of collateral circulation (CC), injection at the left AC vein not only revealed CC toward the right side of the neck but also produced the same "hot spot". CC to the opposite side of the neck was unexpected. The purpose of the study was to elucidate how venous circulation was disturbed in LC. The supine position with the arms extended laterally appeared most suitable and simultaneous tracer injection was made at the bilateral AC veins. When necessary, unilateral injection was made.

In normal subjects the tracer reached the superior vena cava (SVC) almost simultaneously from both sides. No CC was seen. In patients with LC with SVC syndrome CC was present without exception. The collateral pathways were 1)through the internal thoracic vein to the inferior vana cava, 2)through the lateral thoracic vein to the intercostal veins anteriorly or posteriorly and 3)through the jugular veins to the opposite side of the neck. These pathways were seen singly or in combination. A hot spot was seen on and off. There were patients who showed CC without SVC syndrome when examined but who developed the syndrome some time later.

In conclusion RI venography seems useful to the evaluation of venous circulation which is liable to be affected by metastases in the mediastinal and cervical regions.

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EVALUATION OF THE PULMONARY HILAR INDENTATION WITH SAGITTAL ECT. T.Sakatani, T.Shintaku, H.Yamashita, T.Sugawara, T.Fukuda, M.Kanasaki and H.Akagi. Department of Radiology of Osaka Medical School, Osaka.

We evaluated the pulmonary hilar identation with sagittal ECT using 99m-Tc MISA. Twenty three patients(6 normal, 6 L-to R shunt diseases, 7 mitral valvular diseases, 4 primary pulmonary hypertention) were studied with the purpose of separating normal from abnormal indentational images. We excluded the cases having abnormal perfusion pattern in lung area. Sagittal slices were reconstructed by the algorythm of filtered corrected back projection. We calculated the ratio of cross sectional square of indentational portion for whole lung area and slice thickness from its ROI histogram. With these two means, significant differance between normal and various cardio-pulmonary diseases was gained. Good correlation between these two means and PA(V) measuremental value on chest X-P(the former; $r=0.745$ $P<0.001$, the latter; $r=0.84$ $P<0.001$) indicated the possibility to asses the indentation tangentially on slices and some anatomical appropriation of the pulmonary hilar indentation, especially PA(V). In conclusion, pulmonary sagittal ECT was useful to clarify the normal and abnormal images of hilar perfusional distribution.

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POTENTIAL USE OF DYNAMIC SCINTIGRAPHIC LUNG IMAGING. F.Deconinck, H.Ochi. Vrije university Brussel,Belgium and Osaka City university Medical School,Japan.

Standard scintigraphic lung imaging by means of radioactive gasses is used to assess global or regional ventilation. In a static study,the activity distribution in the lung is proportional to $\bar{V}/(\bar{V}/\bar{V}+\lambda)$,$\bar{V}$ is the mean ventilation,$\bar{V}$ the mean lung volume and λ the radioactive decay constant of the gas.In dynamic imaging a term proportional to $\frac{\omega V_T}{2(\lambda^2+\omega^2)}(\lambda\sin\omega t-\omega\cos\omega t)$ is added,where V_T is the tidal volume and $\omega=2\pi/T$ the breathing frequency.This term can be rewritten as $A\sin(\omega t+\phi)$,where the amplitude$=\omega V_T/2\sqrt{\lambda^2+\omega^2}$ is strictly proportional to ventilation,and the phase $\phi=\mathrm{arctg}(\omega/\lambda)$ which introduces a global phase shift of no clinical value. Therefore,the amplitude image of a dynamic lung study using radioactive gas will show pure regional ventilation if there are no motion artifacts.The artifact may be corrected when a dynamic series of lung perfusion images is available.It is expected that the method will provide new information on the dynamics of normal and pathological lung function.

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EVALUATION OF PULMONARY VENTILATION SCAN USING FORIER ANALYSIS. K.Terakawa,S.Fujimoto,N.Kurihara,N.Takeda,H.Shimonishi,M.Ohmura,H.Ikeda,K.Hamada,M.Hata,S.Taniguchi,H.Ochi,Y.Onoyama and F.Deconinck. First Department of Internal Medicine and Nuclear Medicine Osaka City University Medical School, Japan and Vrije Universiteit Brussel, Belgium.

We applied Fourier analysis to pulmonary ventilation scan using Kr-81m gas in healthy males. We investigated the changes of regional ampulitude and phase by three breathing maneuvers (natural, abdominal and costal breathing) and three body positions (sitting, supine and right decubitus position). Ampulitude was largest in both lung bases during abdominal breathing, but it shifted to the middle lungs during costal breathing. Phase in both lung bases preceded that in the rest of the lungs during abdominal breathing but the lung bases followed after the rest of the lungs during costal breathing. In sitting position amplitude showed largest in both lung bases. In right decubitus position greater amplitude was seen in the right lung than in the left. We compared this regional amplitude with R.I. activity of sum images. R.I. activity of sum images was largest in the middle lungs during three breathing maneuvers and less shifts of regional activity were seen in various body positions. Phase analysis was useful in studying the regional ventilation.