
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 unexptected. 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 vena cava, 2) through the lateral thoracic vein to the intercostal veins anteriorly or posteriorly and 3) through the jugular veins to the SVC. In the SVC syndrome injection at the left AC vein not only revealed CC toward the right side of the neck but also appeared most suitable and simultaneous tracer injection was made at the bilateral AC veins. When necessary, unilateral injection was made.

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.

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 $\frac{1}{T}$, where $T$ is the mean ventilation, $\lambda$ the radioactive decay constant of the gas. In dynamic imaging a term proportional to $\frac{1}{T} \cos(\omega t)$ is added, where $\omega$ is the tidal volume and $\lambda$ the rate of decay of the gas. The ratio of the amplitude of the radioactivity at the lung bases over the radioactivity at the lung bases is obtained from the ROI histogram.

We applied Fourier analysis to pulmonary ventilation scan using Kr-81m gas in healthy males. We investigated the changes of regional amplitude and phase by three breathing maneuvers (natural, abdominal and costal breathing) and three body positions (sitting, supine and right decubitus position). Amplitude 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 amplitude was largest in the right lung and 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.