A NEW METHOD TO EVALUATE REGIONAL PULMONARY BLOOD FLOW AND EXTRAVASCULAR SPACE USING 13-N Labeled AMMONIA AND POSITRON COMPUTED TOMOGRAPHY.


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Following bolus intravenous injection of 10 mCi of 13-N labeled ammonia solution, a dynamic scan of the lungs was performed at the framing rate of 10 or 15 seconds. We assumed that the ammonia is first distributed in the lungs according to the regional blood flow (F) and extracted in the extravascular space (V) and then washed out by the blood flow. Applying a single compartment model, we calculated the turnover rate (F/V), blood flow (F) and extravascular space (V) from the regional time-activity curves.

In a supine normal volunteer, the dorsal part showed larger F and V than the ventral part due to the gravity. In a patient with congestive heart failure, F/V showed marked decrease due to decreased cardiac output and increased extravascular space. In a patient with emphysema, the diseased area showed decrease in F and V, demonstrating V-Q match and decreased interstitial space caused by destruction of the alveolar tissues. Thus our method provides useful informations about regional pulmonary blood flow and the size of extravascular space.

STUDIES OF REGIONAL VENTILATION AND PERFUSION IN RADIATION PNEUMONITIS BY VENTILATORY STEADY STATE MEASUREMENT WITH XENON-133.

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Cervical cord-injured patients generally show restrictive lung dysfunction due to paralysis of the intercostal muscles, and their vital capacity decrease below 50 per cent of normal ones. They reveal paradoxical respiration that the intercostal muscles subsides on inspiration.

We performed ventilation scintigraphy with Xe-133 and perfusion scintigraphy with Tc-99m-MAA to nine cervical cord-injured patients and three normal ones, and investigated local lung function.

1) Wash-in and wash-out curves were sluggish in the cervical cord-injured patients.

2) Compared with normal ones, ventilation of the upper lung were especially impaired.

3) Functional lung images were different from those of normal ones.

LOCAL LUNG PERFUSION AND VENTILATION WITH RADIOISOTOPES IN THE CERVICAL CORD-INJURED PATIENTS.

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