

G) Lung, Heart and Blood Flow

Clinical Significance of Radioaerosol Scanning in Lung Disease

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^{133}Xe is one of the most useful nucleides both for inhalation and perfusion study in lung disease.

Also, clinical usefulness of radioaerosol scanning combined with perfusion scanning by ^{131}I -MAA has been established. By the difference of physical properties of gas and aerosol, the distribution of these materials in the lung is not similar.

We compared $^{99\text{m}}\text{Tc}$ -albumin aerosol scanning with inhalation scanning by ^{133}Xe . The most characteristic patterns of aerosol scan were excessive deposition of aerosols and peripheral defect. In hypoventilated area where ^{133}Xe could enter by steady-state rebreathing, these patterns were showed. For example, in lung cancer having bronchial stenosis at l-main

bronchus, aerosol scan showed excessive deposition at the left hilum and peripheral defect, while ^{133}Xe could enter more peripherally.

The distribution ratio of aerosols to r-lung and l-lung was nearly equal to the ratio of inhaled ^{133}Xe .

We postulated that the excessive deposition would show relative ventilatory volume of the diseased lung, and that the cause of excessive deposition would be abrupt change of air flow rate at the site of bronchial stenosis.

Compared with ^{133}Xe inhalation study, we showed that aerosol scan would be useful in detecting the site of bronchial stenosis and in assessment of relatively decreased ventilation.

"Hot" Spot on Aerosol Inhalation Scan: Its Significance

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Occurrence of an area of excessive radioactive deposition or a "hot" spot on the aerosol inhalation scan has been considered disadvantageous and prevented from a wide acceptance and clinical application of this procedure. The purpose of this paper is to show that this is a misconception.

Aerosol inhalation scans in normal subjects

shown uniform patterns of aerosol distribution nearly identical to their perfusion counterparts. Patients with obstructive airway disease show distinctly abnormal configurations, namely centrally located "hot" areas and irregular peripheral patchy distribution of aerosol or peripheral "hot" spots, and combination of each. The abnormal central and peripheral patterns correspond re-