EL6. Study of Alveolar-Capillary Permeability in Lung Disease Using Technetium-99m DTPA Aerosol

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Ventilation lung scans and quantitative studies of alveolar-capillary permeability can be done, using soluble tracers such as technetium-99m DTPA. This report deals with imaging and quantitative clearance studies using Tc-99m DTPA radioaerosol in patients with suspected inhalation burns, in smokers and glue-sniffers, in patients with chronic obstructive pulmonary disease (COPD), and in patients with lung metastases from thyroid cancer receiving radioiodine treatment. In the normal volunteers, the time taken for 50% of inhaled Tc-99m DTPA to be cleared from the lungs (T_1/2) was 66 minutes ± 1sd of 12 mins. The smokers had a mean T_1/2 of 20 mins ± 1sd 4 min. In the hard-core glue-sniffing group, the majority were smokers who had stopped smoking and glue-sniffing for periods varying from 1 day to 42 days and it was possible to note the changes in clearance times against period of abstinence.

In the patients with inhalation burns, besides the T_1/2, retention images of uncleared Tc-99m DTPA in the lungs were obtained to note regional differences, if any, in lung clearance arising from pulmonary epithelial damage; these patients showed increased rate of clearance (short T_1/2) with mean T_1/2 of 36 min ± 1sd of 11 mins, while the retention images revealed regional lung damage in moderately severe inhalation burns. Twenty-four patients with COPD had ventilation and perfusion lung scans; general the perfusion images matched the defects noted in the ventilation scans. The Tc-99m DTPA clearance rate in these patients was normal i.e. T_1/2 = 78 ± 14 mins. In the thyroid cancer patients with lung metastases, the T_1/2 remained similar to normal values or slightly prolonged.