

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

F.X. Sundram

Nuclear Medicine Department, Singapore General Hospital, Singapore

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 \pm 1sd of 12 mins. The smokers had a mean $T_{1/2}$ of 20 mins \pm 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 \pm 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. $T_{1/2}=78 \pm 14$ mins. In the thyroid cancer patients with lung metastases, the $T_{1/2}$ remained similar to normal values or slightly prolonged.