ORIGINAL ARTICLE

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Detection of alveolar epithelial injury by ^{99m}Tc-DTPA radioaerosol inhalation lung scan following blunt chest trauma

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DTPA clearance rate is a reliable index of alveolar epithelial permeability, and is a highly sensitive marker of pulmonary epithelial damage, even of mild degree. In this study, ^{99m}Tc-DTPA aerosol inhalation scintigraphy was used to assesss the pulmonary epithelial membrane permeability and to investigate the possible application of this permeability value as an indicator of early alveolar or interstitial changes in patients with blunt chest trauma. A total of 26 patients was chest trauma (4 female, 22 male, 31–80 yrs, mean age; 53 ± 13 yrs) who were referred to the emergency department in our hospital participated in this tsudy. Technetium-99m diethylene triamine pentaacetic acid (DTPA) aerosol inhalation scintigraphy was performed on the first and thirtieth days after trauma. Clearance half times ($T_{1/2}$) were calculated by placing a mono-exponential fit on the curves. Penetration index (PI) was calculated on the first-minute image. On the first day, mean $T_{1/2}$ value of the whole lung was 63 ± 19 minutes (min), and thirtieth day mean $T_{1/2}$ value was 67 ± 21 min. On the first day, mean PI values of the lung and 30th day mean PI value were 0.60 ± 0.05, and 0.63 ± 0.05, respectively. Significant changes were observed in radioaerosol clearance and penetration indices. Following chest trauma, clearance of ^{99m}Tc-DTPA increased owing to breakdown of the alveolar-capillary barrier. This increase in the epithelial permeability of the lung appears to be an early manifestation of lung disease that may lead to efficient therapy in the early phase.

Key words: ^{99m}Tc-DTPA aerosol inhalation scintigraphy, clearance, blunt chest trauma