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Clearance of technetium-99m-labeled DTPA in hyperthyroidism without clinical evidence of lung disease, and relation to pulmonary function

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Objective: The mechanisms of dyspnea and exercise intolerance have not been fully elucidated. We aimed to investigate the clearance rate of technetium-99m diethyltriaminepentaaceticacid (Tc-99m DTPA) from lungs in hyperthyroid patients without clinical evidence of lung disease and to explore the interactions between their Tc-99m DTPA radioaerosol lung scintigraphy, spirometric measurements, and the levels of thyroid hormones. ***Methods:*** We studied 19 hyperthyroid patients and 16 sex- and age-matched controls. Thyroid hormone levels were assessed. Spirometric lung function tests, diffusing capacity of the lung for carbon monoxide (DLCO) and the clearance rate of Tc-99m DTPA were performed in all participants. Ratio of DLCO value to the alveolar ventilation (DLCO/VA) and the means of half-time ($T_{1/2}$) of Tc-99m DTPA clearance rate, which were used to evaluate alveolar-capillary membrane permeability, were calculated. ***Results:*** There were no statistical differences between spirometric parameters (VC, FVC, FEV_1/FVC, FEF 25–75) of the two groups ($p > 0.05$). Although the mean FEV_1 level was significantly lower in the hyperthyroid patients than the control subjects ($p < 0.01$), in five patients FEV_1 was only less than 80 percent of the predicted value. No significant difference in the means of DLCO, DLCO/VA or $T_{1/2}$ values of Tc-99m DTPA clearance was observed between the two groups ($p > 0.05$). In hyperthyroid patients, there was a positive relation between DLCO/VA, DLCO/VA % and $T_{1/2}$ values of Tc-99m DTPA clearance ($p < 0.01$, $r = 0.732$, $p < 0.01$, $r = 0.742$, respectively). The lung volumes and the levels of thyroid hormones did not show a significant relationship to $T_{1/2}$ values of Tc-99m DTPA clearance in hyperthyroid group ($p > 0.05$). ***Conclusions:*** We conclude that increased thyroid hormones have no effect on permeability of alveolar-capillary membrane in hyperthyroid patients.

Key words: hyperthyroidism, pulmonary function, Tc-99m DTPA aerosol scintigraphy, alveolar-capillary permeability