

Use of iodine-123 metaiodobenzylguanidine scintigraphy for the detection of amiodarone induced pulmonary toxicity in a rabbit model: a comparative study with technetium-99m diethyltriaminepenta acetic acid radioaerosol scintigraphy

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The purpose of the study was; (i) to determine whether ^{123}I -MIBG scintigraphy is sensitive for detection of amiodarone induced pulmonary toxicity (AIPT) and (ii) to compare it with $^{99\text{m}}\text{Tc}$ -DTPA radioaerosol. Twelve white New Zealand rabbit with initial mean body weight 4.24 ± 0.47 g were divided into two groups. AIPT group ($n = 7$) was administered amiodarone (20 mg/kg BW). The control group ($n = 5$) received the same amount of 0.9% saline. All animals underwent ^{123}I -MIBG and $^{99\text{m}}\text{Tc}$ -DTPA radioaerosol scintigraphy at the end of the treatment period. ^{123}I -MIBG static thorax images were obtained during 10 minutes at 15 minutes and 3-hours after intravenous injection of the radiopharmaceutical. Lung to heart ratios (LHR) and lung to mediastinum ratios (LMR), and retention index (LRI) of ^{123}I -MIBG were determined. Two days after ^{123}I -MIBG scintigraphy, $^{99\text{m}}\text{Tc}$ -DTPA radioaerosol scintigraphy was performed, and clearance from the lungs was measured for 10 min (1 min/frame) following termination of inhalation. ^{123}I -MIBG lung retention index (LRI) was significantly higher in the AIPT group than the control (61 ± 4.6 vs. 40 ± 4.5 , $p = 0.01$). Early LHR and LMR were significantly lower in the AIPT group than in the control group ($p = 0.04$, $p = 0.01$, respectively), whereas those of late LHR and LMR were not significantly different. $T_{1/2}$ values of DTPA clearance were significantly increased in AIPT group according to the control group (55 ± 7.2 vs. 86.6 ± 18.5 , $p = 0.02$). ^{123}I -MIBG scintigraphy is a valuable tool for detecting AIPT in a rabbit model. Additionally, $^{99\text{m}}\text{Tc}$ -DTPA radioaerosol scintigraphy is an excellent comprehensive investigational tool for detecting AIPT with the added advantage of lower cost.

Key words: amiodarone, pulmonary toxicity, ^{123}I -MIBG, $^{99\text{m}}\text{Tc}$ -DTPA radioaerosol, scintigraphy