

Comparison of ^{99m}Tc -tetrofosmin uptakes on planar images with those in excised rats organs

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The radioactivity in the organs adjacent to the heart causes interference with the quantitative assessment of myocardial uptake of tracer on scintigraphy. In order to investigate how much the functions of these organs affect myocardial uptake seen in imaging, we compared the myocardial uptake measured by means of a gamma camera with the actual activity in the excised organs. **Methods:** Thirty-three rats were imaged at 5, 10, 15, 30, 45, 60, 90 and 120 min after the administration of ^{99m}Tc -tetrofosmin, and % injected dose per pixel (%ID/pixel) for each organ was assessed on planar images (PI measurement). Percent injected dose per gram of tissue (%ID/g) in the heart as well as lungs, liver, gastrointestines and blood was measured by means of a well scintillation counter (WC measurement). Comparison between PI and WC measurements was performed with % uptake, the PI-to-WC ratio and heart-to-organ ratios. **Results:** Our WC measurement showed an increase in cardiac uptake until 30 min ($1.67 \pm 0.31\%$) postinjection and subsequent gradual decrease, whereas PI measurement showed maximum activity of $1.81 \pm 0.52\%$ at 15 min postinjection. There was a prominent difference between the two measurements, particularly at 10 min, with a PI/WC ratio of about 1.6 times. Our WC measurement showed maximum pulmonary uptake at 15 min ($0.87 \pm 0.31\%$) and a gradual decrease over 15 min, whereas PI measurement showed maximum uptake at 10 min ($1.14 \pm 0.38\%$). There was hardly any variation in activity observed later than at 10 min. Our WC measurement showed hardly any variance in hepatic activity from 5 min ($0.77 \pm 0.19\%$) to 30 min ($0.69 \pm 0.27\%$) with a subsequent gradual decrease. The percent uptake in PI measurement was generally greater than that in WC measurement, and high values were found at 10 min and 15 min with PI/WC ratios of about 3.3 times and 2.3 times, respectively. **Conclusion:** Percent uptakes in PI measurement were greater than those in WC measurement. The difference between the two measurements was prominent in the early phases. The cardiac uptake in PI measurement was significantly greater than that in WC measurement at 10 min. It was considered that this discrepancy between the two measurements was caused by the Compton scatter from the organs adjacent to the heart.

Key words: ^{99m}Tc -tetrofosmin, myocardial uptake, planar image, scintillation counter, rat