

Evaluation of Tc-99m(V) DMSA for imaging inflammatory lesions: An experimental study

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The present study evaluated $^{99m}\text{Tc(V)}$ DMSA as an agent for the visualization of inflammatory lesions in comparison to $^{99m}\text{Tc(III)}$ DMSA and $^{99m}\text{Tc-HIG}$. All three radiopharmaceuticals were prepared with commercial kits. $^{99m}\text{Tc(V)}$ DMSA was prepared at neutral pH by the addition of first bicarbonate and then pertechnetate to the kit contents. The labeling efficiency was 99% as determined by ITLC. Abscesses were induced by i.m. injection of 50 μl turpentine into the right thighs of 36 Swiss albino mice. Six days later 3.7 MBq of each radiopharmaceutical was i.v. administered to 12 mice. The mice were sacrificed at 1, 3, 6 and 24 h later. Scintigrams were obtained with a gamma camera. The abscesses were better visualized on scintigrams with $^{99m}\text{Tc(V)}$ DMSA compared to $^{99m}\text{Tc(III)}$ DMSA, starting at 1 h. The animals were dissected and the organs were removed, weighed and the radioactivity determined with a gamma counter. The abscess to other tissue ratios were higher with $^{99m}\text{Tc(V)}$ DMSA than the other radiopharmaceuticals. The max. abscess/muscle ratios were 9.46 ± 3.20 (24 h), 4.19 ± 1.39 (6 h) and 5.98 ± 1.17 (24 h) and max. abscess/blood ratios were 6.22 ± 1.41 , 4.09 ± 0.84 and 0.914 ± 0.351 all at 24 h for $^{99m}\text{Tc(V)}$ DMSA, $^{99m}\text{Tc(III)}$ DMSA and $^{99m}\text{Tc-HIG}$, respectively.

Experimental arthritis was produced in 6 New Zealand white rabbits by intra-articular injection of ovalbumin. Four days later 37 MBq of $^{99m}\text{Tc(V)}$ DMSA and $^{99m}\text{Tc-HIG}$ were each i.v. administered to 3 rabbits. Scintigrams obtained at 1, 3, 6, and 24 h clearly demonstrated arthritic joints. ROI's over arthritic joints were compared to contralateral normal joints (A/C). The max. A/C ratios were 2.10 ± 0.31 (3 h) and 2.92 ± 0.99 (24 h) for $^{99m}\text{Tc(V)}$ DMSA and $^{99m}\text{Tc-HIG}$, respectively.

Our results indicated the feasibility of imaging inflammatory lesions with $^{99m}\text{Tc(V)}$ DMSA.

Key words: $^{99m}\text{Tc(V)}$ DMSA, $^{99m}\text{Tc(III)}$ DMSA, $^{99m}\text{Tc-HIG}$, inflammation, arthritis