Annals of Nuclear Medicine Vol. 6, No. 4, 209–214, 1992

The use of quantitative scintigraphy in the measurement of portal-systemic shunting in rats

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Portal-systemic shunting was studied in 54 portal hypertensive rats both *in vivo* and *in vitro* using radioactive microspheres. The animals underwent partial portal vein ligation around needles of varying diameter to produce a wide range of shunting. Two to four weeks later, quantitative lung-liver scintigraphic and whole body images were obtained *in vivo* following ileocolic vein injection with ^{99m}Tc-MAA. After sacrifice, the lung and liver activities were determined by the gamma camera, a dose calibrator, and a well counter. Portal-systemic shunting ranged from 0.1–97.6%. When shunting was compared *in vivo* and *in vitro*, an excellent correlation was found ($r=0.99$, $p<0.001$). A subgroup of 24 animals had consecutive injections of ^{99m}Tc-MAA and ^{51}Cr-labeled 15 μm microspheres, which, although different in size, yielded similar results ($r=0.89$, $p<0.001$). We conclude that in small laboratory animals a wide range of shunting can be measured accurately *in vivo* by quantitative scintigraphy.

Key words: portal hypertension, portal vein ligation, portal-systemic shunting, microspheres, ^{99m}Tc-MAA, quantitative scintigraphy