

Purpose: This study was to evaluate lung shunting from Tc^{99m} MAA and Y⁹⁰ imaging, and its effect on treatment planning. Y⁹⁰ Microspheres (Therasphere, MDS Nordion) have been used for the treatment of unresectable hepatocellular carcinoma (HCC). Tc^{99m} MAA imaging is utilized to assess pulmonary shunting which will affect treatment dose. Standard shunting compares the ratios of activity in the liver and lungs. **Method and Materials:** Twenty five patients were randomly selected to examine shunting ratios. Eight studies required the redrawing of RoIs to correct the variance in geometric mean. Actual activity was determined following treatment planning guidelines based on standard and measured shunting. Y-90 imaging of patients was also investigated for radionuclide distribution. **Results:** Inadequate RoIs were identified in 8 patients, which yielded up to 5% (mean 0.79%, STD 1.76%) difference (p=0.90) in lung shunting. The treatment dose showed 5.29% (mean 0.74%, STD 2.21%) deviation (p=0.91) caused by the ratios. It was further compared with standard ratios of 4% for none-HCC and 7% for HCC. Difference in the treatment doses from corrected ratios and the standard was: mean 9.01%, STD 19.7%, p=0.19 for the 4% and mean 5.18%, STD 19.0%, p=0.55 for the 7%. Y-90 patients images did not provide activity distribution in lungs when there was high shunting based on Tc^{99m} MAA imaging, but demonstrated Y-90 activity in liver. **Conclusion:** Tc^{99m} MAA imaging is important in treatment planning to avoid error from lung shunting. RoIs should be accurate and consistent to reduce error in treatment dose. Y-90 imaging depends on scatter characteristic of tissue and does not yield appropriate shunting images with Yttrium-90.