

Hepatectomy simulation discrepancy between radionuclide receptor imaging and CT volumetry: influence of decreased unilateral portal venous flow

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Background: Regional dysfunction demonstrated by Tc-99m-diethylenetriamine-penta-acetic acid-galactosyl human serum albumin (GSA) scintigraphy due to regional decrease in the portal venous flow has previously been reported. In this study, we call attention to the significance of unilateral portal venous flow decrease for preoperative hepatectomy simulation, and evaluate the hepatectomy simulation discrepancy between Tc-99m-GSA single-photon emission computed tomography (SPECT) and CT volumetry. **Methods:** Twenty-four hepatectomy candidates underwent preoperative hepatectomy simulation by both Tc-99m-GSA SPECT and CT volumetry. Both anatomical and functional resection ratios were calculated by means of CT volumetry and Tc-99m-GSA SPECT, respectively. The differences and ratios between anatomical and functional resection ratios were calculated in all patients, and compared in patients with and without unilateral portal venous flow decrease. **Results:** Anatomical resection ratios were 28.0 ± 11.7 (mean \pm standard deviation) in patients with unilateral portal venous flow decrease, and 42.1 ± 15.7 in patients without unilateral portal venous flow decrease ($p = 0.0127$). Functional resection ratios were 14.7 ± 12.8 in patients with unilateral portal venous flow decrease and 40.5 ± 14.6 in patients without ($p = 0.0004$). The differences between anatomical and functional resection ratios were 13.0 ± 7.9 in patients with unilateral portal venous flow decrease and 5.6 ± 3.1 in patients without ($p = 0.0099$). The ratios between anatomical and functional resection ratios were 0.48 ± 0.29 in patients with unilateral portal venous flow decrease and 0.86 ± 0.10 in patients without ($p = 0.0018$). In 12 of the 13 patients with unilateral portal venous flow decrease, anatomical resection ratios were found to be larger than functional resection ratios, whereas this happened in only 6 of 11 patients without unilateral portal venous flow decrease ($p = 0.0063$). **Conclusion:** Unilateral portal venous flow decrease is suspected to be a major factor in the discrepancy between hepatectomy simulations with radionuclide receptor imaging and CT volumetry.

Key words: ^{99m}Tc -GSA, receptor imaging, CT volumetry, hepatectomy simulation, portal venous flow