Abstract

Purpose: To retrospectively evaluate and correlate the contrast-enhanced computed tomography (CECT) and non-enhanced magnetic resonance imaging (MRI) during the early period following renal cryoablation.

Materials and Methods: Both dynamic CECT and non-enhanced MRI were performed within 4 days following cryoablation in 34 renal tumors in 33 patients. The renal volumes of the unenhanced regions on dynamic CECT (nephrogenic phase, 4-mm thickness) and the regions with signal intensity changes on non-enhanced MRI (fat-suppressed T2-weighted image, 4-mm thickness) were evaluated. Fusion images of the axial, coronal, and sagittal sections of CECT and MRI images were created from the maximum cross-section of the renal tumor, and the match score of each image was visually evaluated on a 5-point scale.

Results: The mean renal volume of the unenhanced regions on CECT and those with signal intensity changes on non-enhanced MRI following cryoablation were 29.5 ± 19.9 cm^3 (range, 4.3–97.4 cm^3) and 30.7 ± 19.8 cm^3 (range, 6.7–94.0 cm^3), respectively; the difference between them was -1.17 cm^3 (95% confidence interval [CI] -2.74, 0.40, P = 0.139). The Pearson's product-moment correlation coefficient (r = 0.975; 95% CI, 0.951, 0.988; P < 0.0001) showed a strong correlation between the volumes. The average match score between CECT and non-enhanced MRI was as high as 4.5 ± 0.5 points (radiologist 1, 4.3 ± 0.5; radiologist 2, 4.7 ± 0.5). Local tumor control rate was 94.1% (32/34 tumors) and recurrence-free survival rate was 82.0% (95% CI: 64.2%, 91.5%) at 5 years.

Conclusions: The region with signal intensity changes on non-enhanced MRI was strongly correlated with the unenhanced region on CECT during the early period following renal cryoablation.