Reliability of standardized uptake value normalized to lean body mass using the liver as a reference organ, in contrast-enhanced 18F-FDG PET/CT imaging

ABSTRACT

Purpose: To evaluate the reliability of standardized uptake value (SUV) normalized to lean body mass for maximum (SULmax) and mean values (SULmean) as well as maximum SUV values (SUVmax) in contrast-enhanced 18F-FDG PET/CT by assessment of inter-reader agreement, using the liver as a reference organ. Materials and methods: 272 images of baseline PET/CT scans were analyzed. A volume of interest (VOI) of 30-mm in diameter was placed by two independent readers in the right liver lobe to measure the parameters. An analysis was performed for the variance, intra-class correlation coefficient (ICC), and Bland-Altman plots. Results and discussion: For Reader 1, the SUVmax ranging from 1.33 to 5.94 (3.20 ± 0.69), SULmean ranging from 0.84 to 3.46 (1.90 ± 0.40) and SULmax ranging from 1.18 to 4.07 (2.38 ± 0.50), were obtained; for Reader 2 the SUVmax ranging from 1.47 to 5.43 (3.20 ± 0.70), SULmean ranging from 0.84 to 3.45 (1.90 ± 0.40), and SULmax ranging from 1.18 to 4.48 (2.38 ± 0.50), were obtained. The coefficient of variance for SUVmax, SULmean, and SULmax, were 21.9%, 21.1%, and 20.8%, respectively, having no significant differences between Reader 1 and Reader 2. The ICC of the two readers for SUVmax, SULmean and SULmax were 0.975, 0.982 and 0.977 (95% CI of 0.97, 0.98 and 0.97; $p < .001$) respectively. Bland-Altman plots revealed that SUVmax gave the best agreement with 97.1% of measurements falling within 2SD. Conclusion: There is an excellent inter-reader agreement for liver SUVmax, SULmean and SULmax, and the best reliability of measurements achieved with SULmax in contrast-enhanced PET/CT scans.

Keyword: Positron emission tomography; Oncology, quantification; Contrast-enhanced CT