Evaluation of the SUV values calculation and 4D PET integration in the radiotherapy treatment planning system.

To evaluate the SUV calculation and integration of the gated (4D) PET in the iPlan 4.0 treatment planning software (BrainLAB). Phantom and patient data for different tracers were used. Two comparisons were performed for each patient: for the delineated VOI, the maximum value of SUV in iPlan was compared with the results from TrueD software. For 10 patients lesion volumes were defined in both systems for a given SUV threshold and differences were calculated. For four patients examined with respiratory gated PET, SUV(max) and volume analysis was performed in each phase of the breathing cycle in the gated and the ungated PET. Maximum differences of 6% and 10% were found for phantom and patient measurements of SUV(max). For patient data, maximal differences in delineated volume of 10% for ungated and up to 27% for gated PET were found in both systems. This study suggests that for the safe implementation of PET data and delineation algorithms in the radiotherapy planning system, one has to be aware of the differences in SUVs and volumes found in the two systems.

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