

**Purpose:** Stereotactic body radiotherapy (SBRT) is associated with a high biological dose delivered in a small number of fractions. Before treatment the position of the tumor is verified on cone-beam CT (CBCT) and on-line position correction is applied. A correction is always verified by a second CBCT. As only translational errors in the tumor position can be corrected, it is hard to determine the effect of anatomical changes of the patient or dose changes in the organs at risk (OARs). The goal of this study was to evaluate the actual dose distribution in stereotactic lung cancer patients to determine whether on-line dose evaluation could improve the decision making.

**Methods:** The actual dose distributions were determined by recalculating the original treatment plans on CBCT. 108 CBCTs of 10 patients were analyzed retrospectively (54 before and 54 after correction). The actual dose distribution was compared to the original plan. We analyzed the relative change in volume of the internal target volume (ITV) receiving the prescribed dose,  $dV_{100\%}$ , where a negative value indicates an underdosage with respect to the plan, and we evaluated the volume that exceeded the constraints of the OARs.

**Results:** Before applying position correction  $dV_{100\%}$  was in the range -2% - 0 in 69% of the cases. In 7% the deterioration before correction was more than 30% with respect to the original plan. The average  $dV_{100\%}$  was -6.4% (range -75.9 to 0) before correction. After correction the largest error with respect to the plan was -0.07%. The OARs never exceeded their constraints, neither before nor after correction.

**Conclusions:** Compared to image-guided radiotherapy (IGRT), dose-guided radiotherapy (DGRT) may prevent the execution of unnecessary position correction and with that, treatment time can be reduced. Moreover, DGRT enables verification of the dose in the ITV and OARs in case of anatomical changes.

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