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# Comparative analysis of delivered and planned doses in target volumes for lung stereotactic ablative radiotherapy

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Background: Adaptive therapy has been enormously improved based on the art of generating adaptive computed tomography (ACT) from planning CT (PCT) and the on-board image used for the patient setup. Exploiting the ACT, this study evaluated the dose delivered to patients with non-small-cell lung cancer (NSCLC) patients treated with stereotactic ablative radiotherapy (SABR) and derived relationship between the delivered dose and the parameters obtained through the evaluation procedure.
Methods: SABR treatment records of 72 patients with NSCLC who were prescribed a dose of 60 Gy (Dprescribed) to the 95% volume of the planning target volume (PTV) in four fractions were analysed in this retrospective study; 288 ACTs were generated by rigid and deformable registration of a PCT to a cone-beam CT (CBCT) per fraction and the dose delivered to the patient was estimated.
Results: The prescribed dose was confirmed to be fully delivered to the tumor (internal target volume, ITV). Multiple linear regression analysis between the obtained parameters and the dose delivered to 95% volume of the PTV (D95%) revealed four PTV parameters [Warpmean, DSC, ΔHI, Dmean] and the PTV D95% to be significantly related. The ACT cases of high ΔHI were caused by higher values of the Warpmean and DSC from the deformation image registration. The mean values of PTV D95% and Warpmean showed significant differences depending on the lung lobe where the tumour was located.
Conclusions: Evaluation of the dose delivered dose to patients with NSCLC treated with SABR using ACTs confirmed that the prescribed dose was accurately delivered to the ITV. However, for the PTV, certain ACT cases characterised by high HI deviations from the original plan demonstrated variations in the delivered dose. These variations may arise from factors such as patient setup during treatment.

## Paper submission Plan

## Best Presentation

## Contribution track

ICABU WG4. Applications of Particle Beams

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