Purpose or Objective: The aim of the study was to analyze tumor volume variations, by contouring on cone-beam computed tomography (CBCT) images, to evaluate early predictive parameters of Flattening Filter Free Stereotactic Ablative Radiation Therapy (SABR) treatment response.

Material and Methods: The prescribed dose of SABR varied according to the tumor site (central or peripheral) and maximum diameter of the lesions using a strategy of risk-adapted dose prescription with a range of dose between 48 and 70 Gy (3-10 consecutive fractions). For the purpose of the analysis, gross tumor volume (GTV) was re-contoured for each patient at first and last CBCT using two lung levels/window: 1) -600/-1000 Hounsfield Units (HU) and 2) -1000/-250 HU. Statistical analysis was performed to evaluate correlations between target variations on CBCT, using the two window-levels, and treatment response three months after the end of SABR. The analysis was conducted considering the following variables: number of fractions, BED 95-110, BED > 110 and GTV volume pre-SABR > 6 cc.

Results: 41 lung lesions were evaluated. The median follow-up was 14 months (range, 5 - 43 months). For both the CBCT level/windows, GTV shrinkage of at least 20% was associated to the probability of achieving a disease complete response (CR) at 3 months. The probability of CR ranged between 6 and 8 times higher, in respect to the CBCT lung level adopted, comparing to patients without a GTV decrease of 20%. This cut-off value was confirmed for all the variables analyzed.

Conclusion: According to current findings, a tumor shrinkage cut-off of at least 20% at last session of SABR is predictable for CR.