Abstract ID: 16884 Title: Relative gamma analysis approach using an EPID portal dose-based to set CBCT imaging decision threshold for lung patients.

Purpose: Determine decision thresholds for replanning lung tumor patients and verify the relation between volume variations and thresholds.

Method and Materials: We used a relative gamma analysis approach with an EPID portal dose-based imaging on Varian Clinac iX. After testing our preliminary thresholds against a weekly CBCT with the first patient, we followed 24 patients with lung tumor. Typically patient received 60 Gy in 30 fractions. When threshold were reached, a CBCT was done to evaluate the quality of the planning. If the target moves outside planning margin or OAR doses increased, a replanning procedure started. Only 3 patients were planned with IMRT. A target volume study, final CBCT volume over initial CT volume, was made for 17 patients to check if there is a relation between thresholds and volume variation. The effect of chemotherapy is also verified.

Results: The thresholds were evaluated with the first patient using a weekly CBCT. A good correlation of 0.98 was found between %>1 and the average gamma. The thresholds of 15% and 0.60 were confirmed for %>1 and average gamma respectively. 8 patients exceeded the thresholds but only 3 were replanned due to target outside margins. 2 other patients became palliatve one. For the target volume study, 6 patients who has exceeded thresholds the mean Vf/Vi has 0.45 ± 19 and 0.80 ± 0.38 for the other 11 patients. In those 11 patients, if we remove 4 patients with a diffuse tumor, the mean Vf/Vi becomes 0.85 ± 0.08. Chemotherapy does not have an effect on this study or the relative gamma analysis.

Conclusion: The utility of gamma analysis from dose EPID images was demonstrated for patients having lung tumor treatments. With this technique, CBCT scan has to be done only when EPID gamma analysis indicates significant dosimetric change