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Is There Any Prognostic Significance of the Level of Change in SUVmax after SBRT in Patients with Early Stage NSCLC?

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Objectives: We aimed to evaluate the prognostic significance of the level of change in SUVmax (Δ SUVmax) between pre and post-treatment in esNSCLC patients treated with SBRT.

Methods: Between November 2009-February 2018, pathologically proven esNSCLC patients (T1-2N0M0) treated with CyberKnife as primary treatment alone and who had pre and post-treatment PET/CT were retrospectively identified. The Δ SUVmax was calculated using formula Δ SUVmax=(PostSBRT SUVmax- PreSBRT SUVmax)/(PreSBRT SUVmax). The area under the curve (AUC) was used to verify the accuracy; the product of maximum sensitivity and specificity was chosen as the cutoff value. Then, we stratified the study cohort above and below AUC and the survival data were estimated by Kaplan Meier method. Univariate and multivariate analyses were carried out by use of a Cox proportional hazards model.

Results: A total of 48 patients with median age of 67 (range: 54-84 years) were identified. All patients had biopsy-confirmed NSCLC (22 (45.8%) squamous cell carcinoma, 13 (27.1%) adenocarcinoma). Median dose was 45 Gy/3 fr (range: 45-60 Gy/3-5 fr). According to EORTC metabolic response criteria at 12-16 weeks after SBRT, 8 (16.7%) patients achieved complete response, 35 (72.9%) patients achieved partial response, and 2 (4.2%) patients had progressive disease. AUC was calculated as 0.62 for cutoff Δ SUVmax (sensitivity 79%, specificity 45%). Δ SUVmax was \geq 0.62 in 7 of 8 patients with complete response and<0.62 in progressive 2 patients. At a median follow-up of 23 (range: 6-92) months local, regional and distant relapse were developed in 16 (33.3%), 11 (22.9%), and 16 (33.3%) patients, respectively. 29 (60.4%) patients were still alive at the time of analysis. Median PFS was 15 (range: 6-54) vs 59 (range: 10-92) months (p=.012) and median OS was 36 (range: 10-75) vs 70 (range: 23-92) months (p=.045) in patients with Δ SUVmax<0.62 and \geq 0.62, respectively. In univariate analysis, sex, age, KPS, tumor histology, T stage, PTV volume, and BED10 was not significantly associated with and both PFS, and OS. In both univariate analysis, the lower Δ SUVmax (as both dichotomous and continuous variable) was determined as a negative prognostic factor on PFS and it has been showed that the lower Δ SUVmax (only as a dichotomous variable) is a negative prognostic factor on OS in multivariate analysis.

Conclusion: Δ SUVmax is a prognostic factor in esNSCLC patients treated with SBRT and patients with higher Δ SUVmax (\geq 0.62) have better PFS and OS.

Keywords: Non-small cell lung cancer, Stereotactic body radiotherapy, Cyber Knife, SUVmax