Risk-adapted lung SBRT for central and ultra-central tumors

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Purpose: Stereotactic body radiation therapy (SBRT) is a widely-accepted treatment for early-stage lung cancer, however, safety concerns in the treatment of central (C) lung tumors have been raised. In addition, a new concept, called “ultra-central” (UC) tumor, has emerged. Currently, it is not known if outcomes and toxicities of SBRT for C and UC tumors are the same. Herein we report our institution’s experience for these tumors, where a risk-adapted fractionation with prioritization of dose to organs at risk was used.

Methods: Our SBRT institutional database was retrospectively reviewed to extract C (RTOG 0813 definition) and UC tumors. Tumors with a 5mm planning target volume (PTV) overlap of the proximal bronchial tree, pericardium, major vessels or esophagus were classified as UC. Primary lung tumors and recurrent lung cancer were included. We assessed local control (LC) and overall survival (OS) using the Kaplan-Meier method. Outcomes of C and UC tumors were compared. Toxicity was assessed following Common Criteria Terminology for Adverse Events v4.03.

Results: From 2009 to 2016, 44 C and 60 UC tumors were treated in 103 patients. Primary lung adenocarcinoma was confirmed in 34% of cases, epidermoid carcinoma in 27%, others histologies in 10%. In 29% there was no histologic confirmation but a progression pattern on several imaging. Median patient’s age was 76 years (range 51-94) and 83% were surgically inoperable. Stage I and stage II accounted for 66% and 34%, respectively. Median tumor size was 2.4 cm (range 0.9-6.5). Median follow-up was 18 months (range 6-85) for the whole population, 21 months (range 6-85) for C tumors and 18 months (range 6-62) for UC tumors. The median fractionation schedule delivered to the PTV was 50 Gy (range 40-60) in 5 fractions (range 2-8). Actuarial LC rates at 12 and 24 months were 97% and 93%, respectively, and actuarial 12- and 24-months OS rates were 93% and 80%. There were no significant differences between C and UC tumors for LC and OS. OS at 12- and 24-months was 97% and 84% for C tumors vs 91% and 77% for UC tumors, respectively.

Conclusion: SBRT for C or UC lung tumors is associated with high LC and OS rates, despite a less aggressive treatment scheme than in peripheral tumors. C and UC tumors appear to have comparable outcomes. Toxicity results are pending and will be presented at the meeting.