PROSPECTIVE EVALUATION OF QUALITY OF LIFE AND PULMONARY FUNCTION IN EARLY-STAGE NON-SMALL CELL LUNG CANCER PATIENTS TREATED WITH ROBOTIC SBRT: 5-YEAR RESULTS

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Abstract

Purpose: To prospectively evaluate the quality of life (QoL) and pulmonary function of patients with early-stage non-small cell lung cancer (NSCLC) treated with robotic stereotactic body radiation therapy (SBRT).

Methods and materials: Eligible patients had histologically confirmed T1-T2N0M0 NSCLC and were not surgical candidates. SBRT was delivered with CyberKnife® at a median dose of 60 Gy in 3 fractions for peripheral tumors and 50 Gy in 4 or 5 fractions for central tumors. QoL was scored using the European Organisation for Research and Treatment of Cancer
Quality of Life Questionnaire C30 (QLQ-C30) and Lung Cancer-13 questionnaires. Pulmonary function tests (PFTs) included forced expiratory volume in 1 second (FEV1) and lung diffusion capacity of carbon monoxide (DLCO). Changes over time in QoL scores and PFTs were tested with nonparametric tests for longitudinal data. Tumor control and survival rates were estimated with the Kaplan-Meier method. Toxicity was assessed with the Common Terminology Criteria for Adverse Events version 3.0.

**Results:** From January 2010 to May 2013, 45 patients were enrolled. Median follow-up was 63 months. QLQ-C30 mean (±SD) baseline scores for global QoL and physical functioning were 66 ± 20% and 73 ± 22%. Multilevel analyses showed no statistically and clinically significant (10-point change) deterioration in any of the QoL scores after SBRT. Mean baselines PFTs were 68 ± 23% for FEV1% and 63 ± 25% for DLCO%. There was a progressive decline in mean PFTs of 1.2%/year for FEV1% and 2.3%/year for DLCO% that did not reach statistical significance. At 5 years, actuarial estimates for local control, disease-free survival, and overall survival were respectively 94%, 46%, and 59%. One patient with a history of idiopathic pulmonary fibrosis died of radiation pneumonitis.
three months after treatment. Grade 3 dyspnea occurred in three (7%) patients and four (9%) patients presented with grade ≤2 radiation-induced rib fractures.

**Conclusions:** In early-stage inoperable NSCLC patients, SBRT may achieve long-term tumor control while maintaining QoL and pulmonary function.