Impact of 4-Dimensional CT (4D-CT) on Toxicity, Outcomes, and Dose Escalation for Radical Lung Cancer Radiation Therapy


Document Version:
Publisher’s PDF, also known as Version of record

Queen's University Belfast - Research Portal:
Link to publication record in Queen's University Belfast Research Portal

Publisher rights
Copyright 2013 Elsevier.
This manuscript is distributed under a Creative Commons Attribution-NonCommercial-NoDerivs License (https://creativecommons.org/licenses/by-nc-nd/4.0/), which permits distribution and reproduction for non-commercial purposes, provided the author and source are cited

General rights
Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
The Research Portal is Queen’s institutional repository that provides access to Queen’s research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person’s rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.
of the histological types of non-SCLC, accounting for 1-3% of all SCLC. The low incidence has precluded the development of randomized clinical trials. To investigate the clinical features, prognostic factors, as well as the role of radiation therapy, we designed this retrospective analysis.

**Materials/Methods:** Between January 2004 and December 2011, patients with histologically diagnosed CSCLC in CHI-CAMS were retrospectively analyzed. The overall survival (OS), progression free survival (PFS), loco-regional recurrence free survival (LRFS), and distant metastasis survival (DMFS) were calculated by Kaplan-Meier method.

**Results:** Forty-four patients were enrolled, with a median age of 59 years old. The most common combined component was squamous cell carcinoma (59.1%). The disease of stage I, II, III and IV was 13.6%, 20.5%, 47.7% and 18.2%, respectively. Thirty-seven patients (84.1%) received multimodality treatment, including 37 (84.1%) with chemotherapy, 34 (77.2%) with surgery, and 23 (52.3%) with radiation therapy. The median follow-up was 24 months. The median time of OS, PFS and LRFS was 26.5-, 13.3-, 18.4-month, respectively. The 1-, 3- and 5-year OS was 68.6%, 46.9% and 32.8%, respectively, with corresponding PFS of 51%, 45.4% and 32.3%, and LRFS of 61.7%, 43.3% and 34.6%, respectively. The median DMFS of patients with stage I-III disease is 40.8 months, with 1-, 3- and 5-year DMFS of 59.5%, 51.5% and 36.6%, respectively. On univariate analysis, KPS 3 cm (p = 0.049) and positive margin (p = 0.001) were associated with lower OS. Radiation therapy significantly improved OS in patients with IIIA/IIIB disease (p = 0.032), positive lymph nodes (p = 0.006), trended to increase the OS in patients with T3-4 disease (p = 0.179), but not in those with different age, sex or tumor site. For patients who had received surgery, radiation therapy significantly improved OS only in patient with >4 metastatic lymph nodes (p = 0.025).

**Conclusions:** CSCLC is a rare type of SCLC with relative limited stage and good prognosis. KPS 3 cm and positive margin were poor prognostic factors. At present, multimodality therapy is recommended. Radiation therapy can benefit the patients with IIIA/IIIB CSCLC, or positive lymph nodes, or those with >4 metastatic lymph nodes after surgery.

**Author Disclosure:** Y. Men; None. H. Zhonguang; None. L. Jun; None. L. Jima; None. Z. Zongmei; None. X. Zefen; None. F. Qinfu; None. C. Dongfu; None. Z. Hongxing; None. X. Zefen; None. W. Luhua; None.

---

**Thoracic-Only Extensive Stage Small Cell Lung Cancer: Assessment of the Benefit of Thoracic and Brain Radiation Therapy Using the SEER Database**

O.M. Mahmoud,1 B. Greenfield,2 J. Wright,1 and M. Samuels1; 1Radiation Oncology Department, Sylvester Comprehensive Cancer Center, University of Miami, Miami, FL, 2Radiation Oncology Department, Baylor College of Medicine, Houston, TX

**Purpose/Objective(s):** Extensive-stage small cell lung cancer (ES-SCLC) includes patients with metastatic disease outside the thorax as well as those with locally advanced disease confined to the thorax without distant metastases. The latter group involves thoracic disease that cannot be encompassed in a practical radiation portal either due to an extremely large primary, contralateral lung parenchymal disease, pleural effusion or diffuse lung disease. Thoracic radiation therapy (TRT) and brain radiation therapy (BRT) have been used in patients with ES-SCLC after achieving a response to chemotherapy. This study aims to assess the benefits of TRT and/or BRT on overall survival (OS) in thorax confined ES-SCLC (T) in comparison to those benefits in the metastatic group (M) using a Surveillance, Epidemiology, and End Results (SEER) database analysis.

**Materials/Methods:** Demographic and staging data, identified from National Cancer Institute’s SEER program, were available in 50,193 ES-SCLC pts, diagnosed between 1989 and 2009. TRT and BRT data were available for 10,191 pts treated between 1998-1997. The T ES-SCLC group included 1122 pts (11%). OS and CSS were estimated by the Kaplan-Meier method. OS hazard ratios (HR) for prognostic factors included patient age, gender, race, tumor size, grade, laterality, T and N stage, TRT, BRT and year of diagnosis were estimated using the Cox proportional hazards model.

**Results:** In the T group, TRT and BRT were delivered in 533/1122 and 69/1122, respectively. The 3 year OS was 6.6% vs 3% favoring the TRT vs no TRT group (p < 0.001). Patients who received BRT had 11.5% OS at 3 years vs 4.5% without BRT (p < 0.001). The multivariate analysis (MVA) of OS in the T group was significant for age at diagnosis >70 years with a hazard ratio (HR) = 1.85, p < 0.001, TRT (HR = 0.7, p < 0.001) and BRT (HR = 0.7, p = 0.0078). In the metastatic group (M), 3065/9069 received TRT while 1908/9069 received BRT. The 3 year OS was 2.4% vs 1.1%, favoring the TRT vs no TRT group (p < 0.001). BRT had 2.1% OS at 3 years vs 1.4% (p < 0.001) in the no BRT group. Similar to the T...