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Effect of cigarette smoking on quality of life in small cell lung cancer patients

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Abstract *Background:* Continued cigarette smoking after small cell lung cancer (SCLC) diagnosis has been shown to shorten patients' survival, but little is known about the impact of smoking and cessation on quality of life (QOL) profile (e.g., overall QOL, pain, fatigue, cough, dyspnea, appetite change, and performance status) in SCLC survivors (who survived at least 6 months post initial diagnosis). In this study, we sought to evaluate the relationship between cigarette smoking and QOL profiles in SCLC patients.
Methods: A total of 223 survivors were classified into five groups: never smokers, former smokers (quit more than 1 year prior to diagnosis), recent quitters (quit within 1 year surrounding diagnosis), late quitters (quit after 1 year post diagnosis) and never quitters. One hundred and sixty-eight of these survivors were matched with 334 lung-cancer-free controls on age, gender, and smoking status for comparative analysis. QOL scales were scored from 0 (worse) to 100 (best). Conditional logistic regression, linear mixed-effect models, and Wilcoxon signed rank tests were used.
Results: SCLC survivors consistently showed a significant deficit in QOL profile; e.g., mean overall QOL in patients was 17.5 points worse than the controls ($p < 0.0001$). Among all smokers, former smokers reported the best QOL profile, while late or never quitters reported the worst. The recent quitters showed an improving trend in QOL profile and lower percent of reduced appetite (an average of 43%) compared to the late or never quitters (58%).

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Conclusions: Our study confirmed the negative impact of smoking on SCLC survivors' QOL and found that smoking cessation surrounding the time of diagnosis could improve overall QOL and symptoms. The findings of this study provide evidence for oncologists to recommend smoking cessation to their SCLC patients.

1. Introduction

Health-related quality of life (QOL) has become a very important outcome for cancer therapy especially when the treatment intent is supportive or palliative or the survival benefits are modest. Therefore, although survival is generally the most important measurement for treatment efficacy, patients and physicians are giving greater consideration to multiple dimensions of QOL including symptom burden. Indeed, QOL at baseline may be as important as stage and performance status in predicting non-small cell lung cancer (NSCLC) survival,[1] but the QOL of small cell lung cancer (SCLC) has not been well documented. SCLC represents approximately 13% of all lung cancer[2] and is the most aggressive cell type among all subtypes. From the time of diagnosis, the median ranges of survival for limited stage and extensive stage SCLC are 15–20 months and 8–13 months, respectively.[3,4] Despite that a modest improvement has been achieved in the past two decades in treating SCLC,[5–7] treatment bears positive and negative effects on patients' QOL. Specifically, side-effects from various therapies could severely deteriorate patients' conditions.

Cigarette smoking is the most predominant risk factor in SCLC prognosis. A personal history of cigarette smoking has been associated with decreased overall survival among patients receiving treatment for both SCLC and non-small cell lung cancer (NSCLC).[8–11] Our recent study of a series of 284 SCLC patients also showed that compared to continuing smokers (those who never quit smoking), patients who quit at or after diagnosis cut the risk of death by 45%,[7] but little is known about smoking's effects on patients' QOL in SCLC survivors. The negative effects of cigarette smoking on QOL in general and specific disease populations have been well established, including NSCLC patients.[12–19] In this study, we sought to determine the relationship between smoking and QOL profile, including overall QOL and selected symptoms, in a relatively large series of SCLC survivors. We hypothesised that cigarette smoking would have a negative effect on the QOL profile of SCLC survivors, and we specifically evaluated the differing effects of the timing of smoking cessation.

2. Methods and materials

2.1. Patients follow-up and clinical data

This study was undertaken within a prospectively followed lung cancer patient cohort at Mayo Clinic in Minnesota starting on January 1, 1997, and was approved by the Mayo Clinic Institutional Review Board. Informed consent was obtained from the subjects and/or proxies. Details of patient enrollment, diagnosis confirmation, follow-up procedures, data collection, and quality assurance have been previously reported.[20,21] In brief, at enrolment, each patient's medical record was reviewed and the diagnosis was confirmed. SCLC was classified into the two stage system: limited stage SCLC is defined as disease confined to the ipsilateral hemithorax and within a single radiotherapy port and extensive stage SCLC is defined as evident metastatic disease outside the ipsilateral hemithorax.[22] To acquire complete follow-up information, all patients were actively followed by a series of questionnaires, including QOL and symptom questions beginning within 6 months post diagnosis and then annually thereafter. Of all patients in this study who answered their first questionnaire within 12 months post diagnosis, 9.4% answered between months 3–6 and 90.6% answered between months 7–12.

Information on current and past use of tobacco products was self-reported and collected each time during follow-up through a structured questionnaire. A never smoker was defined as one who had smoked less than 100 cigarettes in his or her lifetime. Current smokers were individuals who reported tobacco use within the same year of their diagnosis. In order to evaluate the impact of timing on the QOL profile in this study, we categorised survivors according to time of smoking cessation in relation to diagnosis time: early quitters (more than 1 year prior to the date of diagnosis), recent quitters (within 1 year surrounding diagnosis, either prior to or after the date of diagnosis), late quitters (after 1 year post diagnosis) and never quit.

2.2. Health-related quality of life (QOL) assessment

The QOL measure was a built-in component of the lung cancer follow-up questionnaire. The Lung Cancer Symptom Scale (LCSS) was used at the outset, starting in October 1999. In April 2005, the Linear Analogue Self-Assessment (LASA) was implemented and the redundant LCSS items were dropped to minimise patients' burden yet expand QOL measures beyond symptoms. Both are previously validated QOL tools.[23,24] For the purpose of this study, we focused on the five overlapping items between these two tools: pain, fatigue, cough, dyspnea and overall QOL. Two