Prevalence and Predictors of Symptoms in the Terminal Stage of Lung Cancer*

A Community Study

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Background: **There is little knowledge concerning the prevalence and predictors of symptoms in the terminal stage of lung cancer.**
Methods: **We examined, retrospectively, all cases of lung cancer diagnosed from 1990 to 1996 in a defined hospital area in Norway. All medical records from general practitioners, nursing homes, and hospitals were investigated. A total of 271 cases were diagnosed, and 247 of 253 deaths (98%) were analyzed.**
Results: **In the terminal 8 weeks, pain was recorded in 85% of the patients, psychological symptoms (anxiety, insomnia, and/or depression) in 71%, dyspnea in 54%, neurologic symptoms in 28%, cough in 24%, nausea in 21%, and hemoptysis in 9%. Young age ($p = 0.02$) and small cell lung carcinoma ($p = 0.03$) were risk factors for psychological symptoms. Terminal dyspnea was more frequent in patients with stage III ($p = 0.002$) and nausea in stage IV ($p = 0.02$) at the time of diagnosis, while cough ($p = 0.04$) occurred more often in non-small cell lung carcinoma. Terminal pain was independent of gender, age, performance status, stage, and histology.**
Conclusion: **In a community health service encompassing all lung cancer patients, pain, psychological symptoms, and dyspnea were frequent complaints in the terminal phase. Terminal dyspnea and nausea were associated with staging at the time of diagnosis, and terminal cough and nausea were associated with histology.** ***(CHEST 2007; 131:389–394)***

Key words: critical care; epidemiology, pulmonary; lung cancer

Abbreviations: CI = confidence interval; NSCLC = non-small cell lung carcinoma; OR = odds ratio; SCLC = small cell lung carcinoma; WHO = World Health Organization

The mortality rate of lung cancer is high, and there has been little improvement in the long-term survival over the last 40 years.[1–3] In addition, information is lacking whether sex, age, initial stage and performance status, and histology may predict the presence of serious symptoms in the terminal stage. In previous community studies of patients dying from lung cancer, 78% displayed dyspnea and 85% had pain in the final year of life,[4] while depression was observed in 33% of patients with lung cancer referred to palliative treatments centers.[5] In the first study,[4] the participation rate was only 69%, while the latter[5] was comprised of patients from three lung cancer trials with very different inclusion criteria. Comparison of these studies is difficult due to these different inclusion criteria and also to information gathered at various points during the course of the disease. Quality of life measurements give incomplete information at the end stage because many

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This work was performed at Haugesund Hospital.
The authors have no conflicts of interest to disclose.

Manuscript received May 12, 2006; revision accepted August 10, 2006.

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DOI: 10.1378/chest.06-1233

patients are unable to fill out the questionnaires.[6] Therefore, information is not available concerning the incidence and prevalence of major symptoms in the terminal care of lung cancer patients from a population-based study.[7]

In this retrospective study, we collected information concerning the frequency of symptoms at the end stage of all lung cancer patients within a geographic area of Norway. Furthermore, we have examined if these symptoms could have been predicted at the time of diagnosis by gender, age, extension of the neoplasm, functional performance, and histology of the tumor.

Materials and Methods

Study Location

Haugalandet is located in southwest Norway and includes the city of Haugesund and nine surrounding municipalities. In 1996, the hospital district consisted of 100,724 inhabitants, of whom 77,337 were > 15 years of age.

Cases

The diagnosis of lung cancer was confirmed by histology or convincing radiologic signs (chest radiography, CT). Included in this survey were the following: (1) all new patients in the Norwegian Cancer Registry[8] with lung cancer in International Classification of Diseases, Seventh Revision (1990 to 1992) and International Classification of Diseases, Ninth Revision (1993 to 1996) living in Haugalandet; and (2) all new lung cancer patients admitted during 1990 to 1996 to Haugesund Hospital. Exclusion criteria were as follows: (1) patients with lung cancer in the same period but not residents of Haugalandet; (2) patients alive as of December 1, 2003; and (3) patients with no records of the terminal stage of the disease. The study was approved by the Regional Committee for Medical Research Ethics of West Norway.

Case Record Form

The case record forms included data at the time of diagnosis on sex; age; description of primary tumor (T); regional lymph nodes (N); distant metastasis (M); stage group according to the International System for Staging Lung Cancer[9]; and histology and initial performance status scale according to the World Health Organization (WHO).[10] Signs, symptoms at the time of diagnosis and in the terminal 8 weeks, treatment, place of death (home, hospitals, and nursing homes), and concurrent diseases were recorded.

Terminal Symptoms

The terminal stage of lung cancer was defined as the last 8 weeks of life, and relevant terminal symptoms were extracted from patient records. Pain was graded according to its intensity: if the symptoms required peripheral analgesics, opioids, or a morphine infuser. The presence and possible causes of dyspnea (central stenosis when a tumor was observed on bronchoscopy, pleural fluid observed on chest radiographs, or other reasons) was recorded. Psychological symptoms were recorded in patients files and in addition prescribed drugs according to the Anatomical Therapeutic Chemical Classification System,[11] in which drugs are localized into different groups according to the organ or system on which they act: depression, when administered antidepressive medication (N 06); anxiousness, when administered diazepam (N05 B A 01) or other anxiolytic treatments (N05 B A 04); or insomnia, when administered hypnotics (N 05 C). Dizziness, headache, or signs of paresis were defined as neurologic symptoms. Additional terminal symptoms recorded were nausea, cough, and hemoptysis. The number of weeks in the terminal 8 weeks treated for pain, psychological symptoms, and dyspnea was recorded. The case record form was tested in a pilot study of 20 patients by two consultants in internal medicine. The wording of the questions was thereafter improved, a semiquantification of symptom load was added, and imprecise questions were deleted. Dates of death were collected from the Cancer Registry of Norway.[8] The records from hospitals, nursing homes, and general practitioners were reviewed randomly by three physicians following written instructions provided by the principal author.

Statistical Methods

The case record forms were scanned into a database in Microsoft Excel Worksheet (Microsoft; Redmond, WA) and then imported into a statistical program (SPSS 10.5; SPSS; Chicago, IL). Gender, age, initial stage and performance status, and histology were analyzed as predictors for symptoms such as pain, dyspnea, nausea, cough, psychological symptoms, and neurologic signs, respectively, using two-way contingency tables. Finally, backwards multiple logistic regression analysis was performed for each symptom with respect to the potential predictors and adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were calculated.

Results

Demography

There were 271 incident lung cancer patients from 1990 to 1997. Eighteen patients (6.6%) were alive by December 1, 2003. The diagnosis was confirmed by histology in 218 patients (89%). Information on symptoms and treatment in the terminal 8 weeks were collected from 247 of the 253 patients (98%) who died within this period of surveillance. One patient died abroad, and the records of five patients were not available. Only 53 of the 247 deaths (22%) were in women. The distribution of age, stage, performance status, and histology at the time of initial diagnosis (Table 1) did not differ between genders ($p > 0.05$). Of 56 patients with small cell lung carcinoma (SCLC) 27 patients had localized disease corresponding to stage I-III, and 29 patients had extensive disease with metastasis corresponding to stage IV. The average age was 68.5 years (SD, 10.1 years; range, 38 to 89 years). Initial antineoplastic treatment (surgery, radiotherapy, and/or chemotherapy) was administered to 60% of the patients. Lung cancer was the underlying cause of death in 227 patients and was contributory to death in 15 of the remaining 20 patients. The average time from beginning of symptoms to diagnosis was 89 days.