ORIGINAL ARTICLES

# Bronchogenic Carcinoma 2000-2001: Characteristics and Overall Survival

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**OBJECTIVE: To describe the clinical characteristics and survival of patients diagnosed with bronchogenic carcinoma during the years 2000 and 2001 in a tertiary level hospital.**

**PATIENTS AND METHODS: Data were collected from our hospital´s tumor registry and validated with independent sources. Of all the patients diagnosed with or treated for bronchogenic carcinoma in our hospital, only those from our health care area were selected.**

**RESULTS: During the 2-year study period, 482 patients were diagnosed. Of those, 90% were men. The mean (SD) age was 66.6 (9.65) years. Large cell carcinomas accounted for 29.4% of cases. Of all the cases of bronchogenic carcinoma, 41.3% were diagnosed in stage IV. Thirty percent of non-small cell carcinomas were classified as stage I, compared to 6% of small cell carcinomas (*P*<.001). The most frequent treatment was chemotherapy (42.1%) and 20% of patients underwent surgery. The overall 5-year survival rate was 13% (95% confidence interval [CI], 10%-16%), while survival was significantly lower in patients aged 68 years or older (95% CI, 3%-15%; *P*<.001) and in patients with small cell carcinoma (0%, *P*<.01).**

**CONCLUSIONS: Our recent experience (2000-2001) confirmed the advanced age of patients with bronchogenic carcinoma, the frequency of diagnosis in advanced stages of the disease (41% in stage IV), and the low overall 5-year survival rate (13%).**

**Key words:** *Carcinoma, bronchogenic. Survival. Staging. Prognosis.*

## Carcinoma broncogénico 2000-2001: características y supervivencia global

**OBJETIVO: Describir las características clínicas y la supervivencia de los carcinomas broncogénicos (CB) diagnosticados durante los años 2000 y 2001 en un hospital terciario.**

**PACIENTES Y MÉTODOS: La información se recogió de la base de datos del Registro de Tumores del hospital y se validó con fuentes independientes. De todos los pacientes con CB diagnosticados o tratados en nuestro centro, se seleccionó a los que provenían exclusivamente del área de salud correspondiente.**

**RESULTADOS: Se diagnosticaron 482 casos en los 2 años del estudio; un 90% de los pacientes eran varones. La edad media ± desviación estándar fue de 66,6 ± 9,65 años. El 29,4% eran CB de células grandes. El 41,3% de todos los CB se diagnosticaron en estadio IV. El 30% de los CB no microcíticos se clasificaron en estadio I, en comparación con el 6% de los CB microcíticos (p < 0,001). El tratamiento más frecuente fue la quimioterapia (42,1%); la cirugía se efectuó en el 20% de los casos. La supervivencia global a los 5 años fue de 13% (intervalo de confianza del 95%, 10-16%), y fue significativamente inferior (p < 0,001) en los pacientes con mayor edad (≥ 68 años), en quienes se cifró en un 9% (intervalo de confianza del 95%, 3-15), y en el CB microcítico (0%; p < 0,01).**

**CONCLUSIONES: Se confirma en nuestra reciente experiencia (2000-2001) la elevada edad de los pacientes con CB, el frecuente diagnóstico en estadios avanzados (estadio IV: 41%) y la deficiente supervivencia global a los 5 años (el 13% del global).**

**Palabras clave:** *Carcinoma broncogénico. Supervivencia. Estadificación. Pronóstico.*

## Introduction

Bronchogenic carcinoma is the most common tumor in men and the one associated with the highest mortality rate. It is estimated that in Spain this cancer causes 17 000 deaths annually,[1] and this rate is expected to remain unchanged in the coming years. The overall survival rate of bronchogenic carcinoma, not only in Spain but worldwide, has not changed substantially despite medical advances and the introduction of new therapies in the last 3 decades.[2,3] Various studies have provided reliable data on survival of patients in Spain who have undergone surgery,[4-7] but few have examined survival over the entire spectrum of diagnosed cases of the disease.

Our hospital´s tumor registry was begun 6 years ago and includes data on all the tumors diagnosed and treated in our hospital. Due to their high prevalence, lung tumors

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in general, and bronchogenic carcinomas specifically, represent a large component of the registry.

The objective of the present study was to describe the general characteristics and overall 5-year survival of all patients diagnosed with bronchogenic carcinoma in our hospital between the years 2000 and 2001.

## Patients and Methods

We carried out a retrospective cross-sectional study. Data were collected from our hospital´s tumor registry database and validated with independent sources for the detection of bronchogenic carcinoma. For this purpose, we first compared the data from our tumor registry with those of the bronchoscopy unit database and records of diagnostic transthoracic needle biopsies in order to determine whether the diagnoses were consistent and whether the diagnosis was primary bronchogenic carcinoma. Patients from our health care area were selected and those who were treated at our hospital but belonged to other health care areas were excluded.

The tumor registry database provided all the variables needed for the proposed objectives except for TNM classification[8] and clinical stages. Staging data were obtained by reviewing clinical reports in order to determine clinical stage as accurately as possible. If TNM classification was not provided in the report, bronchoscopy, chest computed tomography, and other tests were reviewed. If TNM classification could not be ascertained in this way, the original medical history was evaluated.

### *Statistical Analysis*

The statistical analysis was performed using SPSS statistical software, version 11.0. Qualitative variables were compared using the $\chi^2$ test. Survival curves were plotted using the Kaplan-Meier method and compared using the log-rank test. The minimum follow-up time from diagnosis was 54 months.

## Results

### *Demographic Characteristics*

During the years 2000 and 2001, 482 patients from our health care area were diagnosed with bronchogenic carcinoma. Of those, 259 (53.7%) were diagnosed in 2000 and 223 (46.7%) in 2001. Of the 482 patients, 438 (90.9%) were men and 44 (9.1%) were women. The mean (SD) age was 66.6 (9.65) years, with a median age of 68 years.

TABLE 1
**Distribution According to Histological Type**

| Histological Type | No. | % |
|---|---|---|
| Large cell carcinoma | 142 | 29.4 |
| Squamous cell carcinoma | 116 | 24.0 |
| Small cell carcinoma | 88 | 18.8 |
| Adenocarcinoma | 83 | 17.2 |
| Other | 53 | 11.0 |

TABLE 2
**Combined-Modality Therapies**

| | N | % |
|---|---|---|
| Chemotherapy and radiation therapy | 108 | 22.4 |
| Radiation therapy and chemotherapy | 32 | 6.6 |
| Surgery and radiation therapy or chemotherapy | 11 | 2.3 |
| Chemotherapy or radiation therapy and surgery | 2 | 0.41 |

### *Histology and Tumor Extension*

Of the cases diagnosed, 394 (72%) were non-small cell carcinomas and 88 (18%) were small cell carcinomas. The distribution of cases according to histological type is shown in Table 1.

The distribution by clinical stage was as follows: IA, 33 (6.8%); IB, 85 (17.6%); IIA, 1 (0.2%); IIB, 16 (3.3%); IIIA, 27 (5.6%); IIIB, 105 (21.8%); and IV, 199 (41.3%). In 16 patients (3.3%), TNM classification could not be determined due to lack of information in the medical history. The distribution by pathologic stage was as follows: IA, 23 (4.8%); IB, 42 (8.7%); IIA, 6 (1.2%); IIB, 9 (1.9%); IIIA, 4 (0.8%); IIIB, 13 (2.7%); and IV, 1 (0.2%). It is noteworthy that 28.7% of non-small cell carcinomas were diagnosed in stage I compared to only 5.7% of small cell carcinomas ($P<.001$).

### *Treatment*

The most frequently used initial treatments were chemotherapy (n=203; 42.1%) and palliative treatment (n=93; 19.6%), followed by radiation therapy (n=88; 19.3%). Twenty percent (n=98) of the patients underwent surgery.

Combined-modality therapy was used in 153 cases (31.7%), as shown in Table 2. The order shown in the table reflects the temporal sequence of therapies.

### *Survival*

The overall survival of all the patients diagnosed with bronchogenic carcinoma of any histological type was 13.3% (95% confidence interval [CI], 10%-16%), with a median survival of 10 months after a follow-up period of 5 years. Figure 1 shows the overall survival curve.

Establishing 2 age groups around the median of 68 years, we found that older patients (≥68 years) had significantly poorer 5-year survival (9.2%; 95% CI, 5.3%-

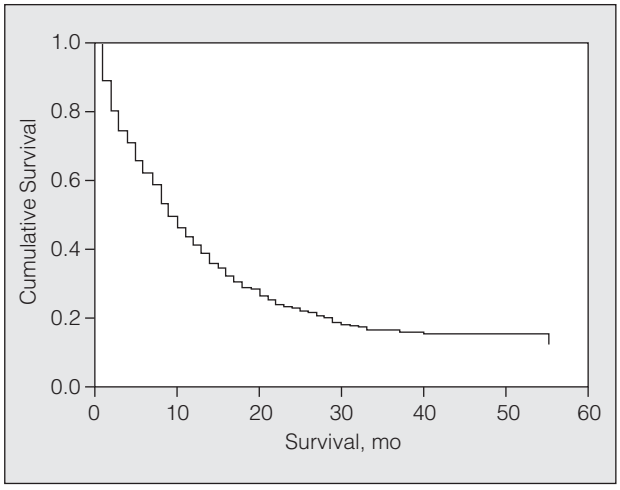



**Figure 1. Overall survival.**

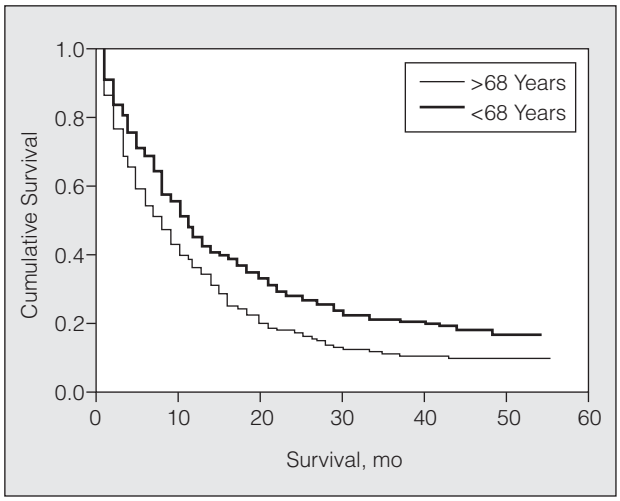



**Figure 2. Survival curves according to median age.**

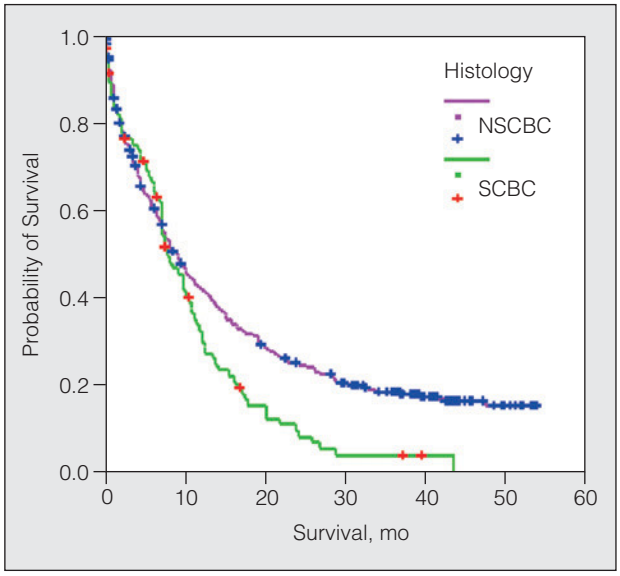



**Figure 3. Survival in patients with small cell bronchogenic carcinoma (SCBC) and with non-small cell bronchogenic carcinoma (NSCBC).**

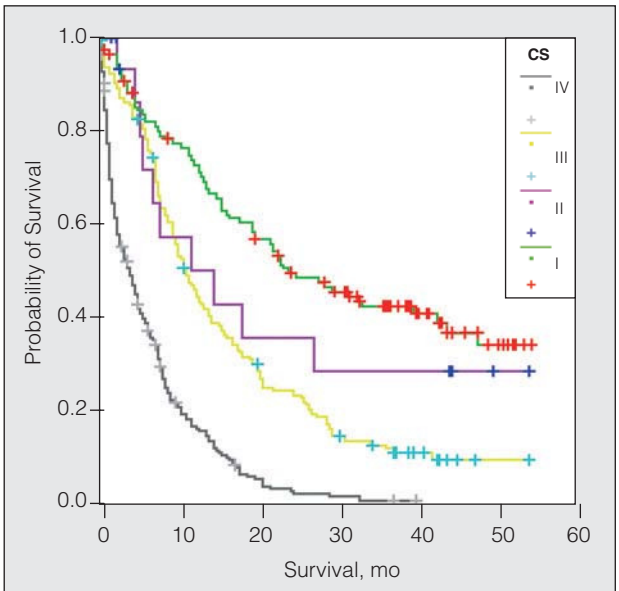
13.1%) than younger ones (<68 years; 95% CI, 12%-20%) (*P*<.001) (Figure 2).

Five-year survival with small cell carcinoma was 0% and with non-small cell carcinoma, 15.4% (95% CI, 13%-19%; *P*<.01), as shown in Figure 3.

The probability of survival in each stage is shown in Figure 4. There were significant differences between stage IV tumors and the other stages (*P*<.001) and between stage III and stage I tumors (*P*<.001).

Patients with small cell carcinoma and disease limited to the chest had a significantly better 3-year survival rate (7.9%; 95% CI, 0.1%-15.7%) than those with extrathoracic extension (3.5%; 95% CI, 0%-9.4%) (*P*<.005) (Figure 5).

Figure 6 shows survival according to stages for non-small cell carcinomas. There were significant differences between stage IV tumors and other stages (*P*<.001) and between stage III and stage I tumors (*P*<.001).




| CS | No. | S5 | 95% CI |
|---|---|---|---|
| I | 118 | 34 | 24-44 |
| II | 17 | 29 | 5-52 |
| III | 132 | 10 | 6-13 |
| IV | 199 | 1 | 0-16 |

**Figure 4. Survival according to clinical stage, all histological types. CS indicates clinical stage; CI, confidence interval; S5, 5-year survival.**

## Discussion

Bronchogenic carcinoma is still a matter of current concern and the available epidemiological data suggest that it will continue to be in the near future.[9] For this reason, we felt there was a need to have a registry of all currently diagnosed cases of bronchogenic carcinomas, to analyze their characteristics, to compare them with previous periods, and to carry out correlation and prognostic studies.

The median age of patients with bronchogenic carcinomas at the time of diagnosis in our study was similar to that of other recent studies[19-12] and older than that of other studies from previous decades.[13,14] Distribution by sex showed a predominance of male patients, although an increase in the number of women was observed.[15,16] This behavior is similar to that described by other authors in Spain, although the number of cases affecting women is still lower than that observed in other countries.[15,17,18]

The most frequent histological type in our series was large cell bronchogenic carcinoma, a finding that has not been common in other descriptive analyses.[10-12] In an analysis carried out at our hospital it was observed that 50% of the cases diagnosed before thoracotomy as large cell carcinomas were seen after thoracotomy to have been in fact either a squamous cell carcinoma or an adenocarcinoma. It was also observed that the remaining 50% were, for the most part, large cell bronchogenic carcinomas with neuroendocrine differentiation (G.E.T., unpublished data, 2002).

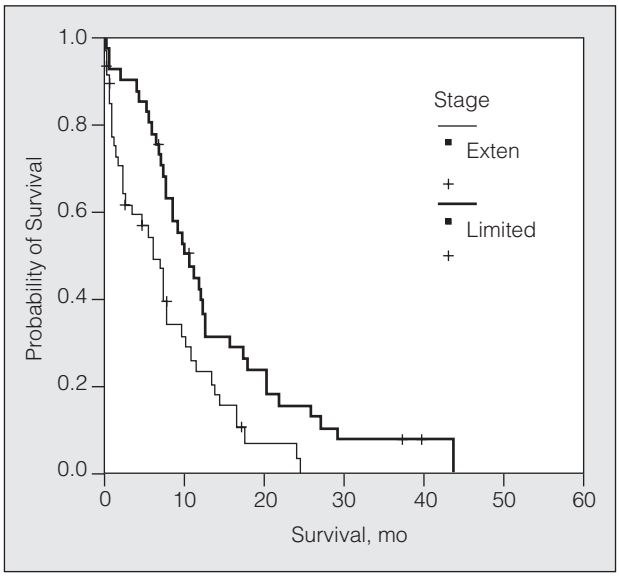
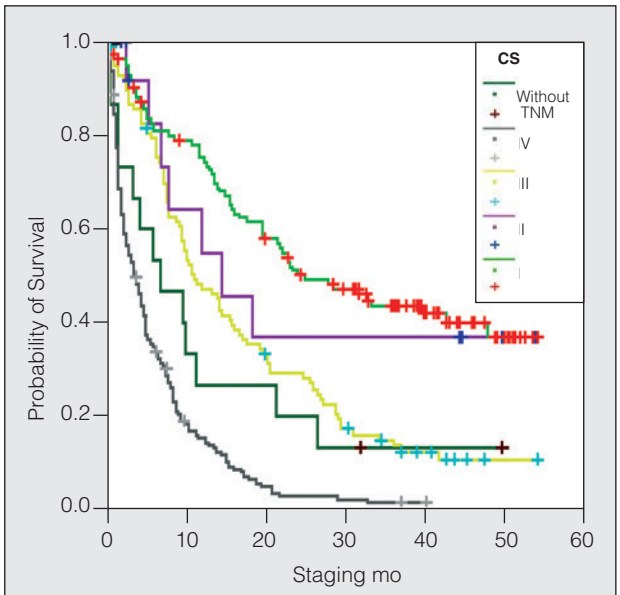



**Figure 5. Survival according to stage in small cell bronchogenic carcinoma.**




| CS | No. | S5 | 95% CI |
|---|---|---|---|
| I | 113 | 37 | 27-47 |
| II | 14 | 37 | 9-64 |
| III | 99 | 11 | 5-11 |
| IV | 153 | 1 | 0-2 |
| Sin TMN | 15 | 13 | 0-29 |

**Figure 6. Survival according to clinical stage in non-small cell bronchogenic carcinoma. CS indicates clinical stage; CI, confidence interval; S5, 5-year survival.**

The percentage of cases diagnosed at very advanced stages was quite high. This factor, while not the only one, is very important in the prognosis of the disease.[19]

While not very important in terms of survival, improvement in quality of life has given chemotherapy an essential place in the treatment of bronchogenic carcinomas in advanced stages,[20] and it has thus become the most used treatment in our hospital, to an even greater extent than that reported in other studies.[21] Twenty percent of patients underwent surgery, the only potentially curative treatment. This percentage has not increased in recent years and is similar to that found in other registries.[12,21,22] A recent Spanish multicenter descriptive study (EpicliCP-2003) found the percentage of patients undergoing surgery to be about 15%.[23] Considerable epidemiological differences between various hospitals were also observed. In Table 3 we attempt to show some of the epidemiological characteristics of the main descriptive studies published in Spain. No major differences are to be found in terms of age, sex, tumor extension, or treatment, but there were considerable differences in overall survival. Survival in our series was higher than the 8% survival rate reported in another Spanish study analyzing a larger series of patients,[21] although that rate was similar to the survival reported in a study carried out in the north of Castellón.[24] It is difficult to explain so great a difference between regions. A recently published study compared the characteristics of patients with bronchogenic carcinoma in 2 regions of 2 European countries.[25] A significant difference in 3-year survival was observed: 5% in 1 region and 14% in the other. The main differences observed were in age, stage at the time of diagnosis, comorbidity, and treatments used. It would appear logical that survival would be greatest in series with a greater number of patients treated surgically, but this has not been the case in Spain,

TABLE 3
**Epidemiological Characteristics of the Main Descriptive Studies Published in Spain***

| Study/Region | Years | Multicenter | Tumor Registry | No. | Mean Age, y | Male Sex, % | NSCBC, % | Surgery, % | Survival, % |
|---|---|---|---|---|---|---|---|---|---|
| Guipúzcoa[14]† | 1983-92 | Yes | Yes | 1815 | 63 | 91 | 78 | - | 12 |
| Extremadura[21] | 1991-98 | Yes | No | 610 | 65 | 97 | 77 | 20 | 7.9 |
| Castellón[24] | 1993-97 | No | No | 118 | 67 | 85 | 83 | 23 | 7.6 |
| La Coruña[19] | 1995-96 | No | No | 378 | 66 | 95 | 83 | 17 | –‡ |
| Madrid | 2000-1 | No | Yes | 482 | 66 | 91 | 78 | 20 | 13 |
| Asturias[12] | 2001 | Yes | No | 521 | 67 | 92 | 81 | 21 | –§ |
| EpicliCP-200323 | 2003 | Yes | No | 1189 | 67 | 89 | 80 | 15 | – |

*NSCBC indicates non-small cell bronchogenic carcinoma. †Therapies used not included. ‡Survival not expressed as a percentage, but in months: 7 months.
§Survival not expressed as a percentage, but in weeks: 36 weeks at 3.5 years.

where the percentages of patients undergoing surgery were very similar in the main studies analyzing survival. It is evident, therefore, that there are other factors involved. In the EUROCARE study, which described lung cancer survival and prognosis in Europe, it was observed that countries fell into 2 groups[26]: those with a probability of survival similar to the one reported in our study (about 10%), and those with a lower probability (around 7%). The probability of survival in Spain according to that study was 12%.

Analyzing age, we observed significant differences between the group of patients 68 years or older and those younger than 68 years. Consistent with the findings of Montero et al,[19] age and tumor extension were the 2 most significant predictors of survival.

We observed differences in survival and tumor extension between patients with stage IV tumors and all the others, and between those with stage III and stage I tumors, but not between those with stage II and stage III tumors. This result is probably due to the small number of bronchogenic carcinomas diagnosed in stage II (n=17). Finally, we confirmed the poor prognosis of small cell carcinomas found in other studies.[19,21]

In conclusion, the epidemiological characteristics of the patients diagnosed with bronchogenic carcinoma in our area were similar to those described in other studies carried out in Spain. It can be observed that despite all efforts, bronchogenic carcinoma is still diagnosed in very advanced stages, so that only a small number of patients (20%) can be offered curative treatment. For this reason, the overall probability of survival in cases of bronchogenic carcinoma of all histological types is very low (13%).

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