Surgical results of stage I non-small cell lung cancer: comparison between elderly and younger patients

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Abstract

Objective: The aim of this study was to evaluate the overall cancer-related survival in younger and elderly (over 70 years old) patients with stage I non-small cell lung cancer (NSCLC) together with prognostic factors in the elderly.

Methods: The patient records of 797 patients who underwent surgery for stage I NSCLC were analyzed retrospectively. A total of 132 patients were over 70 years old. The clinical variables and overall cancer-related survival were compared between two groups. An analysis was performed to determine the risk factors that influenced the survival of elderly patients. Variables analyzed included sex, presence of symptoms, operative procedure, histopathology, size of tumor and tumor classification.

Results: Between the two groups, the nature of the operation performed (pneumonectomy or not) and the presence of symptoms reached statistical significance ($P < 0.001$). Overall 5- and 10-year survival rates were 64.5% and 53.68% in younger patients and 58.23% and 52.24% in the elderly. There was no significant difference in survival between the groups ($P = 0.35$). The only significant prognostic factor in the elderly patients was the size of the tumor in the multivariate analysis ($P = 0.0442$, relative risk 2.28 (1.02–5.10 95% CI)).

Conclusions: Surgical resection for stage NSCLC in elderly patients over the age of 70 years results in a comparable overall cancer-related survival to that evident in younger patients. The size of the tumor is the only significant factor to influence the survival of elderly patients. Continued careful selection of elderly patients for surgical resection is important for acceptable operative results. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Survival; Elderly; Stage I; Non-small cell lung cancer

1. Introduction

The incidence of lung cancer in the elderly is increasing in Western countries and this disease is an important cause of death. Surgical resection is the current mainstay of treatment for early non-small cell lung cancer (NSCLC). Several articles report on the effectiveness of surgery in elderly patients with NSCLC as well as in younger patients. However, these reports include all stages of the disease [1–3]. Some authors insist that N2 disease is not a local disease but a ‘systemic disease’ and that these advanced cases of lung cancer should not be treated with surgery and require additional therapy such as adjuvant or neoadjuvant chemo-radiotherapy [4,5]. In these situations, to determine the rate of survival in the elderly, it is necessary to estimate patient survival in every stage.

The aim of this study was to analyze the effectiveness of surgery in elderly patients greater than 70 years old with stage I NSCLC and to evaluate the prognostic factors that influence survival in this population.

2. Methods

The medical records of patients from 1969 to 1998 were retrospectively reviewed. A total of 827 patients with stage I NSCLC [6] underwent complete resection in the Thoracic Surgery Service of the Hospital “La Fe” in Valencia. Postoperative mortality occurred in 29 patients (3.5%) (25 (3.6%) 70 years old or less, four (2.9%) over 70 years old) and these patients were excluded from the study. Amongst the 798 remaining patients, 132 were older than 70 (mean age 73.89 ± 0.2 years; range 71–82 years) and 666 patients were 70 or less than 70 years old (mean age 59.6 ± 0.3 years; range 30–70 years). No patient exhibited evidence of metastatic disease in radiological examinations of the head, chest, abdomen or bones. In all cases, a mediastinal exploration and not a systematic lymph node dissection was performed during the operation with only detected lymph nodes being removed. Resected lymph nodes were histologically examined through multiple sections.

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Following surgery, patients were followed up through 31 December 1999. Recurrence was defined as the presence of tumor in the ipsilateral hemithorax or mediastinum, or distant metastasis. Second primary cancer was defined according to the criteria of Martini and Melamed [7].

Factors compared between the elderly and younger patient groups included tumor size, T-factor (T1 or T2), histopathology (squamous or non-squamous), presence of symptoms such as hemoptysis, chest pain, etc., surgical procedure (pneumonectomy or non-pneumonectomy), recurrence rate, death secondary to a second primary lung cancer and the rate of unrelated deaths. Sex, presence of symptoms, operative procedure, tumor location, tumor histology, T-factor and tumor size were analyzed as potential prognostic predictors of decreased overall cancer-related survival in the elderly group.

The patients’ demographic and medical characteristics were summarized and the Chi-square and Student’s t-tests were applied to compare the characteristics of each age group. The Kaplan–Meier method was used to estimate the survival probability. The different curves were statistically compared using the log-rank and Tarone–Ware tests. A P value less than 0.05 was considered to be significant. All the significant variables from this univariate method, together with some others classically admitted, were then used in a multivariate analysis using the method of regression of the proportional risk for survival data developed by Cox.

3. Results

3.1. Comparison of the clinical characteristics and prognosis between elderly and younger groups

The patients consisted of 121 men (91.7%) and 11 women in the elderly group and 633 men (95%) and 33 women in the younger group. No differences were detected with respect to tumor size, T-factor (T1 or T2), histopathology (squamous or non-squamous), surgical procedure, recurrence rate, death secondary to a second primary lung cancer and the rate of unrelated deaths. The elderly patients had a lower frequency of symptoms and pneumonectomies compared to the younger group (P < 0.001). In addition, the younger patients had a higher rate of recurrence (P = 0.051) (Table 1).

Five-year and 10-year overall cancer-related survival in the elderly were 58.23% and 52.24%, respectively, and 64.48% and 53.7% in younger patients. No significant difference was detected (P = 0.351) (Fig. 1).

3.2. Estimation of prognostic factors for survival in the elderly

Table 2 shows the significance levels according to the univariable analysis. A significant reduction in survival was observed only in patients with larger tumors (Fig. 2). An increased survival rate was observed in patients with tumors less than 3 cm in size but no significant difference was evident when comparing patients with tumors between 3 and 5 cm in size and those larger than 5 cm (Fig. 3). Reduced survival was observed in patients with T2 lesions but this was not significant. No significant differences in survival were observed between patients who did or did not undergo a pneumonectomy.

The size of the tumor and T-factor were analyzed using the Cox model. Only tumor size entered into regression. A significantly decreased survival was observed in patients with tumors larger than 3 cm (P = 0.0442, relative risk 2.28 (1.02–5.10 95% CI)).
4. Discussion

The incidence of lung cancer among the elderly is increasing but there are few articles specifically related to this patient group [1–3]. There are differences in the treatment approach between elderly and younger patients. The progressive nature of malignancy must be considered when treating an elderly patient with poor cardiopulmonary status. In this article, we focused on elderly patients with stage I NSCLC treated in our hospital during the last 30 years. During this period there have been numerous technical and medical improvements concerning the treatment of early lung cancer, and these changes have probably affected both of the patient groups in the study.

Our first aim was to compare the clinical characteristics and the prognosis between elderly and younger patients. Statistical analysis revealed significant differences only in the presence of symptoms and the type of surgical resection undertaken. Annual routine screening by chest X-ray is not performed in Spain and some patients presented with symp-

Table 2
Overall cancer-specific survival

<table>
<thead>
<tr>
<th>Variable</th>
<th>Subset</th>
<th>n</th>
<th>5-year</th>
<th>10-year</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>121</td>
<td>57.7</td>
<td>51.5</td>
<td>0.664</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>11</td>
<td>63.3</td>
<td>63.3</td>
<td></td>
</tr>
<tr>
<td>Symptom</td>
<td>(−)</td>
<td>63</td>
<td>61.8</td>
<td>54.9</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(+)</td>
<td>69</td>
<td>55</td>
<td>49.5</td>
<td></td>
</tr>
<tr>
<td>Histology</td>
<td>Squamous</td>
<td>83</td>
<td>59.5</td>
<td>48.8</td>
<td>0.599</td>
</tr>
<tr>
<td></td>
<td>Non-squamous</td>
<td>49</td>
<td>56.1</td>
<td>46.8</td>
<td></td>
</tr>
<tr>
<td>T-stage</td>
<td>T1</td>
<td>24</td>
<td>77</td>
<td>38.5</td>
<td>0.117</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>108</td>
<td>54.7</td>
<td>51.5</td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td>Pneumonectomy</td>
<td>13</td>
<td>55.9</td>
<td>55.9</td>
<td>0.609</td>
</tr>
<tr>
<td></td>
<td>Non-pneumonectomy</td>
<td>119</td>
<td>58.6</td>
<td>51.9</td>
<td></td>
</tr>
<tr>
<td>Tumor size 1 (cm)</td>
<td>≤ 3</td>
<td>36</td>
<td>74.8</td>
<td>37.4</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>&gt; 3</td>
<td>96</td>
<td>52.4</td>
<td>49.3</td>
<td></td>
</tr>
<tr>
<td>Tumor size 2 (cm)</td>
<td>≤ 3</td>
<td>36</td>
<td>74.8</td>
<td>37.4</td>
<td>0.0495</td>
</tr>
<tr>
<td></td>
<td>3 &lt; ≤ 5</td>
<td>55</td>
<td>49.5</td>
<td>44.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 5</td>
<td>41</td>
<td>56.1</td>
<td>56.1</td>
<td></td>
</tr>
</tbody>
</table>
toms such as hemoptysis, chest pain or weight loss. However, most asymptomatic patients are diagnosed following the chance detection of abnormal lesions on a chest X-ray. In the elderly, it may be the case that increased access to hospital as a result of other diseases may contribute to the early detection of pulmonary lesions.

The reduced frequency of pneumonectomy among the elderly is thought to be the result of avoiding a more aggressive surgical procedure. The careful selection of the patients is a very important factor in all circumstances but is particularly important in elderly patients. Elderly patients often exhibit other medical conditions such as ischemic heart disease, cerebral infarction or lower respiratory dysfunction that may require aggressive preoperative treatment. If these complications are difficult to control then this predicts an increased possibility of significant postoperative complications. In the case of very high risk patients, it is possible to choose an alternative treatment such as chemo-radiotherapy. Some of the elderly patients who require pneumonectomy are regarded as inoperable. We did not find any significant difference in overall recurrence rate or long-term survival between the elderly and younger patients and this probably results from a careful preoperative selection. In the elderly patients, there was no significant difference in the cancer-specific survival between pneumonectomy and non-pneumonectomy groups.

The lack of a significant observable difference in the long-term survival of elderly and younger patients is compatible with another report on patients with stage I NSCLC [8]. In contrast, Wertzel et al. reported a negative impact on survival after surgery in the elderly [9].

The second purpose of our study was to evaluate the prognostic factors affecting the long-term survival in elderly patients with stage I NSCLC. There are several reports regarding the prognostic factors in stage I NSCLC [8,9]. Harpole et al. reported that the presence of symptoms, vascular invasion, visceral pleural invasion, tumor size and high mitotic rate were negative prognostic factors [8]. Wertzel et al. reported that histology, lymphangiosis carcinomatosa, age and T-stage were negative prognostic factors [9]. In both articles, as in other reports, the main common negative factor was the size of the tumor. From our experience in both elderly and other groups of patients [10], the only variable which determined a worse prognosis in the multivariable analysis was tumor size. The overall 5-year survival was 74.8% in patients with a tumor of 3 cm or less but fell to 52.3% in patients with larger tumors.

In the revision of staging lung cancer, stage I was divided into two groups according to the T-stage [6]. In recent years, surgery has been thought to be the only effective radical therapy for patients with stage I NSCLC. Mineo et al. reported the effectiveness of adjuvant chemotherapy in patients with stage Ib NSCLC [11]. In our study, elderly patients with tumors larger than 3 cm exhibited significantly lower survival. This
suggests that this patient group may need some kind of additional treatment and this requires further study.

5. Conclusion

Overall cancer-related survival after surgical resection in elderly patients with stage I NSCLC is comparable to that of younger patients. Careful patient selection based on preoperative evaluation is mandatory especially in elderly patients. The only significant prognostic factor in the elderly group seems to be the size of the tumor.

References