Bronchial stump recurrence after surgery for bronchial carcinoma

G. Verleden, G. Deneffe, M. Demedts

Clinic for Pulmonary Diseases, University Hospitals, Catholic University, Leuven, Belgium.

Correspondence: Prof. M. Demedts, Kliniek Longziekten, Universitair Ziekenhuis, Weligerveld 1, B-3041 Pellenberg, Belgium.

Keywords: Bronchial carcinoma; bronchial stump; stump recurrence; tumour resection.

Received: February, 1989; accepted after revision August 8, 1989.

There is a lot of literature about residual tumour at the bronchial resection line, but there are few data on bronchial stump recurrences. The first report was published in 1956 by HABEIN et al. [1], who described bronchial stump recurrence in 13 patients. In an attempt to identify the characteristics of stump recurrence, we reviewed the literature of the last ten years. We found only three publications in which bronchial stump recurrences were briefly discussed [2-4].

We therefore performed a study to assess the incidence of such recurrences in the last decade, to investigate the role of the distance between the tumour and the bronchial resection line, and to possibly identify the effect of therapy on these recurrences. In our study we defined bronchial stump recurrences as tumours which are endoscopically strictly confined to the stump. Furthermore, in contrast with several of the 18 patients in the study of HABEIN et al. [1], all resections in our study were considered curative (by surgical and pathological criteria) and not palliative. Indeed, no microscopic residual disease was identified at the resection line, either in the form of direct mucosal extension or as extramucosal involvement of peribronchial lymphatics or soft tissue [5].

Patients and methods

We reviewed the hospital charts of 295 patients with proven non-small cell carcinoma of the lung which was resected for cure in the period from January, 1980, until December, 1986. None of these patients received any adjuvant therapy. Ten out of these 295 patients developed a bronchial stump recurrence, which was diagnosed by means of fibroptic bronchoscopy and biopsy. Patient figures are given in table 1. There were 9 men and 1 woman, with a mean age of 63 yrs (median 69 yrs, range 53-71 yrs). Three tumours were right-sided, 7 were left-sided. Nine patients were operated on for squamous cell carcinoma, one patient (case 3) for an adenocarcinoma. Six patients had stage I disease, two stage II disease and two stage III disease [6]. Six patients underwent pneumonectomy (5 on the left, 1 on the right), and 4 patients underwent lobectomy (2 right lower lobe, 1 left lower lobe, 1 left upper lobe). All resections were considered curative. When the stump recurrence was diagnosed, six patients complained of haemoptysis, only 3 patients showed X-ray progression. Following staging, two patients had N\textsubscript{0} stage disease, three patients had N\textsubscript{1} stage disease, three patients N\textsubscript{2} stage disease, three patients N\textsubscript{3} stage disease with paralysis of the left vocal cord, and two patients had distant metastases.

As treatment for the recurrence, 6 patients received an antitumoural treatment: 2 were reoperated on, 2 were irradiated, 1 received chemotherapy, and 1 patient was treated with a combination of irradiation and chemotherapy.

Statistical analysis was performed by the Chi-squared test and regression analysis.

Results

Bronchial stump recurrences developed in 10 out of 295 patients, i.e. an overall recurrence of 3.4% (table 2). There were 6 recurrences out of 219 patients with N\textsubscript{0} disease (2.7%), 3 out of 55 patients with N\textsubscript{1} disease (5.4%) and 1 out of 21 patients with N\textsubscript{2} disease (4.8%).
Table 1. – Patient values for ten cases of bronchial stump tumour recurrence

<table>
<thead>
<tr>
<th>N</th>
<th>Sex</th>
<th>Year of Birth</th>
<th>Localization of tumour</th>
<th>pTNM stage I–III</th>
<th>Surgical procedure</th>
<th>Distance from tumour to bronchial resection line (cm)</th>
<th>Relapse time (months)</th>
<th>cTNM (stump recurrence)</th>
<th>Therapy</th>
<th>Survival after diagnosis (months)</th>
<th>Total survival (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>1920</td>
<td>R Lo lobe</td>
<td>T,N,M0, I</td>
<td>R Lo lob</td>
<td>1</td>
<td>4</td>
<td>T,N,M0</td>
<td>chemotherapy</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>1930</td>
<td>L Lo lobe</td>
<td>T,N,M0, I</td>
<td>L Lo lob</td>
<td>1.5</td>
<td>6</td>
<td>T,N,M0</td>
<td>resurgery</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>1926</td>
<td>R U + M lobe</td>
<td>T,N,M0, III</td>
<td>R Pneu</td>
<td>1.5</td>
<td>12</td>
<td>T,N,M0</td>
<td>none</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>1917</td>
<td>L U lobe</td>
<td>T,N,M0, II</td>
<td>L Pneu</td>
<td>7</td>
<td>14</td>
<td>T,N,M0</td>
<td>irradiation</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>1914</td>
<td>L Lo lobe</td>
<td>T,N,M0, II</td>
<td>L Pneu</td>
<td>2.5</td>
<td>16</td>
<td>T,N,M0</td>
<td>none</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>1929</td>
<td>L main bronchus</td>
<td>T,N,M0, III</td>
<td>L Pneu</td>
<td>1.5</td>
<td>16</td>
<td>T,N,M0</td>
<td>none</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>1914</td>
<td>L U lobe</td>
<td>T,N,M0, I</td>
<td>L U lob</td>
<td>2</td>
<td>20</td>
<td>T,N,M0</td>
<td>resurgery</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>1928</td>
<td>L U lobe</td>
<td>T,N,M0, I</td>
<td>L Pneu</td>
<td>3</td>
<td>23</td>
<td>T,N,M0</td>
<td>irradiation</td>
<td>13</td>
<td>36</td>
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<tr>
<td>9</td>
<td>M</td>
<td>1916</td>
<td>L U lobe</td>
<td>T,N,M0, I</td>
<td>L Pneu</td>
<td>3</td>
<td>24</td>
<td>T,N,M0</td>
<td>none</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>1911</td>
<td>R Lo lobe</td>
<td>T,N,M0, I</td>
<td>R Lo lob</td>
<td>1</td>
<td>52</td>
<td>T,N,M0</td>
<td>chemotherapy</td>
<td>10</td>
<td>62</td>
</tr>
</tbody>
</table>

R: right; L: left; U: upper; Lo: lower; Pneu: pneumonecctomy; Lob: lobectomy; pTNM, cTNM: pathological and clinical tumour/node/metastasis staging, respectively; *: MOUNTAIN et al. classification [6].

Fig. 2. - Relationship between survival and the distance between tumour and the bronchial resection line.

Fig. 1. - Relationship between the relapse time and the distance between tumour and the bronchial resection line.
The mean relapse time was 18.9 months (median 16 months, range 4–52 months). The mean distance between the primary tumour and the bronchial resection line was 2.4 cm (median 1.75, range 1–7 cm). The distance was estimated by the surgeon and by the endoscopist and in two patients was also measured by the pathologist upon the fixed specimen. There seems to be a good correlation between the distance and the relapse time in 8 of the 10 patients (r=0.87; p<0.01; fig. 1).

The mean survival time after surgery was 26.6 months (median 19.5 months); the mean survival after diagnosing the recurrence was 9.3 months (median 7.5 months). There seems to be a relationship between the distance and the overall survival time in 8 of the 10 patients (r=0.75; p<0.05; fig. 2). One patient (case 8) died one month after diagnosis due to pneumonia, unrelated to the recurrence.

After diagnosing the stump recurrence, the untreated patients survived 6.6 months (5–9 months), the reoperated patients 11 months (7–15 months), the irradiated patients 8.5 months (4–13 months), and the patients treated with chemotherapy 9 months (8–10 months).

Irrespective of treatment and considering only the TNM stage at the time of recurrence, the survival after diagnosis was for the patients in the N_0 stage disease 11 months (7–15 months), for those with N_1, M_0, 9.3 months (6–13 months) and for those with N_2, M_0, 4.5 months (4–5 months). Two patients with M_1 stage disease survived 9 months (8–10 months).

Discussion

Bronchial stump recurrence occurred in 3.4% of our patients with non-small cell carcinoma who underwent curative resection for stage I to stage III disease. A relationship was found between the relapse time and the distance from the resection line to the primary tumour in 8 of the 10 patients. No clear relationship existed between relapse (or overall survival) time and tumour stage at the time of resection. Survival after detection of the relapse was not related to tumour stage at the time of the relapse or to therapy.

Since a bronchial stump recurrence is endoscopically strictly confined to the stump, it could be regarded as a special form of local recurrence. It is possible that the distance between the primary tumour and the bronchial resection line is a determining factor in the development of such recurrences: the shorter the distance, the greater the risk of local recurrences. In this regard, Iascione et al. [2] advised a more radical resection for N_1 disease (pneumonectomy instead of lobectomy), in order to prevent local recurrences. Grees et al. [7] and Corrones [8] proposed a distance of at least 1.5 cm for a squamous cell carcinoma and a distance of at least 2 cm for an adenocarcinoma. We generally followed this criterion. In our group of 295 patients we could not demonstrate that distance influenced the development of bronchial stump recurrences: in fact there was no difference in the distances between patients with or without such a recurrence. However, in those with a stump recurrence, the relapse time was related to the distance in 8 of the 10 patients.

All resections were radical and there was no macroscopic or microscopic residual tumour at the bronchial resection line either in the form of direct mucosal extension or as extramucosal involvement of peribronchial lymphatics or soft tissue. Yet occult nodal invasion has to be considered as a possible cause of the bronchial stump recurrence. However, we found no significant difference in bronchial stump recurrences between N_0, N_1 or N_2 stage disease (table 2). As an alternative explanation new carcinomatous changes in the predisposed epithelium of the region at the resection site is not excluded [1]. Finally, among the 18 bronchial stump recurrences in a series of 631 patients of Habben et al. [1] this was due in 5 patients to residual tumour at the bronchial resection line.

Iascione et al. [2] diagnosed 3 bronchial stump recurrences in a series of 95 patients (3.15%). In a 20 yr period, Robelin et al. [3] diagnosed 11 stump recurrences in a series of 1,223 patients. Since they did not have a follow-up in the majority of the patients, this number may be an underestimate. We found an incidence of 3.4% in our series. It is reported in the literature that 55% of overall recurrences occur within the first year after surgery, and 80% within the second year [9]. In the series of Habben et al. [1] 13 patients developed a stump recurrence within two years after surgery, with a mean relapse time of 12.3 months, and a 16–54 month overall survival after the relapse. In the series of Robelin et al. [3], 64% of the bronchial stump recurrences were diagnosed within two years of surgery, and 100% within four years, the mean relapse time being 20 months. We diagnosed 90% of the stump recurrences within two years, with a mean relapse time of 18.9 months (median 16 months)

Table 2. – Percentage and characteristics of bronchial stump tumour recurrences in relation to lymph node involvement

<table>
<thead>
<tr>
<th>Lymph node involvement</th>
<th>Number of resections</th>
<th>Bronchial stump recurrences</th>
<th>%*</th>
<th>Mean distance (median distance) cm</th>
<th>Mean relapse time (median) months</th>
<th>Mean overall survival (median) months</th>
</tr>
</thead>
<tbody>
<tr>
<td>N_0</td>
<td>219</td>
<td>6</td>
<td>2.7</td>
<td>1.9 (1.75)</td>
<td>22 (21.5)</td>
<td>32 (35)</td>
</tr>
<tr>
<td>N_1</td>
<td>55</td>
<td>3</td>
<td>5.4</td>
<td>3.6 (2.5)</td>
<td>15 (16)</td>
<td>20 (18)</td>
</tr>
<tr>
<td>N_2</td>
<td>21</td>
<td>1</td>
<td>4.8</td>
<td>1.5 (1.5)</td>
<td>12 (12)</td>
<td>18 (18)</td>
</tr>
<tr>
<td>Total</td>
<td>295</td>
<td>10</td>
<td>3.4</td>
<td>2.4 (1.75)</td>
<td>18.9 (16)</td>
<td>26.6 (19.5)</td>
</tr>
</tbody>
</table>

N_0, N_1, N_2: degree of regional lymph node involvement; *: no significant difference between N_0, N_1 and N_2.
and an overall survival of 26.6 months (range 12–62 months, median 19.5 months). Furthermore, in our series overall survival seems to be determined by the relapse time, and neither therapy nor TNM stage clearly influenced the final outcome once a bronchial stump recurrence was diagnosed. In our series, two patients were selected for reoperation; both had N\textsubscript{0} M\textsubscript{0} stage disease, which was confirmed at operation and they were resected for cure. Even in these circumstances we did not have any five year survivors. This is in agreement with the literature, which reports a low percentage of reoperation for recurrence (only 1% in the series of Nielsen et al. [10]) and an associated poor prognosis [10].

From our series it seems that once a bronchial stump recurrence is diagnosed, prognosis is poor. There is no significant difference in survival after diagnosing the recurrence either between treated and untreated patients, or between patients with N\textsubscript{0}–N\textsubscript{1} stage disease, and those with N\textsubscript{2} (M\textsubscript{0} or M\textsubscript{1}) stage disease. However, our series is too small to draw further conclusions.

References


RéSUMÉ: De 1980 à 1986 nous avons constaté une récidive au niveau du moignon bronchique chez 10 des 295 patients (3,4%) opérés pour carcinome bronchique autre qu'à petites cellules. Il existe une bonne corrélation entre la longueur de la période de sans récidive (de 4 à 52 mois) et la distance entre la tumeur et la tranche de section (1–7 cm) pour 8 de ces patients (5 à 8 mois par cm; p<0.01). La survie moyenne après la constatation de la récidive a été de de 10 mois (de 1 à 15 mois). Cette survie n'était pas clairement influencée par la thérapie appliquée (réintervention, chimiothérapie, radiothérapie) ni par le stade TNM de la récidive. Eur Respir J., 1990, 3, 97–100.