Repeat mediastinoscopy in the staging of lung cancer

Marc Pauwels a, Paul Van Schil a,*, Wilfried De Backer b, Filip Van den Brande a, Erik Eyskens a

a Department of Surgery, Antwerp University Hospital, Wilrijkstraat 10, 2650 Edegem, Belgium
b Department of Pneumology, Antwerp University Hospital, Wilrijkstraat 10, 2650 Edegem, Belgium

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Abstract

Objective: Despite technical difficulties due to mediastinal fibrosis, repeat mediastinoscopy can be a valuable tool in the restaging of lung cancer. It provides essential pathological information on mediastinal invasion when selecting patients for surgical resection after induction chemotherapy in stage IIIa disease. The aim of our study was to evaluate the feasibility, sensitivity and accuracy of repeat mediastinoscopy. Methods: From 1994 to 1997 we performed a repeat mediastinoscopy in 15 patients (13 men, two women) with bronchogenic carcinoma. Their age ranged from 49 to 75 years (mean 64.7). Seven patients had induction chemotherapy for a non-small cell bronchogenic carcinoma with positive N2 nodes on mediastinoscopy. Four patients had a second primary contralateral lung cancer, one had a locoregional recurrence of bronchogenic carcinoma. The other three had a first mediastinoscopy for other reasons than lung cancer, repeat mediastinoscopy being performed for staging of malignant disease. Results: In all 15 patients it was possible to perform a complete repeat mediastinoscopy. In one patient repeat mediastinoscopy turned out to be false negative, so, in our series, sensitivity was 87.5%, specificity 100% and accuracy 93.7%. Conclusion: Previous mediastinoscopy is no contraindication for a repeat one. Repeat mediastinoscopy offers valuable pathological information in restaging of lung cancer. © 1998 Elsevier Science B.V. All rights reserved

Keywords: Mediastinoscopy; Lung cancer; Staging

1. Introduction

Cervical mediastinoscopy is generally accepted as a safe and highly accurate procedure in the staging of lung cancer [1–4]. In case of mediastinal lymph node invasion, primary surgical treatment is not advocated as 5-year survival is low and inclusion in a neo-adjuvant trial should be considered.

Until recently, a second mediastinoscopy was considered to be contraindicated [5] because of severe fibrosis, due to prior surgery. Firm mediastinal adhesions containing vital structures increase the surgical risk.

On the other hand, computed tomography (CT) alone is not accurate enough to evaluate mediastinal lymph node invasion or to evaluate the effect of induction chemotherapy on mediastinal lymph node metastases. The need for histological proof of mediastinal lymph node invasion has led some reports to reconsider repeat mediastinoscopy [6–8].

The aim of our study was to evaluate the feasibility of repeat mediastinoscopy, with special interest for those patients that received induction chemotherapy. Furthermore, sensitivity and specificity were evaluated.

2. Material and methods

From 1994 to 1997 we performed a repeat mediastinoscopy in 15 patients (13 male, two female). Ages ranged from 49 to 76 years (mean age: 64.7 years). All patients had a previous cervical mediastinoscopy during which all accessible lymph nodes were sampled and mapped according to the original map described by Naruke [9].

In seven of our patients, mediastinal invasion of lung cancer was found at first mediastinoscopy (N2 disease, stage IIIa). In these patients, induction chemotherapy was started. Five of them had chemotherapy, using cisplatinum in combination with etoposide, in one a combination of cisplatinum with mitomycine C was given and one had...
cisplatinum only. A repeat mediastinoscopy was performed 4–6 weeks (mean: 4.7 weeks) after chemotherapy was ended, to evaluate its effect.

One patient had a local recurrence after lobectomy for lung cancer one year earlier. Four patients surgically treated for lung cancer developed a second primary lung cancer at the contralateral side. In two other patients a new lung cancer was diagnosed, while their first mediastinoscopy was performed for other non-malignant mediastinal disease. In one patient treated for a breast carcinoma, a lung lesion was found and mediastinoscopy revealed mediastinal invasion by breast carcinoma. Induction chemotherapy (tamoxifen) was started followed by repeat mediastinoscopy 6 weeks later.

3. Surgical procedure

Regarding technical details, repeat mediastinoscopies were carried out under general anaesthesia with endotracheal intubation. The transverse scar of the first mediastinoscopy is reopened, usually the strap muscles are fibrotic and sharp dissection is necessary to reach the pretracheal plane. As the right innominate artery can be very adherent to the trachea, the pretracheal plane usually cannot be developed. Mostly, a tunnel can be created by stump dissection at the left paratracheal side. Underneath the aortic arch, dissection can be continued in the pretracheal plane until the subcarinal nodes are reached. Bleeding is treated by packing or electrocoagulation.

Repeat mediastinoscopy was considered complete when biopsies could be taken at the subcarinal level (Naruke 7) and at both tracheobronchial lymph node stations (Naruke 4).

4. Results

The interval between first and second mediastinoscopy varied from 3 months to 5 years (mean: 8.1 months). In all 15 patients it was possible to perform a complete mediastinoscopy. Moderate bleeding occurred in two patients. In both cases adequate haemostasis was obtained by packing with a haemostatic sponge (Surgicel®). No lesions of the recurrent laryngeal nerve or oesophagus were encountered.

Results of repeat mediastinoscopy are shown in Table 1. In seven patients (46.7%) repeat mediastinoscopy revealed mediastinal lymph node invasion, and a non-curative exploratory thoracotomy was avoided. In the seven patients with ipsilateral lymph node invasion at first mediastinoscopy, CT of the chest showed a good response to induction chemotherapy. In three of these patients however, persistent mediastinal invasion was found at repeat mediastinoscopy. In the eight patients with negative repeat mediastinoscopy, CT showed either a good response on chemotherapy, or was considered negative by the radiologist. These eight patients underwent a thoracotomy: five had a pneumonectomy and three a lobectomy with mediastinal lymph node dissection.

In one of these patients, repeat mediastinoscopy turned out to be false negative since, at thoracotomy, the subcarinal lymph nodes showed persistent intranodal invasion at definitive pathological examination. This brings sensitivity in this small series to 87.5%, specificity to 100% and accuracy to 93.7%.

5. Discussion

A very important step in selecting patients with lung cancer for surgical resection is the status of the mediastinal lymph nodes. It is generally accepted that a cervical mediastinoscopy is the procedure of choice to evaluate mediastinal lymph nodes, since it is the only procedure providing histologic evidence. Imaging techniques as CT or magnetic resonance imaging (MRI) cannot distinguish with certainty between inflamed hyperplastic or anthracotic nodes and metastases. In a recent prospective study of our institution, sensitivity and specificity of CT were 63 and 57% and, of mediastinoscopy, 89 and 100%, respectively [10]. We also showed that even with present day CT-scanning radiologic or imaging TNM does not provide an accurate preoperative staging of lung cancer [11].

In patients that had a previous mediastinoscopy for any reason, mediastinal anatomy has changed because tissue

<table>
<thead>
<tr>
<th>Oncologic diagnosis</th>
<th>Number of patients (n = 15)</th>
<th>Results of repeat mediastinoscopy</th>
<th>Further treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction chemotherapy</td>
<td>7</td>
<td>4 Negative</td>
<td>Thoracotomy</td>
</tr>
<tr>
<td>N2 disease</td>
<td></td>
<td>3 Invasion</td>
<td>No</td>
</tr>
<tr>
<td>Local recurrence</td>
<td>1</td>
<td>1 Invasion</td>
<td>Radiotherapy</td>
</tr>
<tr>
<td>Second primary cancer</td>
<td>4</td>
<td>3 Negative</td>
<td>Thoracotomy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Invasion</td>
<td>Chemotherapy</td>
</tr>
<tr>
<td>New lung cancer</td>
<td>2</td>
<td>1 Negative</td>
<td>Thoracotomy</td>
</tr>
<tr>
<td>Breast carcinoma</td>
<td>1</td>
<td>1 Invasion</td>
<td>Chemotherapy</td>
</tr>
<tr>
<td>Lung lesion</td>
<td></td>
<td>1 Invasion</td>
<td>Radiotherapy</td>
</tr>
</tbody>
</table>

Table 1

Findings at repeat mediastinoscopy
planes are obliterated by fibrosis. This makes the interpretation of CT or MRI even more difficult. In recent years, this has occurred more frequently as patients with ipsilateral mediastinal lymph node invasion (Stage IIIa-N2) are treated by induction chemotherapy. Afterwards, a repeat staging is performed to detect patients that responded well to induction chemotherapy and to select them for a possibly curative resection [12,13].

In our limited series, CT proved not reliable to evaluate mediastinal status after induction chemotherapy when compared to the histologic information obtained by repeat mediastinoscopy, which is feasible, although more laborious and time-consuming than the first mediastinoscopy. More often, sharp dissection is initially needed because of firm adhesions. To increase experience, all repeat mediastinoscopies in our hospital were performed by the same thoracic surgeon, who also performs the majority of cervical mediastinoscopies. Representative biopsies could be taken without major complications and repeat mediastinoscopy provided us with essential information to decide on further treatment. Seven needless thoracotomies were avoided and in seven patients, treated with induction chemotherapy, it provided us with a pathological TNM classification at restaging. Repeat mediastinoscopy itself had no more morbidity than the first one.

Although our series is small, the results show that previous mediastinoscopy is no contraindication for a repeat one. Repeat mediastinoscopy, when performed by an experienced thoracic surgeon, offers a safe and crucial tool in the repeat staging of lung cancer.

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