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Dimitrios Angouras

Follow-up of patients after resection for bronchogenic carcinoma

Abstract  Objective. To investigate how the members of the European Association for Cardio-Thoracic Surgery (EACTS) follow up their patients after pulmonary resection for bronchogenic carcinoma.

Methods. A questionnaire was sent to 317 EACTS members (thoracic and cardiothoracic surgeons as well as surgeons of unknown field of clinical practice). We eventually received completed questionnaires from 101 (31.9%) surgeons, who were classified into "thoracic" and "others". Their answers were analysed by the chi-square test.

Results. One out of four EACTS members does not follow up his/her patients, while the remainder follow them up with or without the collaboration of a clinical oncologist, a pneumonologist or a family physician. Among the surgeons who follow up their patients, only one out of two does so throughout the patient's remaining life. The frequency of the routine follow-up visits as well as the type and frequency of the examinations used vary significantly among the members of the Association, but generally the frequency of visits tends to decrease with time. Although 89.8% of surgeons believe that a well scheduled follow-up is beneficial to the patient, only 67% think that such a follow-up is cost-effective.

Conclusions. A great diversity was observed in the way patients operated on for lung cancer are followed up by the EACTS members. The differences were more evident between "thoracic" and "other" surgeons. However, hard data showing the effect of these differences on patients' long-term survival are not available and prospective cooperative studies on this subject are required. Taking into account that these patients are, for the rest of their lives, at high risk of development of a metachronous primary bronchogenic carcinoma or other potentially curable malignancies, we believe that a life-long follow-up is mandatory.

Key words  Follow-up - Bronchogenic carcinoma - Surgical treatment

Introduction

Postoperative follow-up is considered an essential part of the management of patients with bronchogenic carcinoma. However, from the discussions held at the annual meetings of the European Association for Cardio-Thoracic Surgery (EACTS), there seemed to be no consensus on the duration of, and the methods applied for, the postoperative follow-up of these patients. The purpose of this study was to investigate how the EACTS members follow up their patients after resection for bronchogenic carcinoma.
Material and methods

The initial data base of this study was a list of the EACTS members (Nov. 1994) which included the names of 669 surgeons divided into four groups according to their field of clinical practice (“cardiac”, “thoracic”, “cardio-thoracic” surgeons and surgeons whose field of clinical practice was not known). The group of cardiac surgeons was excluded from the study and a questionnaire was sent to 317 surgeons of the three other groups.

The questionnaire included 10 questions divided into two groups. The first group aimed at collecting data concerning the surgeon, namely: sex, age, type of hospital where he or she works and workload regarding resections for bronchogenic carcinoma. The second group of questions aimed at collecting data about: (1) the way in which the postoperative follow-up of patients operated on for bronchogenic carcinoma is performed, (2) the surgeon’s opinion about the cost-effectiveness of a well scheduled follow-up and its benefit to the patients, (3) the percentage of patients who, according to the surgeon’s personal experience, are reoperated on for local recurrence or a second primary lung tumor and (4) the specialty of the physician who, in the surgeon’s opinion, should perform the follow-up. The respondents were required to tick boxes of several given options and to make brief comments on some questions.

One hundred and seventeen EACTS members (36.9%) responded to our letter. Sixteen among them responded without answering the questionnaire, either because they did not perform lung surgery or because they had retired. Thus, we eventually received 101 completed questionnaires (101/317 = 31.9%) from 22 countries, namely: the UK 25, Germany and Spain 11 each, France 10, Italy and the Netherlands 6 each and 16 other countries (Greece, the United States, Austria, Belgium, Finland, Switzerland, the Czech Republic, Denmark, Norway, Sweden, Australia, Canada, Cyprus, Hungary, Japan and Russia) 1–4 each. The surgeons who completed these questionnaires were, for the need of statistical analysis, divided into two groups: “thoracic” surgeons and “others”. The “others” included cardio-thoracic surgeons plus surgeons of unknown field of clinical practice. It is reasonable to expect that several thoracic surgeons were included in this second heterogeneous group, resulting in underestimation of the observed differences between the two groups.

The collected data were analysed in a computer with the aid of custom-made software for this study and tested by the chi-square test for any statistically significant differences among surgeons of different fields of clinical practice, age, type of hospital and workload on lung cancer surgery.

Results

Ninety-nine male and two female surgeons completed the questionnaire. Their characteristics are shown in Table 1. About one out of four (24.7%) surgeons does not follow up his/her patients after their discharge from the hospital.

The specialties of the physicians who perform the postoperative follow-up, according to the answers we received, are shown in Figure 1.

The duration of follow-up varies considerably among the surgeons. Approximately one out of two surgeons (61.4% thoracic vs 37.2% others, P<0.05) who follow up their patients continues this throughout the patients’ remaining life. The remainder terminate the follow-up 1 (9.3%), 3 (4.5%), 5 (30%) or 10 years (6.9%) after the operation. Likewise, a variation of answers regarding the frequency of follow-up visits was observed. The majority (61.3%) of thoracic surgeons who follow up their patients examine them once every 3 or 4 months during the 1st postoperative year. On the other hand, 61.0% of others examine their patients only once or twice during the same period (P<0.05). The differences between the two groups of surgeons are smaller for those who continue the follow-up after the 1st year. Most surgeons (55.3%) examine their patients once every 6 months for the period 2nd–5th postoperative year and most (63.8%) of those who go on after the 5th year examine their patients once every 12 months. The type and frequency of the examinations used by the surgeons are shown in Table 2.

The surgeons’ opinion about the cost-effectiveness of a well scheduled follow-up as well as the benefits that patients might receive from it, are shown in Table 3. About three out of four (89.1% thoracic vs 64.1% others, P<0.01) and four out of five surgeons (84.7% thoracic vs 78.8% others) were able to state whether patients operated on by them for lung cancer had been reoperated on (by them or by another surgeon) for a local recurrence or for a second primary lung tumor, respectively. Their answers are shown in Table 4. Lastly, when asked to state the specialty of the physician(s) who should perform the follow-up, 89.3% of thoracic surgeons as opposed to 55.5% of others (P<0.001) answered that the surgeon should perform or at least participate in the follow-up. However, 54% of the surgeons (49.1% thoracic vs 40.7% others) answered that an oncologist, pneumonologist etc. should perform, or at least contribute to, the follow-up, while 29.9% of the surgeons (19.1% thoracic vs 40.7 others, P<0.05) answered that a family physician should play this role.

There were no statistically significant differences in the answers of surgeons of different age, different types of hospital and different workload on lung cancer surgery.
The specialties of physicians who perform or participate in the postoperative follow-up. The numbers in the columns represent the percentage of surgeons whose patients are followed up by the specialist relevant to each column:

Table 2

Type and frequency of the examinations used by the EACTS members for the follow-up of their patients after resection for lung cancer.

<table>
<thead>
<tr>
<th>Examination</th>
<th>%*</th>
<th>Frequency</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Regularly every</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 m    4 m    6 m   12 m    24 m    Average</td>
</tr>
<tr>
<td>Clinical</td>
<td>100</td>
<td>36.2%  10.8%  36.2% 14.4% – 5.5 m 2.4%</td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>97.5</td>
<td>35.8%  9.9%  37.0% 13.6% – 5.5 m 3.7%</td>
</tr>
<tr>
<td>Sputum cytology</td>
<td>65.0</td>
<td>7.4%  3.7%  7.4%  3.7% – 5.6 m 77.8%</td>
</tr>
<tr>
<td>Blood tests</td>
<td>78.3</td>
<td>23.1%  3.0%  20.0% 7.7% – 5.5 m 46.2%</td>
</tr>
<tr>
<td>Bronchoscopy</td>
<td>86.7</td>
<td>–      5.6%  12.5% 1.4% 11.1 m 80.5%</td>
</tr>
<tr>
<td>Chest CT scan</td>
<td>85.5</td>
<td>4.2%  –      12.7% 9.9% 1.4% 8.5 m 71.8%</td>
</tr>
<tr>
<td>Upper abdomen</td>
<td>77.1</td>
<td>4.7%  –      7.8%  6.3% – 7.2 m 81.2%</td>
</tr>
<tr>
<td>CT scan</td>
<td>79.5</td>
<td>1.5%  –      1.5%  3.0% – 8.2 m 94.0%</td>
</tr>
<tr>
<td>Brain CT scan</td>
<td>78.3</td>
<td>1.5%  –      3.0%  1.5% – 6.7 m 94.0%</td>
</tr>
</tbody>
</table>

Examination: Thoracic Others Statistical significance

Follow-up is:
- Cost-effective 76.1% 59.1% P<0.05
- Beneficial to the patients 91.4% 88.2% ns
  - early diagnosis of local recurrence 78.7% 75.9% ns
  - early diagnosis of distant metastases 70.2% 62.9% ns
  - appropriate management of the patient's complaints 68.0% 55.5% P<0.05

Table 3

The surgeons' opinions about the cost-effectiveness of, and benefit to the patients from, a well scheduled follow-up (ns non-significant)

<table>
<thead>
<tr>
<th>Follow-up is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracic Others Statistical significance</td>
</tr>
<tr>
<td>Cost-effective 76.1% 59.1% P&lt;0.05</td>
</tr>
<tr>
<td>Beneficial to the patients 91.4% 88.2% ns</td>
</tr>
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<td>early diagnosis of local recurrence 78.7% 75.9% ns</td>
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<tr>
<td>appropriate management of the patient's complaints 68.0% 55.5% P&lt;0.05</td>
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</table>

Discussion

The results of this study showed that there exists a considerable diversity in the way patients submitted to resection for lung cancer are followed up by the members of the EACTS. Such a diversity was also observed in a similar survey carried out recently in the USA among members of The Society of Thoracic Surgeons [15], pointing out that prospective multicentre studies on this subject are required.

As shown by our study, one out of four EACTS members does not follow up his/her patients postoperatively and only one out of two who follow up their patients does so
for the remainder of the patient’s life. The data derived from several reported series, however, indicate that the patients who have been submitted to pulmonary resection for bronchogenic carcinoma are, for the rest of their lives, at risk of dying from malignancies, some of which may be curable. Such potentially curable malignancies may permit a radical surgical treatment. Even in these cases, early diagnosis and treatment with satisfactory results may permit a radical surgical treatment. The majority of patients, however, present with lesions not amenable to surgery. Even in these cases, early diagnosis gives the patient a chance for timely palliative treatment. In addition, the timely evaluation of many postoperative symptoms, frequently not due to recurrence of the disease, contributes to an informed prognosis and, therefore, to the patient’s reassurance and relief of doubts and anxiety. For all these reasons, we agree with many authors who believe that a life-long follow-up of the patients operated on for lung cancer is mandatory [1, 2, 7, 12–16, 18, 20–22, 25].

Table 4  The percentage of patients who, according to the surgeons’ personal experience, were reoperated on for a local recurrence or a second primary lung tumor (ns non-significant)

<table>
<thead>
<tr>
<th>Percentage of patients reoperated on for:</th>
<th>Thoracic</th>
<th>Others</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local recurrence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• &lt;1%</td>
<td>56.1%</td>
<td>50.0%</td>
<td>ns</td>
</tr>
<tr>
<td>• 1%–5%</td>
<td>43.9%</td>
<td>47.1%</td>
<td>ns</td>
</tr>
<tr>
<td>• &gt;5%</td>
<td>0.0%</td>
<td>2.9%</td>
<td>ns</td>
</tr>
<tr>
<td>Second primary lung tumor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• &lt;1%</td>
<td>71.8%</td>
<td>87.8%</td>
<td>ns</td>
</tr>
<tr>
<td>• 1%–5%</td>
<td>28.2%</td>
<td>12.2%</td>
<td>ns</td>
</tr>
<tr>
<td>• &gt;5%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>ns</td>
</tr>
</tbody>
</table>

Regarding the frequency of routine follow-up visits, no consensus was observed, especially during the first post-operative year. However, the frequency tended to decrease with time, in accordance with the practice or recommendations of most authors [3, 7, 12, 14, 16, 24]. On the other hand, it should be mentioned that the incidence of metachronous primary lung cancer increases with time [20, 21] and that the more frequent the follow-up visits, the greater are the chances of asymptomatic tumors being diagnosed. As the treatment of malignant tumors on asymptomatic patients yields better results [14, 17], a life-long follow-up at the rate of once every 4 months, as recommended by Shields et al. [20], seems to be the ideal solution, although somewhat difficult to achieve.

Similarly, opinions about the type and frequency of most of the examinations used during the follow-up differ. Of course, the value of clinical examination and chest X-ray is indisputable. By means of these two examinations, a detection of up to 80–95% of metachronous primary lung tumors has been reported [2, 14] and virtually all EACTS members who follow up their patients use them on a routine basis. On the other hand, the value of periodic sputum cytology is controversial [6, 7, 16], and this is clearly depicted in this study. The same is true of the other examinations.

The specialty of the physician(s) who should perform the follow-up is another important issue. It is evident that the management of these patients requires collaboration of physicians of various specialties. For practical purposes, however, one among them should be in charge of the follow-up team. In agreement with Abbey Smith [1], C. A. Hiebert [8] and the vast majority of thoracic surgeons of this study, we believe that it is the surgeon who has to play this role. For patients living in remote rural areas or in circumstances not permitting easy and frequent access to the Thoracic Surgical Centre, the follow-up can be performed by the most competent local physician, who must maintain contact with the thoracic surgeon.

Finally, the financial parameters of such a follow-up protocol should be examined assiduously, as escalating health care costs advocate the evaluation of cost-effectiveness for any method aimed at screening or following up a great number of patients. Although the majority of surgeons believe that a well scheduled follow-up protocol is cost-effective, sufficient data are lacking [23].
patients with potentially curable malignant lesions as well as reliable data regarding the long-term results of the surgical treatment of lung cancer in Europe.

Acknowledgements We thank Mr Andreas Stavropoulos for developing the software for this study and Mr Panos Rozakis for his valuable help in the analysis of the data.

References

Discussion

Dr. L. Lacquet (Nijmegen, The Netherlands). Thank you very much for this interesting and important paper. I agree completely with the suggested protocol and I am very surprised at the amount, that only 55% of the patients are controlled life-long. So what is the reason for this poor follow-up, this poor control after operation?

Dr. Angouras. I am afraid that we can only make assumptions on this. We believe that a very important reason is the underestimation of the incidence of metachronous primary lung cancer or other potentially curable lesions. This underestimation leads to the false impression that only a very small number of patients will benefit from a life-long follow-up. For this reason, such a follow-up may be considered unnecessary by some surgeons and far beyond being cost-effective.

Dr. J. Hasse (Freiburg, Germany). I enjoyed your paper and you have raised a very important point for any oncological work, but I think we have to comment on your conclusion. There are some different conditions involved. The German Society of Thoracic Surgery recommends, and everybody in this Society agrees, that the follow-up should be 3 months by 3 years and not end after 5 years, but rather should be continued. Now, on the other hand, many of the thoracic surgeons are unable to follow their own rules, because there is a struggle over these patients between private doctors and the hospitals. Outpatient clinics are often restricted by the insurance companies. You have shown very nicely that in the U.K. there were 35 positive replies but there were only 11 in Germany, typical of the different health systems.

Dr. Angouras. Twenty-five versus 11, yes.

Dr. J. Hasse: I think that might apply to other European countries in the same way. So I would not conclude there is less interest among many of the surgeons but rather for some it is more difficult to follow their own rules.

Dr. L. Wilson (Mobile, Alabama). I enjoyed this paper very much. I think there are a lot of socio-economic comments to be made here. One, I think, is economics, which you did; the other thing is the cost from a health care management standpoint. In America, where I practice, we have an oncology register and, as a thoracic surgeon, I would see the patient at 2 weeks and then at 6 weeks. At that point those patients are generally turned over to either a pulmonologist or the oncologist. They are followed through the institution at which they were operated on through an oncology register, and I think that’s very helpful, because these registers can collaborate with other registers around the state and then around the country. This leads to a comprehensive follow-up.

Dr. Angouras. I agree with you that the help from other specialties and mainly from clinical oncologists is valuable and welcome. However, this should not lead to the exclusion of the thoracic surgeon from the follow-up team. On the contrary, we think that this follow-up should remain under the responsibility of the thoracic surgeon. Since the patients are followed up at the same institution where they were operated on, the surgeon can collaborate more easily with the oncologists and the pneumologists of the hospital and the oncology register you mentioned can still be used.

Dr. M. Ribet (Lille, France). All that is interesting, but I think the only benefit we could get from a perfect, long follow-up stands for stage I tumors. So if we do something, let us do it for stage I. I don’t think a long and perfect follow-up is very useful for stage II or III, but of course for stage I it certainty is, because that is the group where we can act again for a long-term survival.

Dr. Angouras. I can only agree with the remarks of Dr. Ribet, who has wide experience on the subject. Indeed, a well organized life-long follow-up is expected to be more useful, and of course more cost-effective, for patients operated on for stage I bronchogenic carcinoma. This is because there are many more long-term survivors in this group of patients. But I think that we should still give a chance for cure to those patients with stage II and III disease who will develop a potentially curable malignancy, even though the percentage of such patients is very low.

At the end of this discussion, I would like to thank all the discussants for their comments and their interesting remarks.