Quality of life after surgical therapy of bronchogenic carcinoma

Abstract Quality of life (QL) after the "curative" resection of non-small cell bronchogenic carcinoma was assessed by patients using the EORTC QL questionnaire (QLQ) and by a psychologist using the Spitzer Index. Quality of life was assessed in 52 patients on one occasion 12 months postoperatively and in 20 patients regularly starting with a preoperative assessment. Self- and external evaluation showed a significant correlation (r=0.41), but QL was assessed as being higher by the external observer. After surgery it was mainly affected by restrictions related to physical activities, job and household tasks, and disease symptoms, whereas limitations in emotional, social, and financial domains were found less frequently and less severely. Of the different medical (surgical procedures, tumor recurrence) and social factors (sex, marital and employment status), only tumor recurrence was determined to have a significant and negative influence on postoperative QL (P<0.02). When compared to the preoperative assessment, QL had deteriorated on discharge from hospital but was restored within 3–6 months postoperatively in disease-free patients.

Introduction

Among all treatment methods currently available, radical resection still achieves the best long-term results in patients with non-small cell bronchogenic carcinoma. Nevertheless, even after successful primary operation about 70% of the patients will die within 5 years due to recurrent disease [6]. In these patients the maintenance of a good quality of life (QL) during the limited survival time is the main goal of surgery. Despite a number of different test instruments to measure QL, developed by sociologists and psychologists, very little is known about patients' QL after surgical therapy of bronchogenic carcinoma with regard to somatic, emotional, social, financial, and other dimensions of QL. Therefore, QL following the surgical therapy of bronchogenic carcinoma was studied using two different assessment methods.

Patients and methods

Postoperative study

Over a 1-year period all 52 patients who had undergone "curative" resection of a non-small cell bronchogenic carcinoma at the Department of Surgery, University of Cologne, and who attended the outpatient service for routine follow-up examinations 12 months after surgery, were included. For each patient the QL was assessed only once. The patients' median age was 61 years (range: 39–78). Thirty-eight patients were male and 14 female. The demographic and medical details of the patients are given in Table 1.

Follow-up study

In order to determine the impact of surgery and to analyze the postoperative course, QL was assessed in each patient of a second group regularly: 1 day before surgery, postoperatively on the day of discharge from hospital and at 3-monthly intervals thereafter until the
end of the 1st postoperative year (6 times). Over a 1-year period at first all patients were included in whom a non-small cell bronchogenic carcinoma had been resected with curative intention (32 patients). Patients in whom QL assessment was not complete (6 patients) were excluded. Six patients who developed tumor recurrence within the 1st postoperative year were excluded from this analysis, because the postoperative analysis revealed that tumor recurrence decreased QL significantly and this number was to small for separate analysis. Therefore, the results of the remaining 20 patients represent the postoperative course during disease-free survival. Fifteen patients were male and five female. The mean age was 55±10 years (median 53, range: 39–69). The medical and sociodemographic details of these patients are given in Table 1.

Perioperative treatment

In all patients non-small cell bronchogenic carcinoma were resected with curative intention (R0-resection) via an antero-lateral approach. Patients who survived the operation were discharged from hospital after a median time of 11 days postoperatively. Patients with N2-status received adjuvant postoperative radiotherapy of the mediastinum, starting between 3 and 6 weeks after surgery. A total dose of 50 Gy was delivered in 2 Gy daily fractions. Regular outpatient follow-up examinations were performed in 3-monthly intervals including clinical examination, chest X-ray, ultrasonography of the abdomen and analysis of serum titer of CEA (adenocarcinoma) or SCC (squamous cell carcinoma).

Quality of life assessment

Quality of life was assessed both by the patients themselves and by a psychologist. Self-assessment was made using the German version of the Quality of Life Questionnaire (QLQ) of the EORTC as published in 1987 [1]. The QLQ contains 36 questions which assess different disease symptoms, "physical functioning", "role functioning", "emotional functioning", "social functioning", "financial impact", and the "global QL". As intended by the developers of the QLQ, six questions were added to assess lung-specific disease symptoms, such as coughing or expectoration. The QLQ was explained to the patients by the staff and was completed by the patients themselves. If they had problems with the questionnaire or required further explanation, they could ask the psychologist. These questions were recorded as well.

The external evaluation was made by a psychologist (U. H.) after a 10-min interview with the patient and was based on the QL index developed by Spitzer and co-workers [5]. The Spitzer Index contains five equally weighted items regarding "activity", "daily living", "health", "support", and "outlook". The global index ranges from 0–10 points, whereby a higher score represents a higher QL.

Table 1  Study patients

<table>
<thead>
<tr>
<th></th>
<th>Postoperative study</th>
<th>Follow-up study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Resection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lobectomy</td>
<td>42 (81)</td>
<td>15 (75)</td>
</tr>
<tr>
<td>Pneumonectomy</td>
<td>10 (19)</td>
<td>5 (25)</td>
</tr>
<tr>
<td>Adjuvant postoperative radiotherapy</td>
<td>13 (25)</td>
<td>6 (30)</td>
</tr>
<tr>
<td>No adjuvant treatment</td>
<td>39 (75)</td>
<td>14 (70)</td>
</tr>
<tr>
<td>Tumor recurrence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>42 (81)</td>
<td>20 (100)</td>
</tr>
<tr>
<td>Yes</td>
<td>10 (19)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Marital status</td>
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<tr>
<td>No partner</td>
<td>7 a (13)</td>
<td>4 b (20)</td>
</tr>
<tr>
<td>Partner</td>
<td>45 a (87)</td>
<td>16 b (80)</td>
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<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed full-time</td>
<td>6 a (12)</td>
<td>10 b (50)</td>
</tr>
<tr>
<td>Retired, temporarily disabled</td>
<td>33 a (63)</td>
<td>5 b (25)</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>13 a (25)</td>
<td>5 b (25)</td>
</tr>
</tbody>
</table>

a  At the time of assessment
b  Before surgery

Statistical analysis

The computerized data were entered into dBase III Plus 1 and analysed using the software package BMDP 2. Correlation between different items or components were analyzed by means of the Pearson's correlation coefficient. In order to determine the impact of medical or social factors, the patients' collective was divided into corresponding subgroups and the variables were compared univariately by the Kruskall-Wallis test. The level of significance was defined on a 5% level.

Results

Self-assessment according to the QLQ

The average time for completion of the questionnaire was 15 min. Two patients initially had no clear conception of the term "quality of life" and needed further explanation. Of the different functional domains of the QLQ most limitations were related to physical and role functions (Fig. 1). Only 8 patients (15%) reported no physical limitations at all, 44 patients (85%) could not perform strenuous activities or run a short distance, 34 (65%) had trouble taking a long walk, 14 (27%) had trouble walking a short distance, 3 (6%) had to spend most of the day indoors, and one patient (2%) needed help with eating, dressing, washing, or using the toilet. Thirteen patients (25%) felt no restriction in their job or household tasks (role functioning), while 28 (54%) reported partial, and 11 (21%) complete, incapacity. Regarding emotional components, such as anxiety or depression, 42% of the patients reported no, 56% some, and only 2% very many, disorders. The majority of patients (81%) had no social or financial problems. Patients' self-assessment of their global health status and QL showed similar tendencies on the 7-point scale (Fig. 2), but the median score of global QL (5 points, mean±STD: 4.8±1.5, range: 1–7) was 1 point better than of global health status.

1  Ashton Tate, Maidenhead, UK
2  BMDP Statistical Software, Los Angeles, USA
and 2%, respectively, rated these complaints as severe. In addition, 69% of the patients suffered from meteoropathy and coughing, 62% from fatigue, 60% from pain, and 42% from expectoration in various degrees. Abdominal and digestive disorders were rarely reported.

External assessment according to the Spitzer QL Index

The median score of all patients was 9 points (mean±STD: 8.25±1.9, range: 3–10). Around one third of the patients were assessed with the highest score (10 points), which reflects the best QL (Fig. 4).

Correlations between different components

A significant correlation (r=0.41) was noted between the self- and external evaluation of global QL. Apart from meteoropathy, social functioning, and financial impact, all other scales and individual symptoms correlated significantly with the global QL measures (Table 2), indicating that limitations in each of these components and symptoms will have a negative effect on a patient's overall QL. The highest impact was determined for fatigue and for pain. Although lung-specific complaints, such as dyspnea, coughing, expectoration, or meteoropathy were present in many patients, these symptoms seemed to have only little bearing on the perceived overall QL.

Impact of patient and disease status

Univariate analysis revealed that the factors sex, marital status, previous adjuvant radiotherapy, and present em-
**Fig. 4** QL-assessment by a psychologist according to the Spitzer Index.

**Fig. 5** Self-rating of different scales of the QLQ during follow-up study.

**Fig. 6** Self- and external rating of global QL during follow-up study.

Employment status had no detectable influence on QL 1 year postoperatively.

Patients following lobectomy suffered less frequently from disease symptoms, such as effort dyspnea (55±12 vs 69±17, P>0.05) and had better physical functioning (78±13 vs 62±15) than patients following pneumonectomy. However, these differences were not statistically significant and global QL according to self- and external assessment was comparable.

Tumor recurrence was found to be the most important determinate of postoperative QL: patients without a tumor relapse at the time of assessment had a significantly better functional status (80±15 vs 55±12, P<0.01), suffered less frequently from disease symptoms (P<0.02), assessed their global QL better (65±15 vs 41±12, P<0.02), and were evaluated better by the Spitzer Index (8.5±1.7 vs 6.8±2.2 P<0.02) than patients with a tumor recurrence.

**Follow-up study**

The average self-rating for the single scales of the QLQ are presented in Fig. 5. Preoperatively, disease symptoms and limitations relating to the job and household tasks were the most frequent dysfunctions. These restrictions, as well as limitations in physical functioning, had increased after surgery upon discharge from hospital. Within 6–9 months postoperatively these dysfunctions had improved once again and after 12 months had reached approximately the level of the preoperative assessment. Emotional, social, and financial dysfunction were rated as low during the whole observation period. Self- and external evaluation of global QL showed a similar course (Fig. 6), but QL was higher according to the external assessment. Patients in whom a pneumonectomy have been performed suffered on discharge from hospital significantly more from disease symptoms (P<0.05) and limitations in physical functioning (P<0.05) than patients after a lobectomy. However, emotional, social, and economic domains as well as global QL did not differ significantly. After 3 months there were no statistically significant differences anymore.

Ten patients were in full-time employment before surgery; six of them returned to their jobs after a median time interval of 5 months postoperatively and four patients were retired postoperatively. The postoperative course of patients, who received adjuvant radiotherapy, and of patients who were treated by surgery alone, did not differ significantly. However, the number of patients who received adjuvant treatment was very small (six patients) and radiotherapy had been completed before the QL-assessment at 3 months postoperatively.

**Discussion**

People's overall perception and evaluation of their QL can be influenced by a lot of different physical, emotional, social, financial and other circumstances. Therefore, two methods of QL assessment were employed in this study, which include these dimensions of QL and which have been found to have good reliability and validity for QL assess-
ment in cancer patients [2, 7]. The significant correlation between global self- and external assessment suggests that both methods measure comparable dimensions of QL. However, global QL was evaluated higher by the psychologist using the Spitzer Index. Since the methods for self- and external assessment were different, it remains open whether this difference is primarily due to the type of instrument (QLQ vs Spitzer Index) or due to the rater (patient vs psychologist).

In comparison to physical restrictions and symptoms, emotional, social, and financial dysfunction, were less frequent and less severe. As a result of surgery and the loss of pulmonary parenchyma, effort dyspnea and consecutive impairments during strenuous activities were the most common postoperative limitations. Although there was a tendency for these restrictions to be more severe following pneumonectomies than lobectomies, the number of patients was too small to draw a final conclusion. Apart from lung-specific complaints, some patients suffered additionally from general cancer symptoms, such as reduced well-being, weakness, and tiredness, which are employed in the fatigue scale and which showed to have the strongest bearing on patients’ evaluation of overall QL. As the occurrence and the severity of these symptoms were mainly associated with recurrent disease, tumor recurrence was found to be the most important determinate of postoperative QL. Similar results have also been noted in other investigations [2, 3]. Several studies of the Lung Cancer Study Group [3] showed that QL of patients with bronchogenic carcinoma – which was assessed with the Functional Living Index – Cancer (FLIC) [4] – deteriorated significantly with increasing extent of the disease. The correlation between tumor status and QL was so high that QL was found to be a significant predictor of overall and disease-free survival. In an international and multicenter study of the EORTC [2] QL was investigated in 518 non-operated patients with lung cancer using the QLQ. Although the samples are not strictly comparable, the results of the EORTC study showed similar tendencies to our findings but more severe impairments were noted in almost all components and therefore the patients’ overall QL was worse than that of our patients. However, 41% of the patients of the EORTC study already had distant metastases. These patients showed significantly more restrictions in physical, role, emotional and social components and had a lower overall QL than those patients with limited disease. In the EORTC study statistically significant correlations were found among all scales of the QLQ, indicating that these scales assess various aspects of QL. In contrast to the EORTC study, limitations in social and financial areas were found to be low in our patients and this may be the reason why we could not determine a significant correlation between these components and the global QL measures.

In conclusion, the QLQ and the Spitzer Index were found to be practicable instruments for QL assessment in surgery for lung cancer. Further studies are required to define the impact of different surgical procedures (i.e. lobectomy, pneumonectomy, atypical resection, minimally invasive techniques) and adjuvant multimodal treatments on patients’ QL.

References