Original Article

Evaluation of quality of life of patients submitted to pulmonary resection due to neoplasia*

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ABSTRACT

Objective: To evaluate the health-related quality of life of patients submitted to resection of the pulmonary parenchyma due to neoplasia. **Methods:** The Medical Outcomes Study 36-item Short-Form Health Survey was used to evaluate patients in the preoperative period and on postoperative days 30, 90 and 180. We used the GEE statistical model, in which the dependent variable (quality of life) changes for each patient over the course of the evaluation. Independent variables were gender, age, educational level, type of surgery, radiotherapy, chemotherapy, forced vital capacity and 6-minute walk test. The level of significance adopted was 5%. **Results:** The final study sample comprised 36 patients, 20 of whom were men. Of those 36 patients, 17 were submitted to lobectomy, 10 to pneumonectomy, 6 to segmentectomy, and 3 to bilobectomy. Chemotherapy was used in 15 patients, radiotherapy in 2, and a combination of radiotherapy and chemotherapy in 2. Improved quality of life was seen in the following domains: social (on postoperative day 90); physical/functional (some patients presenting better forced vital capacity and 6-minute walk test performance); and physical (in patients undergoing smaller resections). Lowered quality of life was seen in the following domains: social (for female patients); physical/social (resulting from radiotherapy, chemotherapy or both); and physical/functional (by postoperative day 30). **Conclusions:** It is important that studies evaluating the various determinants of quality of life, as well as the impact that cancer treatment modalities have on such variables, be conducted. The knowledge provided by such studies can contribute to improving the quality of life of patients undergoing pulmonary resection due to neoplasia.

Keywords: Lung neoplasms/surgery; Pneumonectomy; Quality of life; Questionnaires

INTRODUCTION

Oncological pathologies constitute a serious public health problem, chief among which are lung neoplasia and metastatic lung cancer. In 2001, lung cancer was responsible for more than one million deaths worldwide, with a global increase of 0.5% per year, which is principally related to an increase among women. Lung cancer is highly lethal, incidence and mortality rates generally being nearly equal.[1-3]

An analysis of mortality due to lung cancer in Brazil demonstrated that, between 1979 and 2000, lung cancer mortality rates rose from 7.73/100,000 to 12.13/100,000 among men (a relative percentage variation of +57%, whereas a rise from 2.33/100,000 to 5.33/100,000 (+134%) was seen among women. The numbers of lung cancer deaths predicted for 2003 were 11,315 for men and 4,915 for women.[4]

Surgery involving resection of the lung parenchyma has been cited as the only method of curing lung cancer and other metastatic tumors in the lung.[5] Unfortunately, only 20% of the lung carcinomas may be submitted to surgery due to the fact that most of them present advanced anatomical staging in the assessment, or associated comorbidities that contraindicate surgery.[6]

There is an increased involvement of health professionals in the treatment of patients with this pathology, all aiming to offer the best treatment possible. Protocols that determine the impact of the surgical procedure on functional status and daily activities are fundamental instruments that must be routinely implemented in order to improve quality of life (QoL).

The concept of QoL is a subjective and one that presupposes an ideal individualized level of values, capacities, satisfaction and well-being. Generic and specific standardized questionnaires that produce scores for the various aspects involved are used in order to evaluate QoL.[7-9]

Generic questionnaires have been developed to reflect the impact of a disease on the life of patients in a wide variety of populations.[9] One of the most commonly cited in the literature is The Medical Outcomes Study 36-item Short-Form Health Survey (SF-36), which has been one of the principal instruments validated for use in Portuguese. Since it is easily applied and easily understood by the patient, the SF-36 is currently used in clinical research and epidemiological studies.[10]

The choice of this instrument was based on the interest in having access to a generic health evaluation questionnaire, in Portuguese, that presents measurement properties such as reproducibility, validity and susceptibility to alterations.[9]

The objective of the present study is to analyze the health-related QoL of patients submitted to resection of the lung parenchyma due to neoplasia, applying the SF-36 in the preoperative period and again on postoperative days 30, 90 and 180.

METHOD

This was a prospective study, carried out between October 2001 and December 2003, in which we evaluated the performance and the QoL of adult patients, of both genders, submitted to lung resection due to a malignant neoplasm. In the preoperative period, the evaluation was carried out in the thoracic surgery ward of the State University at Campinas Hospital das Clínicas. Subsequently, patients were monitored as outpatients and were submitted to follow-up assessments on postoperative days 30, 90 and 180.

The study was approved by the ethics in research committee of the institution, and all patients gave written informed consent.

Patients who failed to complete the six-month postoperative follow-up period, were diagnosed with benign diseases or were submitted to a second lung resection during the follow-up period, as well as patients whose resections were not considered curative, were excluded from the study.

The preoperative evaluation was carried out using the perioperative respiratory therapy scale of surgical risk,[11] which is used to assess the risk of postoperative pulmonary complications. Data regarding postoperative type of respiration, lung auscultation, intercurrent lung diseases and respiratory therapy procedures were obtained through review of medical charts.

In the four phases of the evaluation, patients were submitted to the following procedures: spirometric tests to determine forced vital capacity (FVC); [12-13] the 6-minute walk test (6MWT)[12]; and application of the SF-36.[9-10]

The SF-36 is a multidimensional questionnaire (comprising 36 questions) that evaluates patient perceptions of their own health status. Rather than

being disease-specific, the questionnaire demonstrates how involved the patient is with the disease, and its application is related to health care interventions conducted in the course of community health programs or clinical research.[10,14-15]

The following are the domains investigated by the questionnaire: physical (in which symptoms such as pain, fatigue, nausea and medication effects are assessed); functional (which addresses patient mobility, daily activities and performance at work); psychological (in which patient satisfaction with their health status and with life in general, as well as symptoms such as depression or anxiety, are assessed); and social (dealing with family, professional and social aspects).

These questions are based on the perception that patients have of their health status in the preceding four weeks. In order to obtain the results in each of the components or dimensions, the score obtained on each question is recorded and then transformed into a scale ranging from zero (worst score) to 100 (best score).[9]

All patients underwent respiratory therapy during hospitalization and participated in the postoperative pulmonary rehabilitation program for at least two months.[16-17]

In order to study the influence of the variables of interest on the QoL throughout the four phases of collection, we performed an analysis using generalized linear models and generalized estimation equation (GEE) estimates. The level of statistical significance adopted was 5%.[18-19]

RESULTS

A total of 36 patients participated in the study: 16 females (44.4%) and 20 males (55.6%). Patient ages ranged from 18 to 78 years, and 4 patients (11%) were under 40. Median age was 55.5 ± 13.4 years.

A total of 49 patients were excluded: 20 because they failed to conclude the study; 13 because they were diagnosed with benign diseases; 9 because they were submitted to a second operation; and 7 because they were submitted to resections that were not considered curative.

The anatomopathological test results revealed 26 primary lung tumors, 10 adenocarcinomas and 10 epidermoid carcinomas. In addition, 4 tumors were classified as carcinoid, 1 as large-cell carcinoma and 1 as adenoid cystic carcinoma. Another 8 lung

tumors were considered metastatic in origin. Of those, 5 were classified as carcinoma (3 colon carcinomas, 1 liver carcinoma and 1 undifferentiated carcinoma), 2 as melanoma and 1 as soft tissue sarcoma. Two patients were diagnosed with primary chest wall tumor with invasion of the lung parenchyma.

Segmentectomy was performed in 6 patients (16.7%), lobectomy in 17 (47.2%), bilobectomy in 3 (8.35) and pneumonectomy in 10 (27.8%).

In the immediate postoperative period, pulmonary complications occurred in 3 patients. According to the perioperative respiratory therapy surgical risk scale, 1 of those patients had been at low risk, and the other two had been at moderate risk.

There were 17 patients (47.2%) who received neither radiotherapy nor chemotherapy, whereas 15 (41.7%) received chemotherapy alone, 2 (5.6%) received radiotherapy alone, and 2 (5.6%) received a combination of the two.

The results of the analysis using the generalized linear models and the GEE were adjusted for each domain of the SF-36 according to the independent variables of interest (gender, age, educational level, type of surgery, radiotherapy, chemotherapy, FVC and distance walked on the 6MWT).

In the analysis of the functional capacity domain, we observed statistically significant correlations between some variables and QoL (Table 1). Greater distance walked on the 6MWT and higher FVC both correlated with improved QoL ($p < 0.003$ and $p < 0.011$, respectively). In patients who were submitted to radiotherapy, chemotherapy or both, QoL was lower ($p < 0.004$). An overall drop in QoL was also seen by postoperative day 30.

TABLE 1

Analysis of the generalized estimation equations for quality of life using the functional capacity domain of the Medical Outcomes Study 36-item Short-Form Health Survey

Variable	Estimate	Standard error	Z score	p
6-minute walk test	0.001	0.000	2.897	0.003
Forced vital capacity	0.005	0.002	2.541	0.011
Radiotherapy, chemotherapy or both	-0.235	0.082	-2.849	0.004
Postoperative day 30	-0.381	0.139	-2.742	0.006

SF-36: *The Medical Outcomes Study 36-item Short-Form Health Survey*

TABLE 2

Analysis of the generalized estimation equations for quality of life using the physical aspect domain of the Medical Outcomes Study 36-item Short–Form Health Survey

Variable	Estimate	Standard error	Z	p
6-minute walk test	0.001	0.000	3.708	0.0002
Segmentectomy/lobectomy	0.189	0.095	1.987	0.046
Radiotherapy, chemotherapy or both	-0.172	0.077	-2.244	0.024
Postoperative day 30	-0.335	0.153	-2.191	0.028

SF-36: *The Medical Outcomes Study 36-item Short-Form Health Survey*

In the physical aspect domain, improved QoL correlated significantly with better performance on the 6MWT (p < 0.0002) and with more limited resection of the lung parenchyma (p < 0.04), as shown in Table 2.

Lower QoL was found to correlate with the use of radiotherapy or chemotherapy (p < 0.024) and with postoperative day 30 (p < 0.028).

In the general health status domain, we found a statistically significant correlation between improved QoL and the independent variable 6MWT (p < 0.03) (Table 3).

TABLE 3

Analysis of the generalized estimation equations for quality of life using the general health status domain of the Medical Outcomes Study 36-item Short-Form Health Survey

Variable	Estimate	Standard error	Z	p
6-minute walk test	0.001	0.000	2.108	0.03

SF-36: *The Medical Outcomes Study 36-item Short-Form Health Survey*

TABLE 4

Analysis of the generalized estimation equations for quality of life using the vitality domain of the Medical Outcomes Study 36-item Short-Form Health Survey

Variable	Estimate	Standard error	Z	p
Radiotherapy, chemotherapy or both	-0.302	0.135	-2.229	0.025

SF-36: *The Medical Outcomes Study 36-item Short-Form Health Survey*

TABLE 5

Analysis of the generalized estimation equations for quality of life using the social aspect domain of the Medical Outcomes Study 36-item Short–Form Health Survey

Variable	Estimate	Standard error	Z	p
Postoperative day 90	0.322	0.091	3.506	0.0005
Females	-0.258	0.100	-2.576	0.010
Radiotherapy, chemotherapy or both	-0.292	0.107	-2.719	0.006

SF-36: *The Medical Outcomes Study 36-item Short-Form Health Survey*

When we analyzed the vitality domain, we observed that the use of radiotherapy, chemotherapy or both correlated with lower QoL (p < 0.025) (Table 4).

In the analysis of the preoperative period and the three phases of evaluation of the postoperative period, patients presented improved QoL in the social aspect domain from postoperative day 90 onward (p < 0.0005). Females presented lower QoL than that observed for males (p < 0.010). Patients submitted to radiotherapy, chemotherapy or both also presented lower QoL (p < 0.06) (Table 5).

DISCUSSION

Among the four interviews, the second, which occurred on postoperative day 30, was the most difficult to carry out due to the general health status of the patients, especially in terms of pain, discomfort at the surgical incision site, tingling or physical debilitation. From postoperative day 90 onward, patients showed signs of greater physical independence, were more hopeful and were more committed to continuing the treatment.

When gender was analyzed as an independent variable using the GEE statistical model, females presented lowed QoL in the social aspect domain (p < 0.010). Other authors have found that postoperative comorbidities are more common in males, thereby contributing to lower QoL.[1,20] In patients submitted to more limited resection of the lung parenchyma, QoL in the physical aspect domain was improved, and the difference was statistically significant (p < 0.046). Few authors have found QoL to be correlated with resection

of the lung parenchyma. However, some do not consider that the type of surgery is predictive of lower QoL.[21] Studies in the literature have made valuable contributions to establishing a relationship between the type of surgery and morbidity/mortality. According to some authors, patients submitted to pneumonectomy presented a higher risk of complication than did those submitted to lobectomy.[22] Other authors have cited mortality as a complication related to the extent of the surgery.[1,23-24]

No improvement in QoL was observed as a result of radiotherapy or chemotherapy. Actually, such treatment was correlated with worsening in the following domains: functional capacity (p < 0.004); physical aspects (p < 0.024); vitality (p < 0.025); and social aspects (p < 0.006).

In a study involving twelve patients with chest cancer, no worsening of QoL or pulmonary function was found to result from the use of radiotherapy, chemotherapy or both.[25] With regard to pulmonary function, median FVC dropped from 98.5 ± 18.0% in the preoperative period to 81.5 ± 23.3% on postoperative day 180. When the statistical analysis was carried out using the GEE statistical model, FVC was found to be predictive of improved QoL in the functional capacity domain (p < 0.011). However, other authors have found that there was no correlation between the SF-36 results and pulmonary function.[21,26] In the 6MWT, the distance walked in the preoperative period was 509 ± 99.5 m, compared with 506 ± 95.1 m on postoperative day 180. When the GEE statistical model was used, we observed that the distance walked on the 6MWT was predictive of improved QoL in the following domains: functional capacity (p < 0.0003); physical aspects (p < 0.0002); and general health status (p < 0.03).

These results differ from those of another study involving patients with lung cancer, in which a mean of 414 ± 107 meters was obtained on postoperative day 180. However, in that study, this variable was not found to be predictive of QoL.[21] The results obtained on the 6MWT in the present study seem to differ from those found in the aforementioned study since our patients have maintained better conditions of nutrition, culture, transportation and medication.

According to some authors, patients submitted to surgical therapy of bronchogenic carcinoma present an immediate postoperative drop in QoL, which is only restored to preoperative status at three to six months after the surgery.[27] The surgical procedure and the perception of QoL have a negative impact that can be influenced by several physical and emotional factors.

To the detriment of QoL, the impairment of daily life activities (such as domestic chores), hair loss and weight loss run parallel to the disease stages. There is a significant correlation between these aspects and patient perception of QoL. Further studies are needed in order to clarify prognostic determinants, biological factors, immunologic factors, tumor markers, laboratory tests for prognoses and general aspects of QoL.[28]

After lung resection, patients may be affected by pulmonary complications, such as atelectasis and pneumonia, and might require prolonged mechanical ventilation, in addition to the daily activity limitations and the use of supplemental oxygen. It has been suggested that the positive and negative preoperative predictors be explained to patients, and that they be fully informed of the possibility of postoperative physical or respiratory debilitation.[24]

Due to the functional worsening, it has been suggested that patients with lung cancer formally participate in rehabilitation programs, thereby relieving the deleterious effects of the surgery, of the disease and of the treatment proposed.[29] High- and low-intensity exercises are resources that can prevent or minimize physical inactivity, fatigue and frailty, thereby contributing to patient recovery.[30]

We conclude that patients submitted to lung resection due to neoplasm present improved QoL in the following domains: functional (patients presenting higher FVC and better 6MWT performance); physical aspects and general health status (patients presenting better 6MWT performance); physical (in patients undergoing more limited surgical resections) and social (by postoperative day 90).

Lower QoL was seen in the following domains: functional/physical (by postoperative day 30), functional/physical/vitality/social (resulting form radiotherapy, chemotherapy or both) and social (for female patients).

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