Changes in quality of life after esophageal resections for carcinoma

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Key words: esophageal carcinoma, esophageal resection, lymphadenectomy, quality of life.

Summary. Objective. To evaluate the changes of the quality of life after the surgery for esophageal carcinoma and to find out whether these changes are influenced by the extent of the resection and lymphadenectomy.

Patients and methods. A total of 49 patients in whom esophageal carcinoma had been resected with curative intent and who stayed disease-free for at least twelve months after the surgery were studied. Twenty-four patients (49.0%) underwent two-field lymphadenectomy and intrathoracic esophagogastric anastomosis (group T), while in another twenty-five patients three-field lymphadenectomy and cervical esophagogastric anastomosis were performed (group C). To determine the impact of surgery quality of life was assessed in each patient just before the surgery, on the day of the discharge and at three-month intervals until the end of the first postoperative year. The quality of life was measured by means of European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Version 3.0.

Results. Compared with the preoperative assessment quality of life had decreased at discharge but was restored within 3–12 months. The emotional functioning had increased just after the surgery. Significant differences between groups C and T were found in global health, physical, and role functioning scales.

Conclusions. Majority of the aspects of quality of life deteriorated after the radical surgery for esophageal carcinoma and regained the preoperative level before the end of the first postoperative year. Major surgical procedure (three-field lymphadenectomy and cervical esophagogastric anastomosis) gives some disadvantages in physical, social and role functioning during the first six postoperative months.

Introduction
Carcinoma of the esophagus has a poor long-term prognosis and the management of it still remains a dilemma for the clinician. Surgical resection of the esophagus with or without lymphadenectomy is recognized to be the main therapeutic modality (1–5). Among seven thoracic surgical treatment modalities, which were found to be based on evidence from randomized controlled trials, there are two esophagectomies for esophageal carcinoma, one of them after neoadjuvant chemotherapy and another one alone (6). Unfortunately, curative resections are associated with significant postoperative morbidity and hospital mortality (7–9). Furthermore, the long-term results of this surgery evaluated by total and disease-free survival rates are not amazingly good as well (10, 11). These are the reasons why not only quantity but the quality of survival as well is very important for the patients and physicians (12). The objective of the study was to evaluate the changes of the quality of life after the surgery for esophageal carcinoma and to find out whether these changes are influenced by the extent of the resection and lymphadenectomy.

Patients and methods
Sixty-six patients in whom esophageal carcinoma had been resected with curative intent were studied. To determine the impact of surgery quality of life was assessed in each patient just before the surgery, on the day of the discharge and at three-month intervals until the end of the first postoperative year. There were six measuring occasions for each patient. Patients in whom quality of life measurements were incomplete because of in-hospital mortality (8 (12.1%) patients)

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or death within first postoperative year (4 (6.1%) patients) were excluded. Patients who developed a tumor recurrence within the study period (3 (4.5%) patients) and two (3.0%) patients who had persistent esophageal leakages at the time of discharge were excluded from analysis as well. Thus, the follow-up data of the remaining 49 patients represent the changes of quality of life during the first year disease-free survival. The study was approved by Kaunas Regional Bioethics Committee.

The resection of squamous cell carcinoma or adenocarcinoma of the thoracic or abdominal esophagus was performed in all cases. Twenty-four (48.9%) patients underwent two-field lymphadenectomy and intrathoracic esophagogastric anastomosis (group T), while in another 25 patients three-field lymphadenectomy and cervical esophagogastric anastomosis was performed (group C). Medical and socio-demographic details of the patients are provided in Table.

The quality of life was measured by means of European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Version 3.0 (EORTC QLQ-C30) composed of multi-item scales and single items, incorporating five functional scales (physical, role, cognitive, emotional and social), three symptom scales (fatigue, pain, and nausea and vomiting) and a global health and quality of life scale. Five single items are designed to assess additional symptoms (dyspnea, sleep disturbance, appetite loss, constipation and diarrhea). The last item is related to the perceived financial impact of cancer and its treatment for a patient (13). The use of this questionnaire in this study protocol was permitted by Quality of Life Unit, EORTC Data Center.

All the scoring procedures were made according to the suggestions presented in EORTC QLQ-C30 Scoring manual (14). Symptom and functional scores were linearly transformed so that results ranged from 0 to 100. The data were analyzed with the software package SPSS 12.0.1. for Windows. Statistical analysis of the data was performed by using procedure of Repeated Measures Analysis of Variance, Student’s t-test and chi-square test. The significance level of 0.05 was chosen for testing statistical hypotheses. The size of the difference between the means of the groups were evaluated by estimation of type I and type II errors (α and β) of the tests. The size of the difference was considered to be significant if α≤0.05, β≤0.2.

Results

The estimated self-rating of global quality of life is presented in Fig. 1. The global health status deteriorated dramatically just after the surgery. Afterwards it showed gradual improvement at all the measuring occasions. All the measurements differ significantly one from another; it means that although the curve rises all the time after the discharge, the global quality of life does not reach the level of the preoperative one even a year after the successful surgery. Statistically significant difference between the groups C and T is found at the fourth measuring occasion (six months after the surgery), when patients with cervical Anastomosis did feel better.

The mean self-rating for the functional scales is presented in Fig. 2. Before the operation poor emotional status was the most severe restriction. Contrariwise to other functional scales, the latter improved from the very beginning and already at discharge the scores were higher than those before the surgery.

Role functioning was worse at the discharge but statistically significant deterioration was found only three months after the surgery. This is a period, when patients start coming back to their everyday habitual life after the rehabilitation and adjuvant therapy courses. Afterwards it starts improving and reaches the preoperative level already six months after the surgery. Role functioning improved significantly faster in group T. Significant differences between the groups

### Table. Socio-demographic and clinical details of the patients

<table>
<thead>
<tr>
<th>Variable feature</th>
<th>Group C n=45</th>
<th>Group T n=24</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (F/M)</td>
<td>4/21</td>
<td>6/18</td>
<td>NS</td>
</tr>
<tr>
<td>Age, years</td>
<td>58.16±9.29</td>
<td>61.21±9.88</td>
<td>NS</td>
</tr>
<tr>
<td>Stage (I/IIA/IIB/III)</td>
<td>2/6/6/9</td>
<td>2/6/6/10</td>
<td>NS</td>
</tr>
<tr>
<td>Histology (adeno/squamous)</td>
<td>4/21</td>
<td>9/15</td>
<td>NS</td>
</tr>
<tr>
<td>Postoperative morbidity, %</td>
<td>28.0</td>
<td>29.5</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS – non significant.
Fig. 1. Estimated marginal means of global health status (significant difference at the fourth measuring occasion)

Fig. 2. The mean self-rating for the functional scales
are found at measurements 4 and 5 (Fig. 3).

Physical functioning is affected at the discharge, but it is the only one occasion when it differs from the preoperative measurement significantly. At this point patients from group T are doing significantly better (Fig. 4), later on no differences between the groups are found.

Social functioning scores decreased at measurements 2 and 3. Six months after the surgery (the fourth measurement) patients with intrathoracic anastomosis are doing significantly better than with cervical ones (data not shown). Cognitive functioning declined at the discharge but nine months after the surgery it even significantly overcame the preoperative level. No differences between groups T and C were found in this scale.

Self-rating of the most important disease symptoms is given in Fig. 5. Reduced nausea and vomiting were observed at the discharge, but significant improvement appeared only three months after the operation. All the other symptoms deteriorated significantly at the discharge, but restoration period separated for different symptoms. Financial problems were solved already three months after the surgery, fatigue disappeared at the ninth postoperative month, dyspnea faded one year after the surgery, while the pain was still detectable even at the last measurement. No significant differences between groups C and T were found in symptom scales.

**Discussion**

The World Health Organization defines health as not only the absence of infirmity and disease, but also a state of physical, mental, and social well-being. This definition is relevant in the treatment of esophageal cancer as well, because this malignancy progresses rapidly in many patients (15). Of course, the main end-points in clinical trials still are postoperative morbidity, recurrence rate, and survival, but measurement of quality of life in these patients is becoming more and more important, because of the increasing emphasis on patient-based outcome assessment (12, 16, 17).

There have been a number of prospective studies assessing quality of life after radical surgery or other treatment modalities (11, 15, 16, 18, 19), thus our study has tried to reveal the influence of the extent of esophageal resection and lymphadenectomy on postoperative quality of life.

This study shows that at first months after treatment many aspects of quality of life have deteriorated significantly. This is easily understandable, having in mind that esophageal resection and lymphadenectomy is a major surgical procedure, invading two (group T) or three (group C) anatomical regions, without normal oral food intake for at least seven days and associated with quite high postoperative morbidity (7, 20, 21). Improvement in all functioning and symptom scores was observed after discharge and this process took from three up to twelve months. Our findings are sup-
**Fig. 4.** Estimated marginal means of physical function (significant difference at the second measurement occasion)

**Fig. 5.** Self-rating of the main disease symptoms and financial problems
ported by the results of A. G. de Boer et al., who compared the quality of life after transhiatal and extended transthoracic esophagectomy. The authors have found that baseline quality-of-life scores declined after the operation but were restored within a year in both treatment groups (22).

The only functioning that has improved already at the discharge was emotional. This can be explained by the fact that emotional status was extremely low (47.1 scores) before surgery and the patients naturally felt themselves better when leaving. The improvement in emotional functioning was observed till the ninth postoperative month, when it becomes stable.

In three function scales we have found differences between the groups of the patients with different extent of the resection and lymphadenectomy. All the three, role, physical and social functions, at several postoperative measurements were better in the patients with intrathoracic anastomosis and two-field lymphadenectomy. This fact shows that major extent of surgical procedure influences several fields of human activities more even six or nine months after the surgery. But at the last measurement, i.e. at the end of the first postoperative year, no differences were found between the groups. Our data intersects with the findings of C. E. Schmidt et al., who reported significantly better quality of life among the patients with cervical compared to intrathoracic anastomosis (23). But the patients included in the latter study had undergone resection and reconstruction at least one year prior to the examination, i.e. their quality of life was not already influenced by the surgical procedure itself and better results could be influenced by less reflux-related symptoms (24).

Significant difference between the groups C and T in self-rating of global quality of life was found at the fourth measuring occasion (six months after the surgery), when patients with cervical anastomosis did feel better. This finding cannot be easily explained, because physical functioning did not differ between the groups, and role functioning was even worse among the patients of group C at the moment. We suppose that this difference could be influenced by emotional satisfaction with successful exclusive radical surgery and optimized chances that the malignant disease is definitely cured, although the difference in emotional functioning scale between groups C and T was not statistically significant. This predication is supported by both, investigators and the patients themselves (25, 26).

Nausea and vomiting are disease specific symptoms and one can notice the palliation of them already at the discharge, although significant improvement appears only three months after the surgery. No differences in symptom scales between cervical and intrathoracic junctions were found in the study. But it is proven by other investigators that the grade of dysphagia, reflux symptoms, and motility across esophagogastric anastomosis are related to the site of the latter (cervical or intrathoracic) (23, 27–29); gastric emptying and dumping symptoms depend on the size of the gastric substitute (30, 31). These differences could not be stated in our study, while we were using only the core of QLQ-C30 questionnaire, because of the lack of disease specific symptoms in it (16). It was the reason to proceed the investigations of quality of life not only with core questionnaire but with its disease specific module EORTC QLQ-OES18. Unfortunately, the number of cases is still insufficient for making conclusions so further investigation is needed.

Conclusions

1. All the aspects of quality of life, except emotional function and nausea and vomiting, deteriorate after the radical surgery for esophageal carcinoma.
2. All the aspects of quality of life, except global health status and pain, regain the preoperative level before the end of the first postoperative year.
3. Global health status and pain also get improved after discharge, but at the end of the first postoperative year these rates still are lower than preoperatively.
4. Major surgical procedure (three-field lymphadenectomy and cervical esophagogastric anastomosis) gives some disadvantages in physical, social and role functioning during the first six postoperative months.

Gyvenimo kokybės kitimas po stemplės rezekcijos ir plastikos, atliktos ligoniams, sergantiems vėžiu

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Raktažodžiai: stemplės vėžys, stemplės rezekcija, stemplės plastika, limfadenektomija, gyvenimo kokybė.

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Santrauka. Tyrimo tikslas. Įvertinti gyvenimo kokybės pokyčius po stenglės rezekcijos bei plastikos ir nustatyti, ar jiems turi įtakos rezekcijos ir limfadenektomijos apimtis.

Tirtiųjų kontingentai ir tyrimo metodika. Nagrinėti 49 ligonių, kuriems buvo atliktos radikalios stenglės rezekcijos ir per pirmuosius 12 mėnesius po operacijos ligonams neatsižvelgiant, gyvenimo kokybės pokyčiai. 24 ligoniams (48.9 proc.) atlikta dviejų laukų limfadenektomija ir stenglės–skrandžio jungtis suformuota įvairiai (T grupė), kitams 25 (51.1 proc.) ligoniams atlikta tris laukų limfadenektomija ir jungtis suformuota kaktė (C grupė). Gyvenimo kokybė vertinta naudojant Europos vėžio tyrimo ir gydymo organizacijos (EORTC) gyvenimo kokybės klausimyną „QLQ-C30“ operacijos išvarkarėse, ligonų išrašant iš stacionaro ir kas tris mėnesius pirmuosius metus po operacijos.


Išvados. Dauguma gyvenimo kokybės rodiklių žymiai sumažėjo po radikalios rezekcijos operacijos, tačiau per pirmuosius metus vėl būna tokie kaip iki operacijos. Didesnės apimties operacija (suformavus jungti kaktė ir atlikus trijų laukų limfadenektomiją) turi didesnės įtakos fizinėse būklei bei savarankiškumo funkcijai per pirmuosius šešis mėnesius po operacijos.

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