

ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Quality of life in patients with laryngeal cancer before and after surgery

Tomasz Zatoński, Mateusz Kolator

Wroclaw Medical University, Clinical Hospital, Department of Otolaryngology, Head and Neck Surgery, Wroclaw, Poland



SUMMARY

Introduction/Objective Assessment of the Quality-of-life questionnaires was filled out before and after surgery by patients with laryngeal cancer hospitalized in the Otolaryngology, Head and Neck Surgery Department, qualified for surgical treatment.

Methods Fifty-four patients with laryngeal cancer in T3 and T4 stages who were qualified for total laryngectomy were asked to fill out the EORTC QLQ-30 and H&N30 modules before and a few years after surgical treatment.

Results The quality of life of the hospitalized patients increased after surgery. The level of pain after surgery decreased and was statistically significant ($p = 0.025$). In the study group, 90.6% of patients survived five years after surgery.

Conclusion The quality of life in patients with laryngeal cancer improved in the domain of pain. Further research should be conducted on a larger group of patients. Future results could provide useful material for analysis regarding the benefits for the patient that may be relevant to a decision to consent to the proposed treatment and the choice of its type.

Keywords: quality of life; laryngeal cancer; follow-up; laryngectomy

INTRODUCTION

According to the World Cancer Research Fund International, 1.1% of all cancers is laryngeal cancer, the most common cancer of the head and neck neoplasms [1]. Males are affected more often than females. Primary risk factors are tobacco smoking, alcohol consumption, and human papilloma virus infection.

Laryngeal cancer is generally squamous cell carcinoma. Symptoms mostly begin with hoarseness in the voice but also may include a lump, sore throat, and swallowing difficulties. Treatment methods include surgery, radiotherapy, and chemotherapy. Infiltration of the laryngeal cartilages is an indication for a procedure called laryngectomy, consisting of total excision of the larynx [2]. Larynx plays the critical role in physiologic functions such as voice production, respiration, airway protection and swallowing – this is why total laryngectomy may significantly affect the patients' quality of life (QoL). Lately, the medical community puts great emphasis on the quality of life, which is why more and more studies on the QoL are conducted.

The World Health Organization defines the QoL as the person's perception of his or her individual daily life and position. It takes into consideration the context of culture, the personal relation to the goals, the situation in which the person lives, expectations, and concerns. In healthcare, the QoL is an assess-

ment of how aspects of an individual's life can be affected by disease or disability [3]. Measuring the QoL gives an enormous amount of information that should be considered in the selection of a treatment method. For example, organ preservation is not necessarily needed to have better QoL. Measuring the QoL also determines how important survival is after treatment [4].

Two types of QoL assessment tools exist – general and specific. QoL recorded with the impact of disease in particular is called general. Specific scales assess the QoL by taking into account a specific group of diseases, a single disease, or a single symptom [5].

In our earlier studies, all PUBMED articles about the QoL in patients with laryngeal cancer were reviewed, and different measuring tools were identified. The European Organization for Research and Treatment of Cancer (EORTC) questionnaire general module (QLQ C-30) and head and neck module (QLQ-H&N35) turned out to be the most commonly used tools to assess the QoL in patients with different stages of laryngeal cancer or to compare treatment methods. Therefore, we decided to use this questionnaire in the current study.

The aim of this study was to assess the QoL of patients diagnosed with laryngeal cancer and qualified for surgical treatment before and after surgery with the use of EORTC QLQ-C30 and QLQ-H&N35 modules and to compare the results.

Received • Примљено:

August 27, 2018

Revised • Ревизија:

May 24, 2019

Accepted • Прихваћено:

May 27, 2019

Online first: May 31, 2019

Correspondence to:

Mateusz KOLATOR
Lubinowa 1d/15
52-210 Wroclaw
mateusz.kolator@gmail.com

METHODS

In this study, 54 patients hospitalized in the Otolaryngology, Head and Neck Surgery Department of the Medical University of Wrocław who were diagnosed with laryngeal cancer in T3–T4 stages and all laryngeal locations qualified for surgical treatment were asked to fill out the paper version of the EORTC questionnaire, translated into the Polish language and validated, one day before surgery. It consists of a general module for patients diagnosed with cancer and a specific one for patients with head and neck cancer. The EORTC questionnaire was developed by Bjordal et al. [6] in 1994. The questionnaire consists of 37 items concerning many aspects like disease-related symptoms, social function, and sexuality. After a few years, a 3.0 version of the EORTC QLQ C-30 questionnaire was developed. The validity and reliability of both QLQ-C30 and H&N35 module was confirmed on a large group of patients from many different countries [7, 8]. Version 3.0 of the EORTC QLQ-C30 module contains 30 questions, and the H&N35 module contains 35 questions. Raw data collected from the questionnaire are calculated into the global, functional, and symptomatic scales according to the instructions provided in the scoring manual [9]. The questionnaire was well accepted and sensitive to changes during a study year. Many symptoms, such as problems with taste, swallowing difficulty, hoarse voice, and sore mouth, showed great variability [10].

From one to five years after surgery, correspondence with blank questionnaires was sent to all the patients with a request to fill out the questionnaires again or to send information about the possible death of the patients. All the data was collected and calculated with the instructions provided in the scoring manual for EORTC questionnaires. The calculated data created three types of scales. The data from the QLQ-C30 module was calculated into the global health status scale, five functional scales, and symptomatic scales. Functional scales are physical functioning, role functioning, emotional functioning, cognitive functioning, and social functioning. Symptomatic scales are fatigue, nausea and vomiting, pain, dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties. Further QLQ-H&N35 module data was calculated only into symptomatic scales like pain, swallowing, sensory problems, speech problems, trouble with social eating, trouble with social contact, less sexuality, teeth, opening mouth, dry mouth, sticky saliva, coughing, ill feeling, pain killers, and nutritional supplements. All the data calculated into

scales creates a score of 0–100. For global health status, a higher score represents high QoL; in functional scales, a higher score represents a high and healthy level of functioning, whereas a higher score in symptomatic scales represents a high level of symptomatology and problems. The approval of ethical review board was obtained before the beginning of the study.

A statistical analysis of the obtained results was then performed using STATISTICA v. 12 (StatSoft, Tulsa, OK, USA). Statistical characteristics of variables are presented as arithmetical mean \pm standard deviation, median, and interquartile range. Statistical characteristics of discrete variables are presented as number and frequency distribution. In the statistical analysis, the Wilcoxon matched pairs test was used for quantitative variables. Survival time was estimated using the Kaplan–Meier method.

RESULTS

The study sample characteristics are summarized in Table 1. Fifty-four patients 46–88 years old, including 50 males and four females, filled out the questionnaire before surgery. From one to five years after surgery, information from 31 patients was received. Twenty-one patients were reported dead. Ten patients filled out the questionnaire and sent it back to the clinic. Twenty-three patients did not answer the request.

Table 1. Age (years) of the respondents

| | |
|--------------|------------------|
| Mean (SD) | 60.5 (8.3) |
| Median (IQR) | 59.0 (55.2–65.7) |
| Min–Max. | 46–88 |

IQR – interquartile range; SD – standard deviation

Table 2. Sex of the respondents

| | |
|------------------------------|------------|
| Male | 50 (92.6%) |
| Female | 4 (7.4%) |
| Replies to the questionnaire | 10 (18.5%) |
| Death | 21 (38.9%) |
| No answer | 23 (42.6%) |

Scores for all scales compared before and after treatment are presented in Table 4. After surgery, the global QoL in patients with laryngeal cancer improved, but the difference was not statistically significant (54.2 vs. 50, $p > 0.05$) (Figure 1). The only statistically significant difference

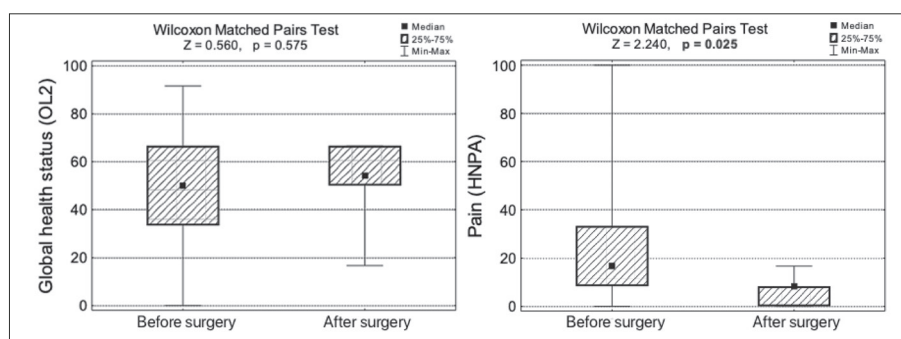


Figure 1. Comparison of the global health status before and after surgery and the result of the Wilcoxon matched pairs test

Table 3. Comparison of the QoL before and after surgery

| Parameter | Before treatment | | After treatment | | p |
|-----------------------------|------------------|-----------|-----------------|-----------|-------|
| | Median | IQR | Median | IQR | |
| Global health status/QoL | 50 | 33.3–66.7 | 54.2 | 50–66.7 | 0.575 |
| Physical functioning | 80 | 66.7–93.3 | 73.3 | 66.7–86.7 | 0.161 |
| Role functioning | 83.3 | 66.7–100 | 83.3 | 66.7–100 | 0.345 |
| Emotional functioning | 66.7 | 50–75 | 70.8 | 58.3–91.7 | 0.308 |
| Cognitive functioning | 83.3 | 66.7–100 | 75 | 66.7–100 | 1.000 |
| Social functioning | 83.3 | 66.7–100 | 75 | 66.7–100 | 0.441 |
| Fatigue | 33.3 | 22.2–50 | 38.9 | 33.3–44.4 | 0.484 |
| Nausea and vomiting | 0 | 0–16.7 | 0 | 0–0 | 0.787 |
| Pain | 33.3 | 0–50 | 33.3 | 33.3–50 | 0.123 |
| Dyspnoea | 33.3 | 0–33.3 | 33.3 | 33.3–33.3 | 0.753 |
| Insomnia | 33.3 | 33.3–66.7 | 33.3 | 33.3–66.7 | 0.123 |
| Appetite loss | 0 | 0–33.3 | 0 | 0–33.3 | 0.345 |
| Constipation | 0 | 0–33.3 | 33.3 | 33.3–33.3 | 0.715 |
| Diarrhoea | 0 | 0–0 | 0 | 0–33.3 | - |
| Financial difficulties | 33.3 | 0–66.7 | 33.3 | 0–100 | 0.787 |
| Pain | 16.7 | 8.3–33.3 | 8.3 | 0–8.3 | 0.025 |
| Swallowing | 16.7 | 0–33.3 | 0 | 0–0 | 0.091 |
| Senses problems | 33.3 | 0–50 | 0 | 0–100 | 0.500 |
| Speech problems | 44.4 | 22.2–55.6 | 44.4 | 22.2–66.7 | 0.834 |
| Trouble with social eating | 8.3 | 0–33.3 | 0 | 0–0 | 0.176 |
| Trouble with social contact | 13.3 | 0–33.3 | 3.3 | 0–40 | 0.779 |
| Less sexuality | 33.3 | 16.7–50 | 33.3 | 0–50 | 0.343 |
| Teeth | 33.3 | 0–66.7 | 33.3 | 0–33.3 | 0.273 |
| Opening mouth | 0 | 0–0 | 0 | 0–0 | - |
| Dry mouth | 33.3 | 0–33.3 | 33.3 | 0–33.3 | 0.068 |
| Sticky saliva | 33.3 | 0–66.7 | 33.3 | 33.3–66.7 | 0.893 |
| Coughing | 33.3 | 33.3–66.7 | 33.3 | 33.3–66.7 | 0.295 |
| Felt ill | 33.3 | 0–66.7 | 33.3 | 0–66.7 | 0.447 |
| Pain killers | 0 | 0–100 | 50 | 0–100 | 1.000 |
| Nutritional supplements | 100 | 0–100 | 100 | 100–100 | 1.000 |
| Feeding tube | 100 | 0–100 | 100 | 0–100 | 1.000 |
| Weight loss | 0 | 0–100 | 100 | 0–100 | - |
| Weight gain | 100 | 100–100 | 100 | 0–100 | 0.593 |

IQR – interquartile range

occurred in the symptomatic scale for pain. Pain created more problems before surgery than after surgery (16.7 vs. 8.3; $p < 0.05$). Swallowing created more problems before surgery than after surgery. The p-value in this variable was on the border of statistical significance (16.7 vs. 0; $p = 0.091$).

The level of functioning mostly decreased after surgery beside emotional functioning and role functioning, but the changes were not statistically significant. The PF score was 80 before surgery and decreased to 73.3 after surgery. A similar situation was observed in CF, where the score decreased from 83.3 to 75, and SF, where the score also decreased from 83.3 to 75. The EF score increased from 66.7 to 70.8. RF kept the same level before and after sur-

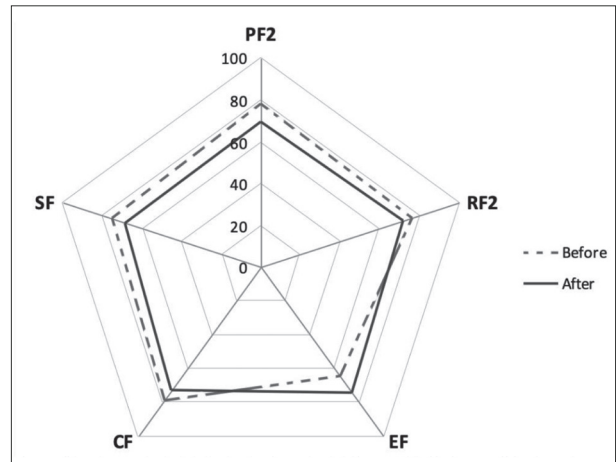


Figure 2. Comparison of the functional scales before and after surgery

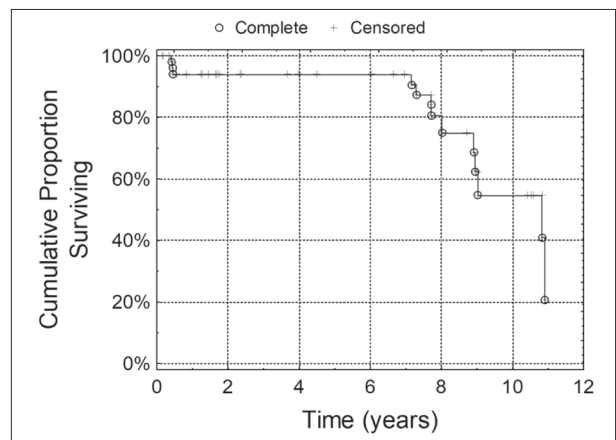


Figure 3. Kaplan-Meier's survival curve in the sample group

gery (83.3). All the aforementioned results are presented in Figure 2.

The length of survival after surgery is presented in Figure 3. In this study group, 90.6% of patients survived five years after surgery. The survival function was 8.01 for the 25th percentile, 9.63 for the 50th percentile, and 10.81 for the 75th percentile.

DISCUSSION

Because of its location and functional importance, the larynx plays a critical role in the maintenance of such cardinal physiological functions as phonation, regulation of respiratory airflow, and airway protection. Laryngeal cancer can have effects on laryngeal function, and the impact of treatment on function has to be carefully weighed against its oncological benefit. Still, in some cases, the only treatment is a total laryngectomy. Lately, the QoL reported by patients regardless of correlation with clinical parameters of health has paramount importance in treatment management. Comparison of the QoL in these patients might give better insight into patients' expectations and benefits from choosing the treatment method [11].

In this study, we compared the QoL in patients with laryngeal cancer qualified for surgical treatment before and

Table 4. Comparison of changes in functional scales after surgery in the literature and in our study

| Scale | Singer et al. [12] | | Zatoński and Kolator | |
|-------|-----------------------|--------|-----------------------|------|
| | Changes after surgery | p | Changes after surgery | p |
| PF2 | deterioration | < 0.01 | deterioration | 0.16 |
| RF2 | deterioration | < 0.01 | same level | 0.34 |
| SF | deterioration | 0.02 | deterioration | 0.30 |
| CF | deterioration | 0.59 | deterioration | 1.0 |
| EF | improvement | 0.37 | improvement | 0.44 |

PF2 – physical functioning; RF2 – role functioning; SF – social functioning; CF – cognitive functioning; EF – emotional functioning

a few years after surgery. The results of our analysis show that the pain level after surgery is lower than before. Also, swallowing improved after surgery, but this change is on the border of statistical significance. A study by Singer et al. [12] was the only one found in the PubMed database that covers the same topic and uses the same questionnaire as the method of QoL assessment. The results of the multicenter prospective cohort study show that the QoL domains that improved were global QoL, coughing, and weight.

In our study, the changes in functional scales before and after surgery were statistically insignificant, but they found confirmation in the literature where the level of the same scales changed almost in the same way, and some of these changes were statistically significant.

A comparison is presented in Table 5 [12].

CONCLUSION

. Though our results are not valid to be generalized due to the number of the obtained follow-up questionnaires being smaller than the initial number of participants, it can, however, be assumed with a certain degree of probability

REFERENCES

- World Cancer Research Fund International [Internet]. [cited 2017 Jan 25]. Available from: <http://www.wcrf.org/>
- Marur S, Forastiere AA. Head and Neck Cancer: Changing Epidemiology, Diagnosis, and Treatment. *Mayo Clin Proc.* 2008; 83(4):489–501.
- WHO. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychol Med.* 1998; 28(3):551–8.
- Morton RP, Izzard ME. Quality-of-life outcomes in head and neck cancer patients. *World J Surg.* 2003; 27(7):884–9.
- Heutte N, Plisson L, Lange M, Prevost V, Babin E. Quality of life tools in head and neck oncology. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2014; 131(1):33–47.
- Bjordal K, Ahlner-Elmqvist M, Tolleson E, Jensen AB, Razavi D, Maher EJ, et al. Development of a European Organization for Research and Treatment of Cancer (EORTC) questionnaire module to be used in quality of life assessments in head and neck cancer patients. EORTC Quality of Life Study Group. *Acta Oncol.* 1994; 33(8):879–85.
- Sherman AC, Simonton S, Adams DC, Vural E, Owens B, Hanna E. Assessing Quality of Life in Patients With Head and Neck Cancer. *Arch Otolaryngol Neck Surg.* 2000; 126(4):459.
- Bjordal K, de Graeff A, Fayers P, Hammerlid E, van Pottelsberghe C, Curran D, et al. A 12 country field study of the EORTC QLQ-C30 (version 3.0) and the head and neck cancer specific module (EORTC QLQ-H&N35) in head and neck patients. *Eur J Cancer.* 2000; 36(14):1796–807.
- Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: A Quality-of-Life Instrument for Use in International Clinical Trials in Oncology. *JNCI J Natl Cancer Inst.* 1993; 85(5):365–76.
- Hammerlid E, Bjordal K, Ahlner-Elmqvist M, Jannert M, Kaasa S, Sullivan M, et al. Prospective, longitudinal quality-of-life study of patients with head and neck cancer: A feasibility study including the EORTC QLQ-C30. *Otolaryngol Head Neck Surg.* 1997; 116(6):666–73.
- Sadoughi B. Quality of Life After Conservation Surgery for Laryngeal Cancer. *Otolaryngol Clin N Am.* 2015; 48(4):655–65.
- Singer S, Danker H, Guntinas-Lichius O, Oeken J, Pabst F, Schock J, et al. Quality of life before and after total laryngectomy: Results of a multicenter prospective cohort study. *Head Neck.* 2014; 36(3):359–68.

that the QoL in patients after surgery improved in the domain of pain, taking into consideration our statistical analysis and discussed literature.

- For all the domains, the result in the swallowing scale improved after surgery, and dry mouth remained on the same level. Changes in these scales were on the border of statistical significance.
- In this study group, 90.6% of respondents survived five years after surgery.
- Further research should be conducted on a larger group of patients. There are many studies about the QoL reported by patients with laryngeal cancer researching the relationship with the type of treatment method of surgery and other variables. All of these studies present statistically significant results. Because of different study protocols, it is hard to construct a global laryngeal cancer treatment algorithm that takes into account not only oncological benefit and treatment results but also patient-reported QoL. There is a need to conduct a bigger multicenter study based on the same examination and data sampling protocol. The obtained results could become a standard for care and proposed treatment choice.

The present study has certain limitations. Assessment of the QoL in patients with laryngeal cancer is a prospective study which has been continued after surgery to follow up potential changes in the QoL. We showed the results of 54 patients who agreed to fill out the QoL questionnaire. Because of the character of the study group and the method of sampling, the number of follow-up questionnaires we obtained was smaller than the initial number of participants. Although the questionnaire was sent to all the participants of this study after surgery, due to the death of some participants or the lack of willingness to re-fill the questionnaire, the response level in this study was low.

Conflict of interest: None declared.

Квалитет живота болесника са раком ларинкса пре и после операције

Томаш Затонски, Матеуш Колатор

Медицински универзитет у Вроцлаву, Клиничка болница, Одељење за оториноларингологију и хирургију главе и врата, Вроцлав, Пољска

САЖЕТАК

Увод/Циљ Болесници са раком ларинкса хоспитализовани на Одељењу за оториноларингологију и хирургију главе и врата, квалификовани за хируршки третман, попуњавали су Упитник о процени квалитета живота пре и после операције.

Метод Педесет четири болесника са раком ларинкса у стадијумима Т3 и Т4 која су квалификована за потпуну ларингектомију замољена су да попуне модуле *EORTC QLQ-30* и *H&N30* пре и неколико година после хируршког третмана.

Резултати Квалитет живота хоспитализованих болесника порастао је после операције. Ниво бола после хируршке интер-

венције се смањио и био је статистички значајан ($p = 0,025$). У студијској групи је 90,6% болесника преживело пет година после операције.

Закључак Квалитет живота болесника са раком ларинкса побољшан је у домену бола. Даље истраживање треба спровести на већој групи болесника. Будући резултати могу пружити користан материјал за анализу у вези са користима за болеснике и могу бити релевантни за одлуку да се пристане на предложени третман и избор његовог типа.

Кључне речи: квалитет живота; рак грла; праћење; ларингектомија