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Quality of life of laryngectomized patients in Serbia

Квалитет живота ларингектомисаних пацијената у Србији

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Квалитет живота ларингектомисаних пацијената у Србији

SUMMARY

Introduction/Objective Total laryngectomy, as a very mutilant operation, leads to drastic changes in the quality of life.

The purpose of this study was to examine factors of importance to the quality of life of laryngectomized patients and to evaluate characteristics of esophageal voice and speech.

Methods The study was conducted at the Clinic of Otorhinolaryngology and Maxillofacial Surgery, Clinical Center of Serbia in Belgrade, in the period from March 2012 to March 2015. The study included 223 patients diagnosed with laryngeal cancer and treated with total laryngectomy, and 168 of them had phoniatric rehabilitation afterward.

Results The quality of life of laryngectomized patients in which was conducted phoniatric rehabilitation was significantly better than those who did not have phoniatric rehabilitation. By means of intensive phoniatric rehabilitation the esophageal voice and speech was established in 86.3% of laryngectomized patients which was registered by objective acoustic analysis. Rehabilitated laryngectomy patients had a significantly lower presence of voice handicap sense (VHI:19.57+-7.35) and expressed significantly lower symptoms of depression and anxiety (PHQ-9:3.8+-4.2; GAD-7:3.4+-4.2). Cronbachs alpha coefficient was above 0.7 EORTC QLQ-C30 questionnaire: scale physical and emotional functioning and fatigue; EORTC QLQ-H&N43 questionnaire: symptoms head and neck pain, speech, swallowing and eating problems and body image.

Conclusion Significantly improving the quality of life of laryngectomized patients is achieved by a multidisciplinary rehabilitation. Phoniatric rehabilitation which is carried out in a planned and systematic way is the most efficient rehabilitation of laryngectomized patients.

Keywords: quality of life; total laryngectomy; esophageal voice and speech; phoniatric rehabilitation

САЖЕТАК

Увод/Циљ Тотална ларингектомија, као веома мутилантна операција, доводи до драстичних промена у квалитету живота.

Циљ ове студије је да истражи факторе од значаја за квалитет живота ларингектомисаних пацијената и да процени карактеристике езофагусног гласа и говора.

Методе Истраживање је спроведено у Клиници за оториноларингологију и максилофацијалну хирургију Клиничког центра Србије у Београду, у периоду од марта 2012. до марта 2015. године. Испитивањем је било обухваћено 223 пацијента којима је због верификованог карцинома ларинкса учињена тотална ларингектомија и у 168 од ових пацијената спроведена је фонијатријска рехабилитација.

Резултати Квалитет живота ларингектомисаних пацијената код којих је спроведена фонијатријска рехабилитација је значајно бољи од оних који нису имали фонијатријску рехабилитацију. Интензивном фонијатријском рехабилитацијом је успостављен езофагусни глас и говор код 86,3% ларингектомисаних пацијенета који је регистрован објективном акустичком анализом. Рехабилитовани ларингектомисани пацијенти имају значајно ниже присуство хендикепа због гласа (*VHI*:19.57+-7.35) и значајно ниже изражене симптоме депресије и анксиозности (*PHQ*-9:3.8+-4.2; *GAD*-7:3.4+-4.2). Кронбахов α коефицијент је био изнад 0.7 на три скале *EORTC QLQ-C*30 упитника: физичко функционисање, емоционално функционисање и умор, као и код пет скала *QLQ-H&N*43 упитника *H&N* бол у глави/врату (0.83), *H&N* проблеми са гутањем (0.86), *H&N* проблеми са говором (0.86), *H&N* проблеми при јелу (0.77) и *H&N* слика о себи (0.82).

Закључак Значајно побољшање квалитета живота ларингектомисаних пацијената постиже се мултидисциплинарном рехабилитацијом. Фонијатријска рехабилитација, која се спроводи плански и систематично, представља најекономичнији начин рехабилитације ларингектомисаних пацијената.

Кључне речи: Квалитет живота, тотална ларингектомија, езофагусни глас и говор, фонијатријска рехабилитација

INTRODUCTION

Quality of life currently represents the most modern concepts of science and it is considered the ideal of modern medicine. A holistic approach to the treatment of human, not only a disease, plays an important role in the realization of the concept of health related quality of life.

In our community is not devoted adequate attention to the quality of life of laryngectomized patients. Total laryngectomy, as a very mutilant operation, leads to drastic changes in quality of life. This radical surgical intervention leaves the patients without larynx but saves their lives, with significant repercussions on their functional and psychosocial domains [1]. Very important functions such as breathing, speech, swallowing, a sense of smell and taste of these patients, are permanently modified [2].

A multidisciplinary rehabilitation program is essential for the laryngectomized patients to improve quality of life. Phoniatric rehabilitation is the most important aspect of rehabilitation because it allows the restitution of verbal communication. Laryngectomized patients could use substitucional voice and speech in communication: esophageal voice and speech, vocal prosthesis or electrolarynx. The vocal rehabilitation establishment of esophageal voice and speech is certainly method of choice for our population, and it also represents a huge savings for the health system . Education of esophageal voice and speech lasts for 4-6 weeks, even a 6 months. In the esophageal voice the source of energy is in esophagus, serving as a new reservoir of air, but significantly less than the physiological lungs. It begins with the establishment of ructus act, which is modelated in the syllables and words. The sound sources represent the vibrations of neoglotis –pharyngoesophageal segment.

Phoniatric team - consisting of phoniatricians, speech therapists, psychologists and nurses - is responsible for the successful rehabilitation of about 87% of laryngectomized patients who have mastered the esophageal voice and speech. Psychological rehabilitation allows the resocialization, return to the family environment and social activities.

The yield of this study is finally established Association of laryngectomized patients of Serbia.

The purpose of this study was to examine factors of importance to the quality of life of laryngectomized patients and to evaluate characteristics of esophageal voice and speech.

METHODS

The study was conducted at the Clinic of Otorhinolaryngology and Maxillofacial Surgery, Clinical Center of Serbia (CCS) in Belgrade, in the period from March 2012 through March 2015.

The study included 223 patients, who were verified laryngeal cancer and underwent total laryngectomy in the Clinic of Otorhinolaryngology and Maxillofacial Surgery, CCS and phoniatric rehabilitation was conducted in the Phoniatric Department. In the study patients were divided into two groups. The first group consisted of 168 laryngectomized patients who underwent all planned phases of phoniatric rehabilitation. The second group consisted of 55 laryngectomized patients who have not underwent the phoniatric rehabilitation because of their lack of motivation or inability to come to rehabilitation. The study was approved by the Ethics Committee of the Faculty of Medicine, University of Belgrade. All respondents are provided with written consent for participation in the research.

All patients performed the following procedures: detailed case history, audiometry, phoniatric rehabilitation, psychological treatment, method of group rehabilitation, and multidimensional computer analysis of voice and speech.

Phoniatric rehabilitation was carried out by a phoniatric team, establishing an esophageal voice and speech, like outpatients or hospital treatment.

Multidimensional computer analysis of voice and speech was recorded in room with ambient noise less than 50 decibels with Electret Condense Meeting Microphone CM 903, placed at 30 centimeters in front of the patients mouth, entire signal was analyzed for 5 seconds. The commercial version of the software package Dr Speech (Tiger) was used, which includes Real Analysis, Vocal Assesment and Phonetogram. The continuous vocal, the original sentence and the text composed so that the phonetic and syntactically best represent the Serbian language, was used as a signal. The analysis of the phoniatric results was carried out according to the proposals of the European protocol for the analysis and evaluation of the results of the rehabilitation of the voice [3].

Laryngectomized patients completed the following questionnaires: structured questionnaire of demographic and clinical parameters; EORTC QLQ-C30 and QLQ-H & N43; Voice Handicap Index-10 (VHI-10); Patient Health Questionnaire (PHQ-9) and Questionnaire of generalized anxiety (GAD-7).

Serbian version of the questionnaire QLQ-H & N43, used in this study, has been developed in cooperation with EORTC Quality of life and EORTC Head and Neck Cancer group, following EORTC standards for translation and cultural validation [4, 5].

Subjective assessment of voice handicap was measured by questionnaire Voice Handicap Index-10 (VHI-10) [6].

The presence of depressive and generalized anxiety symptoms was measured by questionnaires Patient Health Questionnaire (PHQ-9) and Questionnaire of generalized Anxiety (GAD-7) [7].

Statistical analysis

Pearsons chi-squared test was used to test the differences between respondents in relation to the dichotomous markers. The differences to the recent questionnaires of two groups of respondents were compared using t-test. The internal consistency of the scale with three or more questions tested by Cronbachs alpha coefficient. Spearmans p correlation coefficient was used to test the relationship between questionnaire scores.

All the scores on the questionnaires were analyzed individually, not as a set of questionnaires, which meant to include only adequately completed questionnaires. All analyzes were done in the software package Statistical Package for the Social Sciences 18 (SPSS 18).

RESULTS

In our study, respondents were predominantly male (84.3%) and the percentage of women is lower (15.7%). The youngest laryngectomized patient was 28 and the oldest 82 years old, mean age 63.24 (8.1%) years, the largest percentage of patients was in the group of 60-69 years of age.

Laryngectomy patients from this study were mostly pensioners (87.1%) in the invalidity pension due to malignancy or retirement age at the time of testing. A very small number of laryngectomized patients were working active.

Examining the habits of laryngectomized patients before and after surgery was concluded that significantly reduce the percentage of smokers after total laryngectomy and slightly less number of alcohol consumers. Before surgery, 93.7% of patients smoked and postoperative just 3.1% of patients. Alcohol is consumed 21.5% of patients before surgery and postoperative 7.2%. of patients.

The largest number of laryngectomized patients was in stage III of malignant disease which suggests the severity of the disease and justifies the total laryngectomy. Laryngectomized patients from this study had postoperative radiotherapy in 81.6% of cases.

In this study, 23.8% of laryngectomized patients had hearing loss: easily damage hearing impairment 59% of respondents, medium severe hearing impairment 28% and severe hearing impairment 13% of respondents.

Some associated chronic disease had a 48% of laryngectomized patients: chronic respiratory disease 34.6%, reflux disease 37.4%, cardiovascular disease 28% and diabetes mellitus and hypothyroidism 23.4% of respondents.

Phoniatric rehabilitation was conducted with 168 (75.3%) from the 223 laryngectomized patients. Patients who didn't have residence in Belgrade 100/168 (59.9%) were hospitalized for conducting phoniatric rehabilitation in two weeks at the Clinic of Otorhinolaryngology and Maxillofacial Surgery, CCS. Phoniatric rehabilitation was successful in the according to the therapists in 145 (86.3%) patients and 135 (80.4%) of respondents were satisfied with the results of rehabilitation. Successful rehabilitation was in a greater number of patients who did not have a hearing problem, who rarely had associated chronic disease and rarely had postoperative radiotherapy. Intensive phoniatric rehabilitation was established esophageal voice and speech at 86.3% of laryngectomized patients which is registered by objective acoustic analysis (Table 1) (Figure 1).

The quality of life of laryngectomized patients is severely affected in varying degrees by different domains. Laryngectomized patients have a low level of social functioning and business capabilities, lower physical and emotional functioning, as well as global health and quality of life. Very influential predictors of all domains of quality of life are general symptoms such as: fatigue, presence of pain, loss of appetite, insomnia and specific symptoms such as: problems with speech, coughing, problems with sense of smell and taste, dry mouth and secretion, problems with teeth, problems in social contact and sexual problems. Financial difficulties due to reduced working capacity of laryngectomized patients represent a significant predictor for most aspects of daily living. Different demographic and clinical parameters affect the quality of life of laryngectomized patients. Demographic parameters of importance are: age, place of residence, level of education and habits, and clinical parameters of importance are: the age when one underwent total laryngectomy, postoperative radiotherapy and chemotherapy, hearing impairment, comorbidity, phoniatric rehabilitation and psychological support.

Belonging to the Association of laryngectomized patients is very important social parameter.

The quality of life of laryngectomized patients in which was conducted phoniatric rehabilitation is significantly better than those who did not have phoniatric rehabilitation (Table 2).

Laryngectomized patients who were rehabilitated have a significantly better global health and quality of life as well as a significantly higher level of physical, business, social, emotional and cognitive functioning compared to those who are not rehabilitated.

Laryngectomized patients who had conducted phoniatric rehabilitation have a significantly lower level of general and specific symptoms such as fatigue, pain, loss of appetite, problems with

speech and swallowing, coughing, problems with the sense of smell and taste, dental problems, problems with socially contact and sexuality. Rehabilitated laryngectomy patients have a significantly lower presence of voice handicap sense and expressed significantly lower symptoms of depression and anxiety.

The subjective experience of voice handicap of laryngectomized patients significantly impacts to the quality of life. Laryngectomized patients in which was conducted phoniatric rehabilitation have significantly lower values of the scores on the questionnaire VHI-10, which speaks in favor of lower feeling of voice handicap (Table 3).

Our study confirmed the high level of depressive and anxiety symptoms in laryngectomized patients. Laryngectomized patients in which was conducted phoniatric rehabilitation have significantly lower values of the scores on the questionnaire PHQ-9 and GAD-7, which indicates that depressive and anxiety symptoms are less pronounced in the rehabilitated patients (Table 4).

DISCUSSION

The dominance of laryngectomized male patients is noted in the literature but also the rise of the female population that can be explained by increasing the number of women smokers and alcohol consumers as well as their increased exposure to carcinogens. In our study the ratio of female to male sex was 1: 5. Woodard and Berlin in their own research find the same ratio of representation among genders [8, 9]. The most of our patients were in the sixth and seventh decade of life. The situation is similar in other studies [1, 2]. Laryngectomized patients in our study were pensioners in the largest number, in disability due to malignant disease or pension due to age, like in some other reports [10].

Postoperative radiation has been conducted with 81.8% our patients. In other studies the percentage of irradiated patients ranges from 27% to 85%, which depends on the number of patients involved in the study and the stages of malignant disease [11].

Phoniatric rehabilitation was successful in establishing esophageal voice and speech in 86.3% of our laryngectomized patients which was registered by objective acoustic analysis. Esophageal voice has the most humane look of similarity to the healthy normal human voice. Frequency, intensity and voice impostation are significantly different from laryngeal voice. The rhythm of esophageal voice is slower. The range of this voice is very small. Esophageal voice is deep with very characteristic voice color. The intensity of this voice has been significantly reduced, but high quality esophageal voice has satisfactory height for communication.

Multidimensional characteristics of esophageal voice and speech among the respondents who speak Serbian language is objective indicator of the communication skills of the laryngectomized patients. The impact of vocal rehabilitation on quality of life and voice handicap in laryngectomized patients is noticed in other study [12].

The evidence from this study indicates that questionnaires EORTC QLQ-C30 and QLQ-H & N43 could be used to evaluate the quality of life of laryngectomized patients. The results of this study agree with the similar research which have used EORTC QLQ-C30 and QLQ-H & N35 questionnaires whith laryngectomized patients [13, 14]. Meanwhile, it was suggested that further similar research should be carried out, because there are no studies that have been used QLQ-H & N43 questionnaire, in order to develop the norms for use this questionnaire on the population in Serbia. The analysis of domain questionnaires EORTC QLQ-C30 has showed significant variations in the quality of life of laryngectomized patients. It has been observed that our patients have a high level of cognitive functioning, lower physical and emotional functioning, low level of social functioning and business ability, as well as, global health and quality of life. The constant finding in different studies show changes in quality of life, especially in the domain of global health [15, 16]. Some authors report lower functioning in the cognitive domain, as well as, emotional and social functioning [17].

Our study documented that the general symptoms such as fatigue, insomnia and loss appetite are dominant in laryngectomized patients, as noted by some others [18, 19]. The most expressive specific symptoms of our patients were cough, dry mouth and sticky saliva, speech problems, social contact problems and sexual problems. These results are consistent with previous studies [20, 21]. In our study, there was no significant statistical difference in the assessment of quality of life between men and women. One of the previous studies has shown that women have lower emotional and social functioning [22]. Our patients had high level of financial problems, as well as others [23]. Laryngectomized patients have significant psychological problems such as: difficult adaptation with new situation, mood changed, broken confidence, feel loneliness, depression, anxienty disorders, posttraumatic stress syndrome [24, 25, 26, 27]. Studies have shown that laryngectomized patients have more severe psychological problems than patients with other cancer and surgery [28, 29, 30].

Our study confirmed the high level of depressive and anxiety symptoms in laryngectomized patients.

Our study is unique because it examined the quality of life of laryngectomized patients before and after phoniatric rehabilitation. The quality of life of laryngectomized patients in which was conducted phoniatric rehabilitation is significantly better than those who did not have phoniatric

rehabilitation. Laryngectomized patients after phoniatric rehabilitation had significanty lower attendance of voice handicap and lower expressed symptoms of depression and anxienty.

CONCLUSION

Significantly improving the quality of life of laryngectomized patients is achieved by a multidisciplinary rehabilitation of patients as well as their nearest environment. Return to the family, profession and social environment requires organized work of rehabilitation teams which are not all sufficiently engaged. Phoniatric team is the moderator of rehabilitation of laryngectomized patients.

Phoniatric rehabilitation which is carried out in a planned and systematic way is the most efficient rehabilitation of laryngectomized patients. Esophageal voice and speech is the most human form of communication of laryngectomized patients. Phoniatric rehabilitation success in 87% of patients testifies to the importance of education esophageal of voice and speech, which was confirmed by this study.

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Table 1. Multidimensional characteristics – objective acoustic analysis of esophageal voice and speech

Characteristics	M	SD	Min.	Max.
AVE.FO Hz	126.44	32.32	76.22	189.03
SD.FO Hz	30.74	24.07	0.00	83.83
Max.FO Hz	184.62	67.24	28.02	306.25
Min.FO Hz	78.17	20.80	0.00	164.55
PERC.SPEECH TIME	56.82	15.80	25.24	99.88
PERC.SILENCE TIME	42.11	16.93	0.12	74.76
PERC.VOICE TIME	8.57	12.28	0.12	70.56
PERC.VOICELESS TIME	50.51	13.88	24.52	92.39
FO.RANGE HZ	117.26	69.30	0.00	235.58
AVE.Int dB	59.45	4.35	50.32	69.92
SD.Int dB	7.29	1.97	3.02	11.18
Max.Int dB	81.53	5.77	66.44	88.41
Min.Int dB	47.74	2.76	44.03	54.03
FO.RANGE2 Hz	172.30	64.87	58.00	358.00
Max. Hz	277.40	73.75	156.00	554.00
Min. Hz	107.32	26.82	92.00	196.00
SPL.RANGE dB	25.62	21.06	7.90	147.00
MAX2.dB	63.41	7.49	50.80	79.10
MIN2 dB	40.35	5.13	10.06	46.40
AREA dB	135.41	91.17	0.00	396.60

AVE.FO – average frequency; Hz – hertz; Int.– intensity of basic tone sound; dB – decibel; FO.RANGE – frequency range; SPL.RANGE – sound pressure level; AREA – speech area

Figure 1. Graphical display of parameters of esophageal voice in the program Phonetogram

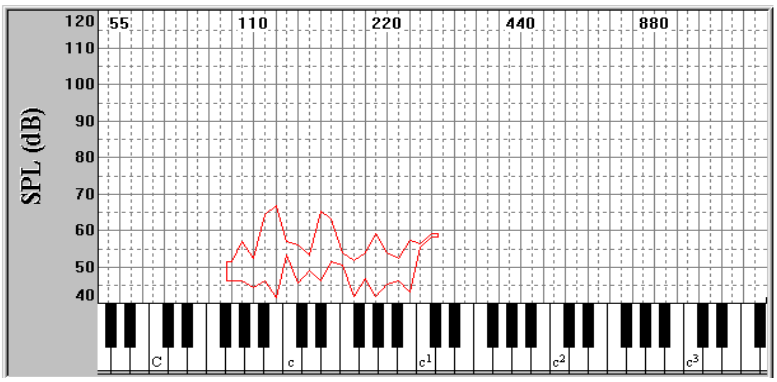

Table 2. Scores QLQ-H&N43 questionnaire in relation with phoniatric rehabilitation (n = 223)

Score	Phoniatric rehabilitation				M. Dif.*	t-test value	p-value
	NO, n = 55		YES, n = 168				
	M	SD	M	SD			
Symptoms / problems							
Fatigue	35.15	19.45	19.84	17.67	15.31	5.43	< 0.001
Nausea and vomiting	9.39	12.73	4.76	9.68	4.63	2.83	0.005
Pain	19.09	20.39	8.23	16.21	10.85	4.03	< 0.001
Dyspnea	11.73	18.49	5.99	19.12	5.74	1.93	0.055
Insomnia	24.24	22.64	16.27	21.88	7.97	2.32	0.021
Loss of appetite	27.88	23.80	15.28	21.54	12.60	3.66	< 0.001
Constipation	12.12	17.41	8.13	18.05	3.98	1.43	0.153
Diarrhea	3.03	9.67	2.58	10.32	0.45	0.28	0.775
Financial problems	41.82	26.62	32.74	29.52	9.08	2.02	0.044
H&N Neurological problems	12.73	19.76	10.12	19.22	2.60	0.86	0.387
H&N Wound healing problem	4.85	11.86	5.16	18.95	-0.31	-0.11	0.909
H&N Loss of weight	20.00	21.85	12.50	23.55	7.50	2.08	0.038
H&N Neck edema	19.14	23.88	12.90	23.34	6.23	1.69	0.091
H&N Cough	43.03	28.45	27.38	27.38	15.64	3.64	< 0.001
H&N Mouth opening	9.26	18.79	3.99	15.87	5.26	2.02	0.044
H&N Social contact	54.55	37.61	25.79	32.36	28.75	5.48	< 0.001
H&N Head and neck pain	19.24	17.63	9.03	12.11	10.21	4.81	< 0.001
H&N Swallowing problems	22.42	18.69	6.25	13.49	16.17	6.97	< 0.001
H&N Senses problems	42.42	25.42	34.33	22.76	8.09	2.22	0.027
H&N Speech problems	75.39	31.99	51.27	24.77	24.12	5.81	< 0.001
H&N Eating problems	23.03	18.70	8.88	16.65	14.15	5.30	< 0.001
H&N Sexuality	60.00	37.21	49.31	31.66	10.69	2.079	0.039
H&N Teeth problems	28.48	20.37	17.80	20.90	10.68	3.30	0.001
H&N Dry mouth/ Sticky saliva	40.12	23.69	27.64	19.25	12.47	3.90	< 0.001
H&N Body image	33.74	22.93	23.41	23.14	10.32	2.87	0.004
H&N Shoulder problem	15.45	19.99	9.82	22.36	5.63	1.66	0.098
H&N Skin problem	12.12	12.52	8.33	11.39	3.78	2.08	0.038
H&N Tension	41.52	26.62	34.42	22.94	7.09	1.91	0.057

*Mean scores difference (M. Dif.)

Table 3. Scores VHI-10 questionnaire in relation with phoniatric rehabilitation (n = 223)

Score	**Phoniatric rehabilitation**				**M. Dif.***	**t-test value**	**p-value**
	NO, n = 55		**YES, n = 168**				
	M	**SD**	**M**	**SD**			
VHI-10 Total	28.25	9.60	19.57	7.35	8.68	7.02	< 0.001

*Mean scores difference (M. Dif.)

Table 4. Scores PHQ-9 and GAD-7 questionnaires in relation with phoniatric rehabilitation (n = 223)

Score	**Phoniatric rehabilitation**				**M. Dif.***	**t-test value**	**p-value**
	NO, n = 55		**YES, n = 168**				
	M	**SD**	**M**	**SD**			
Depressive symptoms (PHQ-9)	6.7	6.0	3.8	4.2	2.88	3.94	< 0.001
Anxiety symptoms (GAD-7)	7.0	4.9	3.4	4.2	3.55	5.14	< 0.001

*Mean scores difference (M. Dif.)