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ORIGINAL ARTICLE

Demographic characteristics of patients with laryngeal cancer and their socio-economic status

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Summary

Purpose: *To define demographic characteristics of patients with laryngeal cancer in central Serbia, and to investigate possible relationships between their socioeconomical status and the appearance of laryngeal cancer.*

Methods: *100 patients (cases) with histologically verified laryngeal cancer were investigated. The control group consisted of 100 patients (controls) having no cancer. A questionnaire was filled in by both cases and controls and comparison between the groups was carried out by individual matching of demographic characteristics and socioeconomical status.*

Results: *91% of the cases and controls were male (mean age 60 years). Most of the cases had lower educational level and poorer socioeconomical status compared to controls, whilst no difference was found between the 2 groups concerning their living in urban or rural environment.*

Conclusion: *It was not possible to correlate urban environment (air pollution) as risk factor. People of lower educational level and poor socioeconomical status had increased risk of getting laryngeal cancer.*

Key words: demographic characteristics, laryngeal cancer, socioeconomical factors

Introduction

About 2% of all human cancers are localized in the larynx [1,2]. Laryngeal cancer is on the 8th place of the most common cancer localizations [1] and one of the most common cancers in Europe with 52,000 new cases yearly. About 90% of patients are men. The yearly incidence rate in northern and southern Europe is 6-18 per 100,000 population for men and a maximum of 1.5 per 100,000 for women [3]. Disease incidence varies considerably in different regions. The largest number of patients can be found in low-developed countries [4]. Laryngeal cancer is one of most common cancers of head and neck region in our country as well, with significant increase in incidence during the last decade. Relatively recent research shows that the population from the region of Former Yugoslavia is included among the most endangered populations in the world, with standardized incidence rate of 10.8 per 100,000 and mortality rate of 5.4 per 100,000 [1]. In 2000, the standardized incidence rate was 12.3 for men and 1.1 for women per 100,000 citizens of central Serbia [5]. The worldwide mortality rate in the same year was 7.1 for men and 0.5 for women per 100,000 citizens [6]. The incidence and mortality rate are steadily increasing in some regions of Serbia.

Laryngeal cancer correlates closely with gender. Men are far more susceptible than women (ratio 10:1). The most standardized incidence rates are noted in the countries of eastern and southern Europe. The highest mortality rates are registered in Hungary (7.33), Poland (6.97) and countries of former Yugoslavia (6.20) [7,8]. The standardized incidence rate in Serbia in 2000 for males was 12.3 and for females 1.1 per 100,000 [9].

Laryngeal cancer appears mostly in the 6th and 7th decade of life [2,10,11]. In central Serbia, the largest number of patients belongs to the 40-70 age groups (82.2%) [12]. However, in the last few years, its incidence increased in 35-64 age categories, especially in

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the male population [7]. Most authors correlate the appearance of laryngeal cancer with low educational level and lower socioeconomical status [4,13,14].

The aim of our study was to define the demographic characteristics of patients with laryngeal cancer in central Serbia, and to investigate the relationship between socioeconomical status and the appearance of laryngeal cancer.

Methods

Patient and control groups

A group of 100 patients with histologically verified laryngeal cancer hospitalized in the Clinic of Otorhinolaryngology, Clinical Centre Kragujevac, and in the Institute for Clinic of Otorhinolaryngology and Maxillofacial Surgery of the University Clinical Center of Serbia, Belgrade, was investigated.

The control group consisted of 100 patients not having cancer, hospitalized in the Orthopedic Center and Traumatology of Clinical Centre Kragujevac, or in the Institute for Traumatology of University Clinical Center of Serbia in Belgrade. Case and control groups were matched regarding age and gender.

Methods

Patients and controls filled in a questionnaire with several questions regarding different risk factors for developing laryngeal cancer (Table 1). Some data were obtained from medical records.

Statistical analysis

All answers were analysed using SPSS for Windows 10.0 software. Descriptive statistical methods were used, as well as methods of statistical tests, x^2 test, Student's t-test, Wilcoxon-Man – Whitney test, U test, univariate logistic regression and multifactorial conditional logistic regression analysis.

Results

Demographic characteristics

The patient group consisted of 9 women and 91 men**,** showing a significant predominance of male gender (Table 2).

Significant increase was noted in the 51-70 years age group. The youngest patient was 40 years old, and the oldest 79 (Figure 1).

Table 1. The questionnaire used

- Group
  - patient
  - control
- Sex
  - male
  - female
- Age (date of birth)
- Place of birth
  - rural
  - urban
- Place of permanent residence
  - rural
  - urban
- Duration (years) of living in permanent residence
- Marital status
  - single
  - married
  - divorced
  - widowed
- Educational level
  - without education
  - elementary school
  - high school
  - college/batchelor
  - university/master
- Occupation
  - none
  - farmer
  - housewife
  - non qualified or partially qualified worker
  - qualified or highly qualified worker
  - technician
  - clerk
  - retired (previous occupation)
- Number of household members
- Do you live
  - in a house
  - in an apartment
  - If apartment, this is in the
    - basement
    - ground floor
    - other floor
- The apartment you lived most was
  - sunny
  - cold
  - dry
  - wet
- If house, is it in a busy street?
  - Yes
  - No
- Is the house in an industrial zone?
  - Yes
  - No
- How many persons sleep with you in the same room?
- Income of your household
  - no income
  - small
  - medium
  - good
  - very good
  - excellent

Rural birthplace was registered in 76% of the cases and 68% of the controls (p=0.209); rural residence was registered in 44% of the cases and 36% of the controls (p=0.249; Table 3).

Most patients (79%) were married, 2% were single, 10% were widowed, and 9% divorced. Similar percents were found in the control group (Table 4).

The highest number of patients with laryngeal carcinoma was registered in those with the lowest educational level. The difference in education between patients and controls was significant (p=0.01; Table 5).

Profession in both groups was defined as: without profession, agricultural worker, housewife, nonqualified and partially qualified worker, qualified worker and highly qualified worker, technician, clerk, retired and expert (master degree or higher). Most were retired or at the end of their working years (Table 6).

Considering the socioeconomical status, living in apartment was related with lower risk of laryngeal cancer compared with living in a house, and most of our cases lived in a house (Table 7). The risk of developing laryngeal cancer was reduced in patients with higher income: the largest number of patients had low income per household member (Table 8), while household location could not be regarded as risk factor (Table 9).

Discussion

In Serbia, laryngeal cancer is one of the most common cancers of the head and neck region [5]. In Europe,

Table 2. Distribution of patients according to gender

Gender	*Patients* *n*	*Controls* *n*
Male	91	91
Female	9	9
Total	100	100

x^2: 67.24, p: <0.01

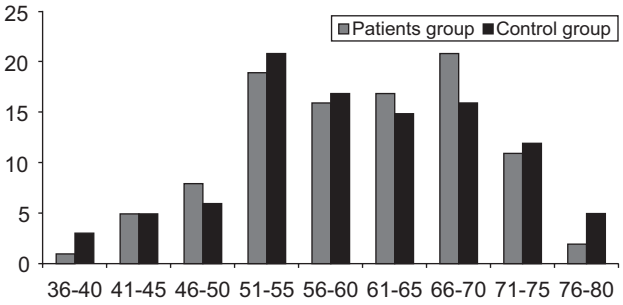

Figure 1. Age distribution of patients and controls.

Table 3. Distribution of patients and controls according to birthplace and residence

	Birthplace		*Residence*	
	Patients *n*	*Controls* *n*	*Patients* *n*	*Controls* *n*
Rural	76	68	44	36
Urban	24	32	56	64
Total	100	100	100	100

OR: 0.671, 95% CI: 0.360-1.250, p= 0.209 for birthplace
OR: 0.716, 95% CI: 0.406-1.263, p= 0.249 for residence

Table 4. Distribution of patients and controls according to marital status

Marital status	*Patients* *n*	*Controls* *n*
Married	79	76
Non married	2	5
Divorced	10	8
Widowed	9	11
Total	100	100

OR: 1.122, 95% CI: 0.736-1.711, p= 0.592

Table 5. Distribution of patient and control groups according to educational level

Educational level	*Patients* *n*	*Controls* *n*
Without education	24	10
Not qualified	19	14
Qualified and highly qualified	34	32
High school	12	22
College/Bachelor	6	9
University/Master	5	13
Total	100	100

OR: 0.695, 95% CI: 0.565-0.854, p= 0.01

Table 6. Distribution of patient and control groups according to work

Working place	*Patients* *n*	*Controls* *n*
None	1	3
Agricultural	9	12
Housewife	3	1
Non qualified or partially qualified	9	1
Qualified or highly qualified	23	18
Technicians	3	2
Clerks	2	2
Retired	48	51
Master degree or higher	2	10
Total	100	100

OR: 0.944, 95% CI: 0.847-1.052, p= 0.298

Table 7. Relative risk of disease based on living in a house or an apartment

Variable	*House*	*Apartment*	*Total*
Patients, n	76	24	100
Controls, n	62	38	100
Total	139	61	200

OR: 0.538, 95% CI: 0.291-0.992, p= 0.047

Table 9. Relative risk of other location-based factors (patients vs. controls)

Variable	*OR*	*95% CI*	*p-value*
Number of household members	1.093	0.941-1.270	0.243
Street traffic	1.176	0.673-2.057	0.569
Industrial zone	1.835	0.882-3.815	0.104
Number of people in bedroom	1.058	0.785-1.427	0.712

this cancer affects mostly men [15,16]. In our study, similar results were obtained: male/female ratio was 91:9.

Laryngeal cancer in males ranks 3rd in Poland and Hungary. The highest incidence of this disease in females is noted in USA (in black population), in Thailand and Cuba, while in Europe most of them are found in Hungary, Poland and in Serbia [3,5]. The incidence of this disease in females tends to increase, especially since 1950, when mortality increased from 0.5 to 1.5 per 100,000. This fact is connected with the use of tobacco and alcohol in women [17,18]. In a research conducted in our country covering 1991 and 1992, the patients' ratio of males and females was 93:7 [13].

According to numerous epidemiological studies, laryngeal cancer is a disease of older age. Newest studies indicate that the average age of patients with cancer of the larynx is 59.5 years (range 51-70) in Cuba, while in Japan and Australia 73% patients are between 50 and 70 years old [3,9,11,19]. Studies conducted in our country indicate that most of the patients (46%) developed laryngeal cancer between 55 to 64 years [12,13]. In the present study, the average age of patients at diagnosis was 60.18 years, while 73% of patients were 51-70 years old.

Higher risk of laryngeal cancer has been noted in developed countries [10]. Some authors claim that urban environment (air pollution) can be a risk factor for laryngeal cancer because the effect of the environment can be carcinogenic or co-carcinogenic [13,20]. On the contrary, other investigators did not find any difference in incidence between urban and rural environment [21].

Most of our patients were born in rural areas, but lived in urban environment afterwards. The average number of years spent in urban environment in the patients' group was 43.61, while in the control group it was 43.68.

Our study indicated that the risk of developing cancer reduces with lower educational level. The kind of profession is directly connected to the education of the patients. Most of the laryngeal cancer patients had low educational level, their professions being connected with their education [4,15]. These results coincide with those of other authors [12,13]. The educational level of the patient and the control group was similar. Although most patients were investigated after their retirement, disease occurrence was related to the type of profession, e.g. patients who worked in metal industry (production and derivation of metal) or as construction workers. Out of 77 patients (77%) with low educational level, 9 were agricultural workers, 19 non qualified and partially qualified, 34 qualified and highly qualified workers. All of 3 females in the patient group were housewives.

In studies on other malignant diseases (bladder, prostate, or gastrointestinal cancers), marital status is often considered as a possible risk factor [1]. Information about marital status of patients with laryngeal cancer is often lacking, or, if any, no correlation has been found [20,22,23]. Most of our patients from both groups were married.

Most studies have indicated increased incidence of laryngeal cancer in patients with poor socioeconomical status, and also in those with low educational level [4,13,15,19,23].

Our patients lived mostly in cities or towns, had house as residence (mostly ground floor), with increased moisture, cold and with insufficient daily amount of sunlight. We believe that living in apartment located on higher floors might reduce the risk of laryngeal cancer. Location of residence of our patients (proximity to high traffic and industrial facilities) was not correlated

Table 8. Relative risk of disease based on household income for patient and control groups

Variable	*Total household income*						*Total*
	Without	*Small*	*Medium*	*Good*	*Very good*	*Excellent*	
Patients, n	–	28	21	38	10	3	100
Controls, n	1	7	29	45	13	5	100
Total	1	35	50	83	23	8	200

OR: 0.669, 95% CI: 0.530-0.922, p=0.01

with their illness, as was the number of household members. Most of the patients had low income per household member compared to the control group (odds ratio 0.699, 95% confidence interval 0.530-0.922, p=0.011).

Based on the results of this analysis, we can conclude the following: Men of older age with laryngeal cancer prevail over women. Although people living in urban areas often develop laryngeal cancer, it was not possible to correlate air pollution as risk factor. People with lower educational level and with poor socioeconomical status are at higher risk for laryngeal cancer development.

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