

Gender-related incidence, risk factors exposure and survival rates of laryngeal cancers – a 10-years analysis of trends at one institution

Daniel Majszyk, Antoni Bruzgielewicz, Anna Rzepakowska, Kazimierz Niemczyk, Ewa Osuch-Wójcikiewicz

Department of Otolaryngology, Medical University of Warsaw, Poland; Head: prof. Kazimierz Niemczyk Ph MD

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ABSTRACT:

Objectives: The aim of the study was to analyse the epidemiology of laryngeal cancer over 10 years in relation to known risk factors and to assess the current survival rates in this group of patients.

Methods: The data were retrospectively collected from patients' medical records, then entered in the database using dedicated software and a statistical analysis was performed.

Results: 512 subjects – 443 men (86.5%) and 69 women (13.5%) were enrolled into the study. The male-to-female ratio was 6.4:1. There were 97.1% smoking women and 98% smoking men, however 81.1 % of women and 94.6% of men admitted to smoking more than 20 cigarettes per day. Heavy alcohol consumption was the case in 14 (20.3%) women and in 307 (69.3%) men. A statistically significant difference was found between women and men with laryngeal cancer ($p < 0.05$) for both the size of heavy alcohol consumption and the size of excessive tobacco use. In the majority of male and female subjects, the tumour was located in the supraglottic/glottic area. Apparently, this tumour location was much more common among women, accounting for 60.9% of cases, while in men was confirmed in 39.3% of cases. The stages of laryngeal cancer were of similarly high advancement for both the men and women – stages III and IV were confirmed in 82.6% of women and in 77.6% of men. The 5-year survival rate was 58% among women and 60.5% among men.

Conclusions: The incidence rate of men to women with laryngeal cancer is 6.4: 1. Most commonly the infiltration of laryngeal cancer is diagnosed in the supraglottic and glottis area. The percentage of advanced stages of laryngeal cancer at the time of diagnosis exceeds 70% both for women and men.

KEYWORDS:

laryngeal cancer, epidemiology, men and women, risk factors

INTRODUCTION

Cancer of the larynx is the most common malignancy of the head and neck region. In Poland, it is the seventh (2.7%) most common malignancy diagnosed in men. In 2015, the laryngeal cancer (C32) was diagnosed in 355 Polish women and 2,171 Polish men, most of them being of 55 to 69 years of age [1]. In Europe, laryngeal cancer was diagnosed in 39,901 patients including 3,920 women and 35,981 men. The highest incidence rate of laryngeal cancer in Europe (calculated per 100,000 people) was recorded in Hungary for men – 16.6 and in Albania for women – 2.7 [2].

These inequalities in the incidence of laryngeal cancer observed between men and women have prompted many researchers to analyse the problem, focusing mainly on such aspects as the etio-pathogenesis of the cancer of the larynx, its clinical development and other parameters [3–8]. These analyses are very helpful in deciding on the right strategy aiming at the reduction of cancer incidence rates, including the incidence of laryngeal cancer. They also provide information which can be used to implement appropriate preventive measures in the target populations.

The aim of this study was to analyse the epidemiology of laryngeal cancer in men and women, including such factors as patient's age, alcohol and tobacco use, the location and advancement of primary tumour, and to compare some of these findings with the results obtained from previous studies.

MATERIAL AND METHOD

The study population consisted of 512 patients treated for laryngeal cancer at the Department of Otolaryngology of the Medical University of Warsaw, between 2001 and 2010. The data were collected in a retrospective manner, based on the analysis of patients' medical records (medical case record, outpatient treatment record, hospital treatment information sheets); when these data were missing, a telephone call to the patient or his/her family was made. The data were then entered in the database using dedicated software and a statistical analysis was performed. The correlations between pairs of categorical (qualitative) variables were investigated with chi-square test. Compliance of the assumptions for the use of the chi-square test were checked and confirmed previously. In this

case, the absence of correlations was assumed as the null hypothesis. The null hypothesis was rejected at significance level $\alpha = 0.05$.

RESULTS

The study group consisted of 443 men (86.5%) and 69 women (13.5%) at the age of 35–87. The male-to-female ratio was 6.4:1. An analysis of the laryngeal cancer incidence was performed depending on the patients' sex and for different age ranges (Tab. I.). No statistically significant differences have been observed between the two sexes in the incidence rate of laryngeal cancer, but there were fewer patients under 50 years of age in the male group (14.2%), than in the female group (23.2%). Analysing the alcohol consumption among patients with laryngeal cancer it was found that 14 (20.3%) of women and 307 (69.3%) had admitted to heavy alcohol drinking (Tab. I). Additionally, the study group included 67 (97.1%) smoking women and 434 (98%) smoking men. In both groups, most tobacco-users smoked more than 20 cigarettes a day: 81.1% of women and 94.6% of men (table 1). A statistically significant difference between women and men with laryngeal cancer ($p < 0.05$) was found for both the size of heavy alcohol consumption and the size of tobacco use. Analysing the time of the patients' first visit to the doctor, it was calculated as 28.9 days for women and 32.4 days for men, what makes a difference of a 3.5-day longer period for male subjects but without statistical significance.

Similarly, no gender-related differences have been observed regarding the time to diagnosis. The mean time to diagnosis was 3.5 days longer for men (36.4 days) than women (32.9 days), but the difference was not statistically significant. The analysis of the cancer localisation within the larynx revealed that the most frequently occupied area was supraglottic/glottic both for women and men. However, for women this location was considerably predominant (60.9%) compared to men (39.3%) although the difference was not statistically significant (Tab. II.). Also, the incidence of laryngeal cancer in other laryngeal locations revealed no statistically significant difference between women and men. Considering the advancement of laryngeal cancer according to TNM stages, the study population included 6 women (8.7%) and 61 men (13.8%) with stage I tumours, 6 women (8.7%) and 38 men (8.6%) with stage II tumours, 22 women (31.9%) and 134 men (30.2%) with stage III tumours, and 35 women (50.7%) and 210 men (47.4%) with stage IV tumours. No significant differences have been observed in the stages of laryngeal cancer between men and women (p value was 0.68, chi-square – 1.48). Finally, there were also analysed the survival rates in women and men with laryngeal cancer (table 3.). Both in women and men the majority of patients survived up to 5 years from the diagnosis of laryngeal cancer, 58% and 60.5%, respectively. Survival rates of over 10 years were only 8.7% for women and 12.4% for men. No significant differences were observed in the survival rates between men and women.

DISCUSSION

Laryngeal cancer has one of the highest male-to-female ratios among all malignancies. In our material, the male-to-female ra-

tio was 6.4:1 and it was similar to the respective ratio of 6.1:1 reported in the Polish National Cancer Registry in 2015 [1]. In the study conducted in 1992, the male-to-female ratio in the group of 2,352 patients with laryngeal cancer diagnosed between 1960 and 1987 was 11.5:1. The authors of this report mention that similar male-to-female ratios have been reported in many others studies published from the beginning of the 20th century to the time of their research in 1992 [8]. Since the beginning of the 21st century, this ratio has kept decreasing, being 7.48:1 in 2006, 7.3:1 in 2009, while in 2012 it was 6.67:1 in Poland and 7.36:1 worldwide [1, 2, 9–12]. This tendency is related to the increase in the incidence of laryngeal cancer in women. The estimations of the Polish National Cancer Registry based on the trends observed in 2007–2011 confirm that this tendency is likely to remain stable in the nearest future. The studies conducted in Poland and some other countries demonstrate that the increase in the incidence rate of laryngeal cancer in women is mainly attributed to the growing tobacco use [4–7, 13]. It may be also related to aging of the society, improved diagnostic methods or better access to medical care [4, 9, 10]. Cancer of the larynx belongs to the group of tobacco-dependent malignancies, including passive smoking [14, 19]. This cancer is very rare among non-smokers. Tobacco smoking and high-percentage alcohol consumption are the main risk factors for the development of laryngeal cancer [16–18]. Its incidence trends are often compared with trends in the incidence of lung cancer, for which smoking is also the main contributing factor [6, 19, 20]. Year 2015 was another year in which the number of women who died from lung cancer exceeded the number of women who died from breast cancer [1]. In the last century, it was commonly thought that mainly men who smoked were exposed to the development of cancer in the region of the respiratory tract. In the face of epidemiological data from the first decade of the 21st century which present a reduction in the gap in laryngeal cancer incidence between women and men, preventive and screening activities among smoking women should be strongly recommended.

In our study group, 67 (97.1%) out of 69 women and 434 (98%) out of 443 men were smokers. Moreover, most male and female tobacco-users smoked more than 20 cigarettes a day – 81.1% of women and 94.6% of men. Lubin et al. analysed the incidence of laryngeal cancer with respect to gender and smoking in a large group of subjects [21]. These authors report similar proportion of smokers among male and female patients with laryngeal cancer, which was also confirmed in our material. However, excessive smoking of more than 20 cigarettes per day is observed predominantly in the male group with laryngeal cancer.

Considering the alcohol consumption in our study group, there were 14 (20.3%) alcohol-abusing women and as many as 307 (69.3%) alcohol-abusing men. Other authors also confirm the increased risk of developing laryngeal cancer even by moderate alcohol drinking (> 1 to < 4 drinks per day), especially when combined with smoking, however they do not analyse the differences in alcohol consumption between sexes [22–24].

The localisation of cancer within the larynx is connected with specific symptoms as well as with differences in tumour progression and regional metastasis mainly due to the diversity of lymphoid

Tab. I. The incidence rate, exposition to tobacco and alcohol abuse in men and women with laryngeal cancer presented according to age ranges. The correlations between sexes were investigated with chi-square test.

GENDER	AGE RANGES OF PATIENTS WITH LARYNGEAL CANCER				P-VALUE	CHI-SQUARE VALUE
	0-49	50-59	60-69	70-100		
The incidence rate						
Women	16 (23.2%)	16 (23.2%)	16 (23.2%)	16 (23.2%)	0.14	5.45
Men	63 (14.2%)	63 (14.2%)	63 (14.2%)	63 (14.2%)		
The incidence rate						
Women	2 (2.9%)	2 (2.9%)	2 (2.9%)	2 (2.9%)	p<0.00	59.24
Men	49 (11.1%)	49 (11.1%)	49 (11.1%)	49 (11.1%)		
Tobacco use						
Women < 20 cigarettes/day	3 (4.3%)	6 (8.7%)	2 (2.9%)	0 (0.0%)	P<0.00	19.9
Women > 20 cigarettes/day	12 (17.4%)	18 (26.1%)	19 (27.5%)	7 (10.1%)		
Men < 20 cigarettes/day	2 (0.5%)	6 (1.4%)	1 (0.2%)	6 (1.4%)		
Men > 20 cigarettes/day	60 (13.5%)	184 (41.5%)	114 (25.7%)	61 (13.8%)		

vessels distribution within the laryngeal mucosa. In the presented study most male and female patients had a tumour located in the supraglottis/glottis. However, in women, this tumour location was much more common, accounting for 60.9% of cases. The authors of other studies from Poland and Europe also confirm that there is a predominance of the supraglottic localisation of cancer in women [3, 4, 7-9, 25].

Most patients from our study group, 82.6% of women and 77.6% of men, had advanced III or IV stage laryngeal cancer. In material from other sites, there were more men than women among patients with clinical symptoms of highly advanced laryngeal cancer upon their first visit [8]. The authors believe that the difference may be attributed to the fact that women are more likely to pay attention to laryngeal symptoms and hence, more of them visit their doctors at less advanced stages of the disease [8]. Our findings confirm this theory as the time to first visit was 3.5 days shorter in women than in men, and time to diagnosis was 4.2 days shorter in women than it was in men, although the laryngeal cancer was more advanced in women. These discrepancies require further research and the analysis of their root cause. They may be related to a higher degree of referentiality in our centre, where patients with a more advanced disease are referred.

Finally focusing on survival rates, in the analysed study group the 5-year survival rate was 58% among women and 60.5% among men, without statistically significant differences between sexes. The study by Ellis et al. including population of 29,420 patients with laryngeal cancer from England and Wales revealed the 5-year survival rate of 63% for men and 55% for women [4]. The authors believe that the 8% poorer survival rate in women may be partially attributed to differences in tumour subsites, with supraglottic tumours being more frequent in women than in men (30% vs 16%, respectively) [4]. The symptoms of supraglottic cancer develop later than the symptoms of glottic can-

Tab. II. Localisation of laryngeal cancer in women and men.

CANCER LOCALISATION	WOMEN (N=69)	MEN (N=443)
Glottis	7 (10.1%)	62 (14%)
Glottis/Subglottis	2 (2.9%)	9 (2%)
Supraglottis	7 (10.1%)	32 (7.2%)
Supraglottis/Glottis	42 (60.9%)	174 (39.3%)
Supraglottis/Glottis/Subglottis	5 (7.2%)	83 (18.7%)
Subglottis	0 (0%)	1 (0.2%)
Transglottic	6 (8.7%)	82 (18.5%)

Tab. III. Survival rates for men and women with laryngeal cancer.

SURVIVAL RATE	WOMEN (N=69)	MEN (N=443)
Up to 5 years	40 (58%)	268 (60.5%)
5 to 10 years	21 (30.4%)	100 (48%)
More than 10 years	6 (8.7%)	55 (12.4%)
No data	2 (2.9%)	10 (2.3%)

p value for between-group difference 0.64537 (chi-square = 8.75)

cers, hence the patients visit their doctor at a later time, when the cancer is more advanced. However, the authors do not present the advancement of laryngeal cancer.

CONCLUSIONS

The incidence rate of men to women with laryngeal cancer is 6.4:1. Most commonly the infiltration of laryngeal cancer is diagnosed in the supraglottic and glottis area. The percentage of advanced stages of laryngeal cancer at the time of diagnosis exceeds 70% both for women and men.

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Corresponding author: Anna Rzepakowska, Department of Otolaryngology, Medical University of Warsaw, Ul. Banacha1a, 02-097 Warszawa, Poland; Tel./fax. +4822 5992716; E-mail: arzepakowska@wum.edu.pl

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