

The incidence of laryngeal cancer in Europe with special regard to Poland in the last 2 decades

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A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
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Małgorzata Wierzbicka^{ABCDEFG¹}, Piotr Winiarski^{ABDF²}, Ewa Osuch-Wójcikiewicz^{BDF³}

¹Klinika Otolaryngologii i Onkologii Laryngologicznej UM w Poznaniu, ul. Przybyszewskiego 49, 60-355 Poznań, Polska

²Oddział Otolaryngologii i Onkologii Laryngologicznej z Pododdziałem Chirurgii Szcękowej Szpitala nr 2 UMK, ul. Ujejskiego 75, 85-168 Bydgoszcz, Polska

³Katedra i Klinika Otolaryngologii WUM, ul. Banacha 1 a, 02-097 Warszawa, Polska

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ABSTRACT:

Objective: Laryngeal cancer is a common respiratory cancer. We aimed to use data from European population-based cancer registries to present variations in the incidence and mortality of laryngeal cancer within Europe.

Methods: High-quality data from cancer registries were qualified for analysis. The pooled data were stratified by area, sex and age groups.

Results: The incidence and mortality rates of laryngeal cancer has been slightly decreasing for the last 10 years in Poland and other European countries. Laryngeal cancer is relatively rare in people under 40 years of age. Laryngeal cancer is significantly more common in men.

Conclusions: Laryngeal cancer it is still a pathology which affects the quality of life of patients in the whole Europe.

KEYWORDS:

laryngeal cancer, incidence, mortality, epidemiology, Poland, Europe

INTRODUCTION

Laryngeal cancer is the second most common respiratory tract cancer after lung cancer and the 18th most common cancer in the world. It represents approximately 2% of new cancer cases diagnosed annually showing significant geographical variation in its incidence, which has been increasing over time in most countries. This is the case for instance in Pakistan, Taiwan and Thailand [1], China [2] and in the Caribbean [3], whereas the incidence has been slightly decreasing in Europe [4-8]. In general, the incidence of laryngeal cancer is falling in more developed countries [8, 9], probably due to campaigns promoting healthy life-style with reduction of tobacco and alcohol consumption [10-15] (Table. 1). In this article we aimed to present variations in the incidence and mortality of laryngeal cancer within Europe with special regard to Poland.

MATERIAL AND METHODS

Data sources

Several population-based cancer registries and other sources were used in order to collect data on the incidence and

mortality of laryngeal cancer in different European countries and to analyze variations in their geographical distribution and temporal trends. The primary source of data was the EUREG, which was supplemented with data from other national registers (NCRI - National Cancer Registry Ireland, KRN - National Registry of Cancer in Poland) and from Eurostat. EUREG registry data permits the exploration of geographical patterns and temporal trends of incidence, mortality and survival observed in European population-based cancer registries in about 100 registration areas (cities, regions, hospitals). Eurostat is the statistical office of the European Union and its task is to provide the European Union with statistics that enable comparisons between countries and regions. Other data sources were The International Agency for Research on Cancer (IARC). The IARC is the specialized cancer agency of the World Health Organization. It compiled and reported high-quality incidence, mortality and survival data submitted by various sources.

Data on laryngeal cancer (ICD 10 code C32) incidence and mortality in 2002 and 2012 was collected and age-specific incidence and mortality rates in 2002 were estimated for a group of 22 European countries under study. These coun-

Tab. I. The incidence and mortality rates of male laryngeal cancer, crude rate (CR) from 1990-1996 in Poland

YEAR	INCIDENCE		MORTALITY	
	NUMBER	CR	NUMBER	CR
1990	2416	13	1560	8,4
1991	2469	13,3	1495	8
1992	2578	13,8	1591	8,5
1993	2720	14,5	1553	8,3
1994	2627	14	1575	8,4
1995	2527	13,5	1606	8,6
1996	2615	13,9	1564	8,3

Source: Zatoński, Tyczyński [4]

tries are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Malta, Netherlands, Norway, Poland, Slovakia, Slovenia, Spain, Sweden, UK, Ukraine. The data that we present is an average value for the above-mentioned countries. Comparative data on laryngeal cancer in 2012 in the European Union and in the European countries outside the community have been calculated.

Statistical analysis

The pooled data were stratified by area (country; EU/other European countries), sex (male/female), and age groups (0-, 5-, 10-, 15-, 20-, 25-, 30-, 35-, 40-, 45-, 50-, 55-, 60-, 65-, 70-, 75-, 80-, 85-).

RESULTS

Incidence and mortality of laryngeal cancer in Poland and Europe

Tracking data on the incidence and mortality of cancer of the larynx in Poland from 1990 we can see that the peak was reached in 1993 with the incidence in men being 2720 and with record incidence crude rate - 14.5/100 000 (Tab. 1, Tab. 2). The highest mortality in male was identified in 1995 with 1606 cases and mortality crude rate of 8.6/100 000. This is followed by a slight decline - the downward trend applies to both men and women and refers to the incidence and mortality of laryngeal cancer. A similar situation occurred in Hungary, Russian Federation and other countries from the Central and Eastern Europe. In southern European countries like France, Italy, Spain, male mortality from laryngeal cancer reached a peak earlier, because already in the mid 1980s [5].

Tab. II. The incidence and mortality rates of laryngeal cancer from 2002-2012 in Poland

YEAR	INCIDENCE			MORTALITY		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
2002	2516	2186	330	1579	1408	171
2003	2516	2186	330	1579	1408	171
2004	2438	2155	283	1670	1506	164
2005	2549	2228	321	1712	1542	170
2006	2368	2089	279	1774	1606	168
2007	2420	2127	293	1684	1528	156
2008	2383	2075	308	1605	1423	182
2009	2413	2123	290	1585	1427	158
2010	2201	1924	277	1527	1358	169
2011	2197	1925	272	1445	1298	147
2012	2234	2057	308	1488	1307	181

Source: KRN

For the last 10 years we can observe a slight decrease in both the incidence and mortality rates of laryngeal cancer in most of the European countries (Tab. 3). Such a dominant trend in Europe is independent from the population size of the country – for instance it refers to both Ukraine and Belgium. What is more, it refers generally to both men and women but is noticeable mainly in men [11]. In other countries, like Ireland, Latvia, Netherlands or Lithuania [12] the incidence has been increasing slightly. The crude incidence rate for 22 European countries is 4.8/100 000 in 2002 and 4.7/100 000 in 2012. The crude mortality rate for the same group of countries is 2.3/100 000 in 2002 and 2.2/100 000 in 2012, respectively.

INCIDENCE

Estimated by IARC 35,981 new cancer cases of the larynx diagnosed in 2012 account for 1.98% of all new cancer cases in Europe. Among the patients aged 0-74 years, the cumulative incidence rate was 1.3% (Tab. 4). According to IARC, the highest age-standardized rates in 2012 were recorded for Balkans: Bulgaria – 6.7/100 000, Croatia – 6.6/100 000. The lowest in: Austria -2.8/100 000, Iceland – 1/100 000, Scandinavia – 1.6/100 000, UK – 2.7/100 000. Laryngeal cancer is significantly more common in men: it has the highest male-to-female ratio (7:1) of all cancers, with very low, consequently unremarkable trends in females [13, 14] (Tab. 3).

Age-specific incidence

Laryngeal cancers are relatively rare in people under 40 years of age [13]. However, the rate increased rapidly in patients

Tab. III. The incidence and mortality rates of laryngeal cancer, crude rate (CR) in 2002 and 2012 for 22 European countries

COUNTRY	2002				2012				2002				2012			
	INCIDENCE		MORTALITY		INCIDENCE		MORTALITY		INCIDENCE		MORTALITY		INCIDENCE		MORTALITY	
	BOTH	MALE	FEMALE	CR	BOTH	MALE	FEMALE	CR	BOTH	MALE	FEMALE	CR	BOTH	MALE	FEMALE	CR
Austria	322	282	40	4	173	154	19	2.1	297	253	44	3.5	118	101	17	1.4
Belgium	727	629	98	7	252	215	37	2.4	724	620	104	6.5	266	238	28	2.4
Bulgaria	648	610	38	8.4	361	331	30	4.7	636	602	34	8.7	436	411	25	6
Croatia	408	382	26	9.5	241	216	25	5.6	381	344	37	8.9	205	188	17	4.8
Cyprus	14	14	0	1.9	6	5	1	0.8	25	22	3	2.9	17	16	1	2
Czech Republic	530	478	52	5.2	256	238	18	2.5	530	478	52	5	236	212	24	2.2
Denmark	262	212	50	4.9	126	101	25	2.3	266	214	52	4.8	112	90	22	2
Estonia	77	73	4	5.6	54	54	0	4	56	52	4	4.2	31	29	2	2.3
Finland	113	105	8	2.2	34	29	5	0.7	118	104	14	2.2	37	32	5	0.7
Iceland	7	1	6	2.4	2	1	1	0.7	4	4	0	1.3	0	0	0	0
Ireland	149	122	27	3.3	71	58	13	1.5	179	149	30	3.9	70	62	8	1.5
Latvia	129	122	7	5.7	89	87	2	3.9	143	132	11	7	89	84	5	4.4
Malta	19	17	2	4.8	4	3	1	1	25	20	5	6	6	6	0	1.4
Netherlands	684	581	103	4.2	226	176	50	1.4	733	606	127	4.4	206	158	48	1.2
Norway	129	111	18	2.8	39	34	5	0.9	119	101	18	2.4	38	36	2	0.8
Poland	2516	2186	330	6.6	1579	1408	171	4.1	2234	2057	308	7	1488	1307	181	3.9
Slovakia	331	189	142	6.2	180	171	9	3.4	280	258	22	5.2	168	156	12	3.1
Slovenia	111	99	12	5.6	52	40	12	2.6	99	89	10	4.8	46	42	4	2.2
Spain	-	1667	77	4.5	-	-	-	-	-	1397	80	3.3	-	-	-	-
Sweden	210	178	32	2.3	46	40	6	0.5	186	154	32	2	56	49	7	0.6
UK	2173	1778	395	3.6	886	715	171	1.5	2201	1811	390	3.5	765	623	142	1.2
Ukraine	2684	2584	100	5.7	1965	1907	58	4.1	2546	2432	114	5.6	1668	1611	57	3.7
total	12243	12420	1567	106.4	6642	5983	659	5.7	11782	11899	1491	103.1	6058	5451	607	47.8
average	556.5	564.5	71.2	4.8	301.9	272.0	30.0	2.3	535.5	540.9	67.8	4.7	275.4	247.8	27.6	2.2

Source: EUREG, KRN, IARC, EUROSTAT

Tab. IV. Age-specific incidence rate of laryngeal cancer in Europe in 2002

	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+
both	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	3.1	5.3	7.9	7.0	8.5	6.0	6.4	5.3
male	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.7	2.1	6.5	16.5	25.5	30.6	33.9	29.5	27.9	23.7	19.7
female	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.9	1.8	2.2	2.7	2.6	1.8	1.8	1.7	2.4

Source: EUREG

Tab. V. Age-specific mortality rate of laryngeal cancer in Europe in 2002

	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85+
both	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.4	3.7	6.2	7.2	8.6	7.6	7.7	8.2	7.3
male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.7	7.2	12.5	14.7	18.5	16.9	18.1	22.9	20.4
female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.7	1.0	1.1	1.4	1.4	0.8	2.8

Source: EUREG

Tab. VI. Incidence and mortality of laryngeal cancer in European Union and Other European Countries, crude rate (CR), age-standardized rate in 2012.

AREA	INCIDENCE					MORTALITY				
	BOTH	MALE	FEMALE	CR	AR	BOTH	MALE	FEMALE	CR	AR
European Union (27)	27955	24851	3104	5.6	4.4	12043	10768	1275	2.4	1.8
Other European countries	11946	11130	816	3.8	4.4	7723	7301	422	2.4	2.4
Europe	39901	35981	3920	4.7	4.4	19766	18069	1697	2.4	2.1
Poland	2234	2057	308	5.8	5.9	1488	1307	181	3.9	3.2

Source: IARC, EUROSTAT

over 40 years old and finally peaked in subjects of 60-75 years (Tab. 4). According to EUREG, the patterns of age-specific incidence rate are very similar between men and women in the analyzed group of 21 European countries, also for Poland.

Mortality

A total of 18,069 cases died from laryngeal cancer in Europe in 2012, accounting for 1.85% of all cancer deaths. Among the patients aged 0-74 years the cumulative mortality rate was 1.4% (Tab. 5). According to IARC, the highest age-standardized mortality rate in 2012 was in Bulgaria – 4.5/100 000 and the lowest age-standardized rates were observed in Austria - 1/100 000, Iceland - 0/100 000, Scandinavia – 0.4/100 000, UK – 0.9/100 000. Male laryngeal cancer is significantly more common in men and is one of the cancers with the highest variations in mortality across all European countries [11] (Tab. 3).

Age-specific mortality

The laryngeal cancer mortality is relatively low in subjects under 40 years old. The rate dramatically increased in patients over 40 years old, reaching its peak in subjects over 85 years old (Tab 5). The patterns are very similar between men and women in Poland and most of other European countries - as in the case of incidence rate, the mortality rate for men is higher than for women (according to EUREG).

Incidence and mortality of laryngeal cancer in EU and countries from outside the community

The incidence and mortality rates of laryngeal cancer in the European Union were higher relative to the countries from outside the community in 2012. This was related with the population of those regions: the population of EU is 1.5 times higher than the population of other European countries together. Interestingly, the crude incidence rate in the European Union is noticeably higher than the same indicator in other European countries, i.e. 5.6/100 000 (EU) vs. 3.8/100 000 (other countries).

The crude mortality rate is the same for EU and for countries from outside the EU, i.e. 2.4/100 000. The age-standardized incidence rate is the same for EU and other European countries, i.e. 4.4/100 000. The age-standardized mortality rate is higher in the rest of Europe, i.e. 2.4/100.000, as compared to 1.8/100 000 for EU. Poland has a much higher value of the indices mentioned above. Poland has a crude incidence rate similar to that for EU countries (5.8/100 000) but age-standardized rates even higher than those for countries from outside the EU (Tab. 6).

DISCUSSION

In this article we presented and estimated the number of new cases and deaths of laryngeal cancer in 2002 and 2012 in 22 European countries with a special regard to Poland. There are no data for other large European countries due to the fact that they are not collected centrally, only regionally - consequently they are not achievable. Based on any available literature we can validate the results of our analysis concerning the decrease in both the incidence and mortality rates of laryngeal cancer in the last decade in most of the European countries [5, 6, 7, 15, 16]. However, it is worth noticing that in some countries like France, Italy, and Spain, in the last decade, the studies have shown a significant reduction in those rates in men and an insignificant increase in women [7, 17-19], probably due to the human papillomavirus which is becoming one of the main risk factors related to this pathology [20-23].

To summarize, this work presents basic data on the incidence of laryngeal cancer within Europe, especially useful for public-health policy and scientific research. Our calculations showed the highest incidence rates for the Balkans and Eastern European countries. Referring to the literature, this concerns also South Europe (Spain, France, Italy), Serbia, Turkey, Hungary (for men) and Albania (for women) [3, 24-26]. Poland follows the European trends in incidence and mortality of laryngeal cancer, showing rates characteristic for the Central and Eastern Europe.

CONCLUSION

Our analysis suggests that despite a slight decrease in the incidence and mortality of the laryngeal cancer, it is still

a pathology predominant in the head and neck region in the European population, which affects the quality of life of patients in the whole Europe.

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Corresponding author: Małgorzata Wierzbicka; Klinika Otolaryngologii i Onkologii Laryngologicznej ul. Przybyszewskiego 49, 60-355 Poznań; e-mail: otosk2@ump.edu.pl

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