Trends in Laryngeal Cancer Incidence in a Health Area Between 2007 and 2013

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Abstract
Objective: Our aim was to study the trend between 2007 and 2013 in the incidence of larynx cancer in a health district of 300,000 inhabitants.

Material and method: With information from the hospital cancer registry for the reference health area, we calculated the incidence and subsequently performed a joinpoint regression using specific software.

Results: We found a statistically-significant downward trend with an annual percentage change of −10.83 LC 95% (−16.85, −4.40) between 2007 and 2013.

Conclusions: We found that the tendency of incidence in larynx cancer decreased, mainly in males, where the results were statistically significant. These results should encourage continuing prevention of smoking and alcohol consumption.

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PALABRAS CLAVE
Cáncer; Laringe; Incidencia; Tendencia; Factores de riesgo

Tendencia de la incidencia del cáncer de laringe en un área sanitaria, entre los años 2007 y 2013

Resumen
Objetivo: Estudiar la tendencia de la incidencia entre 2007 y 2013 del cáncer de laringe de un área sanitaria de 300.000 habitantes.

Material y método: Con los datos del registro de cáncer del hospital de referencia del área sanitaria, se ha calculado la incidencia y posteriormente se ha hecho una regresión utilizando el programa informático joinpoint.
Introduction

This pathology represents around 1%–2% of all tumours diagnosed worldwide, and is most frequently observed in males. According to World Health Organisation data, cancer in this location ranks as eleventh out of all possible locations. During recent years, there appears to have been a downward trend in the incidence of malignant tumours in this location in developed countries, essentially in men, as a consequence of major anti-smoking and anti-drinking campaigns. However, other possible risk factors exist, such as the human papillomavirus, which may very likely impede the continual downward trend, if measures are not taken in this regard, bearing in mind the major personal suffering and financial cost involved. We therefore believe it is highly important to exhaustively control both the incidence and trend with regard to this pathology; in order to objectively quantify what we can qualify as a major health problem.

Material and Methods

Laryngeal cancer cases with codes CIE-O: 32 were used (all anatomopathological type cases were selected) taken from the register of Health Area III in Saragossa, the geographical framework of which corresponds to 46% of the province’s population, including the rural and urban area, and which as a whole has approximately 300 000 inhabitants. The male/female ratio for Saragossa Area III as a whole is 1.07 in favour of the former. This is an ageing population, with a mean age of 42.38 if both sexes are taken into consideration, according to data from the National Institute of Statistics, for half of the period studied.

In 2009, in a study performed on a representative sample of the population of Saragossa Area III, the prevalence of smoking was estimated at 30.6%. Although we do not have data concerning the prevalence of mouth and neck infection from precursor variants of HPV cancer in our population, a study carried out in the North of Spain between 1990 and 2009, which studied HPV infection in oropharyngeal squamous cancers, demonstrated a low prevalence of this cancer although it referred to an increase in the same, from 1.8% in the period from 1990–1999 to 6.1% of cases diagnosed between 2000 and 2009. Other works estimate that there is a worldwide upward trend of HPV and this infection could be an important risk factor for cancers affecting the head and neck.

The method we used was the calculation of laryngeal cancer rates adjusted to the world population by age and sex. This adjustment eliminates possible bias secondary to the ageing of the population studied. The large sample also offsets secondary bias against population movements. The Joinpoint Regression method was then used with software provided by the US National Institute for Cancer, to calculate cancer trends. This is a Poisson segmented regression method which, by using the years studied as the independent variable and the rates adjusted to the world population as the dependent variable is able to recognise the changes in incidence trends. Trend data are represented in percentages, called APC (annual percent change), which is the standard method applied when making comparisons between different geographical areas. The said percent changes are accompanied by confidence limits so that data obtained may be extrapolated.

Results

By observing the laryngeal cancer impact measurements (Table 1) we can observe the variation between 2007 and 2013 in both men and women. In 2007 the incidence of laryngeal cancer in men was 29.67 (adjusted to 18.09) cases per 100 000 inhabitants; and in women 1.96 (adjusted to 5.8) cases per 100 000 inhabitants. In 2008 it was 24.48 in men (adjusted to 13.4) cases per 100 000 inhabitants; and 3.14 in women (adjusted to 1.96) cases per 100 000 inhabitants. In 2009 it was 30.42 in men (adjusted to 20.16) cases per 100 000 inhabitants; and 1.25 in women (adjusted to 0.85).

Table 1  Cases, Incidence Rates (IR) and Adjusted Rates (AR) (Incidence and Adjusted Rates Are Expressed in Cases per 100 000 Inhabitants and Per Year).

<table>
<thead>
<tr>
<th>Year</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>I.R.</td>
<td>A.R.</td>
</tr>
<tr>
<td>2007</td>
<td>40</td>
<td>29.67</td>
</tr>
<tr>
<td>2008</td>
<td>33</td>
<td>24.48</td>
</tr>
<tr>
<td>2009</td>
<td>41</td>
<td>30.42</td>
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<td>2010</td>
<td>37</td>
<td>27.45</td>
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<tr>
<td>2011</td>
<td>24</td>
<td>17.89</td>
</tr>
<tr>
<td>2012</td>
<td>27</td>
<td>20.8</td>
</tr>
<tr>
<td>2013</td>
<td>18</td>
<td>13.2</td>
</tr>
</tbody>
</table>
Trends in Laryngeal Cancer Incidence in a Health Area Between 2007 and 2013

Figure 1  Trend in laryngeal cancer in women (ordered by: incidence adjusted to world population; abscissa: year).

Figure 2  Trend in laryngeal cancer in men (classified by: world population-adjusted incidence; abscissa: year).

cases per 100,000 inhabitants. In 2010 it was 27.45 in men (adjusted to 15.43) cases per 100,000 inhabitants; and 1.25 in women (adjusted to 0.85) cases per 100,000 inhabitants. In 2011 it was 17.89 in men (adjusted to 10.01) cases per 100,000 inhabitants; and 1.25 in women (adjusted to 0.85) cases per 100,000 inhabitants. In 2012 it was 20.08 in men (adjusted to 11.98) cases per 100,000 inhabitants; and 1.25 in women (adjusted to 0.85) cases per 100,000 inhabitants. In 2013 it was 13.2 in men (adjusted to 6.78) cases per 100,000 inhabitants; and 1.96 in women (adjusted to 0.74) cases per 100,000 inhabitants.

95% of tumours registered were squamous carcinomas. Despite the fact that the hospital tumours registry includes all cases regardless of their anatomopathological characteristics, when calculating incidence rates and therefore disease trends, histological types not related to alcohol or tobacco consumption were not taken into account.

In the case of women, (Fig. 1) the trend is slightly downward, with no statistical significance, with an annual percent change of $-0.13$ LC 95% ($-0.80, 0.60$).

Date from the men (Fig. 2), show a clearly negative trend, which is statistically significant, with an annual percent change of $-12\%$ LC 95% ($-21.78, -2.77$).

If we analyse both genders (Fig. 3) jointly there is a statistically significant downward trend, with an annual percent change of $-10, 83, 95\%$ CL ($-16.85, -4.40$).
Discussion

The incidence of laryngeal cancer is falling in more developed countries, probably due to two factors. Firstly, due to campaigns promoting the reduction in tobacco and alcohol consumption and secondly due to the identification and monitoring of lesions from the human papillomavirus which is becoming one of the main risk factors related to this pathology. 

In the USA there has been a downward trend in the incidence of this type of cancer over the last decade. 

In Europe, there is an interesting division between countries in Eastern Europe, with lower economic potential and fewer preventative measures, and those in Western Europe.

In England, there was a downward trend in both males and females between 1985 and 2004. In France, between 1980 and 2004, an increase was found in the number of women with this disease and a reduction in the number of men. In Italy between 1986 and 1997 there was a significant downward trend in men and an upward trend in women. In Finland between 1956 and 1995 there was a reduction of 6.5 per 100,000 in 1956 to 3.5 per 100,000 between 1986 and 1995 in men, whilst in women the trend was constant, at around 0.3 per 100,000 inhabitants. In Spain, a study carried out between 2008 and 1998 using 7 population registers showed a significant reduction (APC = -4.2%) in the case of men and an insignificant increase in the case of women. In Tarragona between 1980 and 1996 there was no increase in laryngeal cancer in either men or women. In countries in Eastern Europe, such as Poland, a study between 1991 and 2001 demonstrated a significant increase in women with a ratio of M:F=8:1; and in Lithuania between 1978 and 2001, there was an increase in laryngeal cancer in men and a faster increase of the same in women. 

In Asia, we focus on an important work which examines the pattern of the incidence between 2003 and 2007, using 32 tumour registries where the incidence remains stable during this period. In India there has been an overall downward trend of head and neck cancers over a period of 11 years, particularly in urban women and rural men.

In our study we observed a downward trend in both women APC = -0.13%, and men APC = -12.80%, with statistical significance in the latter. These data are similar to those found in developed countries, attributed to the anti-smoking and anti-alcohol campaigns. In fact, in the population studied, several campaigns for the prevention of these risk factors have been running since the eighties, and have increased in intensity up to the present day. These campaigns are the result of the development of the national anti-drug plan, which now in our autonomous community translates as the II Regional Plan on Drug Dependencies and other Addictive Behaviour. Several organisations have been involved in the anti-alcohol and anti-tobacco consumption campaigns, including the health organisations belonging to the Ministry of Health and the Government of Aragon, as well as local administration and also the association for the prevention of smoking in Aragon which has offered free help and guidance since 1998 for people wishing to give up smoking. It has promoted several informative campaigns in this regard.

Despite such encouraging results, we believe a good understanding of incidence and trends of this with regard to laryngeal cancer is vital, since specialist international references indicate the influence of HPV infection as a possible risk factor in the development of laryngeal cancer, as well as an increase in the prevalence of this infection worldwide. We consider that the early detection of lesions originating from this infection and susceptible to becoming malignant is of paramount importance.
Conclusion

We noted a downward trend in laryngeal cancer in a health area of 300,000 inhabitants, mainly in males, where the data were statistically significant. These results should encourage the continuation of anti-alcohol and anti-tobacco campaigns.

We believe it is vitally important to continue observing the incidence of cancer in this location since, although its downward trend during the period studied has been confirmed and is secondary to the reduction in alcohol and tobacco consumption, specialised references suggests a possible future increase in laryngeal cancer secondary to the increase in the prevalence of the human papillomavirus.

Conflict of Interests

The authors have no conflict of interests to declare.

References