Epidemiology of Esophageal Cancer in Yanting - Regional Report of a National Screening Programme in China

Xiao Wang¹, Jin-Chuan Fan¹*, An-Rong Wang¹, Yue Leng³, Jun Li², Yu Bao¹, Ying Wang¹, Qing-Feng Yang², Yu Ren²

Abstract

Background and Objectives: Yanting in Sichuan Province is one of the highest risk areas of esophageal cancer (EC) in the world. We here summarize the epidemiology of EC in Yanting using data from the national screening programme during 2006-2011. Methods: Random cluster sampling was used to select a proportion of natural villages from six towns in Yanting, and residents aged 40-69 years old were invited for screening. Participants were screened using endoscopy with iodine staining and then confirmed by histological examinations. Results: The overall detection rates of low-grade hyperplasia (LH), moderate hyperplasia (MH), high-grade hyperplasia (HH), carcinoma in situ (CIS), intramucosal carcinoma (IC) and invasive carcinoma (INC) were 5.33%, 1.28%, 0.68%, 0.15%, 0.06% and 0.29%, respectively. The detection rates of LH, MH, HH and INC increased with age, reaching the peak among those aged 60-65 years, and the prevalences of LH and MH were higher among men than among women. In addition, the detection rates of hyperplasia were much higher in mountainous than in hilly areas. Conclusions: Among the high risk population, there are a great number of people with early-stage EC or precancerous conditions who do not have presenting symptoms. In particular, the elderly, men, or those living in mountainous areas are the most vulnerable population. It is therefore important to reinforce health education and screening services among such high risk populations.

Keywords: Esophageal cancer - screening assessment - Yanting, China - high risk population

Introduction

Esophageal cancer (EC) is one of the most common malignant tumors, with both a high incidence and mortality rate (Ministry of Health Disease Prevention and Control Bureau, 2011). According to the Chinese national annual cancer registration reports in 2011, the incidence rate of EC was 20.85/100,000, which ranks as the sixth most common malignant tumor in China (National Cancer Center, 2012). Yanting in Sichuan Province is one of the highest risk areas of EC in the world (Zou et al., 2007; Li et al., 2009; Zhong et al., 2011). Surveillance data suggested that in 2008, the incidence and mortality rates of EC in Yanting were 92.81/100,000 and 77.50/100,000, respectively (Hao et al., 2012). This mortality was 3.38 times of the average mortality rate of EC in Sichuan Province during the same period (Liu et al., 2011), making EC the most common cause of cancer death in Yanting. Although EC has been a major public health burden in Yanting, the prevalence and its distributions are relatively underreported.

Since 2006, a government-backed project aimed at promoting early diagnosis and treatment of cancer was launched by the Chinese Ministry of Health (MOH), and has been providing free cancer screening service among high risk populations. The present paper aims to summarize the results of this EC screening program in Yanting from 2006 to 2011, and provide epidemiological evidence for better implementing early diagnosis and treatment of EC in the area.

Materials and Methods

Participants

Residents from the six towns (Linnong, Gaodeng, Jinji, Xize, Lianghe and Fuyi) with the highest incidence of EC in Yanting were the targeted screening population. Random cluster sampling method was used to select a proportion of natural villages in each town, and residents aged 40-69 years old in the selected villages were invited for screening. The whole screening lasted from May 2006 to July 2011, including screening in 7 villages from Linnong and 14 villages from Gaodeng from 2006 to 2008, screening in 19 villages from Jinji in 2009, screening in 15 villages from Xize, 18 villages from Lianghe and 24 villages from Fuyi during 2010-2011.

¹Sichuan Cancer Hospital & Institute, Chengdu, ²Yanting Cancer Institute, Mianyang, Sichuan, China, ³Department of Public Health and Primary Care, University of Cambridge, UK  *For correspondence: fanjch@hotmail.com
A total of 15065 people were screened between May and July 2011, including 2449 from Linnong, 3599 from Gaodeng, 2006 from Jinji, 1895 from Xize, 2119 from lianghe and 3001 from Fuyi. These included 7685 men and 7380 women, with an average age of 53.67±8.05 years old (Table 1). The overall detection rates of LH, MH, HH, CIS, IC and INC were 5.33% (n=803), 1.28% (n=193), 0.68% (n=102), 0.15% (n=22), 0.06% (n=9) and 0.29% (n=43), respectively.

### Table 1. Age and Sex Distributions of the Prevalence of Different Diagnosis

<table>
<thead>
<tr>
<th>Town</th>
<th>Age</th>
<th>LH</th>
<th>MH</th>
<th>HH</th>
<th>CIS</th>
<th>IC</th>
<th>INC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linnong</td>
<td>40-45</td>
<td>81(2.90)</td>
<td>12(0.43)</td>
<td>4(0.14)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>10(0.37)</td>
</tr>
<tr>
<td></td>
<td>45-50</td>
<td>71(3.19)</td>
<td>14(0.63)</td>
<td>6(0.27)</td>
<td>3(0.13)</td>
<td>1(0.04)</td>
<td>40(1.88)</td>
</tr>
<tr>
<td></td>
<td>50-55</td>
<td>163(5.66)</td>
<td>46(1.60)</td>
<td>11(0.38)</td>
<td>3(0.10)</td>
<td>3(0.10)</td>
<td>100(3.50)</td>
</tr>
<tr>
<td></td>
<td>55-60</td>
<td>218(7.16)</td>
<td>48(1.58)</td>
<td>28(0.92)</td>
<td>5(0.16)</td>
<td>5(0.10)</td>
<td>100(3.50)</td>
</tr>
<tr>
<td></td>
<td>60-65</td>
<td>198(7.72)</td>
<td>53(2.07)</td>
<td>33(1.29)</td>
<td>7(0.27)</td>
<td>5(0.20)</td>
<td>120(4.50)</td>
</tr>
<tr>
<td></td>
<td>65-70</td>
<td>76(4.87)</td>
<td>20(1.28)</td>
<td>18(1.18)</td>
<td>4(0.26)</td>
<td>5(0.32)</td>
<td>100(6.00)</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>0.14</td>
<td>0.6</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Results are presented as number (prevalence %)

### Discussion

Yanting in Sichuan is a high prevalence area for EC in China. After 40 years’ prevention and control work of EC, the incidence and mortality rates of EC in Yanting have both declined, though the incidence is still relatively high compared to other parts of the world (Chen et al., 2005; Hao et al., 2012). The detection rates of LH, MH, HH and INC were highest among those aged 60-65 years old, and the prevalence of LH and MH were higher among men than among women. This screening suggested that the detection rates of EC and precancerous conditions (HH and CIS) were 0.35% and 0.83% among this high risk population aged 40-69 years old. These are relatively lower than some of the detection rates found in other populations. Liu et al. (2010) found a detection rate of 0.59% and 1.37% for EC and precancerous conditions among 6048 high risk population aged 40-69 in Linzhou, Henan. Similarly, the detection rates of EC and precancerous conditions were found to be 0.59% and 1.01% among 6189 high risk population in Feicheng (Zhao...
changes. Figure 2 shows the time trend of the detection rates of different esophageal pathological conditions. The detection rates of LH, MH and HH were lower than people from Linnong and Gaodeng, the target town from 2006 to 2008. Therefore, the differences we found in detection rates may be a result of improvement in screening and diagnostic techniques. Besides, six years may have been too short a period to observe a notable trend, and more time is needed to confirm the time trend. There are also geographical variations in the detection rates of LH, MH and HH. The town with the highest and lowest detection rates came from mountainous and hilly areas, respectively. This might be resulted from the poor living conditions among residents in mountainous areas. As mountainous areas are usually less accessible than hilly areas, residents from mountainous areas tend to consume more preserved food but less fresh vegetables, fruits and meat. Research suggested that consumptions of fresh vegetables, fruits and meat are protective factors of EC while overconsumption of preserved food leads to increased risk of EC (Yamaji et al., 2008; Kamangar et al., 2009). This may help to explain the geographical variations. Table 2 summarizes the time and geographical distributions of the detection rates.

The ultimate goal of EC management is to reduce incidence and mortality rates, and to improve patients’ prognosis and quality of life. Currently, a majority of patients who present with symptoms are already at a mid- or late-stage. Many of them can not endure surgeries and 5-year survival rate is lower than 10%, while 10-year survival rate can reach 95% among those who have had surgery at an early stage (Gary et al., 2001; Zhong et al., 2011). The current study suggested that among high risk population, there are a great number of people with early-stage EC or precancerous conditions who do not have presenting symptoms. In particular, the elderly, men, or those living in mountainous areas are the most vulnerable population. Therefore, it is crucial to reinforce health education in high risk areas and increase people’s awareness of EC. Also, physical examinations on a regular basis would help to detect early-stage esophageal problems and is thus important for the secondary prevention of EC.

Table 1 shows the age and sex distributions of different diagnosis. The detection rates of LH and MH among men were much higher than those among women, while the differences on the rates of EC and precancerous conditions were not statistically significant. This might be due to the small number of cases of EC and precancerous conditions and thus the limited power. The sex ratios (men: women) of the detection rates of EC and precancerous conditions were 1.46:1 and 1.15:1, respectively, similar to reports from Linzhou and Cixian (Chen et al., 2008; Liu et al., 2010). Figure 1 shows the age distributions of the detection rates of different esophageal conditions. The detection rates of LH, MH, HH and INC increased with age, reaching the peak between 60-65 years old. This suggested that the elderly population should be a target population in primary and secondary prevention of EC.

Previous epidemiological studies (Chen et al., 2005; Li et al., 2010) showed that the incidence and mortality rates of EC have been declining in the past few years. However, our study did not support a declining trend in the detection rates of different esophageal pathological changes. Figure 2 shows the time trend of the detection rates of different diagnosis. The detection rates of LH, MH and HH were higher during 2009-2011 than during 2006-2008. From a geographical perspective, the target screening population during 2009-2011 came from Jinji, Xize, Lianghe and Fuyi, where the detection rates of LH and MH were lower than people from Linnong and Gaodeng, the target town from 2006 to 2008. Therefore, the differences we found in detection rates may be a result of improvement in screening and diagnostic techniques. Besides, six years may have been too short a period to observe a notable trend, and more time is needed to confirm the time trend. There are also geographical variations in the detection rates of LH, MH and HH. The town with the highest and lowest detection rates came from mountainous and hilly areas, respectively. This might be resulted from the poor living conditions among residents in mountainous areas. As mountainous areas are usually less accessible than hilly areas, residents from mountainous areas tend to consume more preserved food but less fresh vegetables, fruits and meat. Research suggested that consumptions of fresh vegetables, fruits and meat are protective factors of EC while overconsumption of preserved food leads to increased risk of EC (Yamaji et al., 2008; Kamangar et al., 2009). This may help to explain the geographical variations. Table 2 summarizes the time and geographical distributions of the detection rates.

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References


