

## RESEARCH COMMUNICATION

# Obviously Increasing Incidence Trend for Males but Stable Pathological Proportions for Both Genders: Esophageal Cancer in Zhongshan of China from 1970-2007

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### Abstract

**Objectives:** To analyze esophageal cancer incidence and pathological data of Zhongshan in China in 1970-2007, and to provide scientific information for its prevention and control. **Methods:** From Zhongshan Cancer Registry esophageal cancer incident and pathological data were obtained. Pathological proportions and trends were calculated and analyzed. **Results:** Although there was a continuously and obviously increasing trend for male incidence rates in 1970-2007 in Zhongshan, squamous cell carcinoma (SCC) and adenocarcinoma (AD) incident proportions during 1990-2007 remained relatively stable. Moreover, SCC was the major pathological type, accounting for 70.6 percent of all new cases, while AD were relatively few and accounted for only 2.66 percent throughout the period. **Conclusion:** The male esophageal cancer incident pattern in Zhongshan in 1970-2007 was quite different from most other domestic areas. The data suggest that etiological analysis should be enhanced for improved control in Zhongshan.

**Keywords:** Esophageal cancer - incidence - pathology - trends - Zhongshan, China

*Asian Pacific J Cancer Prev*, 13, 1783-1786

### Introduction

Recently esophageal cancer epidemiology had changed remarkably, its incidence and mortality had decreased globally, while its AD incidence had increased rapidly and SCC incidence descended or kept stable in some countries (such as in USA and some European countries) or populations (such as American non-Hispanic whites and Hispanic Americans), AD had even become its major pathological type (DeMeester, 2006; CANCErMondial, 2008; Jemal et al., 2008). Its incidence and mortality in China had also declined (Sheng et al., 1998; Wang et al., 2002; Chinese National Office for Cancer Prevention and Control et al., 2008, 2009, 2010; Bill et al., 2011; Wei et al., 2011), but until now there were still no any reports on its population-based incident pathological proportions and their trends, not to mention reports on its different pathological type incident rates and trends (Fang et al., 2008). Moreover, its male incidence rates in Zhongshan had risen remarkably in 1970-1999 (Wei et al., 2003), which was not the situation in most other domestic regions. Hence, for providing information for its prevention and control in China, and also for ascertaining if its male incidence rates in Zhongshan kept rising or not, its incidence in 1970-2007 and pathological proportions in 1990-2007 in Zhongshan were analyzed.

### Materials and Methods

#### *Sources of incident data*

Esophageal cancer incidence data came from Zhongshan Cancer Registry. Since 1970, Zhongshan Cancer Registry has been recording, collating, storing and notifying all cancer incidence and mortality data of Zhongshan registered residents. The registration was done through a three level network, which was called Zhongshan Three Ranks Cancer Prevention and Control Network, covered all the corners of Zhongshan, lead by Zhongshan Cancer Research Institute, and composed by municipal hospitals, township health centers and community health service stations. The collected data were collated by experienced registrars and was of good quality and high credibility.

#### *Source of population data*

Zhongshan population data in 1970-2007 came from Zhongshan Statistical Bureau and Security Bureau. Age-specific population data of Zhongshan in 1970-1989 could be obtained, but not after 1990. Only could be got in 1990-2007 were its male and female population number, so its age-specific population data in 1990-2007 were obtained by calculating from the age-specific population proportions of 1990 (1990-1999) and 2000 (2000-2007)

in Zhongshan, when national population census were done. 1982 Chinese standard population and 1985 world standard population were used respectively when China and World age-standardized incidence rates were calculated.

#### Statistical indices and methods

Excel software was used to set up database and to do statistical analysis. Statistical indices included incident numbers, crude rates, age-specific rates, China and world age-standardized rates, pathological proportions and trends, increasing rate, average developing velocity, average increasing rate and APC. The statistical methods used here were the methods recommend by the Guideline for Chinese Cancer Registration (Chinese National Office for Cancer Prevention and Control et al., 2003).

## Results

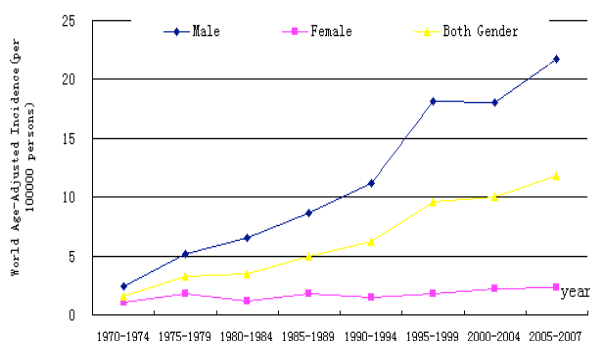
#### Incident general situation

There were 2,494 new esophageal cancer cases in Zhongshan in 1970-2007, 2,154 of them were male and 340 female. Its incident number sex ratio was 6.34:1. Its male incidence crude rate, China and world age-standardized rates were 9.90/105, 9.44/105 and 12.44/105 respectively, female 1.57/105, 1.28/105 and 1.71/105 respectively, both gender 5.74/105, 5.18/105 and 6.82/105 respectively. Its youngest and oldest patients were 17 and 93 years old respectively, and its median and average incident age were 60 and 59.48 respectively.

Some 75.42 percent of new esophageal cancer cases with pathological diagnosis, and 24.54 percent with imaging diagnosis such as CT scan in Zhongshan in 1970-2007, while its pathological diagnosing proportion in 1970-1974 was very low, only 1.82 percent. After 1985, its pathological diagnosing proportions had increased gradually, more than 40 percent in 1985-1989, over 80 percent in 1990-1994, and more than 90 percent after 1995-1999.

#### Incidence trend

There were obviously and continuously ascending trends for its male and both gender world age-standardized incidence rates (Figure 1). Its male incident increasing rate, average developing velocity, average increasing rate and APC value were 2290.43 percent, 112.47 percent, 12.47 percent and 6.70 ( $P=0.0000$ ) respectively, and both gender



**Figure 1. Incidence Trend of Esophageal Cancer in Zhongshan in 1970~2007**

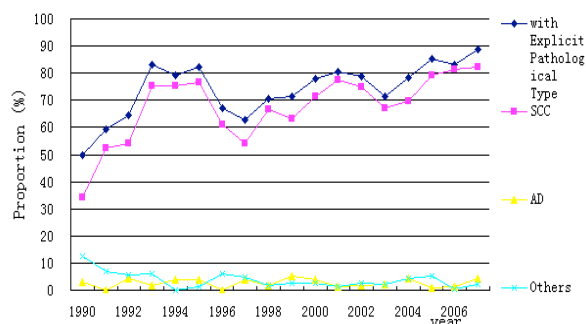
were 2808.84 percent, 113.30 percent, 13.30 percent and 5.46 ( $P=0.0000$ ) respectively in Zhongshan in 1970-2007.

#### Incident Proportions of its different pathological types

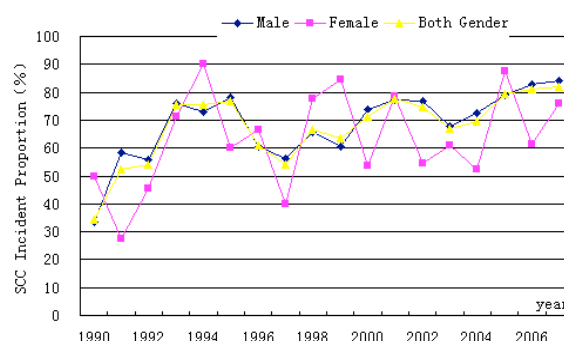
As its pathological diagnosing proportions before 1990 in Zhongshan were very low (less than 50 percent), it was hard to make comparison among the proportions of its different pathological types. It was until 1990 that comparison was possible. In Zhongshan in 1990-2007 there were total 1,956 new esophageal cancer cases (1,744 male, 212 female), 1,496 of them (1,341 male, 155 female) with explicit pathological diagnosis which accounted for 76.48 percent of all its new cases (76.98% male, 73.11% female), 1,380 of them (1,246 male, 134 female, sex ratio=9.30) with SCC which accounted for 70.55 percent of all its new cases (71.53% male, 63.21% female), 52 of them (41 male, 11 female, sex ratio=3.73) with AD which accounted for 2.66 percent of all its new cases (2.35% male, 5.19% for female), 64 of them (54 male, 10 female) with other pathological diagnoses (such as diagnosed only as carcinoma) which accounted for 3.27 percent of all its new cases (3.10% male, 4.72% female). SCC was its major pathological type in Zhongshan in 1990-2007 (Figure 2).

#### Incident Trend of its different pathological types

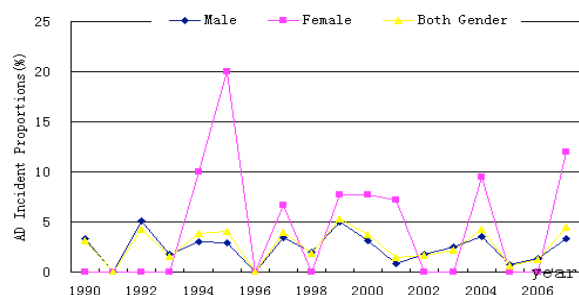
The proportions of its new cases with explicit pathological diagnosis and SCC increased rapidly in 1990-1994, the former ascended from 50 percent in 1990 to 80 percent in 1994, the latter up from 30 percent in 1990 to 75 percent in 1994, after 1994, both remained relatively stable. While the proportions with AD and other pathological types were lower and stable all along (Figure 2). Its SCC incident proportions increased in 1990-1994,



**Figure 2. Incident Trends of Different Esophageal Cancer Pathological Proportions in Zhongshan in 1990-2007**



**Figure 3. Trends of Esophageal SCC Incident Proportion in Zhongshan in 1990~2007**



**Figure 4. Trends of Esophageal AD Incident Proportion in Zhongshan in 1990-2007**

but stable thereafter no matter male or female (Figure 3). Its male AD incident proportions were relatively stable, but female fluctuated more in Zhongshan in 1990-2007 (Figure 4).

## Discussion

In 1985-1989 esophageal cancer pathological diagnosing proportion was less than 45 percent, but in 1990-1994 more than 80 percent in Zhongshan. Its causes may be that gastroscope was not used in major Zhongshan hospitals until 1990. Considering its pathological diagnosing proportions in Chinese selected urban and rural areas in 2005-2006 were lower than that of Zhongshan in 1970-2007 and much lower than that of Zhongshan in 2005-2006 (Chinese National Office for Cancer Prevention and Control et al., 2009, 2010), we can safely say that esophageal cancer incidence data in Zhongshan in 1970-2007 was of good quality and high credibility.

Its male incidence rates in Zhongshan had increased conspicuously and continuously in 1970-2007, but much lower and stable for female. This was consistent with the previous report by Wei et al. (2003) and the increasing trends of some countries such as male Netherlands, the Great Britain, Denmark, Japan and female Denmark, Norway, France and Holland (IARC, 2008), and few domestic regions such as Jinshan districts of Shanghai City (Gan et al., 2007) and Wuwei city of Gansu province (Luo et al., 2002), but not with the global trends and the decreasing trends of some countries such as male France, Korea, Australia and female Finland, USA, Australia, and the stable trends of some countries such as male Finland, Norway, Sweden, Ireland, USA, Canada and female Sweden, Ireland, the Great Britain, Canada and Japan, and the decreasing or stable trends of most domestic areas (Sheng et al., 1998; Wang et al., 2002; National Cancer Prevention and Control Office et al., 2008, 2009, 2010), especially high-risk areas such as Linzhou of Henan province (Cheng et al., 2008), Cixian of Hebei province (He et al., 2006) and Yangzhong of Jiangsu province (Guo et al., 2005; Wang et al., 2005).

Incident trends of its different pathological type worldwide had changed obviously. Its AD incidence rates in some countries such as USA and European countries or some populations such as American non-Hispanic Whites and American Hispanics had surged, even become its major pathological type, while its SCC incidence rates had decreased or kept stable (Pera et al.,

2005; DeMeester et al., 2006; Jemal et al., 2008). Trivers et al. (2008) reported in 1998-2003 its SCC incidence, which represented 83 percent of American population, had decreased 3.6 percent annually, while its AD incidence increased 2.1 percent annually. Esophageal AD incidence rose mainly in Whites or male American non-Hispanics population, while SCC incidence in most races/ethnics decreased. Bosetti et al. (2008) reported esophageal AD incidence in northern Europe had increased remarkably, and surpassed SCC incidence in Denmark and Scotland. Cook et al. (2009) reported esophageal SCC incidence in all races/ethnics of America had down in 1977-2005. Moreover, esophageal SCC incidence had down and AD incidence up in New Mexico of USA (Vega et al., 2010), central Switzerland (Schmassmann et al., 2009) and Holland (Crane et al., 2007).

There were no any reports on its population-based pathological proportions and their trends in China. Only had Fan et al. (2008) covered that esophageal SCC new cases, who were Beijing natives and treated by surgery in Beijing Tongren hospital, increased in 1982-2005, while AD new cases, who were Cixian natives and operated in Cixian People's Hospital of Hebei province and Beijing Tongren hospital respectively, increased too. The report by Fan YJ et al was hard to show if esophageal SCC and AD incidence in urban areas and AD incidence in rural areas had increased or not, as their research was not based on population data. Our research was based on population data, so could demonstrate if its SCC or AD incidence had increased or not in Zhongshan. We found that although there was an obviously and continuously increasing trend for its male incidence, its SCC and AD proportions kept relatively stable, and SCC was its major pathological type in Zhongshan in 1990-2007 all along. This was not the situation abroad especially in USA and European countries. It indicated that its male etiology in Zhongshan maybe different from that of USA and European countries. We did not use incidence rate to analyze its different pathological type trends, it was because 25 percent of its new cases in Zhongshan in 1990-2007 had no explicit pathological types. If incidence rate was used its incidence rates would be much lower than the actual rates.

## Acknowledgements

We would like to thank Ms Liu Jin for help in data collection.

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