RESEARCH ARTICLE

Comparing Survival of Oral Cancer Patients Before and After Launching of the Universal Coverage Scheme in Thailand

Waraporn Sungwalee[1], Patravoot Vatanasapt[2,3]*, Krittika Suwanrungruang[3], Supannee Promthet[1]

Abstract

Background: As the treatment modalities for oral cancer have been relatively consistent during the last two-decades, this study was conducted to compare survivals of oral cancer patients in Khon Kaen Province before and after the universal coverage scheme (UC) was launched in Thailand. Materials and Methods: The data were retrieved from the population-based cancer registry of Khon Kaen for oral cancer patients diagnosed during 1992-2001 (pre-UC), and 2004-2012 (post-UC). To compare survival of the two cohorts, Kaplan Meier and log rank tests were employed. Results: Of 1,196 patients, 65% were females and the median age was 65 years. The most common primary sites were lip (31.0%), tongue (29.9%), and buccal mucosa (14.6%). The proportion of early stage cancer increased from 20.4 % in pre-UC to 41.3% in post-UC. The overall 5-year survival rate was 36.5% (95% CI =32.6-40.9) for pre-UC and 32.4% (95% CI = 28.8-36.4) for post-UC. The declining survival was mainly due to an increasing proportion of tongue cancer. However, no survival improvement was demonstrated on subgroup analysis of the tongue cancer patients. Conclusions: After the universal coverage scheme had been launched, early diagnosis increased, but no significant gain in survival for oral cancer patients was achieved.

Keywords: Survival - oral cancer - universal coverage scheme - Thailand

Introduction

Cancer is a major health problem worldwide. Up to 15 million newly diagnosed cancer cases and 10 million cancer death are expected in the year 2020 (Ferlay, 2012). While the mortality of cancer is declining around the world, it was increasing in the South East Asia, where access to health care system is still inadequate in most developing countries (World Health Organization, 2015).

In Thailand, cancer is the leading cause of death, with the mortality rate for all cancers of 93.7 per 100,000 person-year (Ferlay, 2012). Besides the advanced technology for diagnosis and treatment of cancer, access to health care is a crucial factor determining success of cancer control (World Health Organization, 2015). In 2002, Thailand launched the universal coverage scheme aiming to expand health insurance for all Thai citizens. As a result, the proportion of Thai population with health care insurance coverage increased from 69 percent in 2001, to 95 percent in 2003, and currently covers more than 99 percent (Suntorntham et al., 2012; Tangcharoensathien et al, 2009). This transition period is an ideal condition to determine the impacts of access to health care on cancer control. Although the treatment outcomes could be confounded by the time, in order to minimize the bias on historical control, the oral cancer was selected because the mainstay of treatment is surgery and radiation with limited uses of chemotherapy. In addition, the treatment protocol of oral cancer was relatively consistent during the last two decades.

The purpose of this study was to compare the survivals of oral cancer patients between before and after the universal coverage scheme was launched in Thailand.

Materials and Methods

The data from the population-based cancer registry of Khon Kaen Province was retrieved for the individuals of all ages who were diagnosed as oral cancer, which included cancer of the lips, tongue, gum, palate, buccal mucosa, and retromolar trigone (International Classification of Disease for Oncology (ICD-O) of C00 - C06). Those who had multiple primaries were excluded in the analysis. The first cohort, so called pre-universal coverage (pre-UC), was those who were diagnosed between January 1992 - December 2001. The second cohort, so called post-universal coverage (post-UC), was those who were diagnosed between January 2004 - December 2012. The gap years of 2002 - 2003 was omitted from the analysis to allow a settlement period of the health care system for

[1]Department of Epidemiology, Faculty of Public Health, [2]Department of Otorhinolaryngology, [3]Cancer Unit, Srinagarind Hospital, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand *For correspondence: patvat@kku.ac.th

the universal coverage scheme.

A process of the population-based cancer registry of Khon Kaen was carried out by active registration basis according to the standard guideline of the International Agency for Research on Cancer and the International Association of Cancer Registries (standard methods of IACR) describing elsewhere (Esteban, 1995; Vatanasapt, 2011). The data from this cancer registry was also published in the cancer incidence in five continents (Forman et al., 2014)

Survival analysis was performed using Kaplan-Meier's method. The log-rank test was used for comparisons. All analysis was performed using the STATA software ver.10.

Results

A total of eligible 1,196 oral cancer cases were included in the analysis, with mean age was 65 year-old (range 9 - 97), and 65 percents were female. The most common subsites were lip (31.0%), followed by tongue (29.9%), and buccal mucosa (14.6%). About 65% were diagnosed in advanced stage. The overall survivals at 1, 3, and 5 years were 58.9 (95%CI 56.0 - 61.6), 41.5 (95%CI 38.7 - 44.3), and 35.4 (95%CI 32.6 - 38.2) respectively. The median survival time was 1.7 years (95%CI 1.36 - 1.94).

In comparison between pre-UC and post-UC, the age of the patients in both cohorts were similar, with females as a majority. However, The proportion of tongue cancer increased, becoming the most common subsite in post UC. The quality of information, i.e. cancer staging, was found to be improved although still not complete, where the proportion of unknown stage was reduced more than half, and histological verification increased more than 10 percents. By excluding unknown stage, the proportion of early stage cancer (stage I and II) increased from 20.4% to 41.3% (Table 1).

Interestingly, the overall survival of post-UC was lower than pre-UC (Table 2), but not statistically significant, with the median survival time = 1.31 years (95%CI 1.09 - 1.75) and 1.7 years (95%CI 1.36-2.46), respectively (Figure 1). The overall survival was found to decline in both young and old age groups, and in all stages of cancer. The patients undergoing radiation therapy was found relatively decreasing in post UC, while surgery and chemotherapy remained unchanged (Table 3). Since the proportion of the tongue cancer increased on the post-UC, we further analyzed to compare survivals of the tongue cancer between pre-UC and post-UC, and found no significant change (data not shown).

Table 1. Characteristics of the Oral Cancer Patients Comparing before and after UC

Variables	Pre-UC Number (percents) N=590	Post-UC
Number (percents) N=606		
Female	413 (70)	365 (60.2)
Age>60 years	393 (66.6)	407 (67.1)
Subsite		
- Lip	194 (32.9)	177 (29.2)
- Tongue	145 (24.6)	213 (35.2)
- Buccal mucosa	97 (16.4)	78 (12.9)
- Gum	54 (9.2)	63 (10.4)
- Floor of mouth	30 (5.1)	23 (3.8)
- Palate	29 (4.9)	27 (4.5)
- Retromolar	10 (1.7)	5 (0.8)
- Others	31 (5.3)	20 (3.3)
Stages		
- Stage I	20 (3.4)	95 (15.7)
- Stage II	19 (3.2)	81 (13.4)
- Stage III	32 (5.4)	89 (14.7)
- Stage IV	120 (20.3)	161 (26.7)
- Unknown	399 (67.6)	178 (29.5)
Basis of Diagnosis		
- Histological Verification	487 (82.5)	564 (94.4)
- Death certificate only	6 (1.0)	2 (0.3)

Table 2. Comparison between 1-year / 3-year and 5-year survivals between pre-UC vs. post-UC

≈	Pre-UC (1992-2001) (N=590)		Post-UC (2004-2012) (N=606)	
	Survival (percent)	95% CI	Survival (percent)	95% CI
1	59.2	55.2-63.6	55.7	51.9-59.9
3	42.3	38.3-46.8	38.8	35.1-42.9
5	36.5	32.6-40.9	32.4	28.8-36.4

Table 3. 5-year Survival of Oral Cancers in Pre-UC vs. Post-UC by Various Factors

| Factor	Pre-UC		Post-UC	
	number	5-year Survival (percent(95%CI)	number	5-year Survival (percent(95%CI)
Age				
< 60 years	195	38.8(32.2-46.7)	197	31.8(25.8-39.3)
≥60 years	389	34.9(30.2-40.4)	407	32.7(28.4-37.7)
Stage				
I	20	73.7(56.3-96.4)	95	64.9(55.7-75.7)
II	19	50.2(30.8-81.8)	81	43.2(33.0-56.5)
III	32	46.4(31.2-69.1)	89	24.2(16.7-35.2)
IV	120	12.6(07.6-20.8)	161	13.0(08.7-19.4)
unknown	393	39.7(34.9-45.3)	178	31.3(25.0-39.1)
Treatment				
Surgery	227	44.9(38.7-52.3)	265	46.0(40.2-52.5)
Radiation	210	33.6(27.5-41.0)	188	29.8(23.8-37.2)
Chemotherapy	18	25.0(10.6-58.4)	59	26.2(16.9-40.6)
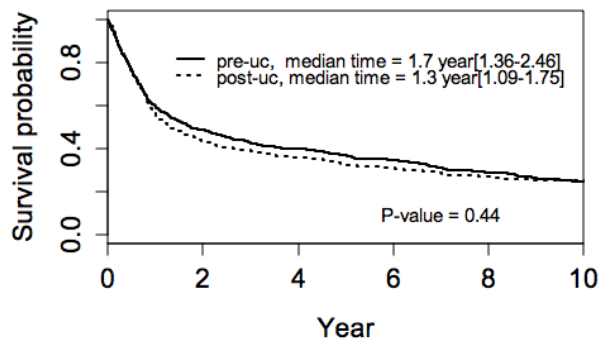
Figure 1. Overall Survival of Oral Cancer Patients Comparing before (1992-2001) and after (2004-2012) the Universal Coverage Scheme Launched

Discussion

Right to health is a fundamental part of the human right. The WHO Constitution enshrines "…the highest attainable standard of health as a fundamental right of every human being". Accessibility and universality are among the principles and standards to achieve the right to health (World Health Organization, 2015). According to the Thailand health reform in the year 2000, the universal coverage scheme was launched aiming to provide the health care insurance for all Thais. In 2010, about 97% of the Thai population of 64 million had health care coverage by either the Civil Servant Medical Benefit Scheme, the Social Security Scheme, or the National Health Security Office (Universal Coverage Scheme) (Wibulpolprasert, 2012). With better access to the health care system, the improved outcomes of diseases control are expected. The longitudinal analysis of the data from the World Bank and WHO between 1990-2010 in 75 countries showed increasing unemployment was strongly associated with an increase in all-cancer mortality, mostly occurred in the countries without universal health coverage (Maruthappu, 2016). Moreover, the National Cancer Database of the United States showed dramatically improvement in survivals for patients with oral cancer, which mainly due to increasing early diagnosis, and increased use of chemoradiation in advanced stage (Schwam and Judson, 2016).

Our study showed improvement in early diagnosis of oral cancer, as shown double increase in proportion of early stage cancers in the post-UC period. This is truly the impact of the universal coverage scheme that enhanced access to the health care system to obtain early diagnosis although the proportion of early cancer stages is still considerably lower than that in developed countries where the majority are diagnosed in early stages (Joseph, 2015; Gatta, 2015; Schwam and Judson, 2016). However, this study could not demonstrate an improvement in survivals of oral cancer after the universal coverage scheme launched. Moreover, most overall survival comparisons were found to be decreased, albeit not statistically significant, in the post-UC cohort in both young and old age groups, and all stages of cancer, especially for those undergoing radiation therapy. This worsening survival was partly due to the change in subsite distribution of oral cancers. While the proportion of lip cancer, with better survival, decreased;

the tongue cancer, with worse survival, increased. The further analysis, nevertheless, showed no improvement in survivals of the tongue cancer cohort after the launch of the universal coverage scheme. The most likely explanation is shorten of treatment facilities and man power, especially in provincial areas. For instance, the number of radiation oncologists in Thailand was 59 in 2007, which means one per more than a million population (Thai Association of Radiation Oncology, 2015). Moreover, the number of head and neck surgeons, or otolaryngologists who operated on head and neck cancer were limited to university hospitals, and some but not all tertiary hospitals and cancer centers. While the demand dramatically increased, but the supply limited. This lead to a longer waiting time.

However, the attempt had been made to produce more specialists in the field to sufficiently serve the nation-wide population, as in 2015, the number of radiation oncologists triple up to 172 (Thai Association of Radiation Oncology, 2015). Besides insufficient human resources, the disparity still exists between the types of insurance as the previous study showed the treatment outcomes in the patients under the Universal Coverage Scheme was inferior to those under the Civil Servant Medical Benefit Scheme for diffuse large B-cell lymphoma and colorectal carcinoma (Intragumtornchai, 2013; Sermsri, 2014). In addition, although with high coverage rate of the health care insurance in Thailand, it is likely that the access to the health care system can possibly be limited by transportation, referral system, as well as the willingness or awareness of the patients to visit the hospital.

This study is the first one specifically determine the impacts of the universal coverage scheme of the health care system of Thailand on survivals of cancer patients. It was conducted on the population-based cancer registry with consistent standardized data collection methods, and no major change in clinical practice for the treatment of oral cancers during the study period. This would minimize the factors confounding the outcomes with the effects of time. However, with at the population level, the potential missing information, i.e. stage of cancer, is still likely. Further improvement of the quality of the database at population level is required. The well established networking among health care units from universal coverage scheme would facilitate to achieve this expectation.

In conclusion, after the universal coverage scheme was launched, we found increasing early stage of cancer at diagnosis but not improving survivals of the patients with oral cancer. Further development is still needed to enhance a timely visit and referral of cancer patients to the health care service. Moreover, a well human resource management is required to provide a sufficient health care with quality to the population.

Acknowledgements

References

Esteban D, Whelan S, Laudico A, Parkin DM (1995). Manual for cancer registry personnel. Lyon, France: IARC Press; 1995 .

Ferlay J, Soerjomataram I, Ervik M, et al (2016). GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBaseNo.11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013 [cited 2016 Jun 1].

Forman D, Bray F, Brewster DH, et al (2014). editors. Cancer Incidence in Five Continents. S.l.: *World Health Organizat*, **1435**.

Gatta G, Botta L, Sanchez MJ, et al (2015). Prognoses and improvement for head and neck cancers diagnosed in Europe in early 2000s: The EUROCARE-5 population-based study. *Eur J Cancer*. **2015**.

Intragumtornchai T, Bunworasate U, Siritanaratkul N, et al (2013). Inferior progression-free survival for Thai patients with diffuse large B-cell lymphoma treated under Universal Coverage Scheme: the impact of rituximab inaccessability. *Leuk Lymphoma*, **54**, 83-9.

Joseph LJ, Goodman M, Higgins K, et al (2015). Racial disparities in squamous cell carcinoma of the oral tongue among women: a SEER data analysis. *Oral Oncol*, **51**, 586-92.

Maruthappu M, Watkins J, Noor AM, et al (2016). Economic downturns, universal health coverage, and cancer mortality in high-income and middle-income countries, 1990-2010: a longitudinal analysis. *Lancet*, **25.**

Schwam ZG, Judson BL (2016). Improved prognosis for patients with oral cavity squamous cell carcinoma: Analysis of the National Cancer Database 1998-2006. *Oral Oncol*, **52**, 45-51.

Sermsri N, Boonpipattanapong T, Prechawittayakul P, Sangkhathat S (2014). Influence of payer source on treatment and outcomes in colorectal cancer patients in a university hospital in Thailand. *Asian Pac J Cancer Prev*, **15**, 9015–9.

Sohn M. Globalization of public health law and ethics. Asia Pac J Public Health. 2012 Sep;24(5):851–5.

Suntorntham S, Chongudomsuk P, Uasiriwan B (2012). Thai health insurance system. Bangkok. Thailand: National Health Security Office.

Tangcharoensathien V, Prakongsai P, Limwattananon S, Patcharanarumol W, Jongudomsuk P (2009). From targeting to universality: lessons from the health system in thailand. in: townsend p, editor. building decent societies: rethinking the role of social security in development. *Hampshire: Palgrave Macmillan*, **2009**, 310-22.

Thai Association of Radiation Oncology - THAS Annual Survey - Services, Manpower, and Equipments in Thailand Radiotherapy Centers [Internet]. 2015 [cited 2016 Jun 30].

Vatanasapt P, Suwanrungruang K, Kamsa-Ard S, Promthet S, Parkin MDM (2011). Epidemiology of oral and pharyngeal cancers in Khon Kaen, Thailand: a high incidence in females. *Asian Pac J Cancer Prev*, **12**, 2505-8.

WHO | Health and human rights [Internet]. WHO. 2015 [cited 2016 Jun 30]. Available from: http://www.who.int/mediacentre/factsheets/fs323/en/

WHO (2015). Health in 2015: From MDGs, Millennium Development Goals, to SDGs, Sustainable Development Goals. 1 edition. World Health Organization; 2016. 212 p.

WHO. Tracking Universal Health Coverage: First Global Monitoring Report. 1 edition. World Health Organization; 2015. 9.

Wibulpolprasert S (2012). Thailand Health Profile Report 2008-2010 [Internet]. 2012 [cited 2016 May 6]. Available from: http://www.moph.go.th/ops/thp/index.php?option=com_content&task=view&id=176&Itemid=2