

# Smoking cessation and lung cancer survival relationship



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## Relationship between smoking cessation and lung cancer survival: A survival data analysis

### Abstract

### Background

For over a decade, lung cancer has been the highest mortality cancer in Hong Kong. Smoking cessation as a protect factor of lung cancer incidence has been confirmed in detail in former study. However, the relationship between smoking cessation and lung cancer survival have not been clarified yet.

### Methods

The prospective cohort included 1208 Chinese male recruited at the beginning of diagnosis of lung cancer in one of the biggest oncology center in Hong Kong. Cancer related clinical data including survival months were collected from hospital records. And smoking statues were identified by a structured questionnaire within three months after diagnosis. We performed cox regression models to calculate the hazard ratio and 95% confidence interval of lung cancer survival in different smoker group (never smoker, former smoker, and never smoker).

### Results

After adjusting age, BMI, overall stage of cancer, treatment, and alcohol drinking, we still got a non-significant result (p-value = \*\*\*) about smoking cessation and lung cancer survival.

## Conclusion

There is not enough evidence to verify the specific hypothesis of this study that lung cancer survival would increase after smoking cessation. More rigorous study design and more representative data should be applied in further study.

## Key words

Smoking cessation, lung cancer survival, histology

## INTRODUCTION

For over a decade, lung cancer has been the highest mortality cancer in Hong Kong. It's reported that a positive smoking history at the time of diagnosis is associated with a shortened survival time for patients with lung cancer. However, the hazard ratio in lung cancer survival after smoking cessation among male population has not been sufficiently defined in earlier studies.

The purpose of our study is calculating hazard ratio of lung cancer survival matched with duration-response relationship between years since smoking cessation, and exploring potential regression model between smoking cessation and lung cancer survival.

## METHODS

This study began in 2004 and was approved by the ethical committees of both the Chinese University of Hong Kong and the Queen Elizabeth Hospital.

Eligible subjects were Chinese males newly diagnosed primary lung cancer at one of the largest oncology center in Hong Kong who were aged 35 to 79 years. More than 95% of eligible patients were male, and

1208 subjects respond to our interview, the other 51 cases refused to be interviewed mainly because of lacking interest.

A standardized structured questionnaire was completed for each patient at the time of recruitment (within three months after diagnosis), including baseline information, expose factors, and some potential confounders in smoking habits. Smoking status was classified as (i) Never smoker, patient who had never smoked or smoked less than 20 packs of cigarettes (one pack = 20 cigarettes) or 12 oz of tobacco in his lifetime; (ii) Former smoker, smokers who had quit smoking for 2 years or more. (iii) Current smoker, smokers who had never quit smoking or quit smoking for less than 2 years. Overall survival (OS) was the endpoint in this study. OS time was calculated from the data of treatment to the data of last follow-up or death from any cause.

To investigate the “ time-response” effects of smoking cessation on lung cancer survival, we further divided former smoker into 9 groups since smoking cessation time and the sample sizes of each subgroup. The 9 subgroups were: never quitters, quitting smoking for 1-1.9 years, quitting smoking for 2-2.9 years, quitting smoking for 3-3.9 years, quitting smoking for 4-4.9 years, quitting smoking for 5-9.9 years, quitting smoking for 10-14.9 years, quitting smoking for 15-19.9 years, quitting smoking for more than 20 years, and never smoker.

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The association between smoking cessation and OS were test by Kaplan-meier functions and log-rank test. Cox proportional hazards models were used as our primary analyses, controlling for multiple possible covariates simultaneously, including age, BMI, stage, alcohol drinking, and treatment, where appropriate. All reported P-values less than 0. 05 were considered statistically significant. All statistical analyses utilized SPSS software version 22.

#### TEST-RETEST RELIABILITY

To evaluate the reliability of the recall of smoking condition and lifestyle information, we conducted a second interview which 30% of the patients were included 2 months later after the initial interview and more than 75% patients responded to the second interview.

#### RESULTS

TABLE 1. Clinical Characteristics and Smoking Status Information of Lung Cancer Patients in Hong Kong

Males During 2004 - 2006

Characteristics	SmokingStat us	
	Never Smoker	Current

		Smoker <sup>a</sup>	Smoker <sup>b</sup>
Total	122 (11.3)	290 (26.8)	652 (60.3)
Age	61.6 ± 10.9	69.5 ± 7.6	64.5 ± 9.3
Body mass index	22.7 ± 3.1	21.7 ± 3.3	20.7 ± 3.1
Alcohol drinking			
No	63 (51.6)	91 (31.4)	237 (36.3)
Yes	59 (48.4)	198 (68.6)	411 (63.7)
Stage			
T Stage	74 (12.8)	159 (27.5)	346 (59.8)
Stage I	9 (12.2)	16 (10.1)	34 (9.8)
Stage II	26 (35.1)	80 (50.3)	144 (41.6)
Stage III	6 (8.1)	18 (11.3)	44 (12.7)

Stage IV	33 (44.6)	45 (28.3)	124 (35.8)
N Stage	70 (12.2)	159 (27.7)	344 (60.0)
Stage 0	24 (34.3)	56 (35.2)	109 (31.7)
Stage 1	8 (11.4)	16 (10.1)	25 (7.3)
Stage 2	17 (24.3)	48 (30.2)	124 (36.0)
Stage 3	21 (30.0)	39 (24.5)	85 (24.7)
Stage 4	0	0	1 (0.3)
M Stage	94 (12.5)	209 (27.7)	452 (59.9)
Stage 0	51 (54.3)	135 (64.6)	278 (61.5)
Stage 1	43 (45.7)	74 (35.4)	174 (38.9)

	7)	5)	
Treatment			
Only surgery	8 (6. 6)	24 (8. 3)	47 (7. 2)
Only chemotherapy	27 (22. 1)	30 (10. 3)	72 (11. 0)
Only radiotherapy	11 (9. 0)	66 (22. 8)	128 (19. 6)
Other treatment	4 (3. 3)	9 (3. 1)	16 (2. 5)
None of treatment	42 (34. 4)	95 (32. 8)	187 (28. 7)
Combination of treatment	30 (24. 6)	66 (22. 8)	202 (31. 0)

Values are given as N (%) or mean  $\pm$  SD

<sup>a</sup> “ Former smoker” referred to those who had quit smoking for 2 years or more.

<sup>b</sup> “ Current smoker” referred to those who had never quit smoking or quit smoking for less than 2 years.

<sup>c</sup> There are 18 cases of smoking status data

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missing

In three different smoking status groups, never smoking group has a minimum of cancer case (122, 11.3%), while current smoking group has a maximum of cancer case (652, 60.3%). Average age at diagnosis of former smoker is largest ( $69.5 \pm 7.6$ ) compared with the other two groups. ANOVA show a significant result of BMI (p-value < 0.001) indicating there are differences between three groups. And it seems former smoker have the highest chance taking a drink, relatively (68.6% in former smoker compared 63.7% in current smoker and 48.4% in never smoker). As for the choice of lung cancer treatment, former smoker are more likely to take surgery method and radiotherapy method (8.3% and 22.8%). They use less chemotherapy method and combination method (10.3% and 22.8%). (Table 1)

#### RELIABILITY OF MEASUREMENT

We tested the reliability for smoking status and years since smoking cessation, kappa or intraclass coefficient ranged from 0.77 to 0.95, indicating the reliability was excellent.

#### DISCUSSION

In the cohort of lung cancer patients, subjects who quit smoking seemed to have a better survival compared to current smoker. Survival differences between the two groups of patients were not statistically different, possibly due to the small number of patients.

One limitation of our study is lacking of smoking cessation information updating after diagnosis. Patients who have lung cancer were more likely to stop smoking after baseline information collection, thus our study may underestimate the effect.

For clinical consideration, male lung cancer patients who is younger than 50 years old when diagnosis should pay more attention to quitting smoking.