



STAGE IV NON-SMALL-CELL LUNG CANCER IN ELDERLY PATIENTS: SURVIVAL ANALYSIS

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ABSTRACT

Objective: To analyze the difference in survival associated with anti-cancer treatment (ACT) versus palliative treatment (PT) intention therapy for stage IV non-small-cell lung cancer (NSCLC) in elderly patients.

Methods: Tapping the cancer registry database of one medical center in Taiwan, Chi-square and Cox regression were used to analyze differences of treatment intentions and factors predicting survival, and Kaplan-Meier survival analysis to the outcomes of anti-cancer therapies.

Results: 333 elderly patients were diagnosed with NSCLC from 2011 to 2014. Multivariate Cox regression analysis revealed that patients at significantly decreased risk of short survival were those having target therapy only ($p=0.008$) and having ≥ 2 treatment modalities ($p=0.009$). Patients at significantly increased risk of short survival were those having poorer performance status (for ECOG 2, 3 and 4, $p<0.001$, $p=0.001$, and $p<0.001$, respectively) and patients of PT group ($p<0.001$). Kaplan-Meier survival analysis of 236 ECOG 0-2 patients revealed those accepting target therapy only had a median survival 713 days, chemotherapy only 436 days, and two treatment modalities 449 days. Log Rank (Mantel-Cox) test showed no significant difference ($p=0.182$).

Conclusions: Elderly patients with stage IV NSCLC who can have ACT intention therapy still survived longer than PT intention therapy. The results of this study can be used as reference for treatment planning and shared decision making.

KEYWORDS : elderly, non-small-cell lung cancer, stage IV, survival

OBJECTIVE

It is projected that demographically the world will see a substantial increase in number elderly persons who will no doubt be diagnosed with and die from cancer. In the United States, lung cancer is responsible for the most deaths of cancer. Lung cancer is mainly found in people 65 years and older. Although a small number of people are diagnosed below the age 45 years, the average age at the time of diagnosis is about 70.^{2,3} Thus, there is great need for information on how age-related health problems affect cancer prevention, detection, prognosis, and treatment. In Taiwan, the proportion of individuals 65 years and older exceeded 14% of the total population in 2018 and this proportion is expected to exceed 20% by 2026. Cancer has been the leading cause of death in Taiwan since 1984. More than sixty percent of people in this age group died as a result of cancer in 2017. And cancers of trachea, bronchus and lung took for the most percentage.⁴

Most older patients with lung cancer are initially diagnosed as having stage IV disease. Their age, health status and possible deterioration in cognition may reduce their ability to perform physical activities, understand the course and outcome of anti-cancer treatment, and manage possible side effects of various treatments.^{5,6,7} All of this comes with increased psychological burden and poorer quality of life for them and their family.^{8,9} This study analyzed the difference in survival outcomes associated with anti-cancer treatments (ACT) versus palliative treatment (PT) intention for stage IV non-small-cell lung cancer in patients 65 years or older, a population who often times question the need for aggressive treatment when they are so old.

METHODS

In Jan. 2016, we tapped registry database of one medical center in southern Taiwan to collect data on pathology proven non-small cell lung cancer (NSCLC) in patients aged 65 years old and above diagnosed from January 2011 to December 2014. From this database, we collected data on age and gender, cancer type, treatments intention (ACT or PT), and survival. Chi-square and Cox regression were used to analyze differences in those receiving anti-cancer treatment and those receiving hospital palliative care only and factors predicting survival. Kaplan-Meier survival analysis was

performed to analyze outcomes of various single and combined anti-cancer therapies. All statistical operations were performed using PASW version 18.0.

RESULTS

Three hundred thirty-three patients 65 years old and above were diagnosed as having non-small-cell lung cancer from 2011 to 2014. The majority of the patients were male (199, 59.8%), 65-74 years old (146, 43.9%), and those intended to receive ACT (178, 53.5%). Table 1 showed multivariate Cox regression analysis. Patients at significantly decreased risk of short survival are those who had target therapy only (HR 0.505, $p<0.01$) and had 2 or more treatments (HR 0.513, $p<0.01$). Patients had poorer performance status were at significantly increased risk of short survival (for ECOG 2, 3 and 4, HR 3.629, $p<0.001$; HR 2.591, $p=0.001$; HR 5.616, $p<0.001$, respectively), and patients receiving PT were significantly increased risk of short survival (HR 2.429, $p<0.001$). Table 2 showed 236 ECOG 0-2 patients for whom physicians recommended various cancer control treatments, 81 accepted the target therapy only, 55 accepted chemotherapy only, and 100 accepted two or more treatment modalities. Figure 1 showed the result of Kaplan-Meier survival analysis of those receiving various anti-cancer therapies. We found those accepting target therapy only had a median survival 713 days, chemotherapy only 436 days, and more than two treatment modalities 449 days. Log Rank (Mantel-Cox) test showed no significant difference.

Table 1 Multivariate Cox proportional hazards regression analysis (N=333)

Variables	Variables (Crude)		
	HR	95% CI for HR	p value
Sex			
Male			
Female	0.828	0.568-1.208	0.327
Age group			0.294
65-74			
75-84	0.731	0.435-1.229	0.238
85-99	0.805	0.318-2.038	0.647
Smoking			

No			
Yes	1.280	0.888-1.845	0.186
Performance status (ECOG)			<0.001***
0			
1	1.300	0.852-1.984	0.223
2	3.629	2.208-5.964	<0.001***
3	2.591	1.481-4.533	0.001***
4	5.616	3.174-9.935	<0.001***
Pathology type			0.082
Squamous			
Adenocarcinoma	0.890	0.576-1.376	0.601
Type unspecified	1.659	0.889-3.096	0.112
Pleural Effusion			
No			
Yes	1.116	0.848-1.470	0.433
Treatment modalities			0.045*
No			
Targeted therapy	0.505	0.306-0.834	0.008**
Chemotherapy	0.597	0.343-1.040	0.069
Radiotherapy	0.945	0.505-1.766	0.858
≥ 2 treatments	0.513	0.310-0.847	0.009**
Treatment intentions			
ACT			
PT	2.429	1.731-3.407	<0.001***

HR = Hazard Ratio
CI = Confidence Interval
ECOG = Eastern Cooperative Oncology Group
ACT = Anti-Cancer Treatment PT = Palliative Treatment
*p<0.05 **p<0.01 ***p<0.001

Table 2 Kaplan-Meier survival analysis of 236 ECOG 0-2 patients receiving anti-cancer treatments (N=236)

Variable	Patient number (%)			p value
	Targeted therapy only	Chemotherapy only	Two treatment modalities	
Patient number	81	55	100	
Median survival	713 days	436 days	449 days	0.182
	(23.77 months)	(14.53 months)	(14.97 months)	
95% CI	508.625-917.375	292.235-579.765	370.727-527.273	
Survival rate	1 year 70.3 % 2 year 46.6 %	1 year 55.4 % 2 year 33.9 %	1 year 62.5 % 2 year 31.9 %	

CI = Confidence Interval
*p<0.05 **p<0.01 ***p<0.001

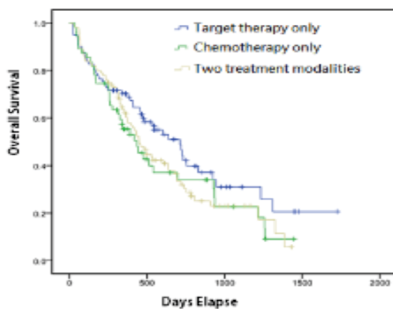


Figure 1 Kaplan-Meier survival curve of 236 ECOG 0-2 patients receiving various anti-cancer treatments.

CONCLUSIONS

Older patients with stage IV non-small-cell lung cancer who can have anti-cancer treatment still survived longer than those receiving hospice palliative care. The results of this study can be used as reference for treatment planning and shared decision making for this population of patients.

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Conflict of interest

The authors have no conflicts of interest to declare.

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