Original Article

Survival of Patients with Advanced Non-Small Cell Lung Cancer at Single Institute in Eastern Thailand, 2013 to 2016

Sitthi Sukauichai MD[1]

[1] Department of Chemotherapy Unit, Chonburi Cancer Hospital, Chonburi, Thailand

Objective: To study the survival of patient with advanced non-small cell lung carcinoma [NSCLC] treated at Chonburi Cancer Hospital, in addition to focus on an epidermal growth factor receptor [EGFR] mutation testing, including an epidermal growth factor receptor-tyrosine kinase inhibitor [EGFR-TKI] therapy and to find a prognostic factor for survival.

Materials and Methods: The present retrospective cohort study was conducted by review medical records of stage IIIB-IV NSCLC patients treated at Chemotherapy unit, Chonburi Cancer Hospital, Thailand, between July 1, 2013 and June 30, 2016.

Results: There were 148 patients with median follow-up time 7.90 months. Median age was 60.5 years old (range 25 to 91). There were male 64%, non-smokers 37%, and stage IIIB/IV 17/83%. The Eastern cooperative oncology group [ECOG] performance status 0 to 1, 2 to 4, and no record were found 35%, 36%, and 29%, respectively. The most common systemic first-line and second-line systemic therapies were platinum-based doublet and docetaxel, respectively. The median survival time of all patients was 8.04 months. Median survival times of patients receiving and not receiving systemic therapies were 10.60 months and 3.00 months, respectively (p<0.001). Less than a quarter of the patients (27/148, 18.2%) were tested for EGFR mutations. Fifty five percent (15/27) of the patients tested for EGFR status were sensitive mutations. Unfortunately, only some of them could access to an EGFR-TKI therapy and mostly received it as a late-line therapy. Multivariate analysis showed that ECOG performance status 2 to 4 (p<0.001), no record for ECOG performance status (p = 0.001), no lung metastasis (p = 0.012), and unknown of EGFR mutation status (p = 0.001) were significantly unfavorable prognostic factors for the survival.

Conclusion: The survival time of advanced NSCLC patients at Chonburi Cancer Hospital was comparable to other pivotal studies. In real-life clinical practice, EGFR testing was quite low because of limitation to access to EGFR-TKI. The poor ECOG performance status, no record for ECOG performance status, no lung metastasis and unknown EGFR mutation were poor prognostic factors for the overall survival.

Keywords: Non-small cell lung cancer, Survival, EGFR mutation, Prognostic factor

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Lung cancer was the leading cause of death from cancer in the world in 2012[1]. Recently, a breakthrough treatment of lung cancer is immunotherapy, programmed death 1 [PD-1] inhibitor, which can be used as both first- and second-line therapies[2-5]. Although, the treatment of advanced stage non-small cell lung cancer [NSCLC] tends to shift to immunotherapy, in Thailand, this extremely expensive treatment is not easy in real clinical practice. Similarly, an epidermal growth factor receptor-tyrosine kinase inhibitors [EGFR-TKIs] has been approved nearly 10 years for treatment of sensitive epidermal growth factor receptor [EGFR] mutation NSCLC[6], however a small number of Thai patients could get access to this standard of care because of a high price of the medication[7].

Previously, reporting the survival outcome and prognostic factor at Chonburi Cancer Hospital [CCH] in advanced NSCLC[8], that preliminary study showed the survival of the patient was comparable to other pivotal studies, the poor Eastern cooperative oncology group [ECOG] performance status, no record for ECOG performance status and having pleural metastasis indicated poor prognostic factors for the overall survival. Moreover, that study also found that only 11% of advanced stage adenocarcinoma NSCLC in CCH was tested for EGFR mutation status due to the limitation on the health insurance system and the financial problem to purchase EGFR-TKIs. In the present study, the author extended enrollment period of the patient from 2 years in previous study to 3 years in order to find more survival outcome and prognostic factors. Besides, the author also centered on the patients

Correspondence to:

Sukauichai S. Department of Chemotherapy Unit, Chonburi Cancer Hospital, Chonburi 20000, Thailand.
Phone: +66-038-455-632
Email: maxstmdcu@yahoo.com

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whose tumors were positive EGFR mutations.

Materials and Methods

The present study was retrospectively conducted in patients with NSCLC stage IIIB-IV according to the International Union Against Cancer (seventh edition)[9], confirmed by histology including an imaging and treated at chemotherapy unit in CCH during the past 3 years (July 1, 2013 to June 30, 2016). All patients were followed up until December 31, 2016. A status of the patient at the cut-off time was taken from the medical record and registration information, Ministry of Interior, Thailand. The study was approved by the Ethics committee of CCH.

An overall survival time was calculated from the date of pathological report to the date of death or the date when the patient was last known to stay alive. Progression free survival time was calculated from the date of starting treatment to the date of tumor progression or death. Tumor responses were assessed by using response evaluation criteria in solid tumors [RECIST] criteria[10] based on radiologic report (CT scan or plain-film) and physical examination.

Statistical analysis

Overall survival time was estimated using the method of Kaplan and Meier[11]. Seventeen variables were included for analyses to identify prognostic factors of overall survival. Comparisons of cumulative survival were obtained by univariate analyses using the log-rank test[12] and multivariate analyses were performed using Cox proportional hazard regression. A p-value <0.05 in univariate analysis and multivariate analysis were considered statistical significant difference. SPSS version 16.0 was used in this study.

Results

Between July 1, 2013 and June 30, 2016, one hundred eighty-seven medical records were enrolled to review. Thirty-nine files of patients were excluded because twenty-nine patients also received systemic therapies from other hospitals, eight patients were diagnosed of small cell lung carcinoma and the other two patients were unclear in staging. Therefore, one hundred forty-eight medical records were included, reviewed and recorded their information to analyze. The data were cut off on December 31, 2016.

Patient characteristics

Patients' clinical characteristics were shown in Table 1.

Table 1. Patient characteristic (n = 148)

	Number (%)
Age (year)	
Median (range)	60.5 (25 to 91)
Sex	
Male	95 (64.1)
Female	53 (35.9)
Health fund group	
UCC	95 (64.2)
SCC	32 (21.6)
GSEO	21 (14.2)
Smoking	
Former/current	93 (62.8)
None	55 (37.2)
Stage	
III-B	25 (16.9)
IV	123 (83.1)
Pathology	
Adenocarcinoma	109 (73.6)
Squamous cell carcinoma	19 (12.8)
Poorly differentiation	12 (8.1)
Others*	8 (5.4)
Tissue diagnosis	
Pathology	127 (85.8)
Cytology	21 (14.2)
ECOG performance status	
0 to 1	51 (34.5)
2	29 (19.6)
3 to 4	25 (16.9)
No record	43 (29.1)
EGFR mutation	
Positive	15 (10.1)
Negative	12 (8.1)
Unknown	121 (81.8)
ALK rearrangement	
Inadequate tumor cell	2 (1.4)
Negative	7 (4.7)
Unknown	139 (93.9)
Metastatic site	
Pleura	49 (33.1)
Lung	47 (31.7)
Bone	44 (29.7)
Brain	37 (25.0)
Distant lymph node	20 (13.5)
Liver	20 (13.5)
Adrenal gland	14 (9.4)
Others**	12 (8.1)

ALK = anaplastic lymphoma kinase; ECOG = Eastern cooperative oncology group; EGFR = epidermal growth factor receptor; GSEO = government or state enterprise officer; SSS = social security scheme; UCC = universal coverage scheme

* Others: not otherwise specified 4, adeno-squamous cell carcinoma 2, large cell carcinoma 1

** Others: meninges 4, pericardium 4, breast 1, paravertebral soft tissue 1, spleen 1, skin 1

Clinical outcomes

At the cut point of time on December 31, 2016, one hundred twenty-four patients (83.7%) had died.

On the contrary, twenty-four (26.3%) patients stayed alive, twelve of whom were periodically appointed to follow-up imaging and symptoms and were planned for further therapy, if there was evidence of disease progression. In addition, as of December 31, 2016, best-supportive care and systemic therapy had been given to six and four patients, respectively, and the other two patients were lost follow-up.

Survival

The median follow-up time of the present study was 7.90 months. Median overall survival of all patients was 8.04 months. In addition, overall survival time of patients receiving and not receiving systemic treatment was 10.60 months and 3.00 months, respectively. Moreover, survival rate at various points of time was shown in Table 2. After excluding patients receiving EGFR-TKIs as first-line treatment, the median overall survival was 10.02 months (data not shown) in patients receiving chemotherapy as first-ling therapy. Furthermore, median survival of patient with positive EGFR mutation was not reach. Progression free survivals of the patient receiving first-, second-, and third-line systemic therapies were 5.17 (range 0.17 to 17.3), 2.43 (range 0.37 to 8.63), and 1.91 (0.03 to 7.70) months, respectively.

Treatment modalities

One hundred twenty-one (121/148, 81.7%) patients received first-line palliative systemic therapy (Table 3): chemotherapy in one hundred and eighteen patients (stage IIIB, 20 and stage IV, 98) and EGFR-TKIs in three patients (stage IV, 3). Regarding the stage of diseases, twenty-five patients with stage IIIB disease NSCLC, ten of them received palliative chemotherapies (and/or a palliative radiotherapy), and eight patients received concurrent chemo-radiotherapy (and/or induction chemotherapy), in addition, two of the eight patients also received maintenance EGFR-TKIs after concurrent chemo-radiotherapy. Three of twenty-five patients received sequential chemo-radiotherapy and the other four received just active best supportive care. One hundred twenty-three patients with stage IV disease, in first-line treatment, ninety-eight patients received palliative chemotherapy, three received EGFR-TKIs, and the other twenty-two received only active best supportive care including palliative radiotherapy. In patients receiving palliative chemotherapy, all of whom were treated by platinum-based doublet, except for two patients. The median cycle of first-line palliative chemotherapy was four (range 1 to 6). The two commonly used chemotherapy regimens were paclitaxel/carboplatin and gemcitabine/carboplatin.

Second-line systemic therapies were given in fifty patients (50/148, 33.8%), thirty-two received docetaxel, ten received platinum-based doublet and eight received EGFR-TKIs. The median cycle of second-line palliative chemotherapy was three (range 1 to 6).

Third-line and fourth-line systemic therapies were provided in fifteen (15/148, 10.1%) and six (6/148, 4.0%) patients, respectively. Median regimen of systemic therapy was one (range 1 to 8).

Seventy (70/148, 47.3%) patients received radiotherapy. The most common of radiotherapy was palliative whole brain radiation in thirty-four patients. Palliative radiotherapy to bone and to mediastinum

Table 2. Survival rates of the patient at several points of time

Time	All patients*	Patients receiving systemic therapy*
3 months	77.0 (70.1 to 83.8)	85.1 (78.7 to 91.2)
6 months	58.8 (50.9 to 66.6)	66.9 (58.4 to 75.3)
1 years	34.7 (27.0 to 42.3)	42.4 (33.5 to 51.2)
2 years	13.0 (6.5 to 19.4)	15.9 (8.2 to 23.5)

* Percent of patients with 95% confident interval

Table 3. Response to systemic therapy

Systemic therapy	Number	Response (number)			
		PR	SD	PD	NA
First-line	121	27	52	21	21
Platinum doublet*	116	24	51	21	20
EGFR-TKIs	3	3			
Others**	2		1		1
Second-line	50	3	20	21	6
Docetaxel	32	3	12	11	6
EGFR-TKIs	8		2	6	
Others***	10		6	4	
Third-line	15	2	4	8	1
Docetaxel	4		1	2	1
EGFR-TKIs	4	1		3	
Others****	7	1	3	3	

CR = complete response; EGFT-TKI = epidermal growth factor receptor-tyrosine kinase inhibitor; PR = partial response; SD = stable disease; PD = progressive disease; NA = non-available data

* 56 paclitaxel/carboplatin (12PR, 26SD, 6PD, 12NA), 47 gemcitabine/carboplatin (7PR, 22SD, 12PD, 6NA), 5 cisplatin/etoposide (1PR, 2NA, 2SD), 3 gemcitabine/cisplatin (2PD, 1NA), 2 pemetrexate/cisplatin (1PR, 1NA), 2 carboplatin/S-1 (2PR), 1 nab-paclitaxel/carboplatin (1SD)

** 1 gemcitabine (1SD), 1 weekly carboplatin combined with radiation (1NA)

*** 3 paclitaxel/carboplatin (2SD, 1PD), 3 gemcitabine (2SD, 1PD), 3 cisplatin/etoposide (2SD, 1PD), 1 carboplatin/S-1 (1PD)

**** 2 gemictabine/carboplatin (1SD, 1PD), 2 carboplatin/etoposide (1PR, 1PD), 2 paclitaxel (2SD), 1 cisplatin/etoposide (1PD)

(and/or lung tumor) was provided in twenty and fifteen patients, respectively. Twelve patients received concurrent chemo-radiotherapy (stage IIIB, 8 and stage IV, 4). The other three received sequential chemo-radiotherapy (stage IIIB, 2 and stage IV, 1).

Response to systemic therapy

Overall response rate was 20.6% (24/116) in patients receiving first-line palliative chemotherapy (Table 3), and 100% (3/3) in patients receiving EGFR-TKIs. In the second-line chemotherapy, the overall response rate with docetaxel was 9.3% (3/32), but no response was found in patients receiving platinum-based doublet.

Patients with positive EGFR mutation and/or EGFR-TKIs treatment

Twenty-seven of all non-small cell carcinoma patients (27/148, 18.2%) were tested for EGFR mutation status. Of these patients, fifteen were positive for EGFR mutation (15/27, 55%). Among EGFR mutation positive patients, most of them were female and no history of smoking except for three patients (number 3, 14, and 15) who were smokers. Exon 19 deletion and exon 21 mutation were found in seven and six patients, respectively, and the other two patients were combined mutation of both exon 19 and 21. All of these patients, EGFR sensitive mutations were proved by tissue pathology, except one was tested by liquid biopsy. All tissue pathologies were adenocarcinoma, except for the patient number 5 was not specified. The details of the disease and treatment were displayed in Table 4.

At the cut-off time, four EGFR mutation patients had past-away, two of them received EGFR-TKIs as one of the systemic therapies, however the other two did not received an EGFR-TKIs in their lives, one patient (number 1) developed unexpected death before receiving medication and the other (number 2) had financial problem. The other eleven patients remained alive. One patient (number 9) did not receive the EGFR-TKIs because of financial problem, even though her disease became progression. At the cut point of time, the author found no patient tested for EGFR resistance mutation such as T790M.

In addition, twenty patients received EGFR-TKIs, three patients received as first-line (one patient was EGFR mutation positive and the other two were EGFR status unknown), eight patients as second line (two patients were positive, one was negative and the other five were EGFR status unknown), four patient as third line (one patient was positive, one was negative and the other two were EGFR status unknown), two patients as more than third line (both of them were EGFR status unknown), and the other three patients as maintenance therapy (all of them were positive for EGFR mutation). In other words, EGFR-TKIs were provided in eleven

Table 4. Characteristics of patients with positive EGFR mutations

Patient	Sex-age	Status	Exon	TKI therapy	H-fund	Stage	PFI[$]	OS[$$]	Treatment
1	F-81	Died*	21	No	B	IV	NA	7.6	C
2	F-44	Died	19	No**	A	IV	NA	13.3	C
3	M-52	Died	19	2nd line	B	IV	3.9	13.8	C-TKI
4	F-62	Died	19+21	Maintenance	A	IIIB[&]	8.9	22.8	CRT-TKI-WBRT-C
5	M-43	Alive*	19[&&]	No	A	IV	NA	7.5	C
6	M-48	Alive	19	2nd line	A	IV	3.9	11.4	C-TKI
7	F-61	Alive*	19	No	B	IV	NA	13.5	C
8	F-61	Alive*	21	No	A	IV	NA	14.8	C
9	F-43	Alive	21	No**	A	IV	NA	18.0	C
10	F-69	Alive[#]	19+21	Maintenance	A	IV	3.5	18.2	C-TKI
11	F-81	Alive	21	1st line	B	IV	19.3	18.5	TKI
12	F-60	Alive	19	3rd line	A	IV	3.5	25.3	C-TKI
13	F-76	Alive*	21	No	B	IV	NA	27.0	C
14	F-74	Alive	21	Maintenance	B	IIIB	27.3	31.0	CRT-TKI
15	M-40	Alive*	19	No	B	IIIB[&]	NA	38.4	CRT-WBRT

C = chemotherapy; CRT = concurrent chemo-radiation; EGFR = epidermal growth factor receptor; F = female; H-fund = health fund group (Group A: universal coverage scheme or social security scheme, Group B: government or state enterprise officer); M = male; OS = overall survival; PFS = progression free survival; TKI = tyrosine kinase inhibitor; WBRT = whole brain radiation

[$] PFI was a progression free interval (months) of an EGFR-TKI, [$$] OS was an overall survival (months) of the patient, * Follow up after chemotherapy, ** Disease progression but facing a financial problem, [#] Lost to follow-up, [&] Later developed only brain metastasis, [&&] Cell free DNA (liquid biopsy)

patients with unknown EGFR mutation, in seven patients with positive EGFR mutation and in the other two patients with negative EGFR mutation.

Palliative and quality care aspects

According to the medical records, the prognosis of the disease was informed to the patients and their families in eighty-four patients (84/148, 56.8%). The difficulty in breathing and cancer pain were recorded in sixty-five patients (65/148, 43.9%) and ninety-six patients (96/148, 64.8%), respectively. Among these patients, fifty-two (52/65, 80.0%) of breath difficulty patients and ninety (90/96, 93.7%) of pain patients were taken care for their symptoms.

Univariate survival analysis

Univariate factors for survival were assessed by log-rank test and found that the favorable significant prognostic factors (p<0.05) for survival were ECOG 0 to 1 (p<0.001), health fund group B (p = 0.018), positive EGFR mutation status (p<0.001), lung metastasis (p = 0.050), receiving systemic therapy (p<0.001). In contrast, factors not contributing to prognostic factor were age group (≤70 vs. >70), sex (male vs. female), smoking status (never vs. current/former), stage (IIIB vs. IV), adenocarcinoma (yes vs. no), number of metastatic organ (0 to 1 vs. ≥2), pleural metastasis (yes vs. no), brain metastasis (yes vs. no), bone metastasis (yes vs. no), liver metastasis (yes vs. no), EGFR-TKIs therapy (yes vs. no) and receiving radiotherapy (yes vs. no).

Multivariate analysis

The significant prognostic factors (p<0.05) in univariate analysis, including ECOG performance status, health fund group, lung metastasis and positive for EGFR mutation were further analyzed in Cox-regression model, with the exception for systemic therapy because the decision to perform a systemic therapy relied on ECOG performance status of the patients.

In multivariate analysis demonstrated that the ECOG performance status 2 to 4 (p<0.001), no record for ECOG (p = 0.012), no lung metastasis (p = 0.012), and unknown of EGFR mutation status (p = 0.001) were the significantly adverse prognostic factors for survival (Table 5, Figure 1), but health fund group, and negative for EGFR mutation did not contribute to prognostic potential.

Table 5. Cox regression analysis

Factors	Group	HR	95% CI	p-value
ECOG performance status	0-1	1.00		
	2-4	2.56	1.64 to 3.99	<0.001
	No record	1.88	1.15 to 3.08	0.012
Health fund*	A	1.57	0.85 to 2.89	0.150
	B	1.00		
Lung metastasis	No	1.60	1.07 to 2.41	0.012
	Yes	1.00		
EGFR mutation	Positive	1.00		
	Negative	3.16	0.90 to 11.07	0.071
	Unknown	5.49	1.92 to 15.62	0.001

CI = confidence interval; ECOG = Eastern cooperative oncology group; EGFR = epidermal growth factor receptor; HR = hazard ratio

* Group A: universal coverage scheme or social security scheme, Group B: government or state Enterprise officer

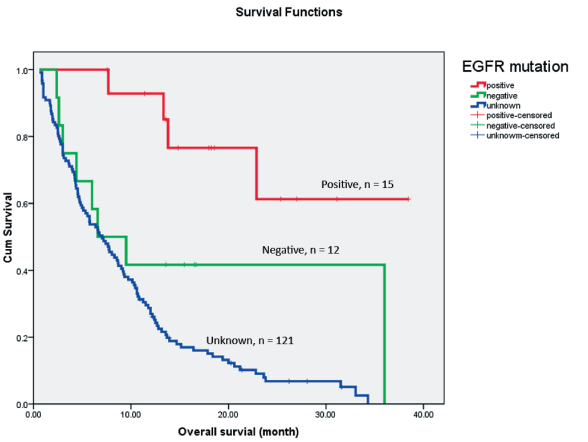

Figure 1. Overall survival of patients depending on EGFR mutation status.

Discussion

When compared with the preliminary report[8] enrolled only 94 patients, the present study included patients up to 148 subjects and were similar to the previous study in term of patients' characteristic, treatment modalities, palliative-quality cares, and some prognostic factors in both univariate and multivariate analyses. However, there were some different points in prognostic factor for survival. After enrolling more patients, the author found that factor contributing to prognostic factors were lung metastasis and EGFR mutation status. Again in the present study, median survival of patients receiving chemotherapy was comparable to other land mark studies[13-16] (10.02 vs. 10.3 to 12.6 months). However, a median survival of EGFR mutation patients was not reach due to short median follow-up time.

The standard treatment guidelines[17,18] in Europe and U.S. suggest that all patients with NSCLC should be tested for EGFR mutation, and if the mutation was discovered, the patient should received EGFR-

TKIs as first-line or as soon as possible after getting confirmed sensitive EGFR mutation result. However in clinical practice at our institute, many factors affected physician's decision whether to test for EGFR mutation, such as reimbursement system and socioeconomic status of the patient. Moreover, if the author focused on the patient with positive EGFR mutation and EGFR-TKIs treatment, about only 18% of non-small cell carcinoma in our hospital was tested for EGFR mutations. In addition, approximately half of them were positive mutation, which corresponded with previous report in Thai population with adenocarcinoma NSCLC by Sriurapong et al[19]. When considering patterns of EGFR-TKIs therapy, the author found that in our hospital most of the patients received TKI as maintenance therapy or other late-line therapies rather than first-line therapy. Even in many well planned clinical studies[20], a lot of patients (30% to 41%) with sensitive EGFR mutation starting with first-line chemotherapy lost the opportunity to receive EGFR-TKIs as salvage treatment because of inaccessibility, denial, and clinical decline after the failure of first-line chemotherapy. Therefore, abundant patients in real clinical practice would lose their chances not only to test EGFR status but also to receive EGFR-TKIs. Regarding a clinical practice in well-developed country[21], such as U.S. in 2010, less than a quarter of patients with NSCLC and less than half of them with positive EGFR mutation obtained the EGFR testing and EGFR-TKIs therapy, respectively. Nevertheless, in U.S. most of them (87%) gained EGFR-TKIs as first-line therapy. Similarly, in that study, health insurance status affected EGFR testing and median income played a crucial role in receiving EGFR-TKIs treatment. In Japan[22], interestingly, nearly all EGFR mutant patients were prescribed EGFR-TKIs according to a standard national regimen, moreover, more than half of them received it as first-line therapy, which had a tendency to progressively increase from 2008 to 2012 and about 40% of the patient could get EGFR-TKIs more than two regimens by switching and re-challenging strategies. However, in Japanese retrospective study did not mention about health care insurance.

In Thailand, there are two main health fund groups; group A consists of universal coverage scheme [UCC] and social security scheme [SSS], and group B consists of government or state enterprise officer [GSEO]. According to health-reimbursement system, patients with advanced stage NSCLC in group A can receive only a chemotherapy such as platinum-gemcitabine, platinum-paclitaxel and platinum-etoposide as first-line and docetaxel as second-line. While, patients in group B[23] can get EGFR-TKIs as later line of treatment, regardless of EGFR mutation status, including more systemic treatments such as vinorelbine, pemetrexate, ALK-inhibitors as well as novel therapy, PD-1 inhibitors. According to the present study, patients with the health fund group A, almost all of them cannot get EGFR-TKIs, because of uncovered by health fund insurance except for one patient (No. 6, Table 4) who was permitted from a hospital of the SSS. Generally, if they needed EGFR-TKIs, they had to purchase by themselves. In contrast, patients with health fund group B, they had an opportunity to get EGFR-TKIs independently of EGFR status, yet they needed pre-approval before getting medication and were able to receive it only as later-line (not for first-line) therapy. One of our patients (No. 11, Table 4) with health fund group B got TKI as first-line treatment, however, he paid the drug.

In researcher's point of view as a clinician, in order to increase an opportunity of Thai patient to modern targeted treatment or immunotherapy, we should provide an appropriate cost and well-qualified medication for our patients (to illustrate: EGFR-TKIs cost 64 US dollar (2,240 bath Thai) per tablet per day at CCH in 2017; (1 US dollar about 35 bath Thai), whereas, at the same time, an average monthly wage of Thai approximates 399 US dollar[24] (13,963 bath Thai)), provide more clinical-trials for regional suburb areas and finally include EGFR-TKIs in a regular updated national standard treatment guideline or protocol by concerning authorities. However, Thailand with average gross national income per capita about 4,210 US dollar in 2011 was in a lower zone of upper-middle income country ranked by World Bank[25], resulting in before determining an costly modern personalized therapy in national treatment guideline, we need more health economic evaluation including cost-health assessment of EGFR testing before providing such medication[7,23].

In multivariate analysis, the present study demonstrated that ECOG performance status 2 to 4 ($p<0.001$), no record for ECOG ($p = 0.012$), no lung metastasis ($p = 0.012$) and unknown EGFR mutation status ($p = 0.001$) were the significantly adverse prognostic factors for survivals. Like preliminary report[8], poor ECOG performance status and no record for ECOG were still the same, indicating adverse prognosis for survival. Interestingly, in the present study the author found no lung metastasis was poor

prognostic factor. After enrolling more patients, the author found that unknown EGFR mutation clearly showed poor prognostic factor contradicted to the initial report. However, the negative EGFR mutation was not contribute to prognosis but still had a tendency to have a worse outcome ($p = 0.071$). This phenomenon was limited by the small number of patients, which was the same as previous report.

In conclusion, after including more patients, the present study revealed that the survival time of advanced NSCLC of our patients receiving systemic chemotherapy was still comparable to other studies. Furthermore, providing an opportunity to get access to EGFR-TKIs therapy will definitely increase the number of EGFR mutation testing and improve the survival of the patient confirmed positive EGFR mutation as well. The poor ECOG performance status, no record for ECOG performance status, no lung metastasis and unknown EGFR status were poor prognostic factors for the overall survival.

What is already known on this topic?

Management of advanced NSCLC is rapidly developed in the last decade. The patients were tailored and treated according to their molecular profiles, which contributed to significant improvement of overall survival in the molecular-selected patient.

What this study adds?

The overall survival of patients with advanced NSCLC in this study was comparable to other pivotal studies. However, in a real clinical situation, only some patients could really get access to modern molecular testing and therapy.

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Potential conflicts of interest

The author declares no conflict of interest.

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