

The Impact of Palliative Care Consultation on Re-Hospitalization in Patients with Metastatic Non-Small Cell Lung Cancer

Suphachok Hittrawatt, MD¹, Win Techakehakij, MD, PhD¹, Napat Phetkub, MD¹, Wararat Thatayu, MD¹, Nutchar Subhamani, MD¹

¹ Department of Social Medicine, Lampang Hospital, Lampang, Thailand

Background: Prior research has demonstrated the impact of palliative care (PC) consultation in lessening re-hospitalization rates for patients with advanced lung cancer. Nevertheless, the effect of PC consultation on patients with metastatic non-small cell lung cancer (NSCLC) remains insufficiently explored within the Asian population.

Objective: To compare the re-hospitalization rates between patients with metastatic NSCLC who received PC consultation and those who did not.

Materials and Methods: A retrospective cohort was conducted in patients who were diagnosed with metastatic NSCLC at Lampang Hospital between 2019 and 2022. Duration of the follow-up was estimated from the inception of diagnosing metastatic lung cancer appeared in the medical records until either the last hospital visits or the death date. All patients' medical records were followed-up until June 2023. PC consultation was indicated when a PC consultation was documented in the hospital's medical record. The patients' all-cause re-hospitalization was defined as the hospital admission events of the inclusive samples, regardless of the causes of admission. The unplanned re-hospitalization visit was defined as patients' hospital admission unappointed for any purposes of treatment or follow-up by the hospital. Multiple Poisson regression analyses were employed to examine the associations.

Results: Two hundred twenty-three metastatic NSCLC patients were included in the present study with 28.7% who received PC consultation. Patients receiving PC consultation were associated with lower chances of all-cause re-admission at 1-year (aIRR 0.767, $p=0.027$) and 2-year follow-up (aIRR 0.783, $p=0.036$). PC consultation was also associated with a lower rate of unplanned re-admission at 1-year (aIRR 0.751, $p=0.029$) and 2-year durations (aIRR 0.766, $p=0.037$).

Conclusion: Findings of the present study advocate for the implementation of PC consultation in metastatic NSCLC patients as it could reduce re-hospitalization.

Keywords: Metastatic non-small cell lung cancer; Palliative care; Re-hospitalization

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Recent clinical guidelines have consistently recommended offering specialized palliative care (PC) to patients with advanced-stage cancers⁽¹⁾, as evidence has shown that PC can improve quality of life of these patients⁽²⁻⁵⁾. This includes the recommendations for current practice of lung cancer, which is the second most prevalent cancer globally⁽⁶⁾.

Correspondence to:

Thatayu W.
Department of Social Medicine, Lampang Hospital, Amphur Muang,
Lampang, 52000, Thailand.
Phone: +66-54-237400
Email: mintwararatt@gmail.com

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Statistics showed that there were approximately 2 million new cases of lung cancer worldwide, with 1.6 million deaths in 2020⁽⁷⁾. Despite various treatment options available, such as chemotherapy, immunotherapies, and targeted therapies, most patients remain experiencing physical and psychological burdens from disturbing symptoms, such as dyspnea, pain, depression, and anxiety, resulting in low quality of life^(8,9). Burden of disease progression, together with added stress from treatments, could cause patients to be hospitalized, which inevitably incurred medical expenses⁽¹⁰⁻¹²⁾.

In Lampang Hospital, a palliative care team (PCT), an interdisciplinary care team that includes doctors, nurses, and social workers, has been established to provide consultations. PC consultation is currently available as an option for attending physicians who seek to give care such as for pain and

symptom management, family meeting, advance care planning, or psychological support, for the patients. In addition to the hospital care, the PCT also includes hospital-to-home services for continuity of care after discharging patients, called palliative home care (PHC)⁽¹³⁾. PHC helps not only to reassure patients and caregivers about the provision of home care, but also reduces the number of re-hospitalizations and subsequent costs⁽¹⁴⁻¹⁶⁾.

There is little evidence exhibiting the effect of PC consultation on the re-hospitalization rate. Vranus et al.⁽¹⁷⁾ studied the association between initial PC use and hospitalization rate among 23,142 advanced lung cancer patients in the U.S. between 2007 and 2013. The results indicated that, comparing with the conventional treatment, initial PC encounter decreased a 30-day probability of re-admission by 36%⁽¹⁷⁾.

Regarding this, none of the existing literature demonstrates the association of PC consultation with re-hospitalization in the Asian population in metastatic non-small cell lung cancer (NSCLC) patients. The present study aimed to compare the re-hospitalization rate of metastatic NSCLC patients who received PC consultation, in relation to their counterparts.

Materials and Methods

A retrospective cohort study was conducted, using the data from electronic medical records at Lampang Hospital. Data of the patients diagnosed with metastatic NSCLC, defined by ICD-10 codes, were retrieved. Only patients that either had a hospital admission or did an out-patient visit at Lampang Hospital between 2019 and 2022 were included in the present study. Patients treated using targeted therapy, chemotherapy, or immunotherapy were excluded. Patients with unknown date for the diagnosis of metastatic lung cancer were also excluded. The present research was approved by the Ethics Committee of Lampang Hospital (No.183/66).

Duration of follow-up was estimated from the inception of diagnosing metastatic lung cancer appeared in the medical records until either the last hospital visits or the death date. All patients' medical records were followed-up until June 2023.

In Lampang Hospital, patients receiving PC could be managed by their attending physicians, such as oncologists or other relevant specialists. Alternatively, these patients might be co-managed by both the attending physician and a PCT following a referral initiated through the hospital's consultation

system. The need for a PC consultation was documented in the patient's medical record when a referral by the attending physician was requested.

The patients' all-cause re-hospitalization was defined as the hospital admission events of the inclusive samples, regardless of the cause of admission or the presence of hospital arrangement. On the other hand, the unplanned re-hospitalization visit was defined as patients' hospital admission unappointed for any purposes of treatment or follow-up. Factors including age and gender were retrieved to use in the analysis.

A chi-squared test was applied to explore the association of the categorical variables with PC consultation status. Multiple Poisson regression analyses were employed to examine the associations of re-admission with PC consultation, adjusted for covariates. An alpha of 0.05 was applied to determine the significance level. The statistical analyses were performed with Stata, version 13 (StataCorp LP, College Station, TX, USA)⁽¹⁸⁾.

Results

Two hundred twenty-three patients with metastatic lung cancer were included in the present study that included 28.7% who received PC consultation. The result of all-cause re-hospitalizations revealed that 90.6% and 98.4% of patients who received a PC consultation were readmitted within the 1-year and 2-year follow-up periods, respectively. This proportion was lower than their counterparts who did not receive a PC consultation at 96.9% and 99.7% for 1-year and 2-year follow-up, respectively. At the 1-year follow-up, 79.7% of patients who received a PC consultation experienced an unplanned readmission, compared to 83.7% of their counterparts, as shown in Table 1.

Table 2 shows the associations between PC consultation and re-hospitalization at 1-year and 2-year follow-up periods. Compared with patients without PC consultation, patients receiving PC consultation were associated with 23.3% and 21.7% lower chances of all-cause re-admission at 1-year and 2-year follow-up, respectively. Additionally, PC consultation was associated with a lower rate of unplanned re-admission at 1-year (adjusted IRR 0.751, $p=0.029$) and 2-year durations (adjusted IRR 0.766, $p=0.037$), compared with their counterparts without PC consultation.

Discussion

The present research demonstrates that

Table 1. Demographic characteristics of the samples stratified by palliative care consultation

Demographic characteristics	Palliative care consultation; n (%)		p-value
	Yes	No	
Total	64 (28.7)	159 (71.3)	
Sex			0.499
Male	37 (57.8)	84 (52.8)	
Female	27 (42.2)	75 (47.2)	
Age group (years)			0.195
<60	9 (14.1)	44 (27.7)	
60 to <70	28 (43.8)	56 (35.2)	
70 to <80	18 (28.0)	45 (28.3)	
≥80	9 (14.1)	14 (8.8)	
Number of all-cause re-admissions visit within 1 year			0.140
0	6 (9.4)	5 (3.1)	
1	32 (50.0)	97 (61.1)	
2	15 (23.4)	38 (23.9)	
≥3	11 (17.2)	19 (11.9)	
Number of all-cause re-admissions visit within 2 years			0.477
0	1 (1.6)	1 (0.6)	
1	33 (51.6)	99 (62.3)	
2	19 (29.8)	39 (24.5)	
≥3	11 (17.2)	20 (12.6)	
Number of unplanned re-admissions visit within 1 year			0.454
0	13 (20.3)	26 (16.3)	
1	30 (46.9)	86 (54.1)	
2	12 (18.8)	34 (21.4)	
≥3	9 (14.0)	13 (8.2)	
Number of unplanned re-admissions visit within 2 years			0.609
0	8 (12.5)	23 (14.5)	
1	33 (51.6)	87 (54.7)	
2	14 (21.9)	36 (22.6)	
≥3	9 (14.0)	13 (8.2)	

receiving PC consultation significantly decreased the probabilities of hospital re-admission at both one- and two-years duration. Compared with their counterparts, patients who received PC consultation reduced the chances of all-cause and unplanned re-admission during the first year by 23% and 21%, respectively. Moreover, within the 2-year period, the probabilities of all-cause and unplanned re-admission decreased by 24% and 23%, respectively. Results of the present study resonated with findings from the previous research⁽¹⁷⁾, which exhibited a 36% reduced chance of re-admission after receiving PC consultation. One reason to explain the differences may be owing to different populations used in the studies.

Pertaining to the decreased re-admission from

Table 2. Associations between PC consultation and re-hospitalization at 1-year and 2-year follow-up using multiple Poisson regression analyses

Variables	All-cause re-admission			Unplanned re-admission		
	aIRR	SE	p-value	aIRR	SE	p-value
1-year duration						
PC consultation	0.767	0.919	0.027	0.751	0.098	0.029
Female	0.807	0.862	0.044	0.795	0.093	0.048
Age group (years)						
• <60	Ref.			Ref.		
• 60 to <70	0.809	0.121	0.155	0.840	0.138	0.289
• 70 to <80	0.833	0.125	0.224	0.846	0.141	0.316
• ≥80	1.121	0.207	0.536	1.266	0.251	0.235
2-year duration						
PC consultation	0.783	0.092	0.036	0.766	0.098	0.037
Female	0.773	0.081	0.014	0.745	0.085	0.010
Age group (years)						
• <60	Ref.			Ref.		
• 60 to <70	0.704	0.104	0.017	0.717	0.117	0.042
• 70 to <80	0.800	0.119	0.135	0.813	0.134	0.209
• ≥80	1.048	0.193	0.799	1.194	0.236	0.370

aIRR=adjusted incidence rate ratio; SE=standard error

PC consultation, these findings advocate for the implementation of PC consultation in end-stage lung cancer patients, which could reduce re-hospitalization and thus decrease subsequent medical costs for these patients.

Despite its promising effects to reduce healthcare resource utilization, the present study revealed that only 28.7% of lung cancer patients had access to PC. Limited access to PC might be due to various factors, including limited resources, inadequate training for healthcare professionals, or absence of strong policies supporting PC. More research exploring this issue in a qualitative manner is encouraged to gain a better understanding of this domain⁽²⁾.

Previous research has suggested that early PC delivery leads to decreased symptom burden, and extended survival⁽¹⁹⁾. Nonetheless, the present study investigated the association of PC with the re-admission without considering the time of PC exposure. This aspect remains unexplored in the present research, indicating a potential area for future investigation.

While the present research unveiled the impact of PC consultation on the reduced rate of re-hospitalization, there are other healthcare utilizations such as outpatient visits, emergency department visits, intensive care unit visits, and home care. These utilizations compose the total medical costs. Future

studies could broaden their scope to encompass a wider range of healthcare utilization, aiming to enhance physician comprehension of how PC impacts the overall healthcare use.

The present study is limited by its reliance on secondary data extracted from medical records. Consequently, it was not possible to capture other potentially relevant information, such as underlying diseases, the Palliative Performance Scale (PPS) scores of the patients, and factors pertaining to their caregivers. Additionally, a limitation concerning a small sample was noted due to the targeted patients being considered rare. Future research, performing adjusted analysis using data from multiple sites to improve the reliability of the results, is recommended.

Conclusion

Results from the present study revealed a decreased rate of all-cause and unplanned re-admissions in both the 1-year and 2-year duration of the metastatic NSCLC receiving PC consultation. However, less than one-third of lung cancer patients had access to PC consultation. These findings advocate for the implementation of PC consultation in end-stage lung cancer patients, which could reduce re-hospitalization.

What is already known on this topic?

Existing research has shown that PC consultation can reduce re-hospitalization rates for patients with advanced lung cancer. However, the effect of PC consultation on patients with metastatic NSCLC in the Asian population is not well understood.

What does this study add?

This study adds to the existing knowledge by providing evidence that PC consultation can reduce re-hospitalization rates at both 1-year and 2-year follow-up for patients with metastatic NSCLC in the Asian population. The findings support the implementation of PC in these patients to reduce medical resource utilization.

Conflicts of interest

The authors declare no conflict of interest.

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