A Pilot study of using Smartphone Application Versus Routine follow up for patients care in Advanced Non-Small Cell Lung Cancer (NSCLC)

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Background: There are many promising data supporting that web-based patient reported outcome (PRO) improved quality of life (QoL), progression free survival (PFS), and overall survival (OS) in patients with advanced NSCLC who were treating with specific therapy. Lung Cancer Care application is a mobile application program that provides patients with individually tailored information on patient reported outcome. This study aims to invent a new mobile application evaluating PRO for Thai NSCLC patients, and to evaluate the validity of mobile application.

Methods: Our mobile application-based PRO under the name of “Lung Cancer Care application” was designed for monitoring quality of life and adverse events from specific treatment. The validity of the application was tested following guidelines for translating, and validating a questionnaire. Moreover, we compared the outcome of progressive disease (PD) between this application and the results from standard CT scan. The quality of life score (FACT-L score) and five different symptoms score were contained in the mobile application-based PRO, which was based on self-scored patient symptoms. After the validated mobile application-based PRO was tested, patients with advanced NSCLC were randomly assigned to use mobile application-based PRO versus routine follow-up. The primary endpoint was to compare quality of life (QoL) score at baseline and 3 months after randomization. Secondary endpoint was OS.

Results: From August to December 2018, thirty-three patients with advanced NSCLC were enrolled. The mean of FACT-L score at baseline in mobile application-based PRO arm and routine follow up arm was similar (90.08 ± 5.66 vs 91.78 ± 5.26, p-value=0.82). Patients with mobile application group had more FACT-L score at 3 months than patients with routine follow up arm (106 ± 5.97 vs 99.96 ± 5.74, p-value = 0.07). There was a trend towards increased in different mean of FACT-L score at baseline and 3 months in patients with mobile application compared to patients with routine follow up (p-value = 0.05). The median follow-up time was 5.43 months, patients with mobile application had longer median OS than patients with routine follow up (4 months vs 2.9 months, p-value = 0.5). The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of this application for predicting disease progression were 50%, 83.3%, 66.7%, and 70% respectively.

Conclusions: Lung Cancer Care application based on self-reported symptoms is a novel electronic device for real-time patient care monitoring. Our study results showed trend towards improved quality of life from using this novel mobile application. However, there was small samples for pilot testing, the relatively large sampling errors may reduce the statistical power needed to validate this tool.

Keywords: Advanced non-small cell lung cancer (NSCLC), Mobile application, Patient reported outcome (PRO)