Cost utility of Tyrosine Kinase Inhibitors versus Chemotherapy in advanced Non-small Cell Lung Cancer Patients in Rajavithi Hospital

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Background: The survival of advanced non-small cell lung cancer (NSCLC) patients with epidermal growth factor receptor (EGFR) gene mutations has improved substantially in the last decade with the development of targeted tyrosine kinase inhibitors (TKIs). However, EGFR TKIs had high cost and did not include in the National List of Essential Medicine in Thailand. The present study aimed to compare the cost-effectiveness of using EGFR TKIs and chemotherapy in advanced NSCLC patients.

Methods: The cross-sectional study was collected by real-life lifetime cost including lifetime healthcare expenditures and out of pocket cost in advanced NSCLC patients who were treated in Oncology unit, Rajavithi hospital during January 1st, 2013 to December 31st, 2018. The primary end point was the incremental cost-effectiveness ratio (ICER) of the treatment between EGFR TKIs and chemotherapy. The second objectives were survival outcome, Quality-adjusted life expectancy (QALE) and lifetime cost different.

Results: Two hundred and forty-six advanced stage NSCLC patients were eligible in cost effective analysis, included 184 patients receiving chemotherapy and 62 patients receiving EGFR TKIs. Majority of patients had adenocarcinoma subtype and good ECOG performance status. The EGFR TKIs group had more females and never smoker patients than chemotherapy group. Of the 63 positive of EGFR mutation patients, 63.4% had exon 19 deletion, 25.3% had exon 21 (L858R) mutation, and 6.3% had exon 20 insertion. For EGFR TKIs group, 41 patients used in first line treatment, 16 patients used in second line, and 5 patients used in beyond second line treatment.
The lifetime healthcare expenditure was 159,491 Bahts/year in chemotherapy group which was significantly lower than EGFR TKIs group (674,134 Bahts/year, $p<0.001$). However, the difference in QALE was not statistically significant between the chemotherapy group and EGFR TKIs group (1.80 QALY vs. 2.93 QALY, $p=0.58$). EGFR TKIs had an ICER of 456,908 Bahts/QALY compared with chemotherapy. The median follow-up time was 12.6 months. The median survival was 30.2 month in EFGR TKIs group, which was significantly better than those for chemotherapy group (12.2 months, $p < 0.001$).

Conclusions: Treatment for advanced NSCLC patients with EGFR TKIs had a longer survival compared with chemotherapy. However, according to the ICER threshold of 160,000 Bahts/ QALY in Thailand, EGFR TKIs appears not to be cost-effective. The further study of cost effectiveness analysis for EGFR TKIs should be done for first line treatment in a prospective or multicenter study and use the current cost of TKIs.