Cost-effectiveness Analysis of Adjuvant Alectinib versus Platinum-based Chemotherapy in Resected ALK-Positive Non–Small-Cell Lung Cancer in the Chinese Health Care System

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INTRODUCTION

- Lung cancer has the highest incidence and mortality rates among all malignant tumors worldwide[1].
- Non-small-cell lung cancer (NSCLC) accounts for approximately 85% of lung cancer patients, with anaplastic lymphoma kinase (ALK) rearrangements occurring in approximately 3%-7% of NSCLC patients[2].

OBJECTIVES

- This study aimed to evaluate the economic value of alectinib compared to platinum-based chemotherapy for treating early-stage ALK-positive NSCLC from the perspective of the Chinese health care system.

METHODS

- **Perspective:** health care system
- **Target population:** patients with early-stage ALK-positive NSCLC in China.
- **Model:** A validated 6-state Markov model with 21-day cycle was constructed to estimate the lifetime incremental cost-effectiveness ratio (ICER). The states in the model include the disease-free survival (DFS) state, locoregional recurrence state, remission state, metastatic not progressed state, metastatic progressed state and the death state (Figure 1).
- **Clinical input:** Patient started and remained in the DFS state as long as they were event-free. The main clinical input was the transition probabilities to experience a recurrence which was extrapolated from the ALINA trial[3]. Several parametric distributions were assessed and the preferred distribution of DFS curves was Gompertz for alectinib and log-normal for chemotherapy (Figure 1). Other clinical inputs were taken from the CROWN trial for lorlatinib[4] and a real world study for alectinib[5]. Utilities for each health state were derived from a multicenter cross-sectional study conducted by China Pharmaceutical University and Beijing University of Chinese Medicine from June 2022 to April 2024 across 18 provinces or cities in China, involving 20 hospitals (Tabel 1).
- **Cost inputs:** The modelled cost comprised drugs, administration, adverse events management, follow-up and therapeutic costs. All costs were obtained from real world data and local published resources (Tabel 2).
- **Sensitivity analysis:** One-way sensitivity analysis and probabilistic sensitivity analysis were adopted to verify the robustness of the results.

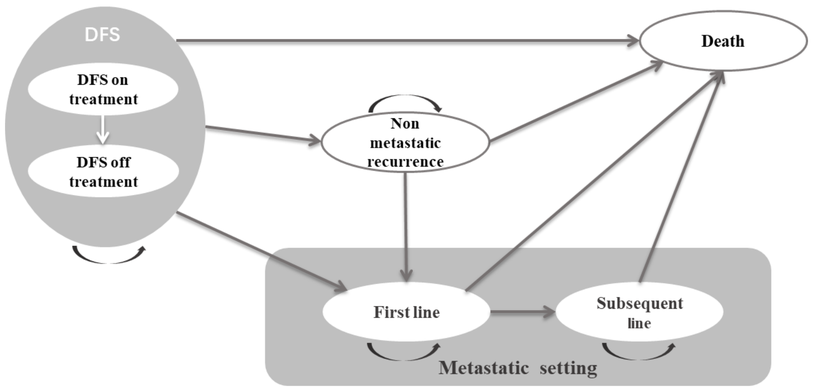

Figure 1 Markov Model

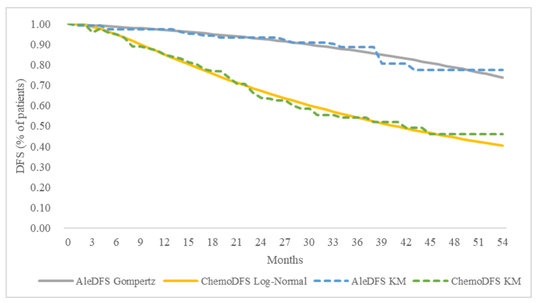

Figure 2 Parametric survival distributions

Table 1 Utilities

State	Utilities
DFS (on treatment)	0.845
DFS (off treatment)	0.872
Nonmetastatic recurrence	0.845
1L metastatic recurrence	0.805
Subsequent line metastatic recurrence	0.741

Table 2 Costs

Direct costs per cycle	Value ($)
Chemo in DFS	412.87
Follow-up visit for 0 to 5 years	24.42
Follow-up visit after 5 years	12.21
Administration	43.36
Cost of treatment for nonmetastatic recurrences (Ale group)	334.95
Cost of treatment for nonmetastatic recurrences (Chemo group)	338.15
Cost of treatment for 1 L metastatic recurrences	1,855.02
Cost of treatment for subsequent line metastatic recurrences (Ale group)	2,659.42
Cost of treatment for subsequent line metastatic recurrences (Chemo group)	2,719.49
End of life	1,967.49
Chemo in DFS	412.87

RESULTS

Base Case Results

- The alectinib group resulted in 11.44 LYs and 9.82 QALYs, with a cost of $75,562.
- The platinum-based chemotherapy group resulted in 9.42 LYs and 7.97 QALYs, with a cost of $56,317.
- The proportion of LYs spent in the DFS health state was 82.95% with alectinib and 66.94% with platinum-based chemotherapy.
- Compared to adjuvant chemotherapy, the upfront costs of 2-year adjuvant alectinib treatment were partly offset by reduced costs of subsequent treatment, administration, follow-up, and terminal care.
- The resulting ICERs of alectinib versus chemotherapy were $8,052/LY and $8,806/QALY.

Table 3 Base Case Results

Results	Ale	Chemo	Difference
LYs			
LYs in DFS	9.49	6.31	3.18
LYs in nonmetastatic recurrence	0.61	0.69	-0.07
LYs in 1L metastatic recurrence	1.18	2.05	-0.86
LYs in subsequent line metastatic recurrence	0.15	0.38	-0.23
Total LYs	11.44	9.42	2.02
QALYs			
QALYs in DFS	8.23	5.46	2.77
QALYs in nonmetastatic recurrence	0.52	0.58	-0.06
QALYs in 1L metastatic recurrence	0.95	1.65	-0.69
QALYs in subsequent line metastatic recurrence	0.11	0.28	-0.17
Total QALYs	9.82	7.97	1.84
Costs ($)			
Costs in DFS	42,245	2,514	39,731
Costs in nonmetastatic recurrence	573	675	-102
Costs in 1L metastatic recurrence	27,167	46,989	-19,822
Costs in subsequent line metastatic recurrence	2,074	5,327	-3,253
Costs in end-of-life care	502	812	-310
Total Costs	72,562	56,317	16,245
ICER ($/LY)	8,052		
ICER ($/QALY)	8,806		

Sensitivity Analyses Results

- One-way sensitivity analysis showed the results were generally robust (Figure 3).
- Probabilistic sensitivity analysis showed that PHT was more cost-effective in over 60% simulations at local threshold regardless of the perspective. (Figure 4 & Figure 5).

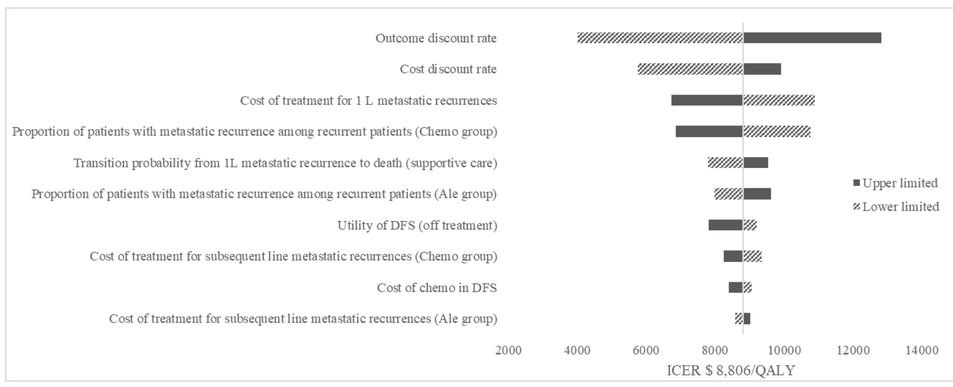

Figure 2 Tornado Diagram

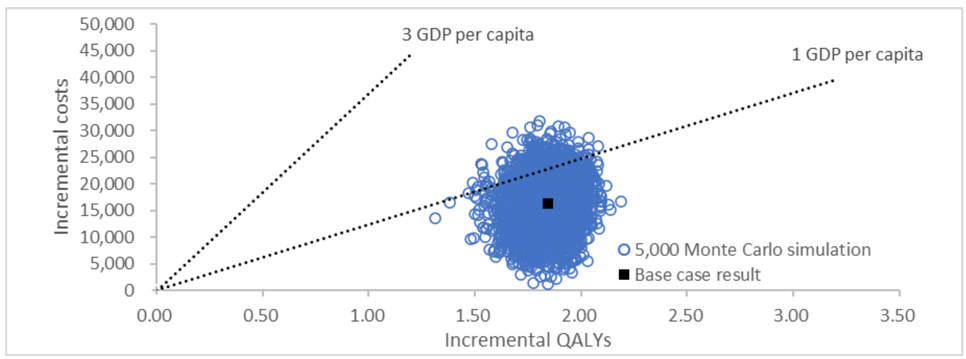

Figure 3 Incremental Cost-effectiveness Scatterplot

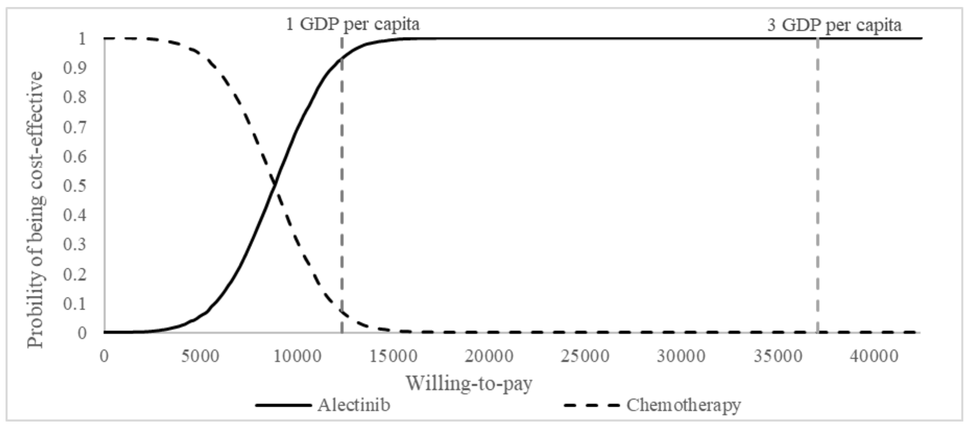

Figure 4 Cost-effectiveness Acceptability Curve

CONCLUSION

From the perspective of the health care system, alectinib appears to be the preferred cost-effective option in the adjuvant treatment for Chinese patients with resected early-stage ALK-positive NSCLC.

REFERENCES

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