Economic evaluation of envonalkib, iruplinalkib, and crizotinib in the treatment of anaplastic lymphoma kinase-positive advanced non-small-cell lung cancer in China

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Keywords

envonalkib, iruplinalkib, crizotinib, cost-effectiveness, multiple myeloma, partitioned survival model

Background

- Envonalkib and iruplinalkib demonstrated promising anti-tumor activity and safety in advanced anaplastic lymphoma kinase (ALK)-positive non-small cell lung cancer (NSCLC) in the first-in-human phase III study.

- This study examined the cost-effectiveness of *envonalkib, iruplinalkib*, and *crizotinib* in the Chinese healthcare setting.

Methods

- Participants: Advanced or metastatic NSCLC patients ALK-positive in whom no systemic treatment with ALK inhibitors has been received

- Data sources: *Two phase III* randomized, double-blind, multi-center *clinical trials* –See Fig.1
  - Compared envonalkib to crizotinib (NCT04009317)
  - Compared iruplinalkib to crizotinib (NCT03635749)

- Cost sources:
  - *Enavonalkib* (assuming that the price of envonalkib is the average of iruplinalkib, crizotinib, and alectinib)
  - *Iruplinalkib, crizotinib, and alectinib* (www.yaozh.com)

- Decision-analytical model and model inputs:
  - Model: Partitioned survival model (*PSM*)
  - Model cycle: *3 weeks*
  - Model time horizon: Lifetime range (*15 years*)
  - Main model output indicators: Cost, quality-adjusted life year (*QALY*), and incremental cost-effectiveness ratio (*ICER*)

- Analysis strategy:
  - Processing of survival data: R was used to reconstruct, fit and extend the original data. (*assuming* that the *OS distribution of envonalkib* = the best-fit distribution for *crizotinib in the OS curve*)

  $$\gamma_{intervention} = \gamma_{comparator} \times HR$$

  - Scenario analysis:
  - 1.Assuming that the OS curve of *envonalkib* = the OS curve of *iruplinalkib*
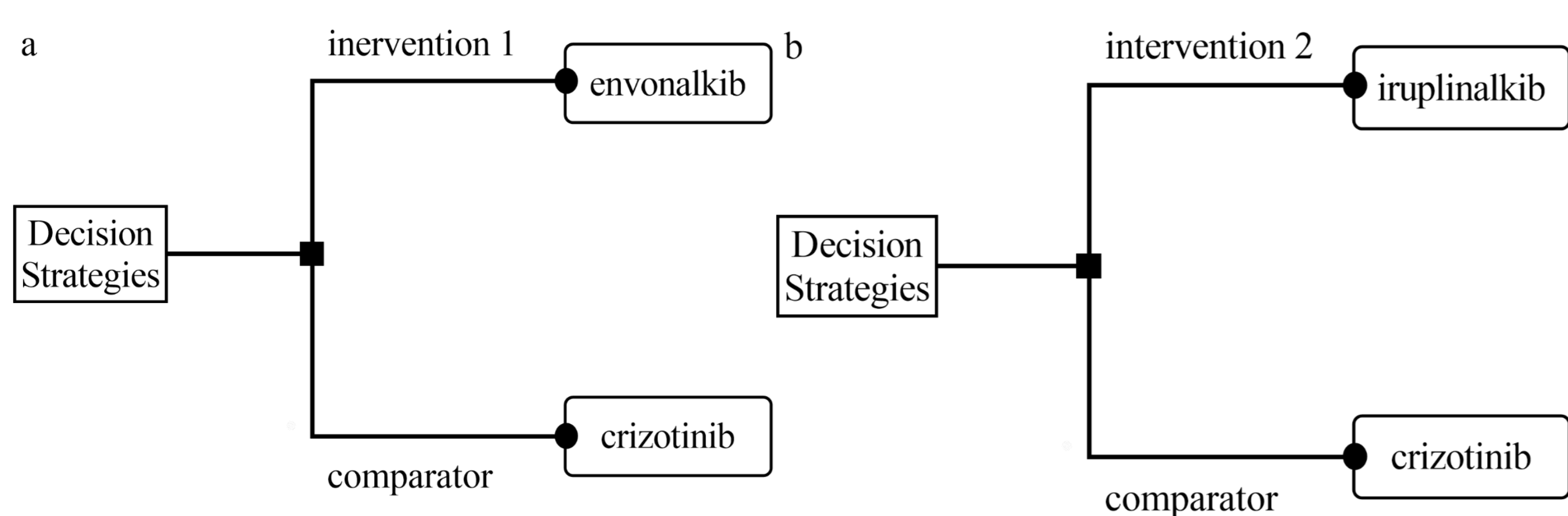 - 2.The utility value of the base analysis changed

Figure1 Decision strategies

Results

- The costs of envonalkib iruplinalkib, and crizotinib were *$178,999.54, $189,331.94, and $147,882.76* and the outcomes were *6.02, 4.18, and 2.93 QALY*, respectively.–See Tab.1

- The cost of iruplinalkib and the cost of envonalkib were the most consequential factors affecting the economy.–See Tab.3

- The results of the scenario analysis illustrated that the envonalkib was still the most cost-effective solution.–See Tab.2

Group	Cost	Incremental cost	Effectiveness/QALY	ICER
Envonalkib (vs iruplinalkib)	167,036.7	-22,295.2	0.16	-138,536.6
Envonalkib (vs crizotinib)		19,153.9	1.42	13,524.2

Table1 The results of base–case analysis

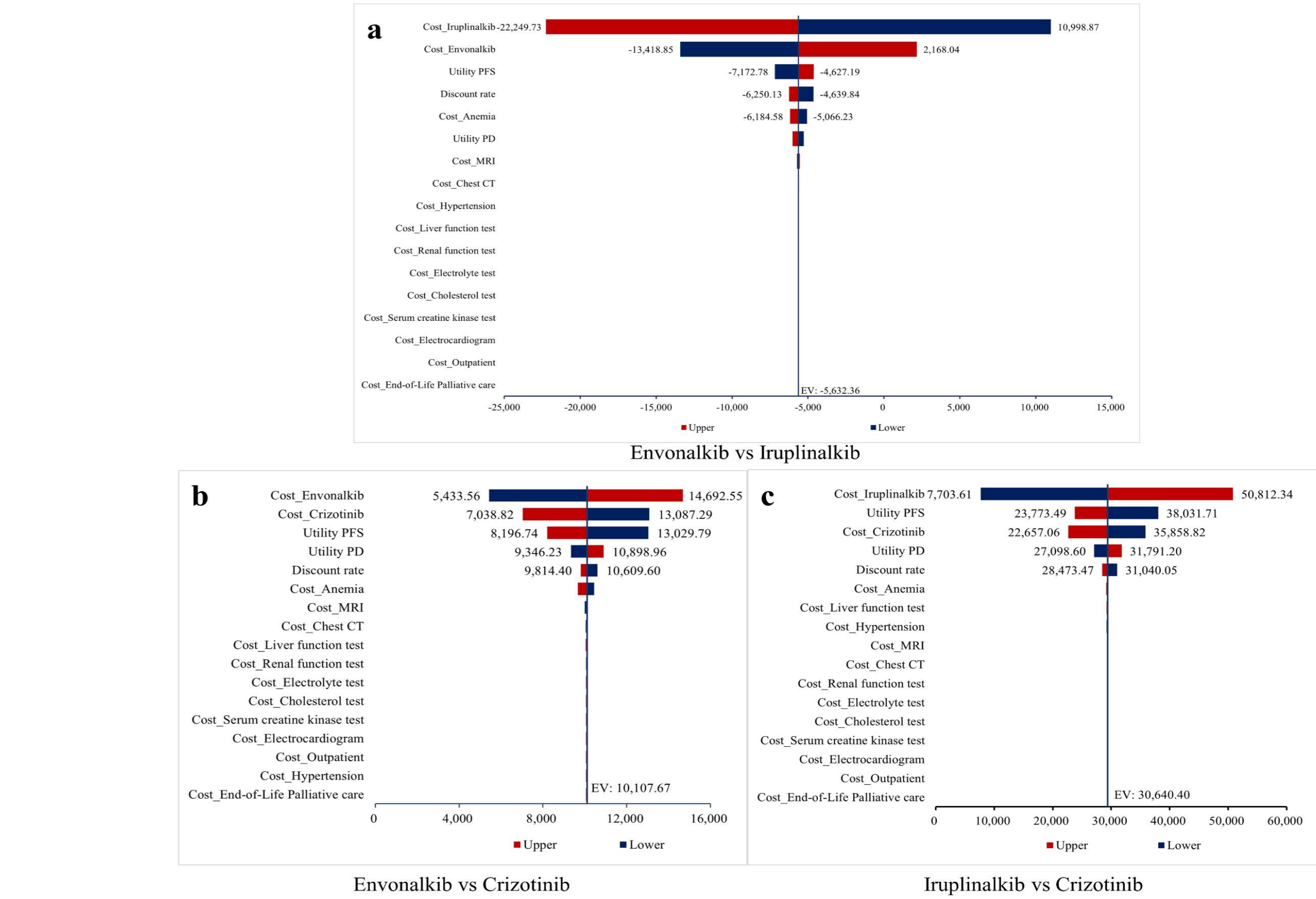| Group	Total QALYs	Incre QALYs	ICER
Envonalkib (vs iruplinalkib)	6.56 (5.61)	0.95	-10,874.34
Envonalkib (vs crizotinib)	6.56 (5.27)	1.29	24,135.23
Iruplinalkib (vs crizotinib)	5.82 (5.27)	0.55	74,692.93

Table2 Results of changed utility value
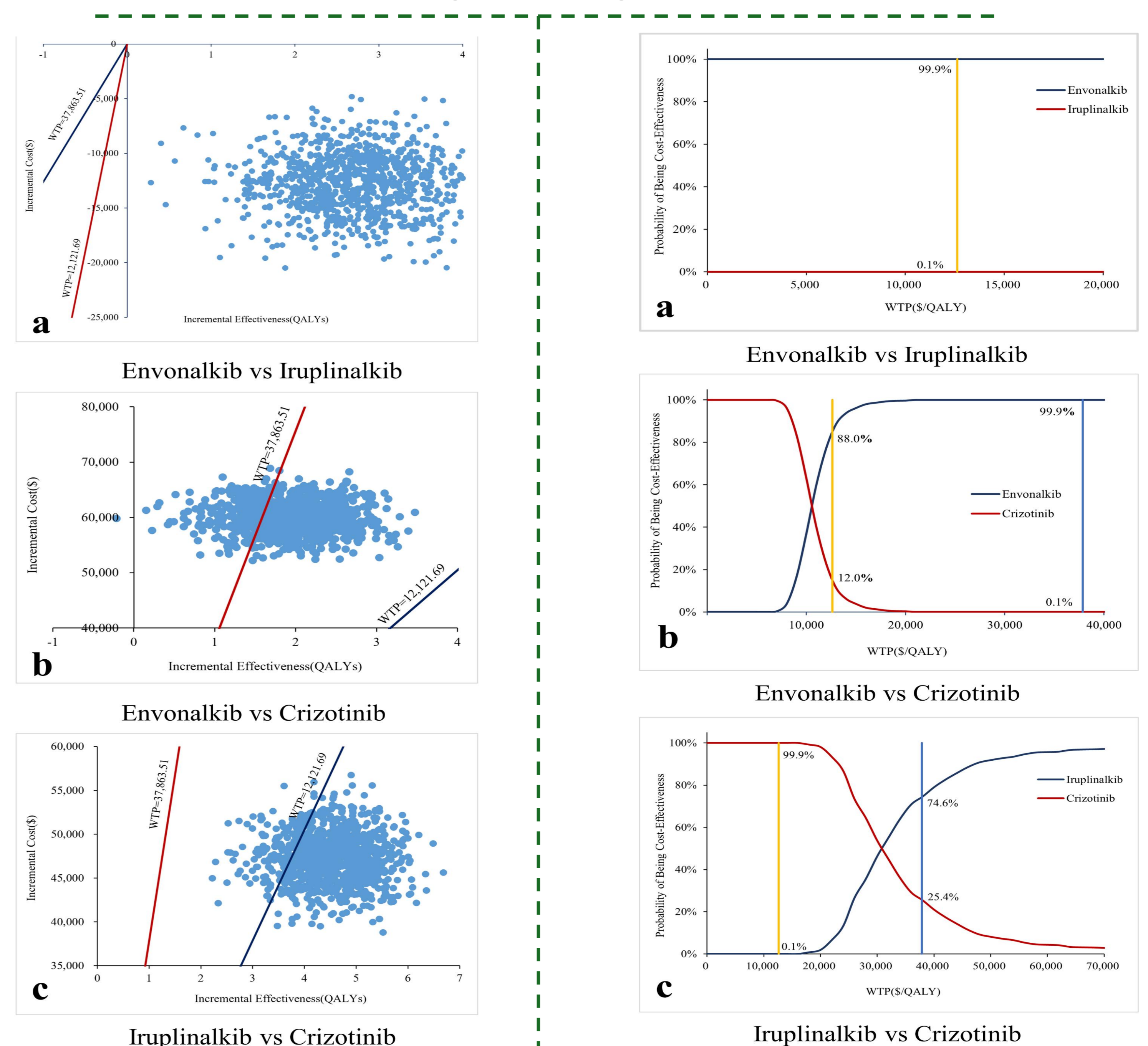
Figure2 Tornado diagram
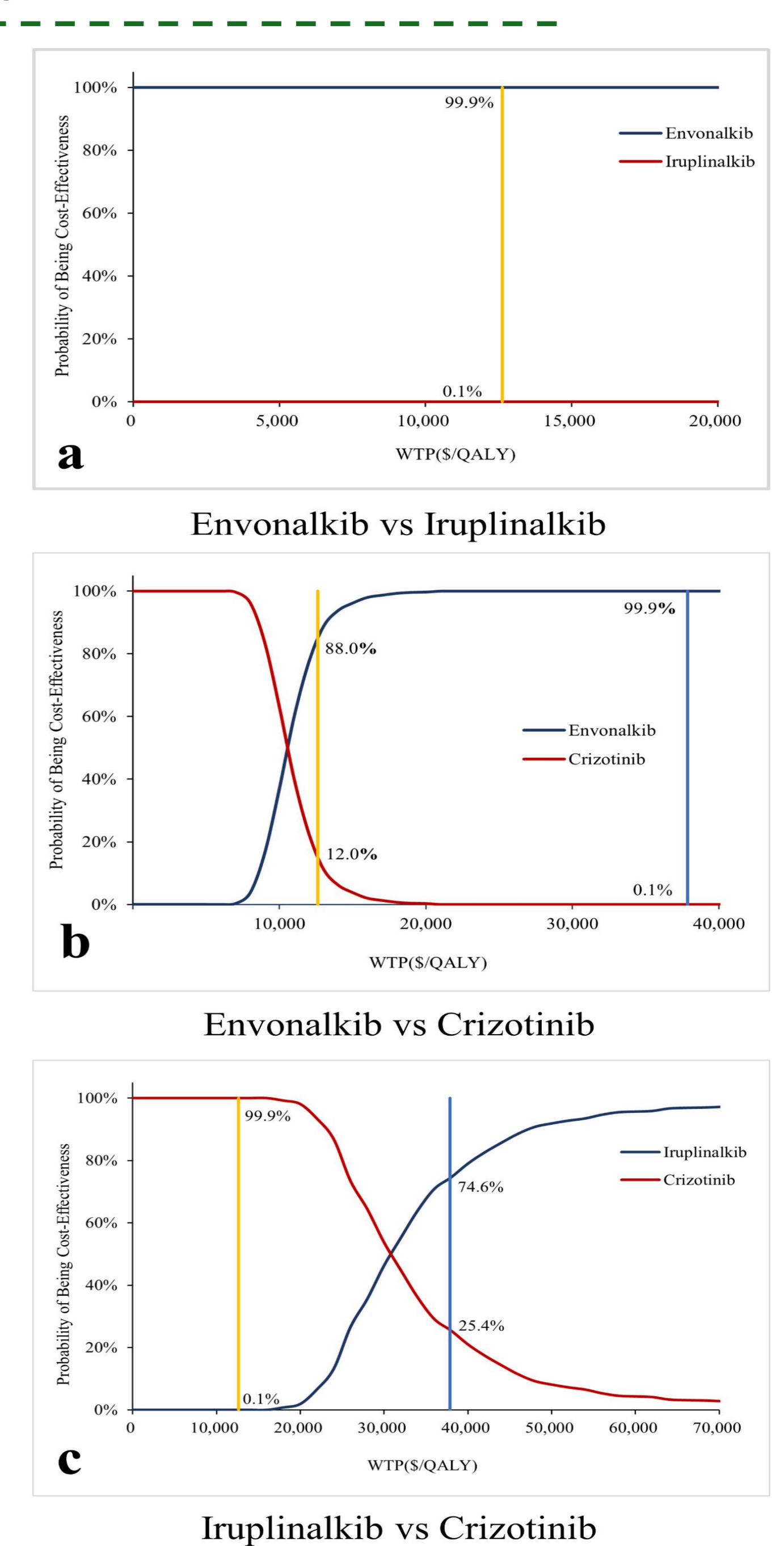
Figure3 Probabilistic sensitivity analysis

Figure4 Cost-effectiveness acceptability curve

Conclusions

- Envonalkib and iruplinalkib were dominant compared with crizotinib, and the ICER of envonalkib compared with iruplinalkib was *-5,625.41*, which was much greater than WTP.

- Envonalkib was the most economical drug compared with iruplinalkib and crizotinib *at the set price ($1,161.78)*, and *iruplinalkib was cost-saving and utility-increasing* compared to crizotinib.

- The ICER appeared to be modest with the WTP threshold for a high disease severity in ALK-positive NSCLC population.

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