Economic evaluation and budget impact of brigatinib versus other ALK-inhibitors for first-line ALK-positive non-small cell lung cancer (NSCLC) treatment in the Brazilian private healthcare system.

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EE 388

Background

- Non-small cell lung cancer (NSCLC) with ALK positive (ALK+) translocation usually affects young patients with no history of smoking.[1] They are associated with a high predisposition to metastases in the CNS, with approximately 30% already presenting with brain metastasis at diagnosis.[2]
- It is estimated that ALK fusion is present in ~5% of advanced NSCLC cases.[3] Targeted therapies that safely prolong progression-free time, that preserve quality of life, with rapid onset of action and that protect the central nervous system (CNS), are essential for these patients.
- No less important are the mid- and long-term clinical and economic impacts on the health system. ALK-inhibitors from 1st to 3rd generation are reimbursed in the Brazilian private healthcare system (i.e. crizotinib, alectinib, brigatinib and lorlatinib).[4]

Objectives

- The objective of this study was to estimate the cost-effectiveness of brigatinib versus crizotinib, the incremental costs versus alectinib and lorlatinib, and budget impact for first-line (1L) ALK+ NSCLC under the private system perspective in Brazil.

Methods

Cost-effectiveness model (CEM)

- A cost-effectiveness analysis of brigatinib versus crizotinib was developed based on final results of the phase 3, randomized clinical trial ALTA-1L.[5] An area under the curve model was developed on Excel using four health states: 1) pre-progression; 2) progression occurring in the CNS; 3) progression non-CNS; and 4) death (Figure 1a). Progression-free survival (PFS) and overall survival (OS) data were extrapolated for a 20-year time horizon. Parametric fit was assessed based on visual inspection with exponential fit selected for all parametric models (Figure 1b, 1c, 1d).
- Direct medical costs related to drug acquisition, monitoring, adverse event management and radiotherapy were considered. Health resource utilization was based on literature and expert opinion. All costs reflect the year 2023 in Brazilian Reais (BRL).[6,7] An annual discounting of 5% was applied for both costs and outcomes.

Cost-comparison

- Previous network meta-analysis (NMA) and indirect treatment comparison showed no significant difference between brigatinib, alectinib and lorlatinib efficacy, hence only cost comparisons were made. [8,9]

Budget impact model (BIM)

- A budget impact model from the Brazilian private system perspective was developed to assess the impact of introducing brigatinib over a 5-year time horizon. The analysis compared a scenario where brigatinib is not available and another scenario where it progressively replaces crizotinib and alectinib. Brigatinib market share increases from 10% on Y1 (2022) to 31% on Y5 (2026)
- Deterministic sensitivity analysis was conducted with +/- 20% variation for CEA and BIM.

Results

Key Take Aways

Brigatinib was dominant versus crizotinib (incremental 0.78 QALY and BRL -26,388 costs) and cost-saving versus alectinib (BRL -170,737) and lorlatinib (BRL -331,297). With 201 front-line ALK+ NSCLC patients starting treatment per year on average, brigatinib could save BRL 13.7 million (ranging from BRL 6.7mi to 23.7mi in savings) in 5-years for the private market.

Table 1: Incremental costs – base case results considering all direct medical costs

Intervention	Costs (BRL)	Incremental costs vs. brigatinib (BRL)
Brigatinib	1,143,987	-
Crizotinib	1,170,375	26,388
Alectinib	1,314,724	170,737
Lorlatinib	1,475,284	331,297

Table 2: Incremental effectiveness – base case results

Intervention	LY	QALY
Brigatinib	5,91	3,87
Crizotinib	5,18	3,09
Incremental	0,73	0,78

Figure 3: Tornado diagram - ICER

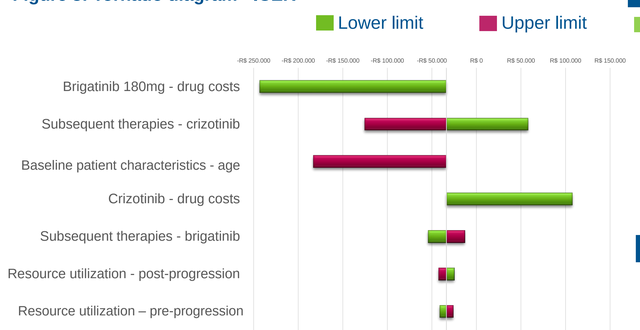
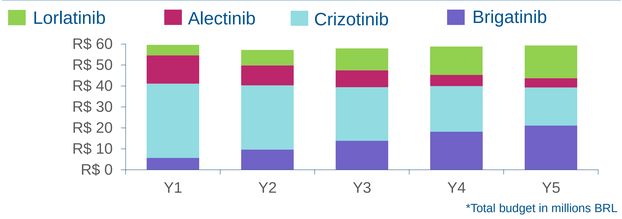


Table 3: Eligible population

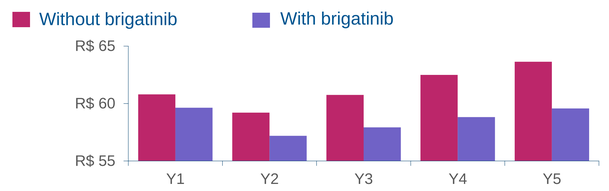
Y1	Y2	Y3	Y4	Y5
196	198	201	203	206

Figure 4A: Budget impact for scenario with brigatinib



*Total budget in millions BRL

Figure 4B: Incremental budget impact



*Total budget in millions BRL

Figure 1: a. Model structure b. Overall survival extrapolation c.PFS extrapolation d. CNS-PFS extrapolation

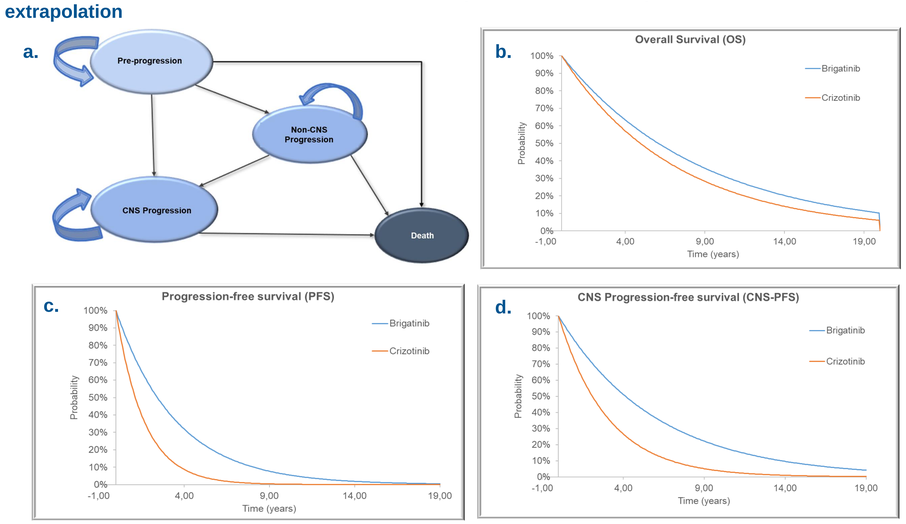
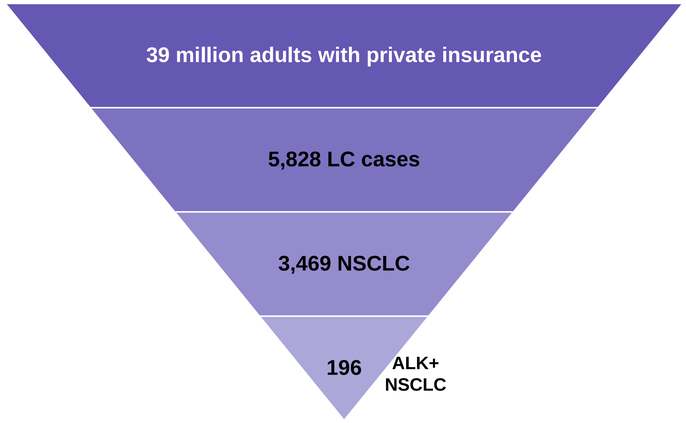


Figure 2: Incidence cases of ALK+ NSCLC



Conclusions

- Brigatinib showed gains of LY and QALY versus crizotinib at lower treatment costs.
- Brigatinib can be a dominant treatment for 1L NSCLC ALK+ patients when compared with crizotinib and a cost-saving option when compared with alectinib and lorlatinib
- Brigatinib can generate savings of BRL 13.7 million for the private healthcare system in Brazil in 5 years.
- There are limitations to cost comparison of brigatinib against lorlatinib. Although NMA indicates no significant difference in efficacy between treatments, the cost comparison may need to be updated when more mature data is available for the latter.

References

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Acknowledgments

IQVIA Brazil for support in economic model adaptation and medical writing.

Abbreviations

ALK: anaplastic lymphoma kinase; CNS: central nervous system; ICER: incremental cost-effectiveness ratio; LC: Lung cancer; LY: life years; NMA: network meta-analysis ;NSCLC: non-small cell lung cancer; OS: overall survival; PFS: progression-free survival; QALY: quality-adjusted life years

Disclosures

Funding statement: This work was funded by Takeda Brazil
Author disclosures: Souza PVS is a current employee at Takeda Brazil and has stock ownership from Takeda; Biglia LV; Sales ML are current employees at Takeda Brazil