RWD191

Real-World Medical Utilization and Outcomes Associated with Treatments for Advanced ALK-Positive Non-Small Cell Lung Cancer

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BACKGROUND

- Anaplastic lymphoma kinase (ALK)-positive non-small cell lung cancer (NSCLC) is a rare subtype primarily affecting non-smokers[1]
- Clinical trials show promising efficacy for ALK tyrosine kinase inhibitors (TKIs) such as alectinib, brigatinib, and lorlatinib[2-4]
- Lack of head-to-head comparisons and scarce real-world evidence (RWE) create significant treatment outcome uncertainty
- As an orphan disease with minimal data and high treatment costs, assembling large real-world samples remains challenging[5]
- Robust evidence to guide medical decision-making is therefore essential

OBJECTIVE

To evaluate real-world outcomes for patients with advanced ALK+ NSCLC receiving a first-line ALK tyrosine kinase inhibitor (TKI), focusing on drug acquisition costs, healthcare service utilization, and clinical outcomes.

METHODS

Study Design: Retrospective observational cohort study

Data Source: Optum Clinformatics Data Mart (CDM) administrative claims data from 2016 to 2021, covering a large national sample of commercially insured and Medicare Advantage patients in the US

Study Population: Advanced ALK-positive NSCLC patients initiating first-line treatment with an ALK tyrosine kinase inhibitor (TKI)

Inclusion Criteria (must satisfy both):

1) Lung cancer diagnosis, based on International Classification of Diseases, Tenth Revision [ICD-10] code: C34x
2) Receipt of any of the following ALK TKIs: alectinib, brigatinib, ceritinib, crizotinib, ensartinib, or lorlatinib

Exclusion Criteria:

1) Age < 18 years at index date (first ALK TKI fill)
2) <6 months of continuous enrollment on health plan prior to index date

Outcomes:

Healthcare Utilization and Costs:

- Utilization and costs were captured per-patient-per-month (PPPM) across pharmacy, inpatient, outpatient, professional, and ancillary services
- Costs were adjusted to 2024 USD using the Consumer Price Index (CPI)

Clinical Outcomes:

- Inpatient admissions
- Time-to-treatment discontinuation (TTD)
- Overall survival (OS)

Statistical Analysis:

Descriptive Statistics

- Baseline demographics, utilization, and cost summaries by treatment group

Generalized Linear Model (GLM)

- Examined factors affecting PPPM costs, using gamma distribution with a log link

Survival Analysis

- Kaplan-Meier Estimates: TTD and OS with Log-Rank test comparisons
- Cox Proportional Hazards Model: Assessed treatment association with TTD and OS, controlling for observable confounders

Additional Information:

- Analyses were conducted using SAS software, version 9.4 and STATA software, version 18.0

RESULTS

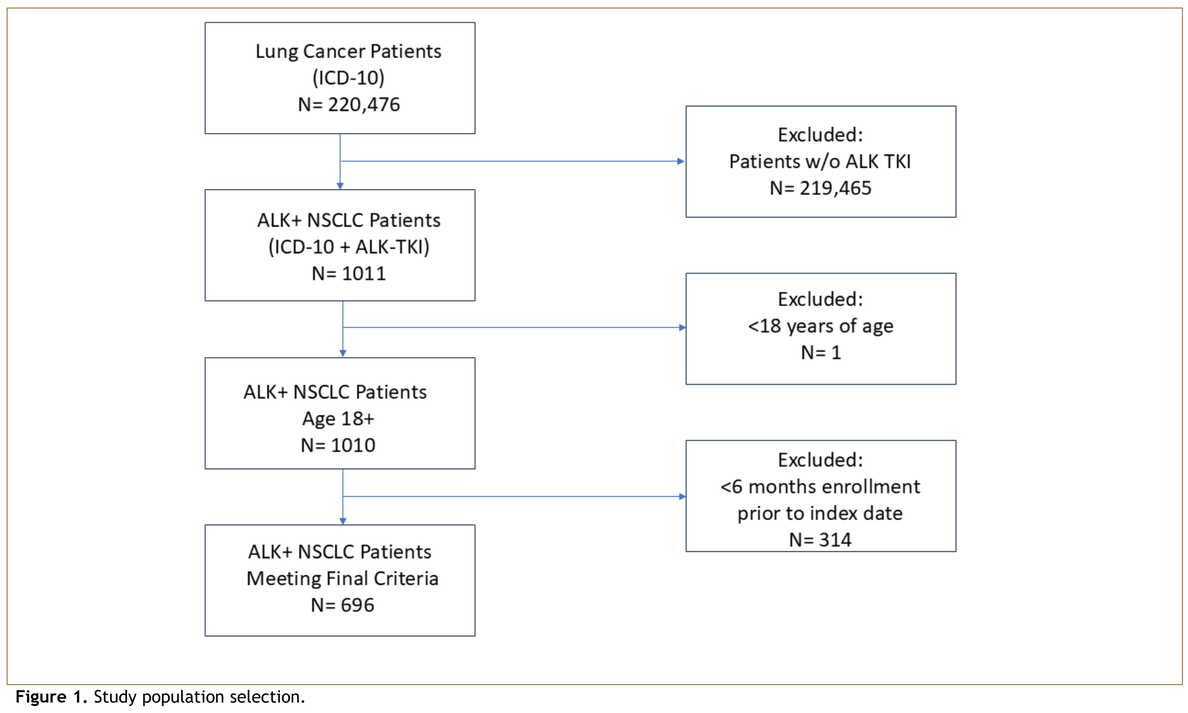

Figure 1. Study population selection.

Table 1. Patient Characteristics

Variable	n = 696
Age, years	
Mean (SD)	64.2 (13.7)
Sex, n (%)	
Male	317 (45.6)
Female	379 (54.4)
Race, n (%)	
White	438 (68.5)
Black	82 (12.8)
Hispanic	64 (10.0)
Asian	55 (8.6)
Insurance Type, n (%)	
Commercial	352 (50.6)
Medicare	344 (49.4)
Charlson Comorbidity Index (CCI) Score	
Mean (SD)	5.0 (2.2)
1st-line ALK TKI Type, n (%)	
Alectinib	267 (38.4)
Brigatinib	22 (3.2)
Ceritinib	25 (3.6)
Crizotinib	366 (52.6)
Lorlatinib	16 (2.3)

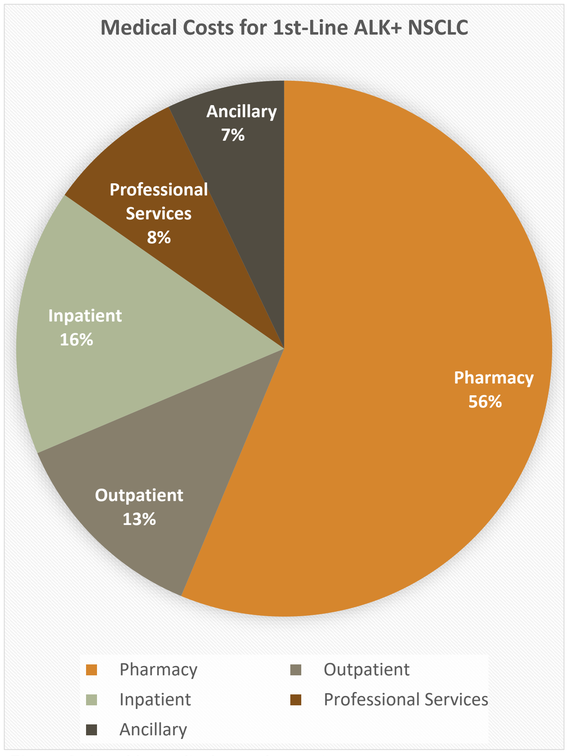

Figure 2. Monthly medical costs by service category.

Table 2. Results: Costs, Utilization, Overall Survival

Variable	Overall (n= 696)	Alectinib (n= 267)	Brigatinib (n= 22)	Ceritinib (n= 25)	Crizotinib (n= 366)	Lorlatinib (n= 16)
Follow-up Months, Median (IQR)	11.7 (4.3 - 26.2)	11.3 (4.8 - 22.8)	8.5 (6.0 - 11.8)	16.7 (10.2 - 35.1)	12.9 (3.9 - 31.1)	3.5 (2.7 - 8.6)
Costs (PPPM), Mean (SD)						
Pharmacy Costs	$15,879 (17,428)	$17,985 (23,699)	$17,397 (6866)	$12,186 (4967)	$14,509 (12,438)	$15,759 (9567)
Outpatient Costs	$3484 (5755)	$3476 (5665)	$3227 (4442)	$2972 (2044)	$3483 (6123)	$4768 (4070)
Inpatient Costs	$4542 (10,074)	$3261 (7779)	$2885 (5029)	$4422 (11,193)	$5380 (11,217)	$9199 (16,064)
Professional Services Costs	$2309 (6544)	$2504 (10,130)	$1852 (1416)	$1754 (1850)	$2190 (2396)	$3299 (3687)
Ancillary Costs	$2002 (6542)	$1857 (5756)	$1930 (4582)	$1388 (2962)	$2136 (7408)	$2387 (3926)
Total	$28,216 (29,017)	$29,083 (35,375)	$27,292 (10,592)	$22,722 (14,065)	$27,699 (25,530)	$35,414 (18,972)
Monthly 1L ALK TKI Costs, Mean (SD)		$17,135 (1750)	$18,474 (3051)	$14,844 (4183)	$18,836 (3154)	$18,484 (3040)
Clinical Outcomes						
Median Overall Survival, Months (95% CI)	25.5 (21.1 - 32.5)	41.1 (30.7 - NR)	NR	24.9 (14.9 - 43.7)	19.9 (16.2 - 25.5)	4.2 (2.8 - NR)
Inpatient Admissions, Mean (SD)	1.3 (1.8)	0.9 (1.3)	0.7 (1.2)	1.2 (1.4)	1.6 (2.1)	1.4 (1.6)

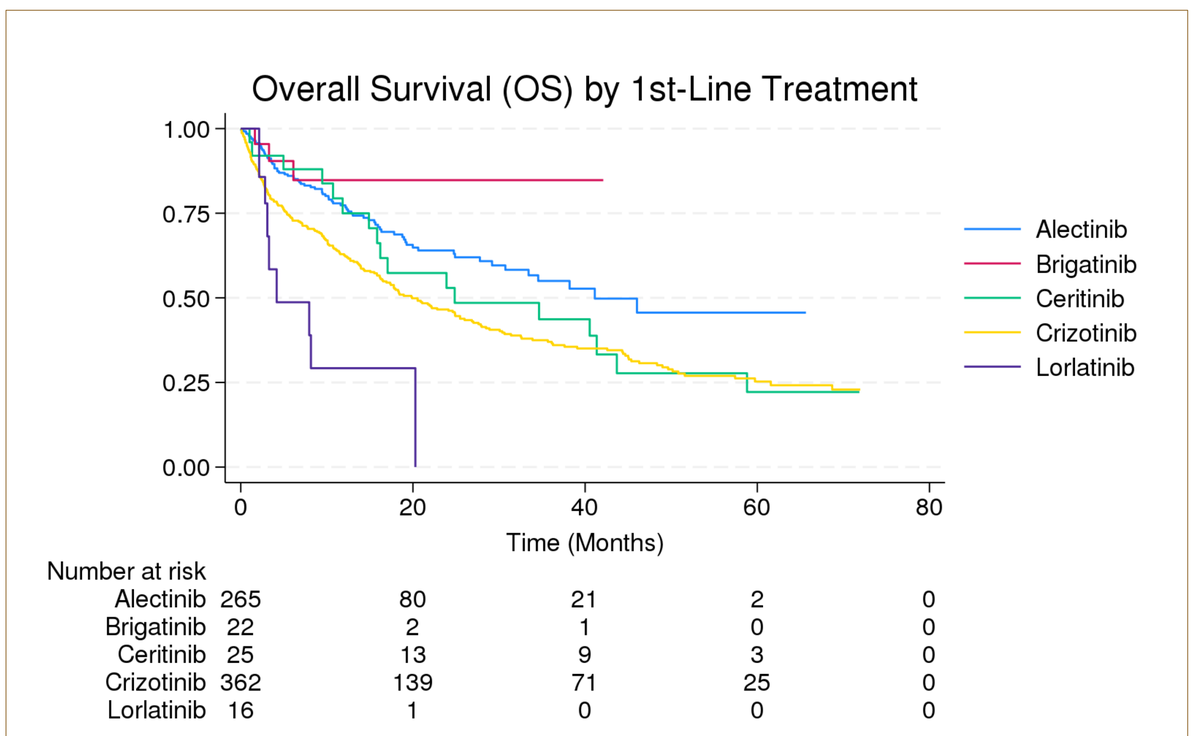

Figure 3. Kaplan-Meier estimates of overall survival by 1st-line treatment.

RESULTS

Costs:

- PPPM costs across all treatments were $28,216 (SD: $29,017), with lorlatinib patients incurring the highest costs due to frequent inpatient and outpatient care
- Of the 5 ALK TKIs examined, lorlatinib's average cost for a monthly supply was the highest, at $18,484 ($3040)

Inpatient Admissions:

- Crizotinib recipients had the most inpatient admissions, averaging 1.6 episodes (SD: 2.1)

Overall Survival (OS):

- Median OS for all patients was 25.5 months (95% CI: 21.1-32.5 months)
- Alectinib showed the longest median OS at 41.1 months (95% CI: 30.7 - not reached)

LIMITATIONS

Data Limitations:

- Patients could be misclassified as 1st-line users if prior ALK TKI prescriptions are unrecorded

Nonrandomized Design:

- Potential selection bias exists due to unobserved factors (e.g., tumor growth rate, TKI resistance), limiting causal inference regarding treatment effectiveness

CONCLUSION

Our study highlights the substantial economic burden, frequent healthcare resource utilization, and unfavorable clinical outcomes faced by patients with advanced ALK+ NSCLC.

Given the scarcity of real-world data, these findings contribute reliable estimates that can be used as model inputs in cost-effectiveness analyses, as well as add valuable insights for informed decision-making in the management of advanced ALK-rearranged NSCLC.

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