Cost analysis of managing brain metastases in anaplastic lymphoma kinase-positive non-small cell lung cancer in Greece.

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Background

- Lung cancer is a major public health problem worldwide in terms of diagnosis and mortality. In Greece, lung cancer was responsible for an estimated 8,960 new cases and 7,662 deaths in 2020[1].
- Approximately 3% to 7% of non-small cell lung cancer (NSCLC) cases are anaplastic lymphoma kinase-positive (ALK+) and may benefit from targeted ALK inhibitor treatment[2].
- ALK+ advanced NSCLC (aNSCLC) patients have a high risk of brain metastases (BM)[3]. BM occur in 15% to 35% of patients with ALK+ aNSCLC and the prevalence can rise to 60% over the course of first-line treatment [3].
- Patients with ALK+ aNSCLC that develop BM are confronted with significant morbidity, poor survival outcomes and a higher economic burden[4].
- Nevertheless, evidence on the cost associated with the management of ALK+ aNSCLC patients with BM receiving first-line treatment is still limited.

Objective

The aim of this study was to estimate the annual cost of managing aNSCLC ALK+ patients with and without BM and compare the relevant costs of BM patients treated in first-line with ALK inhibitors alectinib or lorlatinib in Greece.

Methods

- An excel-based model with one-year time horizon was adapted to evaluate the management cost of ALK+ aNSCLC patients with and without BM.
- Information was collected regarding the utilization of healthcare resources by ALK+ aNSCLC patients with and without BM.
- The cumulative annual incidence of BM was extracted from the ALEX clinical trial[5] for alectinib (9,4%, 95% CI: 5.4% - 14.7%) and the CROWN clinical trial[6] for lorlatinib (2,8%, 95% CI: 1.0% - 8.1%).
- A cost analysis was performed to compare the annual cost of managing patients with ALK+ aNSCLC treated with alectinib or lorlatinib.
- Resource utilization of patients with and without BM included diagnostic/laboratory tests, medical visits, hospitalizations, and medical procedures associated with BM treatment, as sourced from a published study[7].
- Direct medical costs (€, 2023) were extracted from publicly available official Greek sources[8,9].

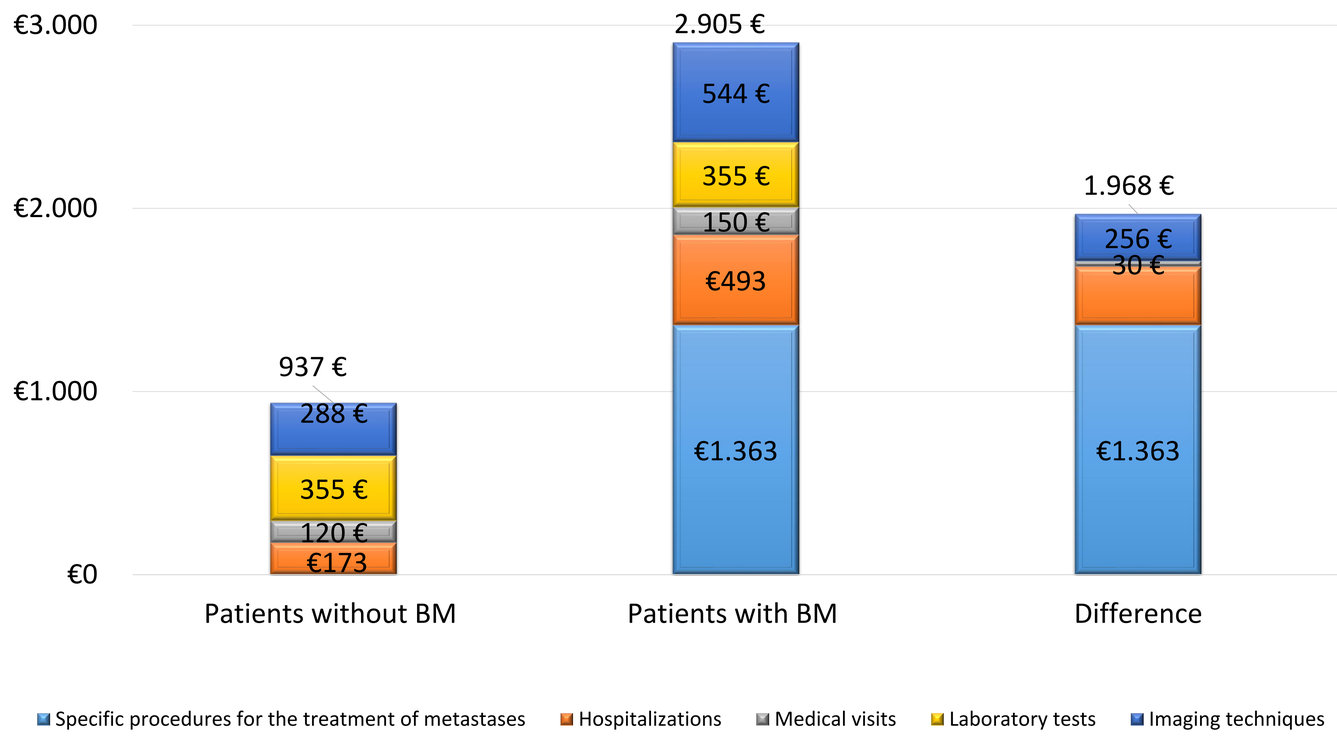
Table 1: Utilization of resources associated with the management of patients with versus without BM and unit costs

Resources	Patients without BM		Patients with BM		Unit cost[8-9]
	Patients (%)	Resources/year (n)	Patients (%)	Resources/year (n)	
Specific procedures for the treatment of metastases					
Holocranial brain radiotherapy	0	0	15	5	175 €
Radiosurgery or stereotactic radiotherapy	0	0	35	3	875 €
Surgical resection	0	0	2	3	5,209 €
None	0	0	48	0	0€
Hospitalizations					
Hospitalizations (metastases-procedures specific assumption)					
Medical oncology	10	1	10	1	1,734 €
Radiation oncology	0	0	0	0	2,429 €
Hospitalizations (Non-metastases-procedures specific assumption)					
Medical oncology	10	1	20	1	1,734 €
Radiation oncology	0	0	2	3	2,429 €
Visitors					
Medical oncology	100	12	100	15	10 €
Radiation oncology	0	0	15	5	10 €
			15	3	10 €
Laboratory tests					
Blood count	100	12	100	12	2 €
Biochemistry	100	12	100	12	22 €
Thoracentesis	10	1	10	1	700 €
Imaging techniques					
Bone scan	5	2	5	2	51 €
Cerebral MRI	0	0	50	4	103 €
Thorax/abdomen computed tomography	100	4	100	4	42 €
Brain computed tomography	70	4	100	4	42 €

Results

- An annual management cost of €936.85 per patient was estimated for ALK+ aNSCLC patients without BM, and €2,904.68 per patient for those with BM (Figure1).
- The presence of BM was associated with an annual cost increase of €1,967.82 per patient compared to non-BM, due to increased monitoring and resource utilization (Figure1).
- Moreover, treatment with lorlatinib was associated with an annual management cost reduction of €130 per patient compared to alectinib due to lower BM incidence.

Figure 1: Annual cost associated with the management of ALK+ aNSCLC patients without BM compared to patients with BM



Conclusions

- **As BM are common in ALK+ aNSCLC, there is a need for treatments that have protective effect against BM development and delay central nervous system progression.**
- **These treatments may offer benefits for the healthcare systems since management cost of ALK+ aNSCLC patients is higher when BM are present.**
- **Based on lorlatinib's lower 12-month cumulative incidence of BM progression compared to alectinib, present analysis suggests lower healthcare resource utilization with lorlatinib, translating to cost savings from payer perspective.**

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Disclosures

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