The Economic Impact of Early Comprehensive Genomic Profiling and Targeted Therapy for Advanced Non-Small Cell Lung Cancer Patients: Real World Evidence From a Brazilian Private Healthcare Provider Database

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Introduction

Are estimated 30.200 new Lung Cancer cases annually in Brazil.[1]

85% Of Non-Small Cell Lung Cancer cases are found in advanced stage TNM III and IV.[2]

24% Are positive for EGFR mutations that are actionable with targeted-therapy.[3]

38% Of NSCLC advanced patients are tested for actionable mutations.[3]

13 Days Is the median time to receive the testing results.[3]

This study aimed to assess the financial impact of delayed CGP testing on the treatment journey of NSCLC patients within a private healthcare insurance provider in Rio Grande do Sul state, Brazil.

Methods

The anonymized data from stage III and IV Non-Small Cell Lung Cancer (NSCLC) adenocarcinoma patients receiving targeted therapy registered between 2019 and 2022 in the Healthcare insurance database was identified from which the procedures, therapies, costs and dates were extracted and compared.

Table 1. Eligibility criteria applied for economic analysis.

Parameters	Criteria
Population	- Patients with CID-34 covered by CABERGS. - Patients with NSCLC adenocarcinoma.
Period	Between 2019 and 2022
Procedure	- Patients who collected tissue for histologic analysis. - Patients who received palliative therapy with mutation targeted drugs. - Patients who had available a whole report of therapies used during their journey.
Data collected	- Biopsy day - Day of entry and exit (delivery) of the anatomy report - Day of entry and exit (delivery) of the immunohistochemistry report - Sequencing and dates of staging CT scans - Sequencing and dates of other staging exams - Dates of chemotherapy estimates - Dates of chemotherapy administrations - Protocol name - Number of cycles completed in the protocol - Sequence of protocols performed

Results

Considering the costs associated with medical procedures, visits, Emergency Room admissions, and treatment for patients with confirmed ICD-10 code C34 (Malignant Neoplasm of the Bronchus and Lung), the total cost was **US $33,026** higher compared to the average annual cost for the general population covered by the same healthcare insurance provider.

Lung cancer patients

32.071 Users

44 patients with lung cancer

Advanced NSCLC patients

14 patients with accessible data

8 patients with advanced NSCLC Adenocarcinoma and target therapy

5 patients who started the treatment with targeted therapy.

3 patients who started with short cycles of conventional chemotherapy and substitution to targeted therapy without reported reasons.

Table 2. Annual total costs per general patient and Lung Cancer patient

	Number of patients	Total cost (US $)	Cost per patient (US $)
General patients	32.071	40.419.773,49	1.260,32
Lung Cancer confirmed	44	1.508.60	34.286,55

Table 3. Conventional chemotherapy short cycle costs and transition to targeted therapy cost saving.

1st line treatment protocol	Number of cycles	Cost per cycle (US $)	Total cost (US $)	Treatment protocol Adjusted to	Potential Saving (US $)
Taxol + carbo	2	1.461,91	2.923,83	Tagrisso	2.923,83
Premetrexate + Carbo + Zometa	1	3.647,96	3.647,96	Tagrisso	3.647,96
Premetrexate + Carbo	2	3.786,00	7.572,00	Alectinibe	7.572,00

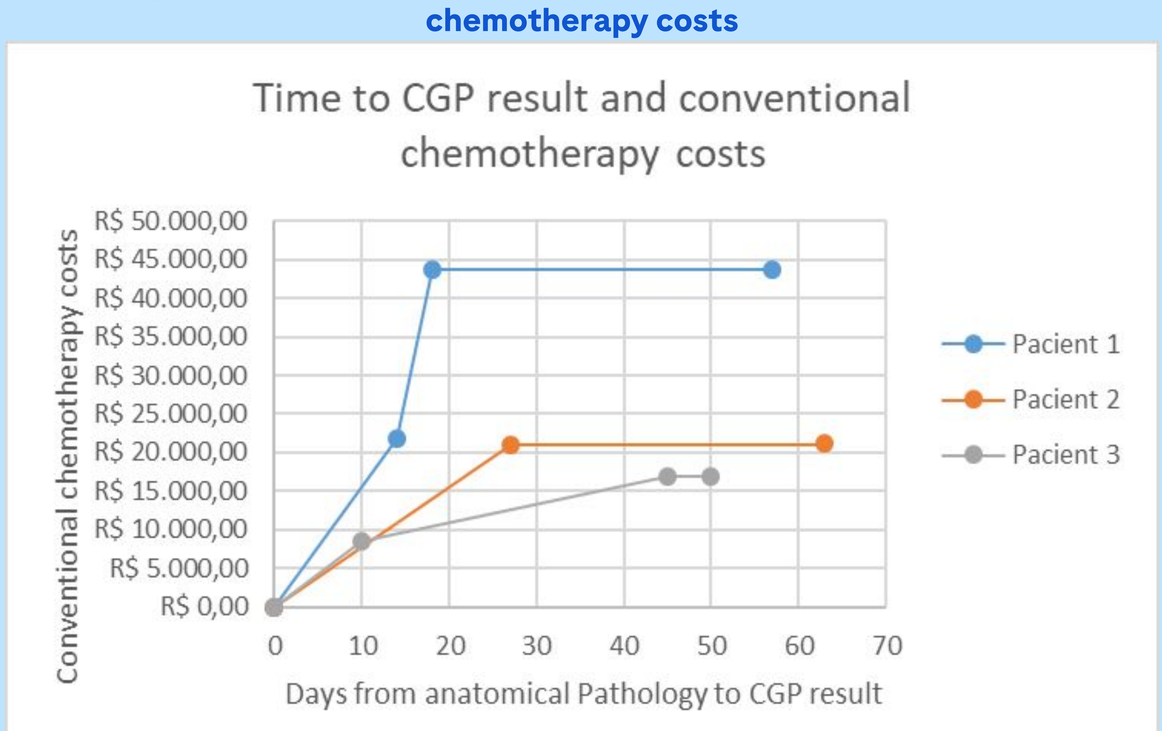
- US $ 14.143,80

Total avoidable cost

-US $ 1.767,97

Avoidable cost per eligible patient

Figure 1. Time to CGP result and short cycles of conventional chemotherapy costs



The short cycles of conventional chemotherapy were used due to delays in performing or receiving the Comprehensive Genomic Profiling (CGP) test results. This approach is commonly adopted by oncologists to avoid leaving patients without treatment; however, the associated costs could have been avoided if the CGP test had been performed in a timely manner.

For patients who received unnecessary short cycles of conventional chemotherapy, the average time from the initial anatomical pathology test to the CGP result was **56.6 days (95% CI: 40.2–72.8)**. In contrast, for the five patients who started with targeted therapy, the average time from anatomical pathology to CGP results was **20.8 days (95% CI: 13.8–27.7)**. The difference between the two groups was statistically significant **(p = 0.002)**.

Conclusion

- In these three patients, no toxicity was observed that would justify the transition to targeted therapy. Conventional chemotherapy was administered in short cycles prior to the availability of Comprehensive Genomic Profiling (CGP) test results. Once the CGP results were available, the therapeutic approach was adjusted accordingly.
- The average time between the anatomical pathology results and the CGP test for patients who received unnecessary chemotherapy was **56.6 days (95% CI: 40.2–72.8)**, while patients who were directly initiated on mutation-targeted therapy had faster turnaround times **(20.8 days; 95% CI: 13.8–27.7, p<0.05)**.
- Had the CGP test been conducted earlier in these three patients, a total cost of **R$ 14.143,80** could have been avoided, resulting in savings of **US $ 1.767,97** per eligible patient.
- Early CGP testing not only optimizes treatment pathways by directly guiding patients to targeted therapies but also significantly reduces healthcare costs by avoiding unnecessary chemotherapy cycles. From the perspective of a healthcare insurer, the timely use of CGP testing in advanced NSCLC patients represents a cost-effective strategy for directing patients to the most appropriate therapy.

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