COST-EFFECTIVENESS ANALYSIS OF RITUXIMAB FOR CHRONIC LYMPHOCYTIC LEUKEMIA USING A SEMI-MARKOVIAN MODEL APPROACH IN R

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BACKGROUND

Chronic lymphocytic leukemia (CLL) is a malignant lymphoproliferative disease characterized by the accumulation of clonal B lymphocytes in peripheral blood, bone marrow, and secondary lymphoid organs. It is the most common adult leukemia in Western countries with an incidence of 4.2 per 100,000 individuals and occurs mainly in the elderly, with approximately 67% of cases being diagnosed after 65 years of age.

OBJECTIVE

This study aims to compare the strategies FCR (fludarabine, cyclophosphamide, and rituximab) and FC (fludarabine and cyclophosphamide) for the treatment of chronic lymphocytic leukemia in Brazil.

METHODS

A three-states clock-reset semi-Markovian model was built in R (**Figure 1**). The time horizon of the analysis was 15 years and monthly cycles were used. Transition probabilities were extrapolated for 180 cycles through appropriate distributions from the published survival curves of the CLL-8 trial. A correction for competitive risks was applied for transitions from the progression-free survival state. Other probabilities were derived from the medical literature. The costs included in the model referred to the application of injectable drugs, prescription costs, the costs of treating adverse events, and the costs of supportive care. The outcomes were measured in QALYs. The model was evaluated by microsimulation. To determine the study result, multiple cost-effectiveness threshold values were used.

RESULTS

In the primary analysis, an incremental cost-effectiveness ratio (ICER) of 19,029.38 PPP-USD/QALY (41,141.52 BRL/QALY) was found. The scatter plot of cost-effectiveness shows very well separated iterations in terms of costs, but some overlap in terms of effectiveness (**Figure 2**). In 1.8% of the iterations, FC was considered dominant over FCR.

It could be shown that, at 1 GDP per capita/QALY, 30.5% of the iterations would consider the technology cost-effective. At 2 GDP per capita/QALY, this number rises to 78.5%. At 50,000 USD/QALY, 91% of the iterations would suggest FCR to be cost-effective (**Figure 3**).

CONCLUSION

In terms of some thresholds accepted or suggested around the world, the technology would be considered cost-effective at 50,000 USD/QALY, 3 GDP per capita/QALY, and 2 GDP per capita/QALY. It would not be cost-effective at 1 GDP per capita/QALY or the opportunity costs threshold. In practice, this ICER would generally be considered acceptable for oncology technologies in Brazil.

Figure 1. Three-states model

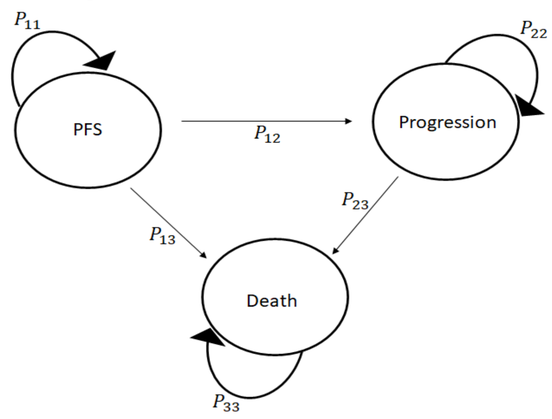


Figure 2. Cost-effectiveness scatter plot comparing FCR and FC

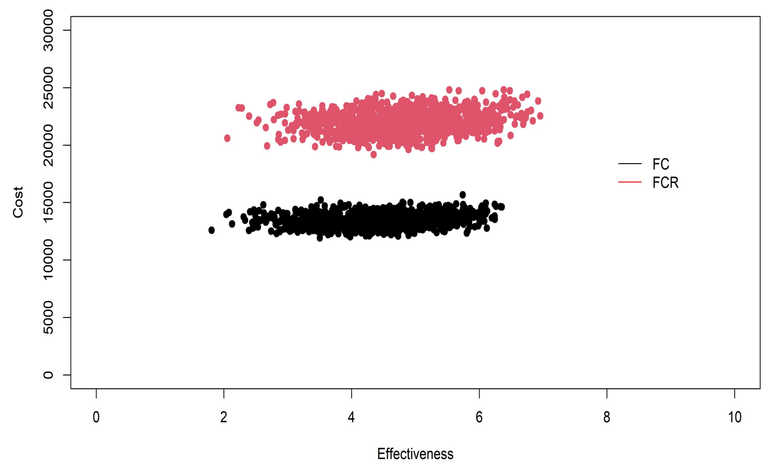
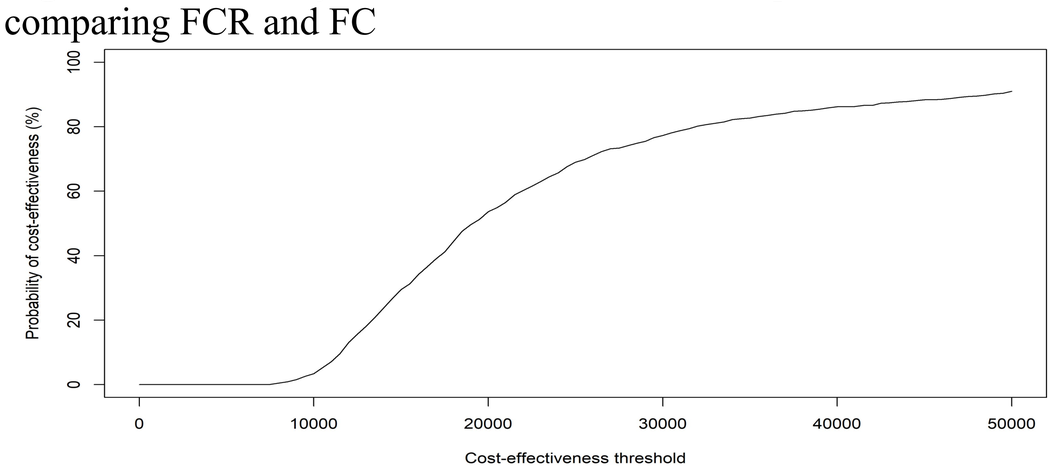


Figure 3. Probability of cost-effectiveness of the probabilistic model comparing FCR and FC



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