

ECONOMIC EVALUATION OF GLOBAL LONGITUDINAL STRAIN IN THE EARLY DETECTION OF CARDIOTOXICITY IN THE BRAZILIAN PRIVATE HEALTHCARE SYSTEM

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INTRODUCTION AND JUSTIFICATION

Cardiotoxicity is one of the main adverse events resulting from the use of chemotherapy, being associated with comorbidities and increased mortality. The increased survival of cancer patients is accompanied by an increased risk of developing cardiovascular toxicity [1]. Usually, recommendations for diagnosis of chemotherapy-induced cardiac dysfunction use conventional echocardiography parameters. However, they allow only the late diagnosis of cardiac dysfunction, which may be irreversible. Therefore, there is a great need for parameters capable of early detection of left ventricular (LV) dysfunction and therefore able to identify patients at risk of rapid progression to irreversible heart failure who may benefit from early therapeutic measures [2,3].

OBJECTIVES

To estimate the incremental cost-effectiveness ratio of global longitudinal strain (GLS) for the early detection of cardiotoxicity in patients under cancer treatment, compared to conventional echocardiographic measurements (ECO) in the Brazilian Private Healthcare System (PHS).

METHODS

Comparison: GLS versus ECO;
Population: cancer patients undergoing chemotherapy with anthracyclines;
Model: Markov type transitional state model (Fig. 1) [4];
Perspective: Brazilian Private Healthcare System;
Costs: The direct medical costs of the procedures and management of cardiotoxicity and heart failure
Discounts: 5% per year to costs and outcomes;
Time horizon: 5 years;
Clinical outcome: Years of life gained (YLG) and quality adjusted life years (QALY);
Sensitivity analysis: Probabilistic sensitivity analyses were performed to explore parametric uncertainties.

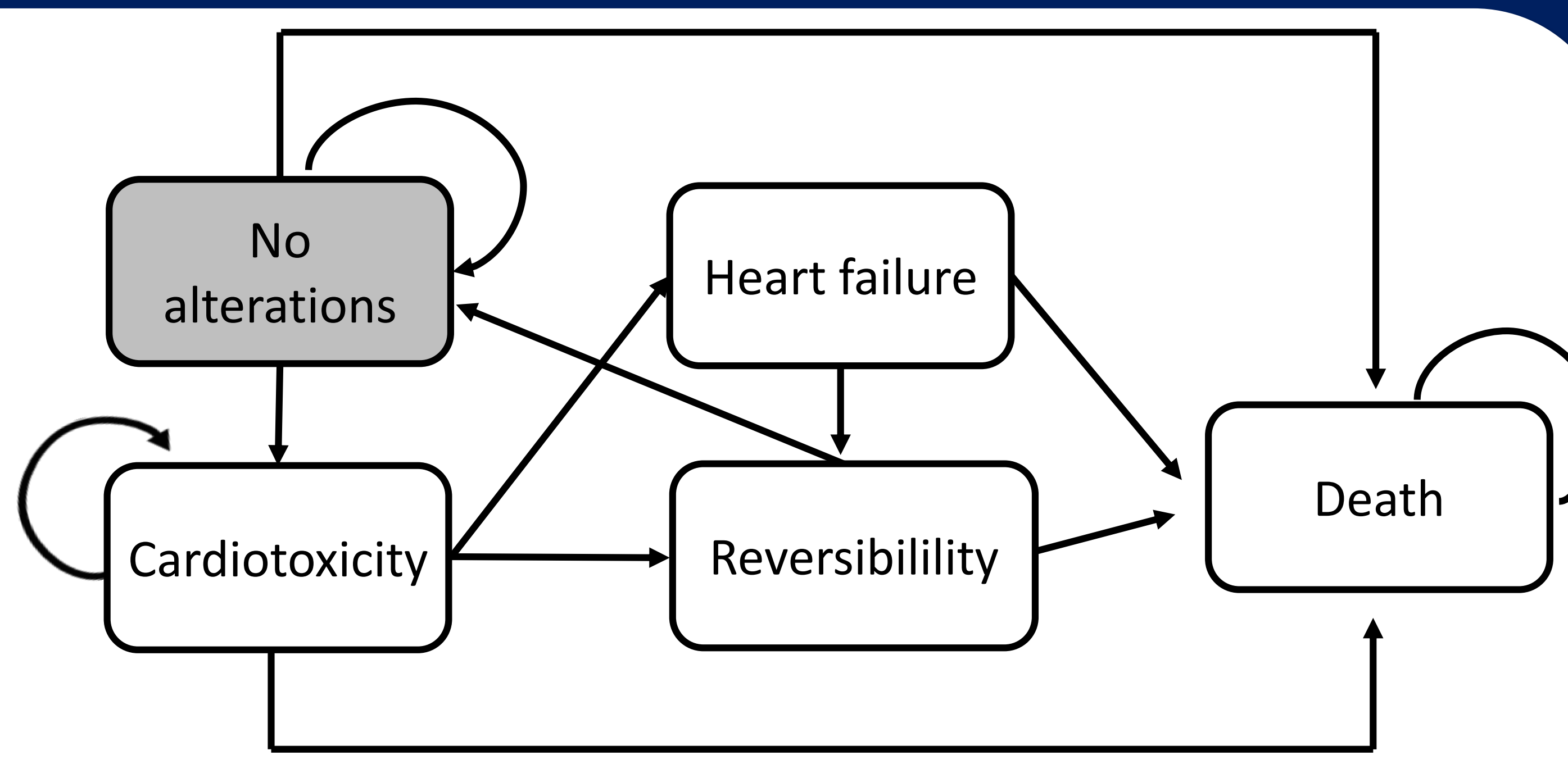


Fig 1. Transitional state model.

RESULTS

- For the base case it was identified that GLS dominates ECO for the target population in a time horizon of 5 years both for YLG (Table 1) and QALY (Table 2).
- GLS presents a clinical gain 0,05 QALY and 0,07 life years compared to ECO, with a decrease in average total cost per patient of BRL 1.332. Deterministic results are corroborated by the probabilistic analyses.

- Regardless of the willingness to pay, GLS has 100% of chance of being the cost-effective option (Fig. 2B and Fig 3B).
- PSA suggests that GLS treatment has lower cost and higher effectiveness than ECO. GLS treatment results in incremental effectiveness (years of life gained and QALY) and decrease in cost in all the iterations. (Fig. 2A and Fig. 3A).

Table 1. Case base results – life years gained

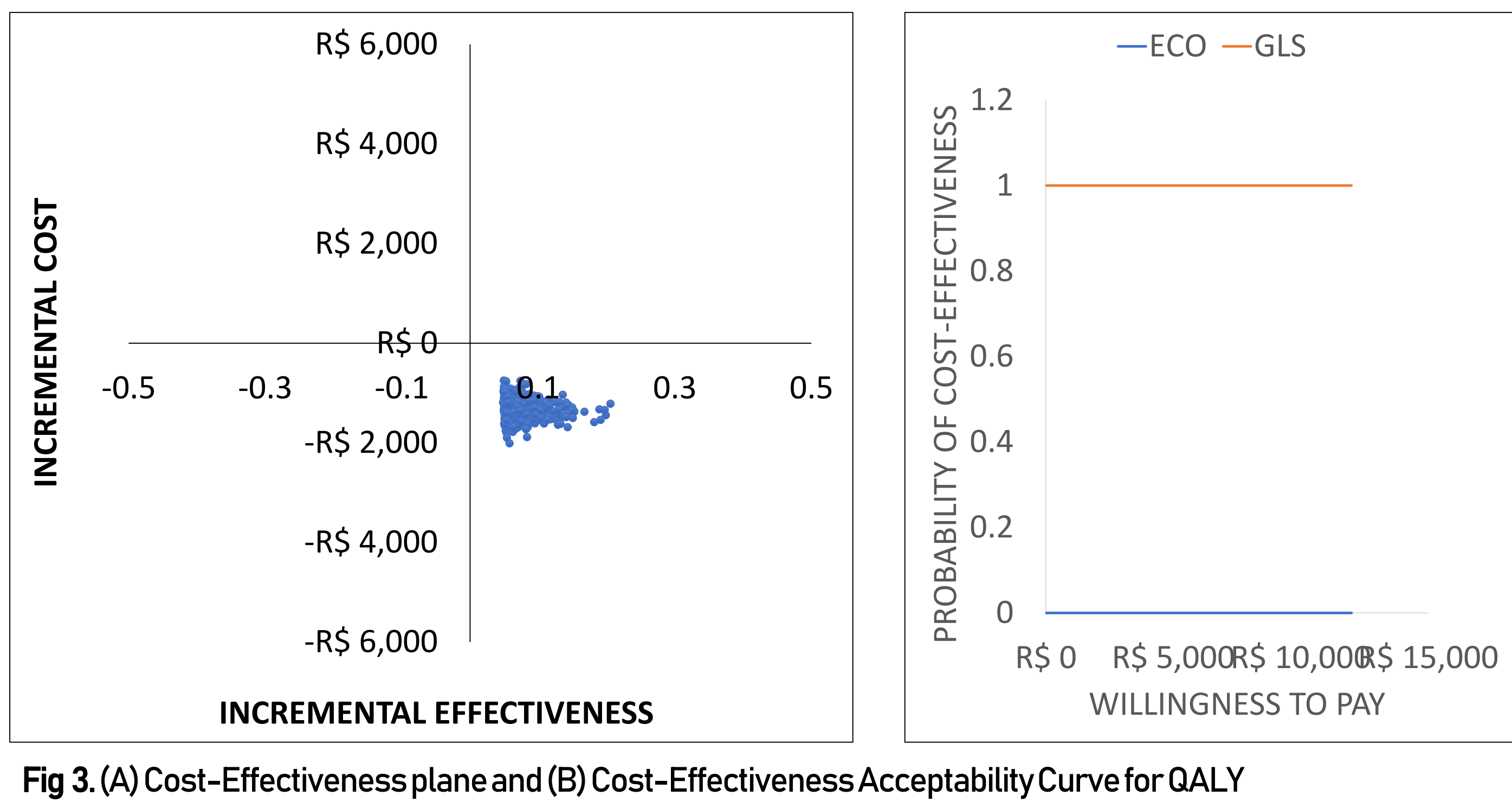
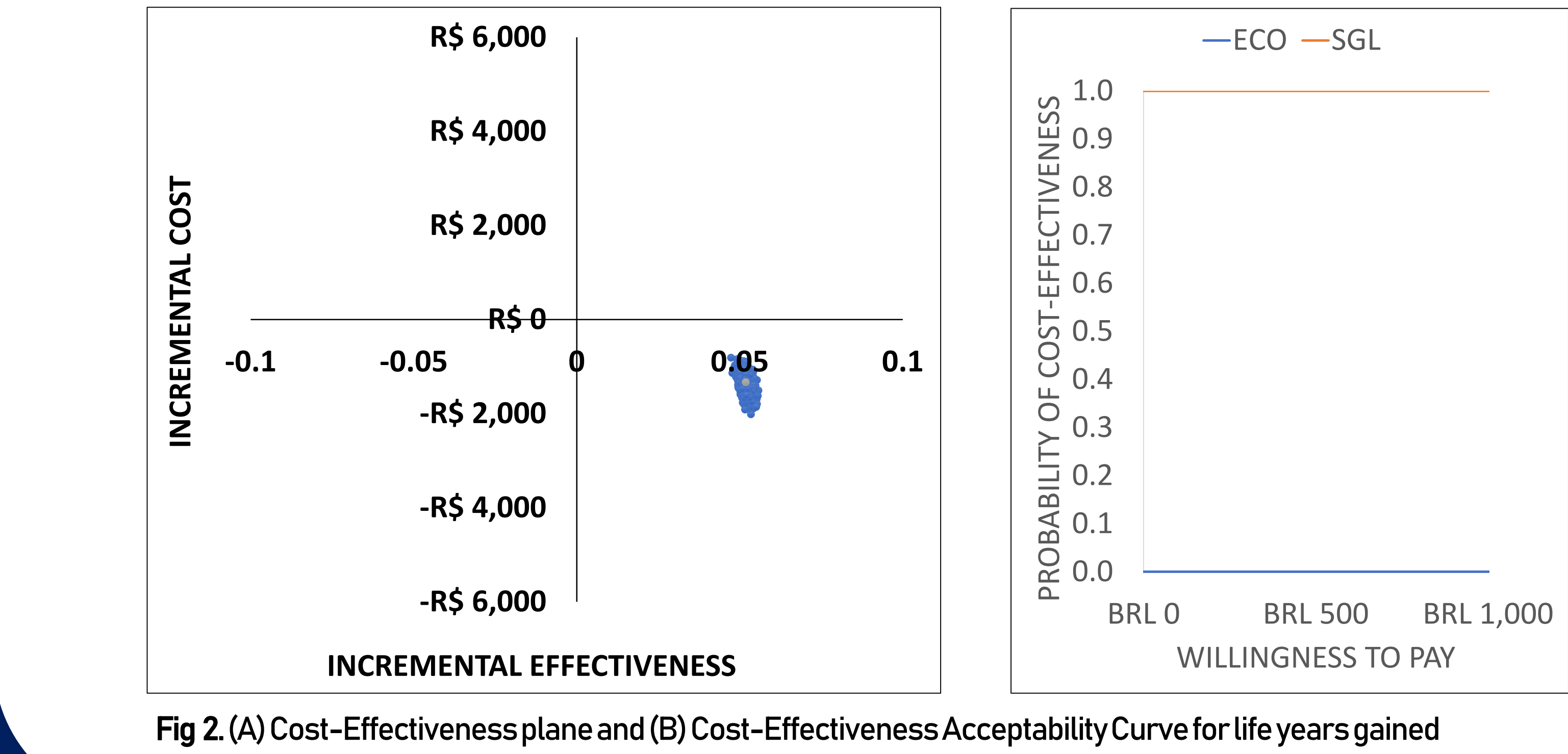
	Cost	diff Cost	Years of life gained	diff effect.	ICER
GLS	BRL 18,299		4,25		<i>GLS dominates ECO</i>
ECO	BRL 19,631	- 1,332	4,20	0.05	

BRL – Brazilian currency; ICER – Incremental cost-effectiveness ratio

Table 2. Case base results – QALY

	Cost	diff Cost	Years of life gained	diff effect.	ICER
GLS	BRL 18,299		4,17		<i>GLS dominates ECO</i>
ECO	BRL 19,631	- 1,332	4,11	0.07	

BRL – Brazilian currency; ICER – Incremental cost-effectiveness ratio



CONCLUSIONS

Cardiotoxicity is one of the major adverse events of chemotherapy, being associated with comorbidities and mortality. In cancer patients undergoing chemotherapy with anthracyclines, the use of GLS has the potential to generate health gains related to QALY and life years with a lower average cost per patient.

References

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