Cost-effectiveness analysis of next-generation sequencing (ngs) panel including brca1 and brca2 genes for women diagnosed with non-metastatic breast cancer in Brazil

H. L. Couto1, R. M. Rahal2, A. T. Hassan3, F. Zanghelini4, L. P. Garganо5, T. C. Oliveira1, B. A. Coelho6,7, at al

1Redimama-Redimasto Breast Unit, Belo Horizonte, Brazil, 2Faculty of Medicine, Department of Gynecology and Obstetrics, Federal University of Goiás, Goiânia, Brazil, 3Breast Cancer Center, Oncoclínicas - CAM, Salvador, Brazil, 4Postgraduate Program in Therapeutic Innovation, Federal University of Pernambuco, Recife, Brazil, 5Department of Social Pharmacy, Faculty of Pharmacy, Federal University of Minas Gerais, Belo Horizonte, Brazil, 6Mater Clínica, Montes Claros, Brazil, 7UNIFIPMOC University Center, Montes Claros , Brazil.

Introduction and Objectives

Pathogenic BRCA1/2 mutations in women diagnosed with non-metastatic breast cancer (MBC) correlate with worse survival outcomes and elevated risk of contralateral breast cancer. Detecting pathogenic BRCA1/2 mutations via next-generation sequencing panels (NGS) provides clinical benefits by optimizing treatment strategies.

This study estimates the cost-effectiveness of using NGS with genetic counselling to detect pathogenic BRCA1/2 mutations in women diagnosed with non-MBC, compared to no genetic testing, from the perspective of Brazil's Public Health System.

Methods and Materials

A hybrid economic model (decision tree plus Markov model) simulated costs and outcomes over a 10-year horizon of NGS with genetic counselling to identify pathogenic BRCA1/2 mutations in women diagnosed with non-MBC. The eligible population was estimated by using epidemiological methods using national data identified in the literature. Were estimated the incremental cost-effectiveness ratio (ICER) per quality-adjusted life year (QALY) gained of adding NGS plus genetic.

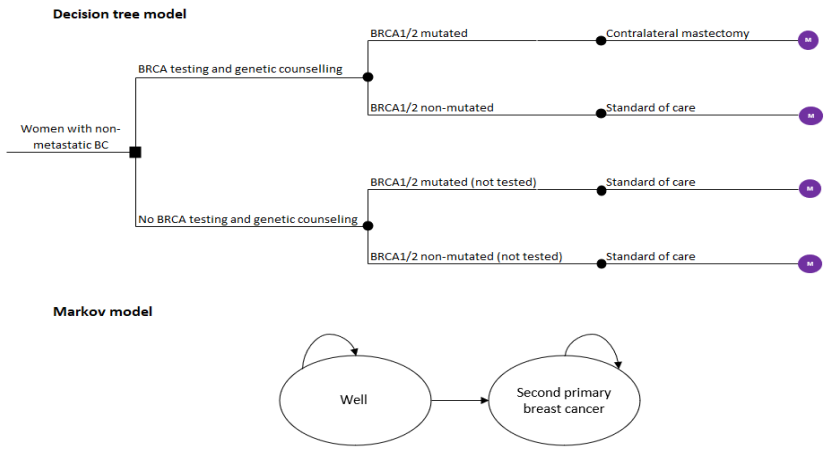


Fig. 1: Decision tree model and Markov model to compare performing BRCA1/2 testing and genetic counselling versus not performing BRCA1/2 genetic testing and genetic counselling

counselling to identify pathogenic BRCA1/2 mutations in women diagnosed with non-MBC (Fig 1.)

Results

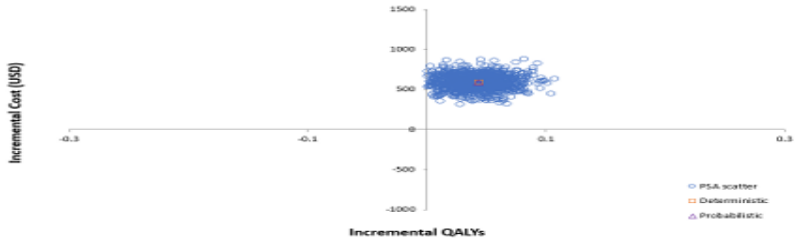
NGS for pathogenic BRCA1/2 mutations combined with genetic counselling showed an incremental benefit of 0.044 QALYs gained at an additional cost of US$ 590.29 compared to no genetic testing and genetic counselling, resulting in an ICER of US$ 13,526.89 per QALY gained.

Strategies	Total costs	Incremental costs	QALYs	Incremental QALYs	ICER/QALY
With NGS BRCA1/2 testing and genetic counselling	US$5,947.74	US$590.29	7,044	0,044	US$13,526.89
No NGS BRCA1/2 testing and genetic counselling	US$5,357.45	-	7,001	-	-

ICER: incremental cost-effectiveness ratio, QALY: quality-adjusted life year

Table 1: Costs, effectiveness, and ICER per patient comparing BRCA1/2 genetic testing along with genetic counselling versus no NGS BRCA1/2 testing and genetic counselling.

Figure 2. Incremental cost-effectiveness plan for the QALY outcome, considering probabilistic sensitivity analysis comparing the clinical strategies of performing and not performing NGS for pathogenic BRCA1/2 mutations along with genetic counselling



Conclusions

NGS for pathogenic BRCA1/2 mutations combined with genetic counselling was cost-effective from the Brazilian public health system perspective, with an ICER value below the Brazilian oncological willingness-to-pay threshold of US$21,500/QALY (R$120,000.00/QALY).

Henrique Lima Couto.
Redimama-Redimasto Breast Unit
enriquecouto@hotmail.com
+55 31 999945973

This presentation is the intellectual property of the author/presenter. Contact them at <<your email address>> for permission to reprint and/or distribute.