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980 – OncoAI: artificial intelligence for recurrence prediction and clinical decision support in breast cancer

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Introduction: Breast cancer remains the most incident malignant neoplasm among women in Brazil and worldwide, representing a significant challenge in risk stratification, therapeutic decision-making, and longitudinal follow-up. The biological heterogeneity of the disease complicates individualized recurrence prediction, potentially leading to over or under-treatment. In this context, OncoAI has developed an artificial intelligence platform in collaboration with the Gynecologic Oncology and Mastology Service of the Dr. Arnaldo Cancer Institute, aimed at predicting recurrence risk and supporting clinical decision-making in breast cancer.

Methods: The solution integrates structured clinical data, anatomopathological variables, tumor characteristics, and therapeutic information to generate predictive models based on machine learning, using epidemiological data from a retrospective cohort covering 20 years of care for breast cancer patients treated at the Dr. Arnaldo Cancer Institute.

Results: The objective is to provide mastologists and the multidisciplinary team with a quantitative estimate of individualized risk, assisting in the definition of adjuvant therapies and follow-up planning. The architecture was designed to prioritize interpretability, enabling the identification of variables that most impact predictions, thereby promoting greater transparency and safety in clinical practice. Currently, the project is in the testing phase at the Dr. Arnaldo Cancer Institute, where predictive performance, clinical applicability, and integration into the care workflow are being evaluated. Preliminary results demonstrate promising performance, with 82% recall in identifying recurrence cases, indicating high sensitivity in detecting higher-risk patients. These findings suggest potential impact on optimizing therapeutic strategies and personalizing clinical follow-up.

Conclusion: OncoAI represents an innovative initiative in mastology by incorporating artificial intelligence in an ethical, safe, and clinically oriented manner, promoting personalized medicine and improving oncological outcomes.

Ethics: Research Ethics Committee Approval (CAAE 58533622.9.1001.0084).

Keywords: breast cancer; artificial intelligence; machine learning.