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Neutrophil-to-lymphocyte ratio predicts long-term survival in early triple-negative breast cancer treated with neoadjuvant chemotherapy

Gabriel Berlingieri Polho¹, Renata Rodrigues da Cunha Colombo Bonadio¹, Letícia Kimie Murazawa¹, Vinicius Vitor Oliveira¹, Victor Rocha Pinheiro¹, Diana del Cisne Pineda Labanda¹, Romualdo Barroso-Sousa², Laura Testa¹

¹Instituto do Câncer do Estado de São Paulo – São Paulo (SP), Brazil.

²DASA Oncologia – Brasília (DF), Brazil.

Objective: To evaluate the role of neutrophil-to-lymphocyte ratio (NLR) in predicting survival after neoadjuvant chemotherapy. **Methods:** This retrospective review analyzed data from medical records of 692 patients who underwent neoadjuvant chemotherapy for early-stage TNBC (II–III), from 2012 to 2024. NLR was calculated from the complete blood count before neoadjuvant chemotherapy initiation, and the cut-off point used was 2. Event-free survival and overall survival were estimated with the Kaplan-Meier method, and Cox regression model was employed to calculate the hazard ratios (HR). Logistic regression was used to verify the association between NLR and pathological complete response (pCR). **Results:** The overall pCR rate was 28.3%, and patients with $NLR \leq 2$ had an increased probability of achieving pCR (33% vs. 22.7%; $p=0.002$). After a median follow-up of 59.6 months, $NLR \leq 2$ was associated with improved 5-year event-free survival in the overall population (51% vs. 66%; HR 0.59; $p<0.001$), in patients with stage II disease (69% vs. 81%; HR 0.49; $p=0.010$), stage III (43% vs. 55%; HR 0.70; $p=0.010$), and residual disease (42% vs. 54%; HR 0.65; $p=0.001$). Overall survival of 5 years was also improved in the overall population with $NLR \leq 2$ (58% vs. 73%; HR 0.56; $p<0.010$), stage II disease (75% vs. 86%; HR 0.42; $p=0.009$), stage III disease (50% vs. 62%; HR 0.68; $p=0.015$), and in patients with residual disease (50% vs. 64%; HR 0.62; $p=0.001$). In multivariate analysis, including pCR status and clinical stage, $NLR \leq 2$ remained statistically significant for improved overall survival ($p=0.002$) and event-free survival ($p=0.002$). **Conclusion:** $NLR > 2$ is an independent risk factor for poorer survival in patients with TNBC who received neoadjuvant chemotherapy.

Keywords: triple-negative breast neoplasms; biomarkers; neoadjuvant therapy.