Predictive Value of Composite Inflammatory Markers for Pathological Complete Response after Neoadjuvant Chemotherapy in Breast Cancer Patients

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Abstract

Breast cancer remains the most common malignancy among women and a leading cause of cancer-related mortality. Neoadjuvant chemotherapy (NACT) is widely used in curative treatment, with pathological complete response (pCR) serving as a surrogate marker of favorable long-term outcomes. Identifying reliable predictors of pCR could enable individualized treatment strategies through therapy escalation or de-escalation.

This retrospective study included 258 patients with breast cancer treated with NACT at the University Clinical Center in Katowice between 2017 and 2022. Clinical, histopathological, and laboratory data were analyzed, with a particular focus on systemic inflammatory markers derived from complete blood counts: neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), lymphocyte-to-monocyte ratio (LMR), neutrophil-to-monocyte ratio (NMR), and systemic inflammatory response index (SIRI). These indices were evaluated before and after systemic treatment, and changes in their values were also assessed.

Baseline NLR, LMR, SIRI, and derived NLR (dNLR) demonstrated a statistically significant association with pCR after NACT. Post-treatment LMR correlated with pCR in patients receiving febrile neutropenia prophylaxis. No predictive value was observed for dynamic changes in marker values during therapy.

The findings support the role of selected composite inflammatory indices as accessible, cost-effective biomarkers for predicting response to neoadjuvant chemotherapy in breast cancer patients and may contribute to future efforts in treatment personalization.

Keywords

Breast cancer, neoadjuvant chemotherapy, pathological complete response, inflammatory markers, NLR.