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Real-world evidence of predictors of pathologic complete response and impact on overall survival in breast cancer patients treated with neoadjuvant chemotherapy

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Objective: The aim of this study was to identify predictors of pathological complete response (pCR) with an impact on overall survival (OS) in patients with breast cancer (BC) treated with neoadjuvant chemotherapy (NAC). **Methodology:** This is a retrospective cohort study conducted at the Centro de Referência em Saúde da Mulher – Hospital Pérola Byington and included women diagnosed with BC between 2011 and 2020. Survival data were reported using the Kaplan-Meier method, and subgroups were analyzed using the log-rank test. The study explored complete pathological responses between groups (with and without response) to identify any clinical or demographic differences. The Cox regression model will be used to analyze the relationship between independent factors and the pCR outcome, with the hazard ratio calculated. The study was approved by the Brazil Platform (CAAE 64633422.4.0000.5463). **Results:** The study involved 1,601 patients who underwent NAC and surgical treatment for BC. The rate of pathological complete response (pCR) in patients who received NAC was 22.8%, while the rate of non-pCR was 77.2% ($p < 0.0001$). The 5-year prognosis for patients with pCR was better, with an OS of 89%, compared with 61.0% in non-pCR patients (log-rank $p < 0.0001$). Factors related to pCR that had an impact on OS were premenopausal status (HR 0.79, 95%CI 0.64–0.98, $p = 0.032$), clinical stage IIB (HR 0.66, 95%CI 0.46–0.96, $p = 0.029$), negative hormonal receptor status (HR 1.39, 95%CI 1.13–1.71, $p = 0.002$), and HER-2 positivity (HR 0.79, 95%CI 0.64–0.97, $p = 0.025$). **Conclusion:** The pCR is a favorable prognostic factor that is associated with increased OS, especially in patients who are hormone receptor-negative, HER-2 positive, and in clinical stage IIB. These factors demonstrate a significant correlation between pCR and OS.

Keywords: breast cancer; neoadjuvant chemotherapy; prognosis.