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ASSESSMENT OF HEMATOLOGICAL CHANGES POST CHEMOTHERAPY IN FEMALE BREAST CANCER PATIENTS IN PALESTINE

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Abstract

Background: Breast cancer is one of the most common malignancies among women worldwide and a leading cause of cancer-related deaths. Chemotherapy is a cornerstone of treatment but is associated with significant hematological toxicity, including anemia, leukopenia, and thrombocytopenia. Understanding the patterns of blood cell changes and recovery after chemotherapy is essential for optimizing patient management and improving outcomes.

Objectives: This study aimed to evaluate the effects of chemotherapy on hematological parameters in breast cancer patients and to investigate the recovery of red blood cells and other blood components post-treatment. Additionally, it sought to identify patterns and variability in recovery, including factors that might influence prolonged anemia or incomplete hematologic restoration.

Methods: A retrospective study was conducted at Beit Jala Governmental Hospital and Dora Hospital in Palestine between October and November 2025. One hundred female breast cancer patients aged 20–60, who had completed chemotherapy and had full medical records, were included. Hematological data—including RBC count, hemoglobin, hematocrit, WBC count, platelet count, and related indices—were collected from routine complete blood counts at pre-treatment, during chemotherapy, end of treatment, 6-month, and 1-year follow-up. Recovery indices (RIE) and inflammatory markers, including NLR, PLR, LMR, and IRI, were calculated. Data were analyzed using descriptive statistics and paired-sample tests to determine significant changes.

Results: Chemotherapy induced a significant decline in RBC, hemoglobin, hematocrit, lymphocytes, platelets, and MPV during treatment, while RDW and MCV increased, reflecting bone marrow stress and altered red cell maturation. Most parameters partially recovered post-treatment, but recovery was highly variable among patients. RDW, lymphocytes, hematocrit, and platelets showed a positive recovery trend, whereas RBC, hemoglobin, and MCH exhibited slower or incomplete recovery. Inflammatory indices (NLR, PLR, IRI) remained elevated during and after chemotherapy, indicating persistent systemic



inflammation in some patients. Platelet–lymphocyte recovery ratios varied widely, reflecting individualized recovery trajectories.

Conclusions: Chemotherapy in breast cancer patients causes significant but largely reversible hematological alterations. Red cell parameters recover more slowly than other blood components, and recovery patterns differ widely between patients. Using recovery and inflammatory indices alongside standard blood tests can help identify patients with delayed hematological restoration and guide personalized post-chemotherapy monitoring and supportive care. Structured follow-up programs and attention to nutrition and immune recovery may improve outcomes and quality of life for breast cancer survivors.

Keywords: Breast cancer, Chemotherapy, Hematological parameters, Red blood cells (RBC), Hemoglobin (HB), Hematocrit (HCT), Anemia, Recovery index (RIE), Inflammatory indices, Neutrophil-to-lymphocyte ratio (NLR), Platelet-to-lymphocyte ratio (PLR), Lymphocyte-to-monocyte ratio (LMR), Platelet count, Mean corpuscular volume (MCV), Mean platelet volume (MPV), Palestine.