PROGNOSTIC SIGNIFICANCE OF THE PROLIFERATIVE ACTIVITY (KI-67) INDEX IN BREAST CANCER

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Relevance: Breast cancer is one of the most common oncological diseases among women, and the incidence and mortality rates remain high worldwide. This disease is characterized by biological heterogeneity, meaning that the clinical course of the tumor, its aggressiveness, and response to treatment may vary significantly.

The aggressiveness of the tumor, its ability to metastasize, the risk of recurrence, and overall survival largely depend on its proliferative activity. The Ki-67 proliferation marker is expressed in the active phases of the cell cycle (G1, S, G2, and M) and reflects the level of tumor cell division.

In recent years, the Ki-67 index has been widely used in clinical practice not only as a prognostic marker but also as a predictive marker. It plays an important role in differentiating luminal A and luminal B subtypes, assessing the effectiveness of neoadjuvant chemotherapy, and selecting individualized treatment strategies. Therefore, determining the relationship between the Ki-67 index and clinicomorphological parameters has important scientific and practical significance.

Objective: To determine the level of the Ki-67 proliferative index in patients with breast cancer and to assess its relationship with the tumor morphological grade, molecular subtype, and lymph node metastasis.

Materials and Methods

The study included surgical and biopsy specimens from 98 patients with breast cancer treated between 2021 and 2024.

Morphological examination was performed using hematoxylin-eosin staining, which allowed determination of the histological type of the tumor and the degree of differentiation (G1, G2, G3).

Immunohistochemical analysis was performed using the Ki-67 proliferation marker. The expression level was evaluated as follows:

- <20% — low proliferative activity
- 20–30% — moderate proliferative activity
- >30% — high proliferative activity.

In addition, the status of ER, PR, and HER2 receptors was also taken into account. Statistical analysis was performed using the χ^2 (chi-square) test and correlation analysis. Results were considered statistically significant at $p < 0.05$.

Results

According to the analysis, 42% of patients had a high Ki-67 index (>30%).

High proliferative activity was mainly observed in poorly differentiated tumors (G3). In HER2-positive and triple-negative phenotypes, the Ki-67 index was significantly higher.

An increase in Ki-67 levels was also associated with a higher frequency of lymph node metastasis ($p < 0.05$).

A low proliferative index (<20%) was more typical for the luminal A molecular subtype, and these patients demonstrated a relatively slower tumor progression and a more favorable prognosis.

Conclusion

The Ki-67 proliferative index is an important prognostic and partially predictive marker in breast cancer.

High proliferative activity is associated with aggressive tumor behavior, increased risk of metastasis, and poor prognosis.

Comprehensive assessment of Ki-67 together with morphological parameters and receptor status serves as an important diagnostic criterion for selecting personalized treatment strategies and predicting treatment outcomes.