Chirurgia (Bucur). 2025;120(1):32-47
http://dx.doi.org/10.21614/chirurgia.3100

**Breast Cancer: A Heterogeneous Pathology. Prognostic and Predictive Factors – A Narrative Review**

Maria-Teodora Popa[1,2], Aniela Nodiți[1,2], Teodora-Mihaela Peleașă[1,2], Smaranda Stoleru[3], Alexandru Blidaru[1,2]
[1]Carol Davila University of Medicine and Pharmacy, Bucharest, Romania
[2]Department of Surgical Oncology, Prof. Dr. Al. Trestioreanu Institute of Oncology, Bucharest, Romania
[3]Department of Pharmacology and Pharmacotherapy, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

**Abstract**
Breast cancer (BC) is recognized as one of the leading malignancies affecting women worldwide. Its remarkable heterogeneity is a defining characteristic, contributing to both diverse patterns of disease progression and varied therapeutic responses. This review explores the evolution of breast cancer classifications, focusing on key prognostic and predictive factors. It examines traditional systems, such as the TNM staging and histological differentiation, while also incorporating modern elements like molecular subtypes, genomic alterations, and advanced diagnostic assays. By combining classical clinicopathological insights with cutting-edge molecular genetic technologies, the goal is to refine the precision of treatment strategies, ultimately advancing both our understanding and management of this complex disease. The review also emphasizes the importance of a global perspective, as achieving the primary treatment goals - prolonged survival and enhanced quality of life - requires addressing the disease in a broader, more comprehensive context. Breast cancer's complexity, driven by significant variability both across and within tumors, presents major challenges to conventional diagnostic and therapeutic approaches. However, breakthroughs in genomic research, such as molecular profiling and genetic testing, have deepened our understanding of this cancer's intricate nature. These advances have led to the identification of critical genetic alterations - including mutations in BRCA1/2, TP53, PALB2, PTEN, and PIK3CA - that profoundly impact tumor behavior, treatment efficacy, and patient prognosis. Genomic assays like Oncotype DX, MammaPrint, PROSIGNA, and EndoPredict offer valuable insights into recurrence risks and treatment choices, underscoring the growing importance of precision medicine. Moreover, the implementation of Molecular Tumor Boards further enhances personalized treatment strategies, contributing to improved patient outcomes and survival rates. This review underscores the significance of tailored therapeutic approaches and highlights the dynamic evolution of breast cancer in clinical practice.
**Key words:** breast cancer, prognostic factors, predictive factors, molecular subtypes, genomic assays