Pathologic Features of Breast Malignancies Undergoing Surgery and Evaluation of Neo-Adjuvant Therapy Efficiency in Shiraz, Iran: A Cross-Sectional Multidimensional Study

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Abstract

Background: Breast cancer, the most prevalent cancer among women, represented 25.4% of all female cancer cases in 2020. Neo-adjuvant chemotherapy has significantly enhanced survival rates and surgical outcomes. This study investigates the pathologic characteristics of breast cancer and their correlations with critical factors in Shiraz, Iran.

Method: This cross-sectional study analyzed 280 pathological reports from Faghihi Hospital in Shiraz, Iran, of patients with histologically confirmed breast cancer; the Named Entity Recognition (NER) technique extracted information from unstructured reports using cancer-related keywords and staging. For structured report sections, text extraction followed specific keyword identification. A physician-supervised the keyword selection and extraction process throughout.

Results: The average tumor size was 32.3 mm, with 1.4% of breast cancer cases occurring in men (female to male ratio = 70:1). Utilizing the Nottingham grading system, it was observed that most tumors were of higher grade, indicating a higher probability of recurrence. As tumors increased in size, tubular, nuclear, and mitotic indices also rose significantly (T: 0.61, N: 0.73, M: 0.73; \( P < 0.001 \)), suggesting that tumor enlargement not only leads to tissue invasion but also enhances malignant cell aggressiveness. The majority of patients were classified as TNM stage IIA. Patients responding to neo-adjuvant therapy had an average tumor size of 2.13 cm, compared with 4.56 cm in non-responders, with each centimeter increase in size raising the likelihood of treatment failure by 34% (\( P = 0.015 \)).

Conclusion: The mean tumor size in Iran is approximately double that of some other countries, highlighting the need for an improved screening system. The relatively low female-to-male ratio suggests that male screening could benefit the Iranian demographic. Further research is warranted to establish a size-based threshold for initiating neo-adjuvant therapy.

Keywords: Breast cancer, Neo-adjuvant chemotherapy, Predictive factors