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

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