Predictive Values of BI-RADS 4 & 5 Sonography for Breast Malignancy in Adult Female Patients in St. Luke's Medical Center

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Abstract

Purpose:
The American College of Radiology (ACR) developed the Breast Imaging Reporting and Data System (BI-RADS) for sonography to standardize lesion characterization, including descriptors of tissue composition, morphology, calcifications, and associated features. BI-RADS ultrasound categories 4 and 5 encompass a broad range of suspicious findings with varying malignancy probabilities. This study aimed to determine the predictive values of BI-RADS 4 and 5 for breast malignancy, identify key sonographic descriptors associated with malignancy, and compare results with international data.

Methods:
A cross-sectional study was conducted among adult females who underwent breast ultrasound and biopsy at St. Luke's Medical Center, Quezon City, from September 2020 to August 2023. Only BI-RADS 4 and 5 cases were included. Demographic, imaging, and histopathologic data were analyzed using SPSS v21 to determine diagnostic performance and feature correlations.

Results:
A total of 504 patients (mean age, 50.5 ± 14 years) were reviewed. Of these, 317 (62.9%) were BI-RADS 4 and 187 (37.1%) were BI-RADS 5. Malignancy was confirmed in 49.8% of cases, most commonly invasive breast carcinoma (82.5%), while fibroadenoma predominated among benign lesions (64.4%). BI-RADS 5 yielded a positive predictive value (PPV) of 90.9%. Among BI-RADS 4 lesions, 74.5% were benign, yielding a negative predictive value (NPV) of 74.5% (with BI-RADS 4 considered negative). Overall sensitivity and specificity were 67.7% and 93.3%, respectively. Significant associations ($p < 0.05$) were observed between BI-RADS category, histopathology, and specific sonographic descriptors.

Conclusion:
BI-RADS 5 demonstrates a high PPV, supporting immediate biopsy, while BI-RADS 4 shows intermediate NPV, indicating the need for selective biopsy or close follow-up. Key sonographic features strongly correlate with malignancy and may refine BI-RADS categorization in local practice.

Image

BI-RADS Category	Malignant, n (%)	Benign, n (%)	Total, n (%)
5	170 (90.9)	17 (9.1)	187 (37.1)
4	81 (25.6)	236 (74.4)	317 (62.9)
Total	251 (49.8)	253 (50.2)	504 (100.0)

Diagnostic performance: PPV, 90.9%; NPV, 74.5%; sensitivity, 67.7%; specificity, 93.3%.

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Photograph



Biography

Dr. Sarah Maye S. Sapaula, MD, DPBR, is a CT-MRI Fellow-in-Training at St. Luke's Medical Center – Quezon City, where she previously served as Assistant Chief Radiology Resident. She earned her Doctor of Medicine degree from the University of the East Ramon Magsaysay Memorial Medical Center and her bachelor's degree in Psychology from Ateneo de Manila University. Her clinical interests include cross-sectional imaging and breast radiology, with ongoing research focused on the diagnostic performance of BI-RADS in the Philippine setting. Dr. Sapaula is actively involved in academic and research initiatives within her department. Guided by a strong foundation in evidence-based practice, she aims to advance diagnostic imaging standards, promote quality assurance, and strengthen research collaboration in Philippine radiology. Her work reflects a deep commitment to clinical excellence, innovation, and the integration of imaging science into patient-centered care.

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Notes/Comments: