

Radiologist Accuracy in Predicting Pathology in Breast Imaging

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Introduction: Breast cancer, the most prevalent cancer in women and second only to lung cancer in female mortality, has seen rising incidence, especially during the 1980s and 1990s due to increased mammography screening. Screening's primary goal is early tumor detection, reducing mortality by over 40%. Yet, it has downsides, including false-positive cases of benign biopsies and potential increased patient anxiety and stress. The average recall rate from screening mammograms is 5-10%. Among women requiring biopsy, the anticipated rate of malignant findings range between 30-50%. With the evolution of image-guided breast biopsy techniques, concerns have risen regarding the escalating frequency of breast biopsies. The possible causes are overlapping imaging characteristics of benign and malignant pathologies, patients' anxiety, litigation risk and radiologist years of experience. A radiologists' ability to predict breast histology from imaging findings remains an understudied domain.

This study's core purpose is to comprehensively analyze the ability of a radiologist to predict benign versus malignant results to provide guidance in reducing the number of benign biopsies.

Methods: This prospective study involved radiologists completing survey sheets when recommending biopsies and when performing the biopsy, predicting benign vs malignant, specific pathology, with confidence interval. Predictions were compared to the final biopsy results to determine accuracy. All patients who underwent biopsy at our institutions were included in the data. Data was categorized as either concordant or discordant when comparing predicted pathology results to actual.

Results: The accuracy of radiologist prediction from initial diagnostic imaging when compared to actual pathology results in the study population is 71% (95% CI, 61.8%-79.37%) with a sensitivity of 75 % (95% CI, 60.4%-86.36%). The accuracy of radiologist prediction at biopsy when compared to actual pathology results is 80.79% (95% CI, 75.89%-85.08%) with sensitivity of 79.77% (95% CI, 73%-85.49%). The accuracy of less to moderately experienced radiologists to highly experienced radiologists is similar, 78.2% vs 81.0%. Further analysis of specific pathology prediction reveals that fibroadenoma is the most common benign pathology encountered, the prediction of which by imaging alone/at biopsy is 65%/68%. In the malignant category, invasive ductal carcinoma is the most common pathology encountered where the prediction is 68%/85%.

Conclusions: This data will potentially help radiologists gain confidence in watching likely benign lesions based on imaging features (assigned as BIRADS 3) to reduce benign biopsies.