Radiologist Accuracy in Predicting Pathology in Breast Imaging

Kirti Dhingra DO, PhD, Jeff Lin MD, Grace Brannan PhD, Nedi Gari MD, Evita Singh MD

Purpose: 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 20%. Yet, it has downsides, including false-positive results leading to unnecessary benign biopsies and patient anxiety.

In the UK, 69% of false positives undergo additional imaging, with 31% requiring biopsies. In Canada, the expected malignant rate among women needing breast biopsies falls between 30-50%. In the UK and the US, 2.3-3.4% of initial screening mammograms and 0.8-1.7% of follow-up ones lead to breast biopsies. Approximately 5-10% of screening mammograms reveal abnormalities, with most not indicative of cancer.

The proliferation of image-guided breast biopsies has raised concerns about their frequency. Radiologists' experience also influences biopsy recommendations. 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..

Materials and 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 69.47% (95% CI,59.18%-78.51%) with a sensitivity of 75.68% (95% CI, 58.80%-88.23%). The accuracy of biopsy imaging when compared to actual pathology results in this population is 80% (95% CI, 70.54%-87.51%) with sensitivity of 78.38% (95% CI, 61.79%-90.17%). Highly experienced breast radiologists tend to perform better at prediction 80.8% (70.3-80.2 CI) compared to moderately experienced at 76.5 % (50.1-93.2%).

Conclusion

The preliminary data indicates that radiologists are very good at predicting the pathology based on imaging features. The radiologists that practice breast imaging primarily or radiologists who have incurred years of experience are more accurately able to predict pathology.

Clinical Relevance Statement (50 words max)
This data will potentially help radiologists gain confidence in watching likely benign lesions based on imaging features (BIRADS 3) to reduce benign biopsies.