Enhancing the Detection of Contralateral Breast Cancer in Breast Cancer Survivors Using Artificial Intelligence

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**Purpose**

Women with a history of breast cancer are at a higher risk of developing contralateral breast cancer (CBC). While annual surveillance mammography is recommended, its sensitivity remains a concern, especially in Asian women, where dense breast tissue is common. Therefore, conducting both mammography and ultrasound simultaneously during surveillance is common in South Korea. This study evaluates the effectiveness of an AI-based computer-aided diagnosis (AI-CAD) system in identifying CBC and how it can help radiologists to improve detection when only mammography is used for assessment.

**Materials and Methods**

This retrospective study involved 454 women with a history of unilateral breast cancer who developed CBC during surveillance and a matched control group of 454 women without CBC. Mammograms were analyzed using a commercial AI-CAD software, which provided a cancer detection score, with scores above 10 indicating cancer. The performance of AI-CAD was compared to initial radiologist assessments for mammography.

**Results**

The AI-CAD system demonstrated a sensitivity of 59.7% (271/454) and a specificity of 93.8%. Radiologists, in comparison, had a sensitivity of 53.5% (243/454). Concordant interpretations between AI and radiologists occurred in 77.1% of cases, with disagreements in 22.9%. AI-CAD identified 14.5% of CBC cases (66/454) that radiologists missed. However, 31.9% (145/454) were still not detected by both the AI system and radiologists.

**Conclusion**

The AI-CAD system identified additional CBC cases missed by radiologists, highlighting its potential as a valuable tool for enhancing breast cancer surveillance and improving diagnostic accuracy. Further studies are needed to validate these findings across diverse populations.