Artificial Intelligence vs. Radiologists in Screening Mammography Interpretation

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Background

Introduction

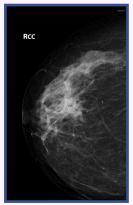
- According to the Centers for Disease Control and Prevention (CDC), breast cancer is the second leading cause of cancer death for women in the United States.
- The U.S. Preventive Services Task Force recommends biennial breast cancer screening for women ages 50–74.
- As of September 1, 2023, the FDA documented a total annual count of 39,844,021 mammography procedures.[1]
- The advent of artificial intelligence (AI) systems within the field of radiology, specifically within screening mammography, has the potential to aid in expeditious cancer diagnoses, reduce false positive findings, and decrease screen-reading workload for radiologists, among other benefits.

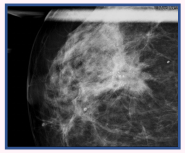
Objectives

- To compare the performance of AI systems to radiologist readers in interpreting digital screening mammography.
- To characterize the clinical utility and safety of AI programs for screening mammography

Visual Aids

Figure 1. Craniocaudal screening view demonstrates a partially obscured mass and malignant calcifications in just lateral to the nipple line the right breast.





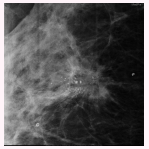


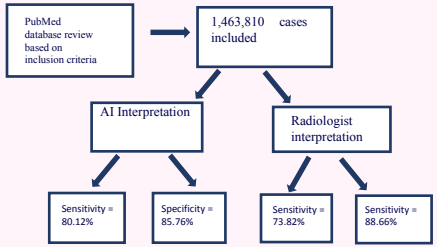
Figure 2. Craniocaudal magnification view of the right breast show malignant calcifications and underlying spiculations.

Figure 3. Craniocaudal magnification view demonstrates a partially obscured mass and malignant calcifications in just lateral to the nipple line the right breast.

Methods

A literature review was conducted using the PubMed database to assess the sensitivity and specificity of mammography interpretations performed by artificial intelligence (AI) in comparison to readings by radiologists working independently.

The review included data from three selected studies that met predetermined inclusion criteria. In total, the analysis included 1,463,810 cases and compared performance metrics with 95% CIs for AI and radiologist interpretations of imaging, respectively.



Results

AI applications demonstrated a weighted average sensitivity and specificity of 80.12% and 85.76%, respectively, in correctly identifying the presence or absence of cancerous findings on screening mammography. Comparatively, radiologists exhibit a weighted average sensitivity of 73.82% and specificity of 88.66% in identifying the presence or absence of cancerous breast lesions.

Conclusions

Radiologists remain indispensable in the field of medical diagnostics; however, the statistics presented here underscore the considerable potential of AI to augment higher sensitivity and specificity levels in specific radiologic diagnostic applications such as screening mammography.

In conclusion, this study demonstrates that AI performance in interpreting screening mammography is comparable in sensitivity and specificity to the performance of radiologist readers alone, lending support to the notion that AI is an excellent supplemental tool for radiologists in their surveillance of breast cancer.

Future Directions

Radiologists in training must embrace and better understand the advantages and limitations of AI. As technology continues to advance, the collaboration between radiologists and AI presents compelling evidence for reshaping the field of medical diagnostics, ultimately improving patient care with enhanced diagnostic accuracy and timeliness.

References

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