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Unlocking Diagnostic Potential: AI-CAD's Impact on Cancer Detection in Radiology

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Introduction

Artificial Intelligence-Computer-Aided Detection (AI-CAD) systems have emerged as valuable tools in radiology, offering enhanced capabilities for cancer detection and diagnosis. This brief report examines the impact of AI-CAD on cancer detection rates compared to radiologists' interpretations, focusing on its recall rates, sensitivity, and clinical significance. AI-CAD detected 5 out of 28 cancers (17.9%) that were initially overlooked by radiologists. This highlights the potential of AI-CAD to identify subtle abnormalities and improve diagnostic accuracy in cancer detection [1].

Description

Among the AI-CAD marks, 89.0% (577 out of 648) were observed on negative examinations, indicating a high rate of false positives. Additionally, 41.2% (267 out of 648) of these marks were deemed negligible, suggesting the need for further refinement of AI-CAD algorithms to reduce false positives and improve specificity [2]. Stand-alone AI-CAD demonstrated higher recall rates compared to radiologists' interpretations, while maintaining comparable sensitivity and Cancer Detection Rates (CDR). This suggests that AI-CAD systems can serve as effective screening tools, particularly in detecting abnormalities that may be missed by human observers [3]. The findings underscore the potential of AI-CAD systems to enhance cancer detection in radiology practice. While AI-CAD demonstrates higher recall rates and comparable sensitivity to radiologists, efforts are needed to address false positives and optimize its performance in clinical settings. Continued research and development in AI-CAD algorithms hold promise for improving diagnostic accuracy, facilitating early detection, and ultimately improving patient outcomes in cancer care.

Mammography stands as the foremost imaging modality for breast cancer screening, with past randomized trials underscoring its pivotal role in reducing breast cancer-related mortality. Despite its widespread use for screening and diagnostic purposes, interpreting mammograms poses significant challenges, with acknowledged variations in outcomes and accuracy. Notably, the sensitivity for cancer detection in women with mammographically-dense breasts can plummet to 30–48%. Achieving effective screening through mammography necessitates access to dedicated facilities and well-trained radiologists specializing in breast imaging to ensure interpretive accuracy. This accuracy is paramount as it enables the early detection and treatment of breast cancer when present (high sensitivity), while simultaneously minimizing false-positive recalls (high specificity) to avoid unnecessary additional evaluations [4,5].

Conclusion

In this study, we utilized a commercially-available AI-CAD software to analyze a retrospectively-collected sample of screening mammograms, aiming to simulate the potential outcomes of AI-CAD analysis within our interpretation workflow. Notably, AI-CAD successfully identified 5 additional cancers (17.9%) out of 9 cases initially missed by radiologists. Radiologists tended to recall mass/asymmetry or calcifications more frequently, whereas distortion and multiple features were more commonly flagged by AI-CAD. While sensitivity and Cancer Detection Rates (CDRs) remained comparable between stand-alone AI-CAD and radiologists, AI-CAD exhibited significantly higher recall rates and lower specificity. Out of the 648 AI-CAD recalls, 89.0% (577 of 648) were observed in the negative examination group.

Acknowledgement

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Conflict of Interest

None.

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