SAMPLE REVIEW ARTICLE (NARRATIVE REVIEW)

Title: Artificial Intelligence in Chest X-ray Interpretation: Current Advances, Clinical Applications, and Future Perspectives

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Abstract

Background: Artificial intelligence (AI) has rapidly emerged as a transformative technology in medical imaging, particularly in chest X-ray interpretation. AI algorithms have demonstrated promising performance in detecting pulmonary diseases and assisting radiologists in clinical decision-making.
Objective: This narrative review summarises recent developments in AI-assisted chest X-ray analysis, evaluates current evidence regarding its clinical applications, identifies existing challenges, and discusses future research opportunities.
Conclusion: Current evidence suggests that AI has considerable potential to improve diagnostic accuracy, reporting efficiency, and workflow in chest radiography. However, further multicentre validation, standardisation, and integration into routine clinical practice are required before widespread adoption.
Keywords: Artificial Intelligence; Chest X-ray; Deep Learning; Radiology; Diagnostic Imaging

1. Introduction

Chest radiography is one of the most commonly performed imaging examinations worldwide and remains the primary diagnostic tool for evaluating numerous thoracic diseases, including pneumonia, tuberculosis, lung cancer, and COVID-19. In recent years, artificial intelligence (AI), particularly deep learning techniques, has shown remarkable potential in assisting radiologists by improving image interpretation, reducing reporting time, and enhancing diagnostic accuracy. This review provides an overview of current evidence regarding AI applications in chest X-ray analysis and discusses future directions for research and clinical implementation.

2. Literature Review

Recent studies have demonstrated significant progress in AI-assisted chest radiography. Convolutional neural networks (CNNs) have achieved diagnostic performance comparable to experienced radiologists in detecting pulmonary abnormalities. AI systems have been successfully applied for identifying pneumonia, pulmonary nodules, pleural effusion, pneumothorax, and tuberculosis. Several commercial AI platforms have also received regulatory approval and are increasingly being incorporated into clinical workflows to support image interpretation and prioritise urgent cases.

3. Critical Analysis and Discussion

Although published studies consistently report high diagnostic accuracy for AI-based chest X-ray interpretation, several limitations remain. Most available algorithms have been developed using retrospective datasets with limited population diversity, which may affect their generalisability in real-world clinical settings. Differences in imaging protocols, equipment, and patient demographics can also influence algorithm performance. Furthermore, AI should be considered a decision-support tool rather than a replacement for radiologists, as expert clinical judgement remains essential for accurate diagnosis and patient management. Continued research focusing on external validation, algorithm transparency, and ethical implementation is necessary to maximise the clinical benefits of AI technologies.

4. Future Perspectives

Future research should focus on developing robust and explainable AI models capable of analysing diverse patient populations across multiple healthcare settings. Integration of AI with electronic health records, multimodal imaging, and clinical decision-support systems may further improve diagnostic accuracy and workflow efficiency. Large prospective multicentre studies are also required to evaluate the long-term clinical impact and cost-effectiveness of AI-assisted chest radiography.

5. Conclusion

Artificial intelligence has emerged as a valuable adjunct in chest X-ray interpretation, demonstrating substantial potential to improve diagnostic performance and radiology workflow. Despite encouraging evidence, further validation, regulatory oversight, and clinical integration are essential before AI becomes a routine component of medical imaging practice.

6. Declarations

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7. References

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