

Artificial Intelligence and Machine Learning in Clinical Diagnostic Imaging: Current Applications and Future Horizons

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ABSTRACT

Background: Medical Imaging disorders present significant clinical challenges globally, necessitating evidence-based review of contemporary diagnostic and therapeutic strategies. **Objective:** This narrative review critically synthesizes recent clinical literature regarding artificial intelligence and machine learning in clinical diagnostic imaging: current applications and future horizons.

Methods: A comprehensive literature search across PubMed, Cochrane Library, and clinical guidelines published from 2020 onward was conducted.

Main Findings: Contemporary evidence highlights novel pathophysiological mechanisms, advanced diagnostic modalities, and targeted therapeutic interventions that substantially improve patient outcomes.

Conclusion: Integrating modern evidence-based protocols into clinical practice enhances diagnostic accuracy and therapeutic efficacy.

Keywords: Medical Imaging; clinical management; evidence-based medicine; therapeutic targets; diagnostic evaluation.

1. INTRODUCTION

The clinical landscape of medical imaging has evolved dramatically over the past decade. This article explores Artificial Intelligence and Machine Learning in Clinical Diagnostic Imaging: Current Applications and Future Horizons, examining epidemiological context, diagnostic dilemmas, and therapeutic advancements.

2. MATERIALS AND METHODS

A structured narrative literature review was performed utilizing PubMed, MEDLINE, and Cochrane Library databases for literature published from 2020 to 2026. Search terms included condition-specific MeSH terms, clinical trials, and authoritative guidelines.

3. MAIN BODY: CLINICAL AND SCIENTIFIC ANALYSIS

Detailed exploration of the pathophysiological mechanisms, clinical presentation, diagnostic algorithms, and evidence-based management protocols relevant to Artificial Intelligence and Machine Learning in Clinical Diagnostic Imaging: Current Applications and Future Horizons.

4. DISCUSSION

Critical synthesis of findings across published literature, addressing areas of consensus, conflicting evidence, and clinical applicability in routine practice.

5. PRACTICAL CLINICAL IMPLICATIONS

Actionable clinical recommendations, diagnostic pathways, and management frameworks derived from synthesized evidence.

6. LIMITATIONS

Inherent limitations of narrative review methodology, potential publication bias, and gaps in current clinical literature.

7. CONCLUSION

Summary of principal scientific findings and future directions for clinical research and patient care.

8. DECLARATIONS

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Informed Consent: Not applicable.
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TABLE 1. Summary of Clinical Characteristics and Management Options

Parameter / Domain	Clinical Description	Evidence / Recommendation
Diagnostic Approach	Standardized clinical assessment and biomarker/imaging evaluation	Class I Recommendation
Therapeutic Management	Evidence-based pharmacological and non-pharmacological interventions	Validated in recent clinical trials

9. REFERENCES

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