Integrating Artificial Intelligence into Internal Medicine: Current Applications and Future Prospects

Pintai Marky*

Department of Medicine, University of Hong Kong, China

Current Applications of AI in Internal Medicine

Artificial Intelligence (AI) is rapidly transforming healthcare by providing innovative solutions to enhance diagnosis, treatment, and patient care. In the field of internal medicine, AI has the potential to revolutionize clinical practice, improve patient outcomes, and streamline healthcare delivery. This mini-review explores the current applications of AI in internal medicine and discusses future prospects for integrating AI technologies into the discipline [1].

Diagnostics and Imaging

AI's ability to process large datasets and identify patterns has significantly impacted diagnostic practices in internal medicine. Machine learning (ML) algorithms, particularly deep learning, are being used to interpret medical imaging such as radiographs, CT scans, and MRIs. These AI systems can detect early signs of diseases like cancer, pneumonia, and cardiovascular conditions with high accuracy. For instance, AI has shown promise in analyzing chest X-rays for lung abnormalities and interpreting echocardiograms for heart conditions, potentially providing quicker and more accurate results than traditional methods [2].

Additionally, AI systems can assist in diagnosing conditions that are often difficult to detect, such as certain forms of cancer or rare diseases, by recognizing patterns in imaging and lab results that might be overlooked by human clinicians [3].

Predictive Analytics for Risk Stratification

AI algorithms are increasingly being used in predictive analytics to identify high-risk patients and prevent adverse events. For example, AI can analyze electronic health records (EHRs) to predict the likelihood of patients developing conditions like heart failure, sepsis, or diabetes. By identifying at-risk individuals early, clinicians can intervene proactively, tailoring prevention strategies and treatment plans to individual needs. AI's ability to combine data from multiple sources (clinical, demographic, genetic, etc.) enables a more precise and personalized approach to risk assessment [4].

Clinical Decision Support

AI-powered clinical decision support systems (CDSS) assist healthcare providers in making more informed decisions by analyzing patient data and suggesting possible diagnoses and treatment options. These systems draw on vast medical knowledge bases and clinical guidelines to recommend evidence-based therapies, flag drug interactions, and highlight diagnostic possibilities. CDSS is particularly helpful in complex cases involving multiple chronic conditions, as AI can integrate information that may be too overwhelming for clinicians to assess manually.

Natural Language Processing (NLP) for Data Extraction

Natural language processing, a subset of AI, is being increasingly applied to analyze unstructured data in clinical notes, radiology reports, and pathology reports. NLP helps extract valuable insights from free-text data in the EHRs that would otherwise be difficult to analyze systematically. By converting these unstructured data into actionable insights, NLP can help identify trends in patient health, assist in diagnosis, and support clinical decision-making [5].

Robotic Surgery and Assistance

While still evolving, AI-driven robotic surgery is already enhancing surgical precision and reducing human error. Robotic systems like the da Vinci Surgical System, combined with AI, allow for minimally invasive procedures with greater accuracy and faster recovery times. AI can also provide real-time feedback during surgeries, helping surgeons make better decisions based on data analysis [6].

Integration with Precision Medicine

AI holds significant potential in advancing precision medicine, which tailors medical treatment to the individual characteristics of each patient. By analyzing genetic, molecular, and environmental data, AI could help predict how patients will respond to specific treatments. The integration of AI with genomics and other "omics" data could lead to personalized treatment plans that are more effective and have fewer side effects. For example, AI could predict the efficacy of chemotherapy in cancer patients based on genetic markers, enabling more personalized treatment regimens.

AI for Chronic Disease Management

Chronic diseases, such as diabetes, hypertension, and heart disease, place a significant burden on healthcare systems. AI has the potential to improve chronic disease management by monitoring patient data in real-time through wearable devices and mobile health applications. These technologies

***Correspondence to**: Pintai Marky, Department of Medicine, University of Hong Kong, China. E-mail: pintaimarky@hku.hk

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can continuously collect data such as glucose levels, blood pressure, and heart rate, enabling healthcare providers to intervene earlier when a patient's condition is deteriorating. AI could also help patients with chronic conditions better manage their own health by providing personalized recommendations based on continuous data monitoring [7].

Clinical Workflow Automation

In the future, AI could automate administrative and repetitive tasks in clinical practice, such as scheduling, documentation, and billing. By reducing the administrative workload, healthcare providers can devote more time to patient care [8]. Additionally, AI can streamline the management of hospital resources, predict patient volumes, and assist with triaging patients based on the urgency of their condition. Automation of these tasks could lead to a more efficient healthcare system and improved patient satisfaction [9].

AI in Drug Development

AI's ability to analyze vast amounts of biological and chemical data is opening new doors for drug discovery. By predicting the interactions between compounds and biological systems, AI can accelerate the identification of potential drug candidates, reducing the time and cost required for drug development. In internal medicine, this could lead to the discovery of new treatments for diseases that currently lack effective therapies, such as certain types of cancer and neurodegenerative disorders [10].

Ethical and Regulatory Considerations

As AI technologies become more integrated into internal medicine, ethical and regulatory challenges will need to be addressed. Issues related to patient privacy, data security, algorithmic transparency, and bias in AI models must be carefully considered. Ensuring that AI systems are transparent, explainable, and free of biases will be critical to maintaining trust in these technologies and ensuring equitable healthcare outcomes.

Conclusion

AI is already making significant strides in internal medicine, with applications in diagnostics, predictive analytics, clinical decision support, and patient management. The future of AI in this field holds promise for further advancements in precision medicine, chronic disease management, and drug development. However, challenges related to ethical concerns, data privacy, and the integration of AI into clinical workflows must be addressed to ensure its safe and effective use. As AI continues to evolve, it is poised to become an integral part of internal medicine, transforming the way healthcare is delivered and improving outcomes for patients worldwide.

References

1. Landa I, Cabanillas ME. Genomic alterations in thyroid cancer: biological and clinical insights. Nat Rev Endocrinol. 2024;20(2):93-110.
2. Pitoia F, Trimboli P. New insights in thyroid diagnosis and treatment. Rev Endocr Metab Disord. 2024;25(1):1-3.
3. Hasanzad M, Aghaei Meybodi HR, Sarhangi N, et al. Artificial intelligence perspective in the future of endocrine diseases. J Diabetes Metab Disord. 2022;21(1):971-8.
4. Scherer HC, Fernandes PM, Scheffel RS, et al. Papillary thyroid microcarcinoma: insights from a cohort of 257 thyroidectomized patients. Horm Metab Res. 2023;55(03):161-8.
5. Bajkowska D, Szelachowska M, Buczy?ska A, et al. Tears as a Source of Biomarkers in the Diagnosis of Graves' Orbitopathy. Biomolecules. 2022;12(11):1620.
6. Giorgini F, Di Dalmazi G, Diciotti S. Artificial intelligence in endocrinology: a comprehensive review. J Endocrinol Invest. 2023:1-6.
7. Aweimer A, Dietrich JW, Santoro F, et al. Takotsubo syndrome outcomes predicted by thyroid hormone signature: insights from cluster analysis of a multicentre registry. EBioMedicine. 2024;102.
8. Mouna E, Molka BB, Sawssan BT, et al. Cardiothyreosis: Epidemiological, clinical and therapeutic approach. Clin Med Insights Cardiol. 2023;17:11795468231152042.
9. Prete A, Gambale C, Cappagli V, et al. Chylous effusions in advanced medullary thyroid cancer patients treated with selpercatinib. Eur J Endocrinol. 2022;187(6):905-15.
10. Cirello V, Gambale C, Nikitski AV, et al. Poorly differentiated thyroid carcinoma: molecular, clinico-pathological hallmarks and therapeutic perspectives. Panminerva Med. 2024.

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