Brief Report

Artificial intelligence in medicine

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Abstract: The integration of artificial intelligence (AI) into cardiology signifies a profound transformation in healthcare, offering innovative solutions to combat the significant global burden of cardiovascular disease (CVD). AI presents many benefits, including improved image interpretation, enhanced patient recruitment for clinical trials, and increased accessibility to care, thus showcasing its potential to revolutionize the field. In this article, we highlight recent studies that demonstrate AI's impact across various domains of cardiology, from refining point-of-care ultrasound (POCUS) image interpretation to accurately identifying electrocardiogram (ECG) abnormalities. Cleerly's plaque analysis is particularly noteworthy, outperforming expert readers, indicating AI's capacity to enhance cardiology practices significantly. However, the increasing integration of AI in healthcare necessitates careful consideration of ethical implications. Prioritizing transparency, accountability, and human-centric design is essential to mitigate potential risks associated with AI implementation. Moreover, encouraging physicians to adopt AI to alleviate burnout and enhance patient care underscores the importance of embracing technological advancements in medicine. Ultimately, the seamless incorporation of AI into healthcare holds promise for improving patient outcomes and signifies a transformative shift towards more efficient and effective healthcare delivery, thus reshaping the landscape of cardiovascular care and medicine for the better. Nevertheless, maintaining the human touch in healthcare remains paramount, necessitating ongoing education and collaboration to ensure responsible AI integration while upholding medical ethics and compassion.

Keywords: Artificial intelligence (AI); medicine; cardiology; cardiovascular disease (CVD); image interpretation

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It is remarkable to see how medicine advances everyday with the help of artificial intelligence (AI). AI is expanding new medical horizons and revolutionizing how we diagnose, treat, and prevent diseases. One of the fields where AI has shown exceptional promise is cardiology. Cardiovascular diseases (CVD) are the leading cause of death in the world and pose an ever-growing challenge. The global prevalence of CVD is rapidly rising, increasing from 271 million in 1990 to 523 million in 2019, accompanied by rising mortality from 12.1 million to 18.6 million during the same period (1).

A range of studies have explored the use of AI in cardiology with promising results. Baum *et al.* found that AI-enabled devices improved image acquisition and interpretation in point-of-care ultrasound (POCUS) novices (2). Kim *et al.* reported that coronary computed tomography angiography (CCTA) with AI quantitative computed tomography (AI-QCT) effectively guided referrals for invasive coronary angiography (3). In the context of pediatric cardiac intensive care unit, Fragasso *et al.* investigated the use of AI in reducing the incidence of postoperative AKI, with positive outcomes (4). Additionally, Demolder *et al.* demonstrated the safety and efficacy of the AI-powered electrocardiogram (ECG) model. It is able

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to accurately identify electrocardiographic abnormalities from the 12-lead ECG, showcasing its utility as a clinical tool for healthcare professionals (5). Lastly, one of the most advanced applications of AI is the Cleerly plaque analysis of CCTA. Cleerly was superior to the consensus of level 3 expert readers in determining stenosis severity, plaque volume, and composition (6). These studies collectively suggest that AI has the potential to enhance various aspects of cardiology from diagnosis to imaging and surgical procedures.

Currently, many companies are exploring AI. Companies such as Amgen, Bayer, and Novartis are training AI to scan billions of public health records, prescription data, medical insurance claims, and their internal data to find trial patients—in some cases halving the time it takes to sign them up.

The world would be unimaginable without the internet, and soon, a world without AI will also be unimaginable; information is power, and AI can analyze vast amounts of data faster than humans. Still, it does not mean it can understand it; proper programming can help elevate quality of life, increase patient safety, and improve outcomes.

Physicians should not be fearful of technology but rather embrace it. It can reduce the burden of burnout caused by mundane tasks that AI can optimize and automate, such as the integration of Epic generative AI into electronic health records (EHRs). This cutting-edge system, boasting Health Insurance Portability and Accountability Act (HIPAA) compliance, effortlessly weaves in advanced language models like generative pre-trained transformer-4 (GPT-4) where AI not only tailors patient responses but also streamlines handoff summaries and provides healthcare providers with real-time insights (7).

A word of caution underscores the risks of AI, emphasizing that the capabilities and consequences of AI are tied to the intentions and decisions of its human creators. This realization highlights the importance of responsible and ethical practices in guiding the evolution of AI, ensuring that it remains a force for good and avoids unintended consequences. Numerous entities and nations have established ethical frameworks for AI, highlighting the importance of transparency, accountability, fairness, and a focus on human-centric design. These guidelines seek to regulate the development and application of AI, with a commitment to protecting user privacy (8).

Often, people fear change, and we see colleagues shying away from new technology and medications due to fear of change and the unknown. But it would be impossible to reach the current state of medicine we are in now if we didn't experiment.

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Footnote

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