EDITORIAL

ARTIFICIAL INTELLIGENCE THE FUTURE OF CARDIOLOGY

Tariq Ashraf[1], Raffat Sultana[1]
[1]Karachi Institute of Heart Diseases, Karachi, Pakistan

Artificial Intelligence (AI) essentially refers to various types of machine learning, often involving deep neural networks. It autocompletes our ideas as we write, enables us to communicate with our phones, and supports language translation.[1]

According to the 2019 Global Burden of Disease Study, the estimated age-standardized incidence of cardiovascular disease (CVD) in Pakistan was 918.8 per 100,000 people (global: 684.33 per 100,000), and the age-standardized death rate was 357.88 per 100,000 (global: 239.85 per 100,000).[2]

With AI, new analytical and data-driven approaches could lead to significant advances in understanding multimorbid groups of cardiology patients and potentially improve therapeutic strategies.[3] AI has been used to interpret echocardiograms and heart rhythms from ECGs, and to detect indicators of heart disease, such as left ventricular dysfunction, from surface ECGs and nuclear cardiology.[4-6]

It is a misconception that AI will replace cardiologists. Instead, skilled practitioners will be able to expand their clinical capabilities, make more accurate and prompt diagnoses, and improve management decisions in patient care.

As with any statistical application, it is important to understand AI's strengths and limitations. To understand the basics of AI, it starts with developing an algorithm based on human expertise. Programmers create relationships between input and output, known as expert systems. In machine learning, a general algorithm, such as a neural network, approximates a mathematical relationship between input data and expected outputs. In unsupervised learning, such as clustering, only the inputs are fed into the algorithm, which then finds insights in the data using its inner structure and statistics. An AI model can discover new relationships in data that have previously eluded human discovery.[1]

For research purposes, cardiologists using AI may follow these steps:

- Type and collection of data.
- Preprocessing of data.
- Choosing the right machine learning approach.
- Validating and evaluating methods and results.[3]

The application of AI techniques in the healthcare system is still in its infancy and requires more understanding through workshops and integrated learning.[7]

In conclusion, AI represents a new development in the field of medicine, especially cardiology. However, it is susceptible to significant errors in interpretation and raises safety and ethical concerns.

REFERENCES

1. Lopez-Jimenez F, Attia Z, Arruda-Olson AM, Carter R, Chareonthaitawee P, Jouni H, et al. Artificial Intelligence in Cardiology: Present and Future. Mayo Clin Proc. 2020;95(5):1015-39.
2. Samad Z, Hanif B. Cardiovascular Diseases in Pakistan: Imagining a Postpandemic, Postconflict Future. Circulation. 2023;147(17):1261-3.
3. Gill SK, Karwath A, Uh HW, Cardoso VR, Gu Z, Barsky A, et al. Artificial intelligence to enhance clinical value across the spectrum of cardiovascular healthcare. Eur Heart J. 2023;44(9):713-25.
4. Cheng LT, Zheng J, Savova GK, Erickson BJ. Discerning tumor status from unstructured MRI reports--completeness of information in existing reports and utility of automated natural language processing. J Digit Imaging. 2010; 23(2):119-32.
5. Narula S, Shameer K, Salem Omar AM, Dudley JT, Sengupta PP. Machine-learning algorithms to automate morphological and functional assessments in 2D echocardiography. J Am Coll Cardiol. 2016;68(21):2287-95.
6. Garcia EV, Klein JL, Taylor AT. Clinical decision support systems in myocardial perfusion imaging. J Nucl Cardiol. 2014;21(3):427-39.
7. Gama F, Tyskbo D, Nygren J, Barlow J, Reed J, Svedberg P. Implementation frameworks for artificial intelligence translation into health care practice: scoping review. J Med Internet Res 2022;24:e32215.

AUTHORS' CONTRIBUTION

TA and RS: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work

Address for Correspondence:

Dr. Tariq Ashraf, Karachi Institute of Heart Diseases, Karachi, Pakistan.
Email: tariqash45@gmail.com