



OPEN ACCESS

EDITED AND REVIEWED BY
Zhongheng Zhang,
Sir Run Run Shaw Hospital, China

*CORRESPONDENCE

Bing Yang
✉ bingyang@tmu.edu.cn;
✉ yang.bing@krirk.ac.th

RECEIVED 22 June 2024

ACCEPTED 01 July 2024

PUBLISHED 23 July 2024

CITATION

Wu L-l, Yang B-r, Meng X-y, Fan G-w and Yang B (2024) Editorial: Artificial intelligence: new hope for critically ill cardiovascular patients. *Front. Med.* 11:1453169. doi: 10.3389/fmed.2024.1453169

COPYRIGHT

© 2024 Wu, Yang, Meng, Fan and Yang. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Editorial: Artificial intelligence: new hope for critically ill cardiovascular patients

Li-li Wu¹, Bo-ran Yang^{2,3}, Xin-yi Meng⁴, Guan-wei Fan^{5,6} and Bing Yang^{4,7*}

¹Department of Health Service, Logistics University of People's Armed Police Force, Tianjin, China, ²Tianjin Zhongshan Elementary School, Tianjin, China, ³Tianjin Wutong High School, Tianjin, China, ⁴Department of Cell Biology, College of Basic Medical Sciences, Tianjin Medical University, Tianjin, China, ⁵National Clinical Research Center for Chinese Medicine Acupuncture and Moxibustion, First Teaching Hospital of Tianjin University of Traditional Chinese Medicine, Tianjin, China, ⁶State Key Laboratory of Modern Chinese Medicine, Key Laboratory of Pharmacology of Traditional Chinese Medical Formulae, Ministry of Education, Tianjin University of Traditional Chinese Medicine, Tianjin, China, ⁷Department of Public Health, International School, Krirk University, Bangkok, Thailand

KEYWORDS

editorial, artificial intelligence, cardiovascular disorder, critically ill patients, cardiovascular medicine

Editorial on the Research Topic

[Artificial intelligence: new hope for critically ill cardiovascular patients](#)

Cardiovascular disease (CVD) remains a major challenge for researchers, clinicians, and patients and is a leading cause of morbidity and mortality around the world (1). CVD is a complex and integrated collection of diseases of the heart, vascular system, and blood. Symptoms of CVD may not be limited to the heart itself. They could include all symptoms of narrowed or clogged blood arteries that may affect the muscles, valves, etc. (2). It is a highly personalized condition that is constantly and rapidly changing. This becomes more complex when dealing with critically ill patients.

For years, scientists have been trying to use all the information available to build more accurate, more efficient, and simpler scoring models. Then they gather evidence to prove whether they are better. Thanks to the development of medical tools, we can collect more data than ever before. But that makes it difficult for the physician to process the vast amount of data to make the right decision. This is vitally important for people with cardiovascular disease. In the high-stakes intensive care unit (ICU) environment, the ability to accurately predict patient outcomes is also paramount.

Almost 80 years after the first artificial neural network, artificial intelligence (AI) has been able to prove itself with its powerful capabilities, especially in the field of medicine (3) (Figure 1). Optimized computer infrastructures are attempting to emulate the capabilities of the human brain and offer support to the doctor, especially in the processing of huge amounts of data. By effectively interpreting vast amounts of clinical data, AI is now accelerating the pace of medical development. Cardiovascular medicine is rapidly embracing AI (4). In this historic

change, we have been able to find more and more AI-based modalities, such as electrocardiograms and cardiac angiography, in the clinical management and diagnosis of CVD.

This editorial introduces the collection of articles published in *Frontiers in Medicine*. We hope that this Research Topic will be able to promote high-quality research on AI in the field of cardiovascular medicine. The following are the researches in the *Frontiers in Medicine: Intensive Care Medicine and Anesthesiology* collection.

Analysis of Hematological Indicators via Explainable Artificial Intelligence in the Diagnosis of Acute Heart Failure: A Retrospective Study, by [Yilmaz et al.](#) Using AI, this study focuses on finding new hematological indicators for acute heart failure. The findings suggest that older age, low platelet count, high erythrocyte distribution width standard deviation, and platelet distribution width are the most important hematology parameters for diagnosing AHF.

A quasi-experimental study of fresh oxygen flow on patients' oxygen reserve during mask-assisted ventilation under general



FIGURE 1

Artificial intelligence changing the future of healthcare. Harnessing the computational power of artificial intelligence to improve medical practice, research, and decision-making. Ultimately, this will lead to more accurate diagnoses, personalized treatments, and improved patient outcomes.

anesthesia induction by Shi et al.. Anesthesia is critical for critically ill cardiovascular patients. The different levels of pre-oxygenation in routine clinical anesthesia are compared in this study.

A Novel Web-based Calculator to Predict 30-Day All-Cause In-hospital Mortality for 7202 Elderly Patients with Heart Failure in ICUs: Multicenter retrospective cohort study in the US by Wang et al.. They developed a web-based program to predict 0-day mortality in older HF patients in the ICU. Especially for elderly patients admitted to intensive care units. This study also predicts risk factors for in-hospital mortality.

Randomized Trial on the Effects of Mindfulness-Based Respiratory Decompression Therapy in Claustrophobia Patients Undergoing MRI Inspection by Zhou et al.. This study concerns the psychological problems that arise in magnetic resonance imaging machines. They found that mindfulness breathing techniques can help patients with claustrophobia complete an MRI scan.

Development and Validation of Risk Prediction and Neural Network Models for Dilated Cardiomyopathy Based on WGCNA by Yu et al.. To discover potential biomarkers and therapeutic options for dilated cardiomyopathy, the author developed a prediction model and a neural network. In combined and validation datasets, their results show good accuracy and sensitivity.

Automating Venous Thromboembolism Risk Assessment: A Dual-Branch Deep Learning Method Using Electronic Medical Records by Yang et al.. In the case of VTE, a common CVD, the researcher proposed a two-stage deep learning assessment method, finding an intelligent way to assist the physician in a tedious assessment.

VNN1 as a Potential Biomarker for Sepsis Diagnosis and its Implications in Immune Infiltration and Tumor Prognosis by Guan et al.. The study looked for biomarkers of sepsis, a serious condition that can be life-threatening in older people. They found that VNN1 could be used as a potential biomarker to help diagnose sepsis. Identifying immune infiltration in tumor tissue to predict a tumor prognosis is also a useful approach.

References

- Sethi Y, Patel N, Kaka N, Kaiwan O, Kar J, Moinuddin A, et al. Precision medicine and the future of cardiovascular diseases: a clinically oriented comprehensive review. *J Clin Med.* (2023) 12:1799. doi: 10.3390/jcm12051799
- Ferreir JL, Kumar S, Soni A, Acharya N, Acharya S. Clinical management of cardiovascular diseases. In: *Current Trends in the Diagnosis and Management of Metabolic Disorders*. Boca Raton, FL: CRC Press. (2023). p. 254–278.
- Iqbal J, Jaimes DCC, Makineni P, Subramani S, Hemaidda S, Thugu TR, et al. Reimagining healthcare: unleashing the power of artificial intelligence in medicine. *Cureus.* (2023) 15:44658. doi: 10.7759/cureus.44658
- Makimoto H, Kohro T. Adopting artificial intelligence in cardiovascular medicine: a scoping review. *Hypertens Res.* (2024) 47:685–99. doi: 10.1038/s41440-023-01469-7

Author contributions

L-IW: Writing – original draft. B-rY: Writing – original draft, Visualization. X-yM: Funding acquisition, Writing – original draft. G-wF: Writing – review & editing. BY: Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This work has been funded by the National Natural Science Foundation of China (82202009).

Acknowledgments

The authors would like to express their gratitude to the co-editors of this Research Topic and the contribution of the reviewers.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.