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Perspective

Cardio-oncology: Examination of progress in China from an oncologist's perspective



Introduction

Cardio-oncology represents an evolving field at the intersection of cancer and cardiovascular health. It delves into the intricate interplay between these two domains, encompassing shared risk factors, interventions for cardiovascular diseases and tumors, cardiovascular complications arising from anticancer therapies, as well as cardiac tumors and tumor-associated cardiovascular diseases.¹ Positioned at the forefront of holistic healthcare, Cardio-oncology underscores the critical need for a comprehensive understanding and management of cardiovascular complications in individuals with cancer. As advancements in cancer treatment continue to improve patient survival rates, the proactive management of cardiovascular risks in this population has assumed heightened significance.

Cardio-oncology on the global stage

In 2000, the University of Texas MD Anderson Cancer Center was established. By 2010, over 200 medical, scientific, and healthcare professionals from 14 countries gathered for the inaugural International Conference on "Cancer and the Heart."² Subsequently, the International Society for Oncology and Cardiology (ICOS) was founded, marking the emergence of cardio-oncology and the characterization of its four key focuses: (1) cardiovascular complications induced by anticancer therapy, (2) cardiac involvement in cancer, (3) shared risk factors between cardiovascular disease and (4) tumors consisting both primary and secondary cardiac tumors.³

In 2022, the publication of the 2022 European Society of Cardiology, cardio-oncology Guidelines marked a significant milestone in the global practice of cardio-oncology. These guidelines introduced the concept of cancer treatment-related cardiovascular toxicity (CTR-CVT) and offered systematic recommendations for diagnosing, treating, preventing, and managing various CTR-CVT.⁴

The development of cardio-oncology in China

While cardio-oncology's inception in China occurred relatively late, its developmental trajectory is on par with that of developed nations. Since the pioneering report on anthracycline drug-induced cardiotoxicity in 1967, Chinese experts and scholars have progressively enhanced their understanding of this phenomenon, particularly in the context of treating acute leukemia in children.^{5,6} A significant milestone was reached in 2011 with the publication of China's inaugural expert consensus on cancer cardiology, titled the Chinese Expert Consensus on the Prevention and Treatment of Cardiotoxicity of Anthracycline Antineoplastic Drugs.⁷

Despite the availability of these foundational documents for many years, Cardio-Oncology in China remains in its nascent stages, largely due to a lack of widespread awareness about the discipline.

In 2015, as part of the "Healthy China 2030" national strategy, oncologists introduced a "Full Process Management Mode" aimed at revolutionizing cancer prevention and treatment models. This approach prioritizes optimizing tumor treatment effectiveness and addresses other diseases linked to or triggered by cancer treatment, such as cardiovascular events, fracture risk, and mental health. The strategy advocates for a "patient-centered," interdisciplinary, and comprehensive management model to significantly enhance the survival rate of cancer patients.^{8,9}

In June 2016, the inaugural China cardio-oncology Conference was held in Dalian City, Liaoning province, China, under the endorsement of Dr. Susan Dent, formally inaugurating cardio-oncology as a recognized sub-specialty in the country. This milestone event not only established a formal discipline name and research field but also led to the rapid adoption of the term "cardio-" across China. Subsequently, both oncology and cardiology fields in China experienced substantial growth, marked by a surge in specialized conferences focusing on oncology, cardiology, and oncology health management. These conferences increasingly incorporate specialized sessions on cardio-oncology, facilitating greater collaboration and knowledge exchange between cardiovascular and oncology professionals. This interdisciplinary synergy has spurred the initiation of numerous collaborative projects, heralding a new era of cooperation between the two disciplines.¹⁰⁻¹³

In 2017, our collaboration with Professor Haitao Zhang's team from the Fuwai Hospital of the Chinese Academy of Medical Sciences (CAMS) resulted in the translation and publication of the original book "*Cardio-Oncology: The Clinical Overlap of Cancer and Heart Disease*".¹⁴ This publication marked the first professional reference book in the field of cardio-oncology in China, providing valuable assistance to clinical doctors in addressing the intricate interplay between the oncology discipline and cardiovascular diseases.

Academic contributions to the development of cardio-oncology led to the establishment of official associations. In June 2017, through the approval of the Chinese Medical Association (CMA), the Cardio-Oncology Professional Committee of the Cardiovascular Physicians Branch of the Chinese Medical Association was established. On November 18, 2017, the Zhejiang Cancer Cardio-Oncology Cooperation Group was established. This group is affiliated with the Zhejiang Anti-Cancer Association and facilitates quarterly academic exchanges. During these exchanges, experts in cardio-oncology from both within and outside the province come together to share their experiences and insights in person.

In August 2018, the Integrated Cardio-Oncology Branch of the China Anti-Cancer Association was announced, which was the first professional

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academic organization in the field of Cardio-Oncology established among cancer related societies. The aim was to further promote its development and make more scholars in the fields of oncology, cardiovascular disease and physicians from other multidisciplinary (MDT) specializations, to realize the importance of the discipline. This marked the beginning of a new milestone in the field of Cardio-Oncology in China. In the same year, the Shanghai Oriental Cardiology Conference (OCC) established the "Cardio-Oncology Forum" for the first time. On June 14, 2019, the Cardio-Oncology Group of the Cardiovascular Disease Branch (CSC) of the Chinese Medical Association was established in Shenyang, China, with Professor Yunlong Xia to lead this initiative. On December 8, 2019, the Cardio-Oncology Expert Committee of the Chinese Society of Clinical Oncology (CSCO) was established, with Professor Jiwei Liu serving as the first chairman and Professor Yunlong Xia serving as the co-chairman of this society. The current distribution of professional associations suggests a geographically diverse spread across China, with established branches in Heilongjiang (northeast), Shanghai (east), Guangdong (south), Jilin (northeast), and Shaanxi (north-central) among others, with further anticipation of the field's increasing national presence.

In 2019, Fuwai Hospital of the CAMS opened the first cardiovascular specialty hospital in China, focusing on cardio-oncology. The hospital also established relevant forums and launched a dedicated column on cardio-oncology in the *Chinese Journal of Heart Failure and Cardiomyopathy*. In 2022, the *Chinese Consensus on Diagnosis and Treatment of Heart Diseases Related to breast cancer (2022 Edition)* and the *Chinese Expert Consensus on Prevention and Management of Coronary Heart Disease in Patients with Malignant Tumor (2022 Edition)* were successively released.

Due to the delayed introduction of cardio-oncology in China, the establishment of cardio-oncology clinics consequently started relatively late. Currently, there are only a few hospitals across Chinese cities, for example in Dalian, Beijing, Harbin, Shanghai and Hangzhou, among others, that have dedicated cardio-oncology clinics.¹¹ Despite the considerable significance of this initiative, there still persists a discernible disparity in the number of cardio-oncology centers in China compared to cardio-oncology clinics around the world. Furthermore, cardio-oncology clinics that have been established remain dominant in cardiac hospitals. However, the challenge arises, as there is significant potential to establish cardio-oncology clinics in cancer hospitals. Indeed, the blueprint would differ from that seen in cardiology-based practice; however, it would serve as a point of direct contact between the oncologist and the patient, providing an incentive for the physician to train in cardio-oncology and manage the patient directly, rather than referring them to the cardiology department if unnecessary. The official crossover between both cardiac and oncology disciplines, which forms the basis of cardio-oncology, would therefore be achieved. Consequently, a collective acknowledgement of the imperative to rectify this discrepancy has emerged on a national scale. This recognition has prompted an intensified emphasis on fostering MDT, notably evidenced during extensive conference engagements and inaugural phases of nascent associations. These concerted efforts aim to facilitate comprehensive education initiatives and catalyze the substantive expansion of cardio-oncology within the Chinese academic and medical landscape."

The challenges of cardio-oncology multi-disciplinary team in China's oncology hospitals

In China, cardio-oncology programs are typically developed in collaboration with cardiac hospitals and clinics. However, the establishment of dedicated cardio-oncology centers in partnership with cancer hospitals is yet to be realized. This gap hinders the promotion of core principles of the MDT framework applied in cardio-oncology.¹⁵ Consequently, oncology hospitals in China often lack comprehensive cardio-oncology teams, ideally including specialists such as cardio-oncologists, vascular oncologists, cardiac specialists, pharmacists, cardio-oncology administrators, and nurse practitioners.

For instance, considering the case of our hospital, the Cancer Hospital of the University of Chinese Academy of Sciences, Hangzhou, a premier

third-tier hospital specializing in cancer care in China. Disparities exist between the doctor and nursing teams. Despite the absence of an official cardio-oncology department, physicians are still able to obtain official qualifications in cardio-oncology from international institutions. However, nurses lack this option domestically; and with little or no knowledge of the availability of internationally recognized qualifications covering basic cardiology care in cancer patients, including disease observation, heart health monitoring and guidance for patients, their families and caretakers during the cancer treatment journey.

Ideally, nurses play a central role in bridging the gap between specialists within the cardio-oncology MDT. Their diverse roles include coordinating the cardiac care process, delivering bedside support, and providing educational resources for other healthcare workers, patients, families and caregivers throughout the patient journey, from admission to remission or end-of-life care.¹⁶

China's 14th Five-Year Plan hence, emphasizes the rapid development of emerging specialties, where nursing groups are called upon to play a key role in improving the quality of novel medical discipline programs.¹⁷ Therefore, investing in the novel field of cardio-oncology within an oncology setting remains critical. The need extends beyond establishing services to incorporating domestic and international official training programs for both nurses and doctors in the field of cardio-oncology.

Conclusions

The evolution of cardio-oncology stands as a testament to the multidisciplinary collaboration beyond traditional cardiology and oncology teams. This collaboration has profound implications for cancer patient care globally, particularly in China. While significant strides in cardio-oncology have led to its maturity among Chinese cardiologists, recognizing its importance in managing cardiovascular complications related to cancer treatment, there is still an urgent need to improve the recognition and understanding of cardio-oncology among oncologists, especially within China's evolving healthcare landscape. Bridging this divide necessitates a more multidisciplinary approach.

The establishment of cardio-oncology organizations and initiatives across various regions of China reflects a promising trajectory for the field's advancement. Recently, in 2023, the Zhejiang Anti-Cancer Association approved the establishment of the Cardio-Oncology Professional Committee. These gradual strides have allowed cardio-oncology to flourish throughout the country, optimizing cancer treatment in patients while managing their cardiovascular health.

In conclusion, the journey of cardio-oncology in China underscores the transformational power of interdisciplinary collaboration in addressing the intricate interplay between cancer and cardiovascular health. However, challenges are still abundant in terms of effective MDT collaboration in cancer hospitals, as well as offering official training programs for oncology doctors and nurses. By increasing the investment in the field of cardio-oncology, through advocacy, research, and education, and establishment of cardio-oncology clinics in the oncology department, the future of cardio-oncology will certainly directly shape the future of cancer care, offering optimized treatment and improved quality of life for patients in China and worldwide.

Ethics statement

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CRedit authorship contribution statement

Xiaojia Wang: Conceptualization, Methodology, Data curation, Formal analysis, Writing – Original draft preparation, Supervision. **K.**

Sharma: Methodology, Writing – Original draft preparation, Reviewing and Editing, Writing – Revised draft, Data curation. **Zhanhong Chen:** Visualization, Investigation, Reviewing, Draft revision editing. **Shanshan Wang:** Reviewing and Editing, Draft revision. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Prof. Xiaojia Wang, upon reasonable request.

Declaration of Generative AI and AI-assisted technologies in the writing process

No AI tools/services were used during the preparation of this work.

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