

VIEWPOINT

Cardio-Oncology Care Delivery for All Patients With Cancer Within Academic and Community Settings



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Cardiovascular disease (CVD) and cancer are the leading causes of death in the United States, with minority and under-resourced communities experiencing disproportionately high rates of CVD and cancer despite the decline in CVD and cancer mortality nationwide. The disparate incidence of and mortality from CVD can be attributed to a multitude of factors, including the known associations with race, ethnicity, socioeconomic status, geography, and gender. Increased incidence of and mortality from certain cancers can also be linked to many of the same risk factors, with disparities existing across most aspects of cancer care from diagnosis through survivorship. Despite advances in early diagnosis, risk factor management, and treatment in CVD and cancer, geographic, racial, and ethnic disparities in morbidity and mortality persist.¹

In the 1970s, the medical community became aware of cardiovascular toxicity from oncology drugs when patients treated with high-dose anthracyclines developed heart failure. Use of the anti-*HER2* medication trastuzumab for breast cancer, treatment with bortezomib, a proteasome inhibitor with anticancer activity in both solid and hematologic malignancies, and other cancer treatments with potential cardiovascular toxicity, such as radiation therapy in the 2000s, increased awareness of unanticipated side effects of cancer treatment.² It took decades to

appreciate the long-term cardiac effects of chest radiation in combination with anthracyclines, and it may take decades for us to fully grasp the short- and long-term effects of newer agents brought into wide clinical use in the past few years.³

Rapid progress in our understanding of the biology of cancer has led to the discovery of numerous new anticancer agents that have produced substantial reductions in cancer mortality. Immunotherapy, such as PD-1 and PD-L1 checkpoint inhibitors, tyrosine kinase inhibitors directed at the vascular endothelial growth factor receptor, and other similar drugs, have substantially improved survival for patients with cancer but have resulted in cardiovascular and other toxicities. In addition, as many agents have been used only in the past several years, we have little information on long-term toxicities.⁴

There are also limited data on outcome disparities in treatment-related cardiovascular toxicity, even though cardiovascular toxicity is the leading cause of non-oncologic morbidity and mortality among cancer survivors. Academic centers are at the forefront of cardio-oncology program development, a growing field that brings cardiologists and oncologists together to balance cancer treatment outcomes with the prevention and management of new and existing CVD. This service exists primarily at tertiary referral centers with comprehensive cancer programs. However, most patients with cancer across the country are cared for in the community by oncology generalists, where they also receive their cardiac care from general cardiologists. Therefore, it is essential that community cardiologists and oncologists understand the adverse and indirect effects of cancer treatment, including radiation, chemotherapy, and immune therapy, that affect the cardiovascular health of patients with cancer, and that together we understand

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how social determinants of health influence both.⁴ With the rapid increase in U.S. Food and Drug Administration approvals for cancer drugs, this is ever more challenging for both oncologists and cardiologists.

Large academic cancer centers generally have oncologists who are focused on one disease, whereas community oncologists often are generalists, treating a spectrum of cancers with many anticancer agents. Likewise, a growing number of academic cancer centers have cardiologists with a special interest in the co-management of patients with cancer, during treatment, and in short- and long-term follow-up. They may be part of a formal cardio-oncology program, integrated with the oncology program, providing highly specialized care for these patients. However, many cardio-oncology programs at large academic centers are limited by an inadequate number of cardiologists with limited training in the field. These programs may not be able to meet the needs of the growing numbers of oncology patients with associated cardiac issues. Cardio-oncology would benefit from standardization of training focused on balancing the cardiovascular and oncologic needs of patients. Although cardio-oncology training programs are growing rapidly, most training is currently offered in the form of workshops and courses. Community programs are less likely to have similar subspecialists.

Data suggest that cancer survival rates may differ between academic and community settings, creating significant disparities in cancer care in the United States. The reasons for this are likely multifactorial and variable from setting to setting.⁵ As we attempt to address these disparities, we need to understand the contributing factors in order to design interventions that improve outcomes for these patients. A limited number of patients with cancer will require cardiology attention during active treatment or survivorship, and when cardiovascular toxicity is an issue, many can be well managed by general cardiologists. However, as newer therapies are introduced, specialized cardiovascular care may be necessary for more patients and available only through a cardio-oncology service. If specialized care is not available to patients, outcomes may be suboptimal, resulting in disparities compared with patients who have access to such care.^{5,6}

There are a limited number of cardio-oncology fellowships in the United States, and there is a need for training to be standardized for all cardiology trainees.⁷ Although it may be challenging to incorporate cardio-oncology education and experience into general cardiovascular fellowship training across the country, it

should be considered in the years ahead. Several systems have been proposed as models for delivering care to patients with cancer at risk for developing /worsening CVD. In a 2016 position paper, the European Society of Cardiology set forth the optimal management of these patients.⁸ They determined that cardio-oncology care requires a multidisciplinary approach to consistent, continuous, coordinated, cost-effective care across the cancer care continuum. They recognized that this would require different specialties dependent upon the phase of care, including medical and radiation oncologists, surgeons, radiologists, anesthesiologists, and nurses. They advocated for establishing clinical and referral pathways in keeping with available resources and dedicated specialty nurses to coordinate diagnostic tests, cardiology visits, and telehealth consultations. As surveillance for late cardiovascular complications in cancer survivors may be the most difficult to translate into practice because the late effects of treatment appear years to decades after receipt of those therapies, they also note the importance of including the primary care providers and caretakers on the team.

Another care model in Texas integrates cardio-oncology care with community-based facilities to improve care access, quality, and equity.⁹ Providers there established a cardio-oncology program with standardized protocols for delivering care, dedicated resources, and imaging, to assess cardiovascular toxicities and optimize clinical management. These services were then expanded to numerous hospitals and ambulatory care centers including rural outreach offices. Close collaborations were established with internal and external providers that included oncology practices, cancer centers, primary care providers, and survivorship clinics to ensure consistent, equitable care in accordance with standardized protocols. As a result, quality measures, including time from referral to office visit and cardiac testing and time from visit to communication to the referring provider, all showed significant improvements. However, outcomes such as the incidence of cardiovascular toxicity, the frequency of treatment changes or holding treatment because of cardiovascular complications, and the occurrence of cardiovascular death must still be evaluated to determine the added value of cardio-oncology care models.

The field of cardio-oncology is still nascent, with a limited number of specialists in the United States to support what is a growing need. The oncology and cardiology communities must work together proactively when planning therapy for patients and developing mechanisms to meet the need of an

increasing number of patients with cancer exposed to cardiotoxic therapies. Although efforts are under way to give guidance in how this should happen, implementation is challenging, particularly in the United States, where cancer care is distributed over a large geographic area and access to specialized care is often limited and challenging. Academic centers around the country could consider partnering with their community oncology and cardiology colleagues to establish in-person and/or virtual cardio-oncology consultation services that would serve broad geographic areas and decrease the potential for disparities in the care provided. The principle of this would be similar to how oncology tumor boards are currently used.

Overcoming these obstacles will involve an increased appreciation of the need for cardio-oncology care on the part of both oncologists and

cardiologists. This includes educating cardiologists, oncologists, patients, and the public and developing mechanisms to ensure that patients are receiving the specialized care essential for their quality of life and survival, regardless of the setting in which they are receiving care.

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