

# THE ROLE OF CARDIO- ONCOLOGY IN THE INTERPROFESSIONAL CARE OF ADULT PATIENTS RECEIVING CANCER THERAPY

EDITH PITUSKIN, IAN PATERSON, NANETTE COX-KENNETT, DEREK ROTHE,  
MELISSA PERRI, AND HARALD BECHER

**OBJECTIVE:** *To discuss the toxic effects of therapy to the structure and function of the cardiovascular system and the role of the cardio-oncology team in the interprofessional care of adult patients, including current approaches, research findings, and future endeavors*

**DATA SOURCE:** *Published articles and international cardiology and oncology association guidance documents.*

**CONCLUSION:** *Although a new field of study, cardio-oncology is a rapidly expanding area of great clinical need. Evidence is only now accumulating, with most guidelines based on opinion or extrapolated from cardiovascular literature. Oncology care providers face complex decisions on a daily basis, whether before, during, or following definitive cancer treatments.*

**IMPLICATIONS FOR NURSING PRACTICE:** *In the era of both traditional and targeted cancer therapies, the long-term side effects to the cardiovascular system*

Edith Pituskin, RN, MN (NP – Adult Oncology), PhD: Faculty of Nursing, Faculty of Medicine (Oncology), University of Alberta, Edmonton, AB, Canada. Ian Paterson, MD, FRCPC: Faculty of Medicine (Cardiology), University of Alberta, Edmonton, AB, Canada. Nanette Cox-Kennett, RN, MN (NP – Adult Oncology): Cross Cancer Institute (Alberta Health Services), Edmonton, AB, Canada. Derek Rothe, RN, BScN, MN(c) (NP Adult): Faculty of Nursing, University of Alberta, Edmonton, AB, Canada. Melissa Perri, RN, BScN, MN Student (NP Adult): Faculty of Nursing, University of Alberta,

Edmonton, AB, Canada. Harald Becher, MD, PhD, FRCPC: Faculty of Medicine (Cardiology), University of Alberta, Edmonton, AB, Canada.

Address correspondence to Edith Pituskin, PhD, 4-256 Edmonton Clinic Health Academy (ECHA), University of Alberta, 11405 87 Ave, Edmonton, AB, Canada T6G 1C9. e-mail: [pituskin@ualberta.ca](mailto:pituskin@ualberta.ca)

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and, consequently, the needs of cancer survivors are increasingly complex. Accordingly, oncology nurses must not only be aware of such potential effects, but should conduct careful serial symptom review and consider risk-reduction and cancer rehabilitation strategies across the disease trajectory.

**KEY WORDS:** *cardiotoxicity, heart failure, chemotherapy, prevention, rehabilitation, symptom screening, interprofessional collaboration.*

With improved understanding of cancer biology, early detection, and multimodal adjuvant therapies, an increasing number of North Americans are surviving cancer diagnosis and treatment. The American Cancer Society projects the number of US cancer survivors to exceed 20 million individuals by 2026.<sup>1</sup> Currently, the number of survivors is increasing at twice the rate of new cases.<sup>2</sup> Therefore, cancer represents a new “chronic” disease that many patients will experience and survive; however, one that often requires complex interprofessional medical management and resource utilization over many years.

Toxicities associated with many effective and commonly prescribed adjuvant therapies may persist for many years. In particular, toxic effects to the structure and/or function of the cardiovascular system, or “cardiotoxicity” may lead to arrhythmias, heart failure and, in some patients, death.<sup>3</sup> In fact, for many survivors, the risk of death from cardiac disease now exceeds that of recurrent cancer.<sup>4</sup> Aiming to manage these potentially devastating effects, a new sub-specialty in cancer care has emerged, a combination of cardiology and oncology called “cardio-oncology” or “onco-cardiology.” The aim of this review is to discuss the role of the cardio-oncology team in the interprofessional care of adult patients, including current approaches, research findings, and future endeavors. While specific tumor types are referenced here, the observations may be applicable to different tumor types (for example, patients with esophageal cancer) who face new risks as treatment recommendations evolve.

### DEFINITION AND DETECTION

Left ventricular (LV) dysfunction and heart failure represent the most concerning and potentially life-threatening cardiovascular toxicities, characterized by poor pump function and potentially associated with clinical symptoms such as fatigue, shortness

of breath, poor exercise tolerance, and peripheral edema. There are several challenges in the clinical detection of cardiotoxicity. Symptoms such as dyspnea, fatigue, and edema (the cardinal symptoms of heart failure) are common among cancer patients and are difficult for the practitioner to distinguish from true cardiac causes.<sup>5,6</sup> Further, the routine assessment of cardiac symptoms, vital signs,<sup>7,8</sup> and the screening of cardiac risk factors are infrequently performed in the oncology outpatient setting,<sup>9,10</sup> and symptoms of fatigue and dyspnea are typically not pursued (38% and 77% of the time, respectively).<sup>8</sup> Current guidelines arbitrarily define cardiotoxicity as a drop in LV ejection fraction (LVEF) by >10 points to a value of <53%.<sup>11</sup> However, in oncology patients receiving anti-neoplastic treatments, LVEF of at least 50% has been considered adequate functioning. Identification of cardiotoxicity relies on the routine ordering of baseline and surveillance imaging tests aimed at identifying changes in LVEF. Many patients will have up to five serial imaging tests performed (some modalities involving radiation exposure) over a routine course of chemotherapy.

The predominant therapies associated with cardiotoxicity are anthracycline-based chemotherapies, monoclonal antibody-based therapies (anti-HER2 agents) such as trastuzumab, and radiation therapy involving the chest and/or mediastinum. Other classes of anti-neoplastic therapies, such as alkylating agents, anti-microtubule agents, anti-estrogen agents, and several others, are also recognized for cardiac complications. However, associated declines in heart function are less common.<sup>12</sup> Indeed, with the common use of multimodality treatments, cardiotoxicity represents a wide spectrum of additional cardiac injuries that include tissue inflammation, electrophysiologic instability, changes in blood pressure control, myocardial ischemia, and thrombogenesis.<sup>12</sup>

Cardiotoxicity has been previously shown to be related to cumulative dose exposure to anthracyclines. An “acceptable ceiling” dose of doxorubicin dose is thought to be in the 400 to

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