JACC: CARDIOONCOLOGY VOL. 2, NO. 3, 2020

VIEWPOINT

Florida Inter-Specialty Collaborative Project to Improve Cardio-Oncology Awareness and Identify Existing Knowledge Gaps*

Diego Sadler, MD,[a] Michael G. Fradley, MD,[b] Roohi Ismail-Khan, MD, MSC,[b] Luis Raez, MD,[c] Deepti Bhandare, MD,[d] Leah Elson, MS,[a] David Perloff, MD,[e] Patricia Guerrero, MD,[d] Zeina Nahleh, MD,[a] Anita Arnold, DO[f]

Cancer and cardiovascular disease are 2 primary causes of morbidity and mortality in the United States (1). In addition to the physical burden of disease, there is an emotional and financial toll on patients, family members, and the health care system at large (2). The success of novel cancer therapies has resulted in significantly improved disease-free and progression-free survival for many cancers; however, many conventional and newer cancer treatments, including radiation therapy, chemotherapeutic agents, targeted therapies, and immunotherapies, are also associated with an increased risk of a number of adverse effects, including cardiovascular toxicity (3).

By 2040, it is estimated that there will be approximately 26.1 million cancer survivors in the United States alone. Many of these patients also may be at risk for or experience cardiovascular risk factors or disease (4). Traditionally, cardio-oncology programs that specialize in the monitoring, prevention, detection, and treatment of cardiotoxicity in patients with cancer have been located in large academic quaternary institutions. However, an increasing number of programs are currently being developed in smaller community practices. In 2014, the American College of Cardiology (ACC) National Cardio-Oncology Survey identified multiple factors that have traditionally acted as barriers to developing cardio-oncology programs nationally, including lack of funding, limited interest, lack of infrastructure, and lack of educational opportunities (5). Such limitations directly impact the number of practicing cardiologists who have expertise in cardio-oncology, which may result in significant public health implications, given the rapidly increasing number of cancer survivors.

FLORIDA ACC AND AMERICAN SOCIETY OF CLINICAL ONCOLOGY PROGRAM DEVELOPMENT

To comprehensively evaluate current cardio-oncology awareness among clinicians in the State of Florida, we developed a collaborative program between the Florida Chapter of the American College of Cardiology (FCACC) and the Florida American Society of Clinical Oncology (FLASCO) and administered a survey to its members. Our goal was to extrapolate the educational needs of both cardiologists and oncologists who actively treat patients with cancer and develop educational materials to help bridge the identified knowledge gaps. In 2019, the FCACC was awarded a grant by the ACC Board of Governors to

*Editorials published in *JACC: CardioOncology* reflect the views of the authors and do not necessarily represent the views of *JACC: CardioOncology* or the American College of Cardiology.

From the [a]Cleveland Clinic Florida, Weston, Florida; [b]H. Lee Moffitt Cancer Center/University of South Florida, Tampa, Florida; [c]Memorial Cancer Institute/Florida International University (FIU), Miami, Florida; [d]Advent Health, Orlando and Sebring, Florida; [e]Broward Health Medical Center, Fort Lauderdale, Florida; and [f]Lee Health, Fort Myers, Florida.
The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: CardioOncology* author instructions page.

Manuscript received April 8, 2020; revised manuscript received June 1, 2020, accepted June 2, 2020.

ISSN 2666-0873 https://doi.org/10.1016/j.jaccao.2020.06.009

JACC: CARDIOONCOLOGY, VOL. 2, NO. 3, 2020
SEPTEMBER, 2020:535–8

survey the knowledge of and resources available concerning cardio-oncology among cardiologists and oncologists in Florida. The investigators established cardio-oncology subcommittees for both FCACC and FLASCO to optimally promote participation among specialists from both organizations.

A 16-question Web-based survey was sent to all members of FCACC and FLASCO via electronic platforms. Both surveys were available at the following links:

FCACC: https://www.surveymonkey.com/r/WPQQPNQ

FLASCO: https://www.surveymonkey.com/r/FLASCO-CardioOncology

The FLASCO survey included several additional questions directed specifically to the oncology community. The surveys were designed to enable participants to complete answering all questions in <5 min to enhance response rate. Clinicians received reminders 4 times over a 3-week period. The results of the surveys were analyzed to determine current levels of awareness and to identify opportunities to enhance and expand education and address knowledge gaps for both specialist groups. Data were directly and securely exported to Microsoft Excel (2010), within which frequency tables were tabulated using Visual Basic for Applications-coded commands. Data are reported in frequency and proportion format.

After identifying specific knowledge gaps from these surveys, the cardio-oncology subcommittees of FCACC and FLASCO developed brief educational materials focusing on 11 fundamental topics in cardio-oncology. These documents were designed to be delivered electronically to FCACC and FLASCO memberships in early 2020. The topics were not intended to be in-depth reviews, but instead brief outlines in crucial areas of cardio-oncology for clinicians. Each topic also included linked references for those interested in obtaining further information (6).

A total of 303 physicians completed the surveys: 165 members (5.8%) from FLASCO and 138 members (5.5%) from the FCACC. Only 23 (14%) of 163 oncologists and 22 (16%) of 134 cardiologists reported feeling "very comfortable" treating patients with cardiovascular complications secondary to cancer treatment (**Figure 1**). As detailed in the figure, cardio-oncology services were available in less than one-half of each of the respondent groups. When cardio-oncology services were available, oncologists more commonly referred patients to cardio-oncology compared with the cardiologists. However, it is important to note that there were a small number of responses to this question from oncologists (n = 44), and the absolute number of providers (n = 41) referring to cardio-oncology were the same for both specialties. Interestingly, fewer than one-half of respondents felt that there was optimal cooperation between their specialties concerning the management of these complex patients. More than one-half of the oncologists rated their knowledge of cardio-oncology above average, whereas more than one-half of the cardiologists rated their knowledge of cardio-oncology average or below average (**Figure 1**). Many of the cardiologists (40%) and more than one-half of the oncologists (56%) had not previously attended any cardio-oncology sessions.

ONCOLOGY-SPECIFIC QUESTIONS

Oncologists primarily consulted general cardiology (58%), as compared with cardio-oncology (38%) for evaluation of treatment-related cardiotoxicity. Overall, a lack of awareness (63%) and lack of funding (40%) were there primary barriers toward establishing a cardio-oncology program. Additional reasons included lack of mentoring (27%), lack of interest (26%), and inadequate reimbursement (16%). Lack of importance was noted by 16%. Whereas 29% (47 of 161) of oncologists treated patients with potential cardiotoxicities more than once per week, 36% cared for patients with cardiotoxicities less than once a week and 35% cared for these patients less than once per month. The most common cardiotoxicities reported by participating oncologists included heart failure or reduced left ventricular ejection fraction (84%), arrhythmias and atrial fibrillation (43%), arterial or venous thromboembolism (42%), and QT prolongation (36%). Myocardial infarction/ischemia/vasospasm was reported by only 10% of respondents.

The survey results indicated that oncologists most commonly initiated cardiac evaluations or consultations for patients treated with the following cancer treatments: anthracyclines (95%), trastuzumab (88%), vascular endothelial growth factor inhibitors (55%), multitargeted tyrosine kinase inhibitors (TKIs) (47%), and immune checkpoint inhibitors (39%). Many oncologists reported being unfamiliar with cardiotoxicities related to proteasome inhibitors (45%), targeted TKIs (33%), 5-fluorouracil (30%), and immune checkpoint inhibitors (23%).

FLORIDA EDUCATIONAL COLLABORATIVE PROGRAM

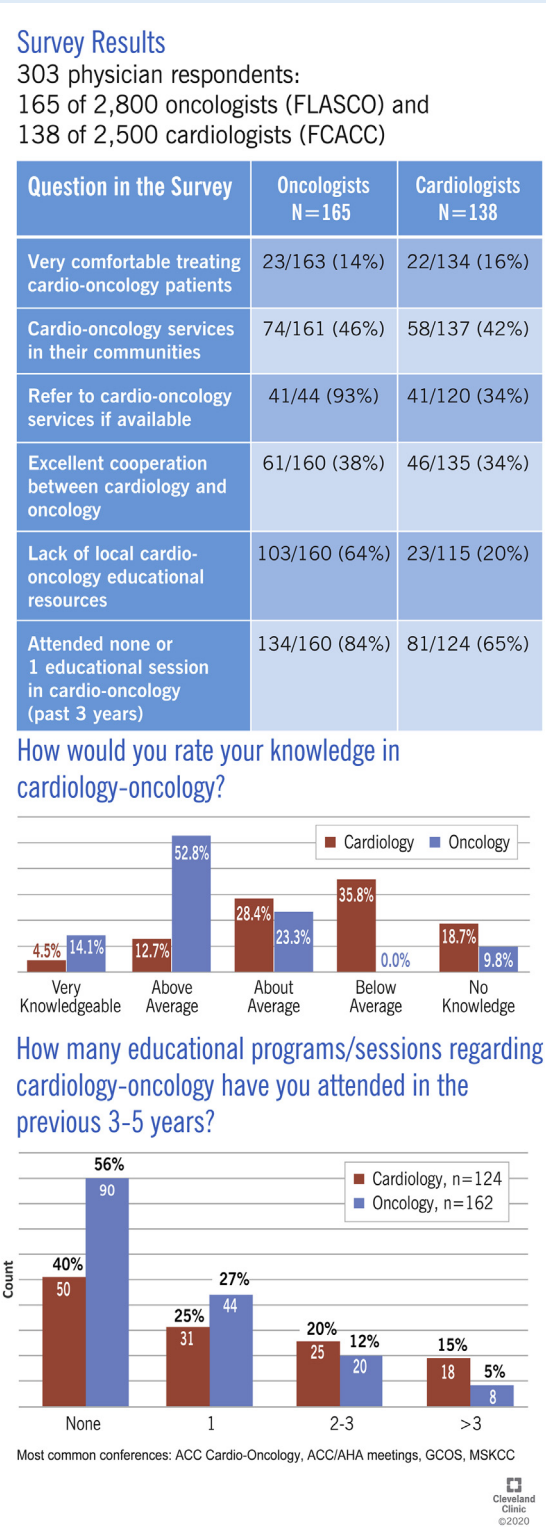
The survey presented herein represents the first step of a statewide, collaborative initiative dedicated to enhancing cardio-oncology knowledge and education. With the results collected from our surveys, we

have developed a program of basic education in cardio-oncology, which is available via the electronic platforms of the FCACC and FLASCO (6). The society platforms act as a permanent repository of information and include monthly e-mail blasts that highlight cardio-oncology topics. Based on the limited number of cardiologists and oncologists with expertise in cardio-oncology, we hope that involvement at the local and state levels will encourage an increased focus on cardio-oncology in more provider groups. This may improve access to care for these complex patients, because most patients are treated in community practices rather than in large academic centers. For institutions without dedicated cardio-oncology programs, our hope is that such efforts to enhance education and increase awareness may improve prevention, early detection, and coordination of care of patients who suffer from both cancer and cardiovascular disease.

We developed focused educational documents for Florida practitioners with brief discussions regarding 11 fundamental cardio-oncology topics (6). The goal of this program is to provide basic information regarding the most common cardiotoxic cancer treatments, including the following: anthracyclines, anti-HER-2 therapies, 5-fluorouracil/capecitabine, TKIs, proteasome inhibitors, immune checkpoint inhibitors, and radiation therapy. These educational materials also focus on specific cardiac topics for patients with cancer, including thromboembolism, arrhythmias, cardiac imaging, and survivorship. The documents can be found at: https://accfl.org/Cardio-Oncology.

This project is unique in that it sought to address current cardio-oncology knowledge gaps specific to the cardiovascular care of patients with cancer among both oncologists and cardiologists in Florida; however, the proportion of respondents was very small, and we recognize this as an important limitation (7). The study design did not account for differences in responses by age, sex, or practice setting demographics. Of the respondents, 49% reported that they practiced in an academic/hospital setting, and 43% indicated that they were in private practice, with the latter group most likely being underrepresented relative to the Florida physicians' workforce. Thus, the data provided by the respondents may not be generalizable to all members of the FCACC and FLASCO. This survey is not a representative sample of Florida's physician population at large and may have sampling bias, reflecting the opinion of physicians who are more actively engaged with medical professional societies than other physicians. However, it highlights the need for further awareness, advocacy,

FIGURE 1 Main Survey Results



Question in the Survey	Oncologists N=165	Cardiologists N=138
Very comfortable treating cardio-oncology patients	23/163 (14%)	22/134 (16%)
Cardio-oncology services in their communities	74/161 (46%)	58/137 (42%)
Refer to cardio-oncology services if available	41/44 (93%)	41/120 (34%)
Excellent cooperation between cardiology and oncology	61/160 (38%)	46/135 (34%)
Lack of local cardio-oncology educational resources	103/160 (64%)	23/115 (20%)
Attended none or 1 educational session in cardio-oncology (past 3 years)	134/160 (84%)	81/124 (65%)

This figure shows the main findings from oncologists and cardiologists responses to the FCACC FLASCO Survey and Collaborative Project. ACC = American College of Cardiology; AHA = American Heart Association; GCOS = Global Cardio Oncology Summit; MSKCC = Memorial Sloan Kettering Cancer Center.

and education in the growing field of cardio-oncology.

Considering these respondents likely represented a more engaged group of practitioners, there was a lack of general cardio-oncology knowledge, uncertainty of local available resources, and low reported rate of cooperation between cardiologists and oncologists. Although we were not able to assess the reasoning for these observed practice patterns, as it was beyond the scope of this study, enhanced collaboration between disciplines will be important and necessary to deliver optimal cardiovascular and oncologic care to this patient group.

Previous studies indicate that approaches vary between cardiologists and oncologists when using cardio-oncology services for the treatment of patients with cancer. Peng et al. (7) reported that most cardiologists (55%) felt that they should monitor for cardiotoxicity even in the absence of symptoms. However, the same study indicated that only 12.5% of oncologists shared this view. Furthermore, 50% of oncologists felt that cardiologists should be involved *only* when patients developed cardiotoxicities, but only 6.5% of cardiologists agreed with that opinion. Most cardiologists believed that access to cardio-oncology services would improve prognosis (88.3%), whereas only 45.8% of oncologists shared this view. Our study did not directly address this same question, but found that only 38% of oncologists and 34% of cardiologists indicated that they felt "very comfortable" interacting with their colleagues for co-management of cancer and heart disease.

One study surveyed 303 oncologists about knowledge of cardiotoxicities in France. The results showed that only 35% of oncologists actively followed guidelines from oncological societies, and no oncologists were aware of recommendations from cardiac societies (8). However, 88% of respondents did support the development and implementation of cardio-oncology programs. These findings strongly suggest that lack of cooperation between cardiologists and oncologists is an international phenomenon. Fortunately, there also appears to be increasing support for creating new programs to address this need.

The next step of our statewide advocacy, survey, and educational program is the establishment of a large multistate network with involvement of the ACC and the American Society of Clinical Oncology (ASCO) state chapters. This will allow different states to use a similar platform to assess the needs of their own ACC and ASCO members and to develop and share methods to close knowledge gaps. Thus far, this burgeoning network includes members from 19 ACC state chapters: Florida, Missouri, Indiana, Tennessee, Michigan, North Carolina, Texas, Maryland, Virginia, Illinois, Georgia, Ohio, California, Connecticut, Pennsylvania, New York, Minnesota, Colorado, and Milwaukee. It also includes 6 ASCO chapters from both academic and private practice settings (9) and has now also incorporated members from 9 countries with International Cardio-Oncology Society-affiliated chapters (ic-os.org), including Canada, Mexico, Brazil, Argentina, England, France, Poland, Japan, and India. This network will become a platform for multiple future collaborations. We look forward to expanding our network to meet the needs of our colleagues and provide enhanced care for cardio-oncology patients.

ADDRESS FOR CORRESPONDENCE: Dr. Diego Sadler, Cleveland Clinic Florida, 2950 Cleveland Clinic Boulevard, Building A, Desk 23, Weston, Florida 33331. E-mail: sadlerd@ccf.org. Twitter: @DSadlerMD, @FloridaACC, @FLASCO_ORG, @ACCinTouch, @Dr_Mike_Fradley, @Dr_RoohiKhan.

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KEY WORDS cardio-oncology program, cardiovascular quality, care delivery, clinical practice, disparities, education, global health, health policy