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Personalizing Heart Failure Care to the Patient With Cancer

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Abstract

Purpose of Review The current review describes the role of the cardio-oncology nurse and the need for personalized heart failure care for the patient with cancer.

Recent Findings It is a new role whereby cardiology or heart failure nurses care for patients with cancer who develop cardiotoxicity or cardiovascular diseases, either during the cancer therapy or in a later stage. Inter-disciplinary approach is important for individualized early treatment, shortened interruptions to cancer therapy, and irreversible cardiovascular injury prevention. Nurses have a key role in early evaluation and quality control of the care provided.

Summary This is a quite new clinical area and not much evidence exists for the development of clinical guidelines and pathways to support clinicians. More trials are needed for the development of clinical recommendations.

Introduction

Over the last two decades, novel anti-cancer therapies have led to a rapid increase in cancer survivorship; however, concurrently the incidence of cardiovascular diseases (CVD), either during or after the cancer therapy, has also increased [1–3]. The prevalence of cancer-induced cardiotoxicity leading to heart failure (HF) is not well established, due to the variable rates of cardiotoxicity among different types of anticancer agents [4]. Nonetheless, patients with established HF presenting with a cancer diagnosis are complex to manage, with multiple overlapping symptoms, limited effective cancer therapies, that often result in treatment delays, frequent re-admissions, and hospitalizations [5]. A requirement to prevent cardiotoxicity and provide an inter-disciplinary approach to treatment and patient care, involving specialists in oncology, cardiology, clinical pharmacology, and other related specialties, led to the development of the field of cardio-oncology, with a mandate to identify, treat, and prevent the high burden of CVD seen in this population [3, 4, 6]. Cardio-oncology aims to investigate innovative strategies, collect evidence-based indications, and develop inter-disciplinary expertise to manage this growing category of patients, guarantee correct clinical administration, and provide the best therapeutic opportunities, particularly in terms of impact on both cardiological and oncological prognoses [4].

The care of patients with cancer and concurrent CVD (HF) is challenging and expensive, in terms of health care costs and impaired health-related quality of life (HR-QoL). Inter-disciplinary management teams may reduce acute and chronic events, with a decrease in readmission rates, as shown in earlier studies [5, 7, 8]. Nurse-led support is offered in the cardiology setting, with regard to patient self-management of their chronic condition, as well as within the oncology setting [9]. Figure 1 illustrates the management of care of a person with cancer and CVD, where the nurse plays a key role as the coordinator of the inter-disciplinary team, and/or using his/her advanced knowledge, skills as an autonomous practitioner, to contribute as clinical expert, researcher, educator, and consultant in health policies [10].

The Comprehensive Role of Nurses in Cardio-oncology

The inter-disciplinary cardio-oncology team includes cardiologists, oncologists, advanced practice providers (advanced practice nurses, physician assistants),

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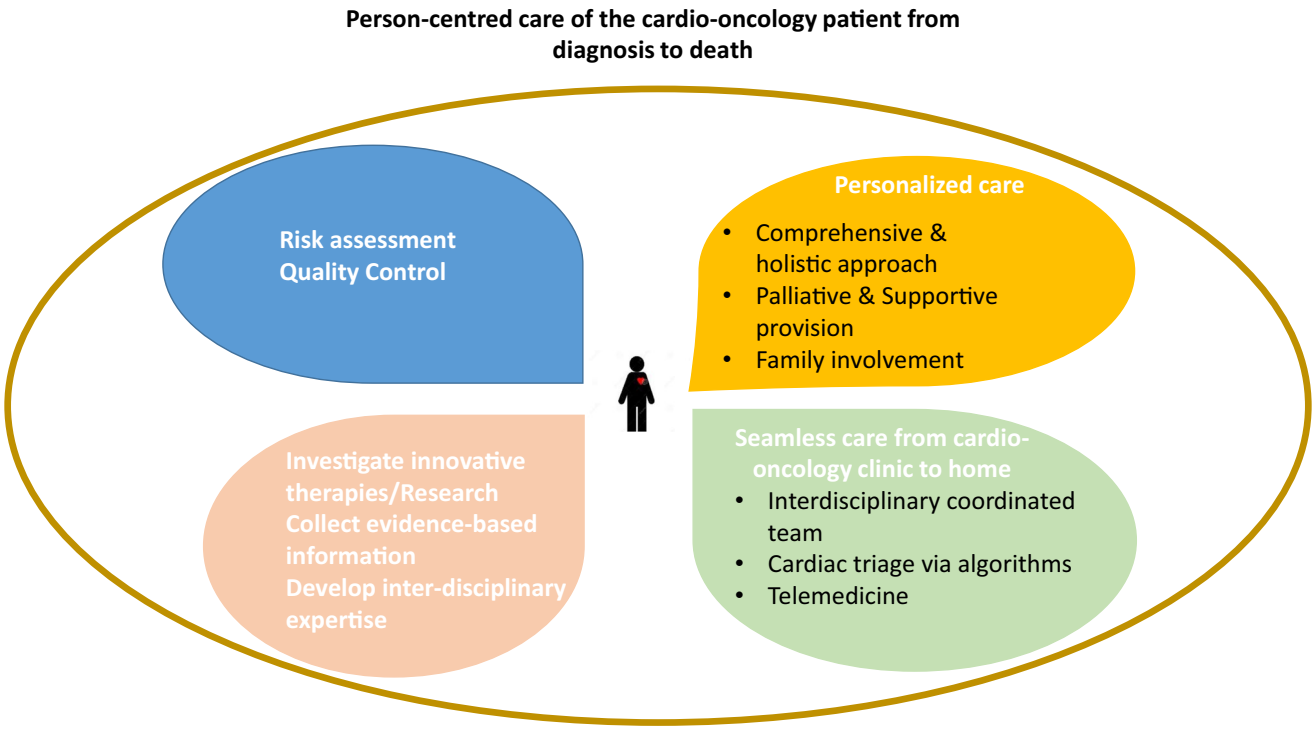

Fig. 1 Person-centered care of the cardio-oncology patient from diagnosis to death

pharmacists, nurses, dieticians, social workers, and other allied health professionals (HPs) involved in the management of these patients [5, 11]. There is an increased recognition of the value of providing personalized supportive and palliative care for patients with cancer and CVD (5, 12). It is important to highlight that patients require practical and emotional support, and information tailored to their needs to ensure shared decision-making from the time of diagnosis [12–14]. The cardio-oncology nurse has a key role in the coordination of the inter-disciplinary team in order to minimize treatment disruptions or delays, triage urgent cardiovascular issues, patient, caregiver, and staff education [15].

Comprehensive Approach

Oncology and cardiology are intrinsically linked, with this partnership deemed increasing relevant due to the growing elderly population, communality of certain risk factors, and co-existent of chronic conditions, such as HF and hypertension. Smoking, elevated alcohol intake, obesity, and the presence of diabetes mellitus [6, 16] increase the individual's likelihood of developing one or both conditions. For example, recent trial results on sodium dependent glucose transporter 2 (SGLT2) inhibitors led to the recommendation of the drug as a secondary prevention medication for patients with HF, as well as cautiously optimistic benefits within cancer [17, 18]. A recent publication by de Boer et al. (2021) illustrates a 5-tier classification system to categorize cardio-oncology syndrome, highlighting the close relationship between cancer and CVD.

Epidemiological studies suggest patients with CV disease are more likely to develop cancer, and those that do, often experience delays in treatment initiation [19, 20]. Unfortunately, this results in many patients with CV and cancer having a poorer prognosis [21]. On the other hand, patients who have undergone treatment following a cancer diagnosis are at an increased CVD risk [6, 22]. The presence of both comorbidities warrants a tailored comprehensive approach to clinical treatment, symptom management, and follow-up, according to the severity of each condition. Joint communication and collaborative working between HPs across both specialties will promote the provision of optimal evidence-based care. This should also extend to discussions with the patient and family members, to ensure clarity of information, expectations of treatment, and possible outcomes.

Palliative Care

For many patients, receiving a cancer diagnosis is extremely distressing, despite advancements in cancer treatment leading to an improved survival [23]. When combined with a chronic CV condition such as HF, patients may experience

clustering of physical, psychological, spiritual, and/or social symptoms. Such will have a negative impact on the QoL and can be reflective of a decline in health status [24, 25].

In a European survey that recruited 262 HPs (65% nursing; 24% medical), there was an increased likelihood to discuss deactivation of implantable cardioverter defibrillator (ICD) when the patient had a cancer diagnosis [26]. Historically, such sensitive discussions occurred only when death was imminent; however, clinical guidelines and expert position papers [12, 27] call for the earlier introduction of an integrated "co-managed" palliative approach to care. This is particularly appropriate within the cardio-oncology setting, due to the complexity of treatments, potential drug interactions, and symptom burden, many patients experience. Ethically challenging and difficult decisions should be informed by the patient and family members, treatment expectations, and underpinned by open and honest communication as well as previous advanced planning.

Supportive Care

The care needs of patients with cancer and CVD often may go beyond palliative, experiencing supportive care needs [12, 28], particularly for patients with HF as they often experience greater symptom burden, increased acute events and re-admissions [5, 12, 28]. The terms "palliative" and "supportive" care can often be used interchangeably; however, there is a different definition for these two terms.

Supportive care is inter-disciplinary holistic care approach provided to the patient and his/her family, from the time of diagnosis and throughout treatment with the aim of prolonging life expectancy and improving HR-QoL, and into end-of-life care [28]. It includes modifying interventions in an effort to manage symptoms, and psychosocial or existential distress, and to identify strategies in order to cope with HF [12, 28, 29]. Supportive care is composed of four components: communication and decision-making; education; symptom management; and psychological and spiritual issues [28, 29]. The study of Fradley et al. (2021) providing inter-disciplinary approach with motivational interviewing and empathy via telephone calls, showed a positive impact on the mental health of 33 women with breast cancer undergoing chemo-therapy [30]. Furthermore, with scarce evidence on interventional studies including cardio-oncology patients, cohort studies reveal the importance of lifestyle modification and exercise on minimizing cardiovascular events in cancer survivors [31–35]. A recent meta-synthesis, exploring patients with heart failure and comorbidities needs revealed their need for continuing support. Patient empowerment helps increase patient awareness as well as encourage mutual trust and open communication between patients and health professionals (HPs) [36]. Patients need care that focuses on their ongoing needs and adapts as these needs change according to the passage of time, the reaction to their therapy, their socio-economic factors, their environment, the health care system, and the possibilities of its application in everyday life and health care needs through shared-decision making [12, 28, 31, 35, 36]. That creates a significant challenge for clinicians to determine which patients will develop cardiotoxicity or are in high risk, develop inter-disciplinary programs to early identify and detect such cases and successfully manage cardio-oncology patients to minimize CV events and maintain HR-QoL.

Cardio-oncology Clinic/Unit

Cardio-oncology service can be divided into six different but overlapping categories: (1) pre-assessment and prevention, (2) early diagnosis of cardiac toxicity, (3) treatment of cardiac adverse effects secondary to oncological therapy, (4) advice on fitness to continue cardiotoxic oncological treatments, (5) management of direct cardiovascular complications of cancer, (6) long-term follow-up of cancer survivors [19, 37]. In the context of chemotherapy, the incidence and the burden of CVD risk increases due to weight gain, an increase in central obesity, cholesterol, blood sugar, or blood pressure. Furthermore, a higher incidence of hypertension, dyslipidemia, acute coronary syndromes or myocardial infarction, and stroke have been reported in long-term cancer survivors [38].

A dedicated cardio-oncology service can facilitate optimization of evidence-based therapies, while enabling successful completion of cancer treatment regimens even in those high-risk populations. Risk stratification tools support clinicians to decide which patients require urgent specialist referral, improving the efficiency of both referring and referral services [20, 22, 37]. Depending on the predicted risk of cardiovascular complications, appropriate surveillance strategies and supportive treatments can be implemented [39]. Cardio-oncology services vary based on the local health care systems and available resources. Ease of accessibility to the cardio-oncology services, either for oncology specialists or cardiology specialists, is essential, as delays may lead to poorer patient outcomes. Dedicated outpatient time for the inter-disciplinary cardio-oncology team is important [19]. Early detection of cardiovascular toxicity is key to allow early treatment, shorten interruptions to cancer therapy, and prevent irreversible cardiovascular injury [15, 20, 37].

The cardio-oncology services play a pivotal role in assessment, early detection, or indeed prevention of structural damage to the heart utilizing imaging and biomarkers. This imaging is almost exclusively provided by doctors. The involvement or the predominant role of the cardiac nurse is more commonly engaged after structural damage has occurred [20, 22, 37]. In addition to supporting the patient through the added cardiac diagnosis, the cardiac nurse plays a pivotal role in monitoring of the cardioprotective drug therapies used to

improve myocardial function and importantly to ensure that this is done in a timely manner, in order to limit delays to the ongoing life preserving or curative cancer treatments [5, 15, 19]. In some services, this cardiology nurse role might be one of a coordinator or "guardian angel" to ensure that these drug therapies (e.g., ACE Inhibitors, ARBs) are added into the patient care plan while the nurse provides the cardiac monitoring [15]. Some units such at that in UK have access to Advanced Nurse Practitioners who prescribe and monitor the cardiac medication, who work autonomously, but within local derived guidelines based on international expert consensus documents as there are no national or international guidelines (39,40). The involvement of Advanced Nurse Practitioners appears to achieve very rapid optimization of the cardiac drugs and less interruption to cancer treatments [20]. The rapid optimization is achieved by making one about two drug increases per week with weekly monitoring and can involve using "a hub and spoke model" as many patients do not live close to the tertiary cardio-oncology units. The hub and spoke model worked well during the COVID pandemic with most monitoring done by spoke teams and communicated by video reviews.

Additionally, the cardiac nurse supports risk factor and lifestyle modification such as exercise, obesity, tobacco, illicit drug and alcohol use and support for hypertension and diabetes. This cardiac nurse's role has many opportunities for further development such as developing interdisciplinary skills with Oncology Nurse Colleagues, in training and education, in personalizing heart failure care for patients with cancer using risk factor assessments and developing emotional burden risk score for patient with dual cancer and cardiac diseases in effort to improve HR-QoL [10, 15].

Quality Control of Patients With Cancer and Heart Failure

Quality improvement efforts to reduce readmission rates and improve HR-QoL are emerging for patients with cancer and HF [15]. Evaluation and metrics of the quality of care provided is an essential tool for health care professionals (HPs), professional societies, supervising institutions, insurance companies, and patients themselves. Such improves patient-centered focus, care coordination, management of transitions across the continuum of care, and cost effectiveness through the prevention of acute events and healthcare use [5, 19]. Patient-reported outcome measures (PROMS) as one metric of quality collection of patient experience via questionnaires or surveys is useful to guide service development, identifying weaknesses and inefficiencies, and providing holistic person-centered approached care. Timings, and rapidity of service delivery (e.g., time from referral to assessment) and audits (e.g., number of patients with cancer who restart and complete oncology protocols following interruption of oncology care for cardiotoxicity, and number of high-risk patients who complete oncology treatment without interruptions for cardiotoxicity), provide a measure of the health care service provided. Also, the collection of clinical data in local registries and, when relevant, in national and international prospective registries is encouraged to grow experience and to identify the prevalence and nature of cardiotoxicity from cancer therapies, the demographics, and clinical characteristics of patients developing cardiotoxicity to facilitate the selection of biomarkers and outcome measures, to inform randomized clinical trials and the testing of novel diagnostic or therapeutic strategies in cardiotoxicity, prevention, and treatment [13, 14, 19, 22]. Those will also make possible the development of sets of quality indicators (QIs) giving the opportunity to HPs and health care stakeholders and systems to easily evaluate the quality of care provided in a regular and continuing basis.

Conclusions

Cardiovascular monitoring of selected cancer patients receiving cardiotoxic cancer treatments is a key clinical strategy for the early detection of cardiac dysfunction and the implementation of cardioprotective strategies. Such will allow the provision of effective cancer therapies as well as maintain safety during treatment and care, with the aim to ensure positive clinical outcomes and HR-QoL. Cardio-oncology services are ideally placed to apply the latest scientific and technological advances in cardiovascular diagnostics to improve the care of cancer patients. Available recommendations vary on how often, by what means, or how long cardiac function should be monitored. More trials are required to identify the optimal monitoring strategy for each cancer treatment and clinical recommendations and pathways, with the goal of improving both cancer and CV outcomes.

Declarations

Conflict of Interest The authors declare no competing interests.

References

1. Sturgeon KM, Deng L, Bluethmann SM, Zhou S, Trifiletti DM, Jiang C, Kelly SP, Zaorsky NG. A population-based study of cardiovascular disease mortality risk in US cancer patients. Eur Heart J. 2019;40(48):3889–97.
2. Bonsu JM, Guha A, Charles L, Yildiz VO, Wei L, Baker B, Brammer JE, Awan F, Lustberg M, Reinbolt R, [3] Zamorano JL, Gottfridsson C, Asteggiano R, Atar D, Badimon L, Bax JJ, Cardinale D, Cardone A, Feijen EAM, Ferdinandy P, López-Fernández T, Gale CP, Maduro JH, Moslehi J, Omland T, Plana Gomez JC, Scott J, Suter TM, Minotti G. The cancer patient and cardiology. Eur J Heart Fail. 2020;22(12):2290–2309

3. Cardinale D, Biasillo G, Cipolla CM. Curing cancer, saving the heart: a challenge that cardioncology should not miss. Curr Cardiol Rep. 2016;18(6):51.
4. Fadol AP, Palaskas NL, Ewer MS, Deswal A. An overview of a different type of cardio-oncology gathering: summary of the COMP (cardio-oncology multidisciplinary practice) meeting held in Houston Texas, January 2020. Cardiooncology. 2020;6:20. https://doi.org/10.1186/s40959-020-00075-7.
5. de Boer RA, Aboumsallem JP, Bracun V, Leedy D, Cheng R, Patel S, Rayan D, Zaharova S, Rymer J, Kwan JM, Levenson J, Ronco C, Thavendiranathan P, Brown SA. A new classification of cardio-oncology syndromes. Cardiooncology. 2021;7(1):24.
6. Lambrinou E, Kalogirou F, Lamnisos D, Sourtzi P. Effectiveness of heart failure management programmes with nurse-led discharge planning in reducing re-admissions: a systematic review and meta-analysis. Int J Nurs Stud. 2012;49(5):610–24.
7. Li Y, Fu MR, Luo B, Li M, Zheng H, Fang J. The effectiveness of transitional care interventions on health care utilization in patients discharged from the hospital with heart failure: a systematic review and meta-analysis. J Am Med Dir Assoc. 2021;22(3):621–9.
8. Kelly F, Carroll SL, Carley M, Dent S, Shorr R, Hu J, Morash R, Stacey D. Symptom practice guide for telephone assessment of patients with cancer treatment-related cardiotoxic dyspnea: adaptation and evaluation of acceptability. Cardiooncology. 2017;3:7. https://doi.org/10.1186/s40959-017-0026-6.
9. ICN Nurse Practitioner/Advanced Practice Nursing Network. Definition and characteristics of the role. (2020). https://international.aanp.org/Practice/APNRoles
10. Pituskin E, Kirkham AA, Cox-Kennett N, Dimitry R, Dimitry J, Paterson I, Gyenes GT. Rehabilitation needs in cancer treatment-related cardiotoxicity. Semin Oncol Nurs. 2020;36(1):150986.
11. Hill L, Prager Geller T, Baruah R, Beattie JM, Boyne J, de Stoutz N, Di Stolfo G, Lambrinou E, Skibelund AK, Uchmanowicz I, Rutten FH, Čelutkienė J, Piepoli MF, Jankowska EA, Chioncel O, Ben Gal T, Seferovic PM, Ruschitzka F, Coats AJS, Strömberg A, Jaarsma T. Integration of a palliative approach into heart failure care: a European Society of Cardiology Heart Failure Association position paper. Eur J Heart Fail. 2020;22(12):2327–39.
12. Austin-Mattison C. joining forces: establishing a cardio-oncology clinic. J Adv Pract Oncol. 2018;9(2):222–9.
13. Parent S, Pituskin E, Paterson DI. The cardio-oncology program: a multidisciplinary approach to the care of cancer patients with cardiovascular disease. Can J Cardiol. 2016;32(7):847–51.
14. Fradley MG, Brown AC, Shields B, Viganego F, Damrongwatanasuk R, Patel AA, Hartlage G, Roper N, Jaunese J, Roy L, Ismail-Khan R. Developing a comprehensive cardio-oncology program at a cancer institute: the Moffitt Cancer Center experience. Oncol Rev. 2017;11(2):340. https://doi.org/10.4081/oncol.2017.340.
15. Giovannucci E, Harlan DM, Archer MC, Bergenstal RM, Gapstur SM, Habel LA, et al. Diabetes and cancer: a consensus report. CA Cancer J Clin. 2010;60(4):207–21.
16. Seferović PM, Fragasso G, Petrie M, Mullens W, Ferrari R, Thum T, Bauersachs J, Anker SD, Ray R, Çavuşoğlu Y, Polovina M, Metra M, Ambrosio G, Prasad K, Seferović J, Jhund PS, Dattilo G, Čelutkiene J, Piepoli M, Moura B, Chioncel O, Ben Gal T, Heymans S, Jaarsma T, Hill L, Lopatin Y, Lyon AR, Ponikowski P, Lainščak M, Jankowska E, Mueller C, Cosentino F, Lund LH, Filippatos GS, Ruschitzka F, Coats AJS, Rosano GMC. Heart Failure Association of the European Society of Cardiology update on sodium–glucose co-transporter 2 inhibitors in heart failure. Eur J Heart Fail. 2020;22(11):1984–6.
17. Scafoglio CR, Villegas B, Abdelhady G, Bailey ST, Liu J, Shirali AS, et al. Sodium-glucose transporter 2 is a diagnostic and therapeutic target for early-stage lung adenocarcinoma. *Sci Transl Med*. 2018;10(467):eaat5933
18. Lancellotti P, Suter TM, López-Fernández T, Galderisi M, Lyon AR, Van der Meer P, Cohen Solal A, Zamorano JL, Jerusalem G, Moonen M, Aboyans V, Bax JJ, Asteggiano R. Cardio-oncology services: rationale, organization, and implementation. Eur Heart J. 2019;40(22):1756–63.
19. Coviello JS. Cardiovascular and cancer risk: the role of cardio-oncology. J Adv Pract Oncol. 2018;9(2):160–76.
20. Banke A, Schou M, Videbaek L, Moller JE, Torp-Pedersen C, Gustafsson F, Dahl JS, Køber L, Hildebrandt PR, Gislason GH. Incidence of cancer in patients with chronic heart failure: a long-term follow-up study. Eur J Heart Fail. 2016;18(3):260–6.
21. Coviello JS, Amin K. Cardio-oncology: the intersection between cardiovascular disease and cancer. J Adv Pract Oncol. 2021;12(3):253–6.
22. Arnold M, Rutherford MJ, Bardot A, Ferlay J, Andersson TM, Myklebust TA, Tervonen H, Thursfield V, Ransom D, Shack L, Woods RR, Turner D, Leonfellner S, Ryan S, Saint-Jacques N, De P, McClure C, Ramanakumar AV, Stuart-Panko H, Engholm G, Walsh PM, Jackson C, Vernon S, Morgan E, Gavin A, Morrison DS, Huws DW, Porter G, Butler J, Bryant H, Currow DC, Hiom S, Parkin DM, Sasieni P, Lambert PC, Moller B, Soerjomataram I, Bray F. Progress in cancer survival, mortality, and incidence in seven high-income countries 1995–2014 (ICBP SURVMARK-2): a population-based study. Lancet Oncol. 2019;20:1493–505.
23. Bekelman DB, Rumsfeld JS, Havranek EP, Yamashita TE, Hutt E, Gottlieb SH, Dy SM, Kutner JS. Symptom burden, depression, and spiritual well-being: a comparison of heart failure and advanced cancer patients. Journal of General Internal Medicine. 2009;24:592–8.
24. Murray SA, Kendall M, Grant E, Boyd K, Barclay S, Sheikh A. Patterns of social, psychological, and spiritual decline toward the end of life in lung cancer and heart failure. J Pain Symptom Manage. 2007;34(4):393–402.
25. Hill L, McIlfatrick S, Taylor BJ, Jaarsma T, Moser D, Slater P, McAloon T, Dixon L, Donnelly P, Stromberg A, Fitzsimons D. Patient and professional factors that impact the perceived likelihood and confidence of healthcare professionals to discuss Implantable Cardioverter Defibrillator deactivation in advanced heart failure: results from an international factorial survey. Journal of Cardiovascular Nursing. 2018;33(6):527–35.
26. Padeletti L, Arnar DO, Boncinelli L, et al. EHRA Expert Consensus Statement on the management of cardiovascular implantable electronic devices in patients nearing end of life or requesting withdrawal of therapy. Europace. 2010;12:1480–9.
27. Kyriakou M, Middleton N, Ktisti S, Philippou K, Lambrinou E. Supportive care interventions to promote health-related quality of life in patients living with heart failure: a systematic review and meta-analysis. Hear Lung Circ. 2020;29(11):1633–47.
28. Goodlin SJ, Hauptman PJ, Arnold R, Grady K, Hershberger RE, Kutner J, et al. Consensus statement: Palliative and supportive care in advanced heart failure. J Card Fail. 2004;10(3):200–9.
29. Fradley MG, Alomar M, Kilpatrick MW, Shields B, Tran N, Best A, Bianco E, Armanious M, Vautier RA, Kip K, Beckie TM, Ismail-Khan R. Patient reported physical and mental health changes associated with a comprehensive cardiovascular risk reduction program for women with breast cancer receiving potentially cardiotoxic chemotherapy. Cardiooncology. 2021;7(1):22. https://doi.org/10.1186/s40959-021-00107-w.
30. Altena R, Hubbert L, Kiani NA, Wengström Y, Bergh J, Hedayati E. Evidence-based prediction and prevention of cardiovascular morbidity in adults treated for cancer. Cardiooncology. 2021;7(1):20. https://doi.org/10.1186/s40959-021-00105-y.

31. Leger KJ, Baker KS, Cushing-Haugen KL, Flowers MED, Leisenring WM, Martin PJ, et al. Lifestyle factors and subsequent ischemic heart disease risk after hematopoietic cell transplantation. Cancer. 2018;124(7):1507–15.
32. Pelser C, Arem H, Pfeiffer RM, Elena JW, Alfano CM, Hollenbeck AR, et al. Prediagnostic lifestyle factors and survival after colon and rectal cancer diagnosis in the National Institutes of Health (NIH)-AARP diet and health study. Cancer. 2014;120(10):1540–7.
33. Okwuosa TM, Ray RM, Palomo A, Foraker RE, Johnson L, Paskett ED, et al. Pre-diagnosis exercise and cardiovascular events in primary breast Cancer: Women's Health Initiative. JACC CardioOnc. 2019;1(1):41–50.
34. Kyriakou M, Samara A, Philippou K, Lakatamitou I, Lambrinou E. A qualitative meta-synthesis of patients with heart failure perceived needs. Rev Cardiovasc Med. 2021;22(3):853–64.
35. Andres MS, Pan J, Lyon AR. What does a cardio-oncology service offer to the oncologist and the haematologist? Clin Oncol (R Coll Radiol). 2021;33(8):483–93.
36. Habibian M, Lyon AR. Monitoring the heart during cancer therapy. Eur Heart J Suppl. 2019;21(Suppl M):M44–9.
37. Lyon AR, Dent S, Stanway S, Earl H, Brezden-Masley C, CohenSolal A, et al. Baseline cardiovascular risk assessment in cancer patients scheduled to receive cardiotoxic cancer therapies: a position statement and new risk assessment tools from the Cardio- Oncology Study Group of the Heart Failure Association of the European Society of Cardiology in collaboration with the International Cardio-oncology society. Eur J Heart Fail 2020;22:1945e1960
38. Baldassarre LA, Yang EH, Cheng RK, DeCara JM, Dent S, Liu JE, Rudski LG, Strom JB, Thavendiranathan P, Barac A, Zaha VG, Bucciarelli-Ducci C, Ellahham S, Deswal A, Lenneman C, Villarraga HR, Blaes AH, Ismail-Khan R, Ky B, Leja MJ, Scherrer-Crosbie M. Cardiovascular care of the oncology patient during COVID-19: an expert consensus document from the ACC Cardio-Oncology and Imaging Councils. J Natl Cancer Inst. 2021;113(5):513–22.