Guest Editorial

Is Cardio-oncology Ready for Algorithms?

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Cardio-oncology can be defined as a cross-disciplinary, collaborative sub-specialty focused on the prevention, management and mitigation of cardiovascular disease in cancer patients in order to achieve optimal patient outcomes.[1] As such, this sub-specialty has been in existence for approximately 40 years, if not in name, then certainly in its goals of clinical practice and lines of scientific inquiry.

Interest in cardio-oncology has blossomed over the past 15 years, as many newer targeted agents have been recognised for their potential to cause cardiotoxicity. The increasing complexity arising from cardiotoxicity of anti-cancer treatment has left clinicians hungry for advice on how to approach this unique patient population.

Two recent publications have sought to provide some authoritative guidance regarding the management of patients undergoing potentially cardiotoxic treatments: the 2016 European Society of Cardiology (ESC) position paper on cancer treatments and cardiovascular toxicity and the 2017 American Society of Clinical Oncology (ASCO) clinical practice guideline on prevention and monitoring of cardiac dysfunction in survivors of adult cancers.[2,3]

The ESC position paper is not a formal clinical practice guideline, but rather a document reflecting expert consensus. The ASCO guideline is more limited in scope, addressing five specific clinical questions for which we have more mature evidence to support recommendations. They both acknowledge the limitations of and gaps in our current scientific evidence.

Specifically regarding surveillance, the ESC document states: "The timing of cardiotoxicity surveillance using echocardiography and biomarkers needs to be personalized to the patient in the context of their baseline cardiovascular risk and the specific cancer treatment protocol prescribed."

Likewise, the ASCO guidelines remain intentionally vague for asymptomatic patients with increased risk for cardiotoxicity: "Frequency of surveillance should be determined by health care providers based on clinical judgement and patient circumstances."

For patients receiving potentially cardiotoxic therapy, both documents agree on the following recommendations:

- Obtain a baseline clinical assessment of risk for cardiotoxicity based on established risk factors, anticipated cancer treatments and assessment of left ventricular ejection fraction.
- Identify and manage modifiable cardiovascular risk factors, such as hypertension and smoking, prior to cancer therapies.
- Consider cardioprotective strategies for patients at high risk for cardiotoxity.
- Monitor for signs and symptoms of cardiac dysfunction during treatment.
- Follow-up assessment of ejection fraction after completion of treatment.

Both documents are also in agreement that there is no evidence to support withholding or interrupting cancer treatment based on biomarkers or global longitudinal strain echocardiography.

Koutsoukis et al. present a nice overview of the spectrum of cardiotoxcity, with particular emphasis on myocardial dysfunction.[4] The authors then go on to provide guidance regarding evaluation and monitoring for patients receiving potentially cardiotoxic therapy.

The authors' proposed algorithm for baseline evaluation (*Figure 1*) aligns nicely with the above evidence-based recommendations endorsed by the ESC and ASCO.

It should be mentioned that routine measurement of cardiac biomarkers is not necessarily part of a pre-treatment cardiovascular assessment. Baseline biomarker values may be reasonable if additional monitoring of biomarkers during treatment is anticipated. Biomarkers can certainly be of use in assessment if signs and symptoms of cardiac dysfunction develop during treatment.

The measurement of global longitudinal strain is a tool we have to identify higher risk patients, but it is not yet clear how to integrate this data into our current management algorithms, and thus, firm recommendations on its routine use may not be justified.

We should be even more cautious, however, regarding algorithms that recommend specific parameters for interruption or discontinuation of cancer therapy. An algorithm for patients receiving anthracyclines (*Figure 2*) is adapted from a review article by Herrmann, et al.[5] The proposed algorithm for trastuzumab (*Figure 3*) is based on recommendations of the UK National Cancer Research Institute,[6] which are referenced and discussed in the ESC document, but not formally endorsed by the ESC or ASCO.

The proposed monitoring and treatment algorithms presented in *Figures 2 and 3* may represent reasonable starting points for some patients, but cannot be applied uniformly to large groups of patients without further validation. Decisions on withholding cancer treatment must always be individualised after careful consideration of risk and benefit by both the oncologist and the cardiologist.

Our goal is not to minimise cardiotoxicity at any cost, but rather to weigh the cardiac risks against the oncologic benefits of our treatments in order to maximise the overall health of our patients. Until more scientific evidence becomes available to support their use, we are not yet ready for detailed management algorithms. Until then, we are left with our best clinical judgement and nuanced collaborative discussions that currently make the practice of clinical cardio-oncology rich and rewarding. ■

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