

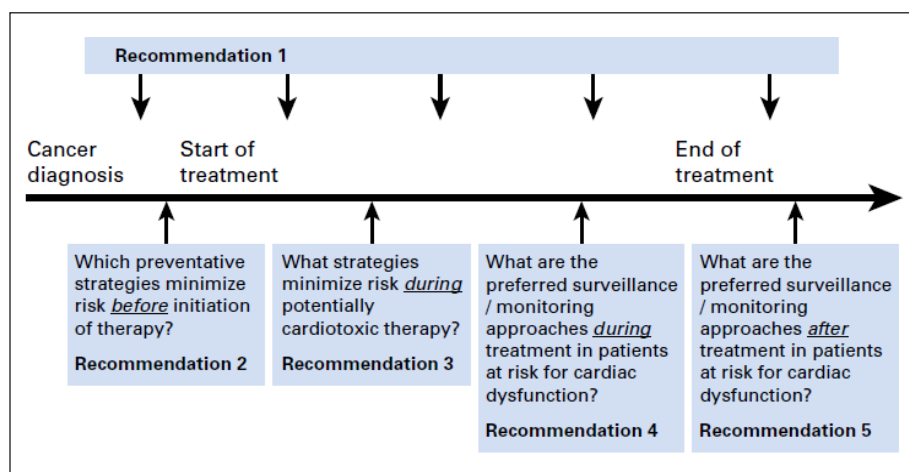


## Prevention and Monitoring of Cardiac Dysfunction in Survivors of Adult Cancers: ASCO

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### 1) Which patients with cancer are at increased risk for developing cardiac dysfunction?



#### Recommendation 1.1

It is recommended that patients with cancer who meet any of the following criteria should be considered at increased risk for developing cardiac dysfunction.

Treatment that includes any of the following:

- High-dose anthracycline (eg, doxorubicin  $\geq 250$  mg/m<sup>2</sup>, epirubicin  $\geq 600$  mg/m<sup>2</sup>)
- High-dose radiotherapy (RT;  $\geq 30$  Gy) where the heart is in the treatment field
- Lower-dose anthracycline (eg, doxorubicin  $< 250$  mg/m<sup>2</sup>, epirubicin  $< 600$  mg/m<sup>2</sup>) in combination

with lower-dose RT ( $< 30$  Gy) where the heart is in the treatment field.

Treatment with lower-dose anthracycline (eg, doxorubicin  $< 250$  mg/m<sup>2</sup>, epirubicin  $< 600$  mg/m<sup>2</sup>) or trastuzumab alone, and presence of any of the following risk factors:

- Multiple cardiovascular risk factors ( $\geq$  two risk factors), including smoking, hypertension, diabetes, dyslipidemia, and obesity, during or after completion of therapy
- Older age ( $\geq 60$  years) at cancer treatment
- Compromised cardiac function (eg, borderline low left ventricular ejection fraction [50% to 55%], history

of myocardial infarction,  $\geq$  moderate valvular heart disease) at any time before or during treatment.

- Treatment with lower-dose anthracycline (eg, doxorubicin  $< 250$  mg/m<sup>2</sup>, epirubicin  $< 600$  mg/m<sup>2</sup>) followed by trastuzumab (sequential therapy)

#### Recommendation 1.2.

No recommendation can be made on the risk of cardiac dysfunction in patients with cancer with any of the following treatment exposures:

- Lower-dose anthracycline (eg, doxorubicin  $< 250$  mg/m<sup>2</sup>, epirubicin  $< 600$  mg/m<sup>2</sup>) or trastuzumab alone and no additional risk factors (as defined in Recommendation 1.1)
- Lower-dose RT ( $< 30$  Gy) where the heart is in the treatment field and no additional cardiotoxic therapeutic exposures or risk factors (as defined in Recommendation 1.1)
- Kinase inhibitors



**Survivorship** *continued***2) Which preventative strategies minimize risk before initiation of therapy?****Recommendation 2.1.**

Avoid or minimize the use of potentially cardiotoxic therapies if established alternatives exist that would not compromise cancer-specific outcomes.

**Recommendation 2.2.**

Clinicians should perform a comprehensive assessment in patients with cancer that includes a history and physical examination, screening for cardiovascular disease risk factors (hypertension, diabetes, dyslipidemia, obesity, smoking), and an echocardiogram before initiation of potentially cardiotoxic therapies.

**3) Which preventive strategies are effective in minimizing risk during the administration of potentially cardiotoxic cancer therapy?****Recommendation 3.1.**

Clinicians should screen for and manage modifiable cardiovascular risk factors (smoking, hypertension, diabetes, dyslipidemia, obesity) in patients receiving potentially cardiotoxic treatments.

**Recommendation 3.2.**

Clinicians may incorporate several strategies, including use of the cardioprotectant dexrazoxane, continuous infusion, or liposomal formulation of doxorubicin, for prevention of cardiotoxicity in patients planning to receive high-dose anthracyclines (eg, doxorubicin  $\geq$  250 mg/m<sup>2</sup>, epirubicin  $\geq$  600 mg/m<sup>2</sup>).

**Recommendation 3.3.**

For patients who require mediastinal XRT that might impact cardiac function, clinicians should select lower radiation doses when clinically ap-

propriate and use more precise or tailored radiation fields with exclusion of as much of the heart as possible. These goals can be accomplished through use of advanced techniques including the following:

- Deep-inspiration breath holding for patients with mediastinal tumors or breast cancer in which the heart might be exposed
- Intensity-modulated RT that varies the radiation energy while treatment is delivered to precisely contour the desired radiation distribution and avoid normal tissues.

**4) What are the preferred surveillance and monitoring approaches during treatment in patients at risk for cardiac dysfunction?****Recommendation 4.1.**

Clinicians should complete a careful history and physical examination in patients who are receiving potentially cardiotoxic treatments.

**Recommendation 4.2.**

In individuals with clinical signs or symptoms concerning for cardiac dysfunction during routine clinical assessment, the following strategy is recommended:

- Echocardiogram for diagnostic workup
- Cardiac magnetic resonance imaging (MRI) or multigated acquisition (MUGA) scan if echocardiogram is not available or technically feasible (eg, poor image quality), with preference given to cardiac MRI
- Serum cardiac biomarkers (troponins, natriuretic peptides) or echocardiography-derived strain imaging in conjunction with routine diagnostic imaging

- Referral to a cardiologist based on findings.

**Recommendation 4.3.**

Routine surveillance imaging may be offered during treatment in asymptomatic patients considered to be at increased risk (Recommendation 1.1) of developing cardiac dysfunction. In these individuals, echocardiography is the surveillance imaging modality of choice that should be offered. Frequency of surveillance should be determined by health care providers based on clinical judgment and patient circumstances.

**Recommendation 4.4.**

No recommendations can be made regarding continuation or discontinuation of cancer therapy in individuals with evidence of cardiac dysfunction. This decision, made by the oncologist, should be informed by close collaboration with a cardiologist, fully evaluating the clinical circumstances and considering the risks and benefits of continuation of therapy responsible for the cardiac dysfunction.

**Recommendation 4.5.**

Clinicians may use routine echocardiographic surveillance in patients with metastatic breast cancer continue to receive trastuzumab indefinitely. The frequency of cardiac imaging for each patient should be determined by health care providers based on clinical judgment and patient circumstances.

**5) What are the preferred surveillance and monitoring approaches after treatment in patients at risk for cardiac dysfunction?****Recommendation 5.1.**

Clinicians should complete a careful history and physical examination in

**Survivorship** *continued*

survivors of cancer previously treated with potentially cardiotoxic therapies.

**Recommendation 5.1.1.**

In individuals with clinical signs or symptoms concerning for cardiac dysfunction, the following approaches should be offered as part of recommended care:

- Echocardiogram for diagnostic workup
- Cardiac MRI or MUGA if echocardiogram is not available or technically feasible (eg, poor image quality), with preference given to cardiac MRI
- Serum cardiac biomarkers (tropo-  
nins, natriuretic peptides)
- Referral to a cardiologist based on findings

**Recommendation 5.2.**

An echocardiogram may be performed between 6 and 12 months after completion of cancer-directed therapy in asymptomatic patients considered to be at increased risk (Recommendation 1.1) of cardiac dysfunction.

**Recommendation 5.2.1.**

Cardiac MRI or MUGA may be offered for surveillance in asymptomatic individuals if an echocardiogram is not available or technically feasible (eg, poor image quality), with preference given to cardiac MRI.

**Recommendation 5.3.**

Patients identified to have asymptomatic cardiac dysfunction during routine surveillance should be referred to a cardiologist or a health care provider with cardio-oncology expertise for further assessment and management.

**Recommendation 5.4.**

No recommendations can be made regarding the frequency and duration of surveillance in patients at increased risk (Recommendation 1.1) who are asymptomatic and have no evidence of cardiac dysfunction on their 6- to 12-month post-treatment echocardiogram.

**Recommendation 5.5.**

Clinicians should regularly evaluate and manage cardiovascular risk factors such as smoking, hypertension, diabetes, dyslipidemia, and obesity in patients previously treated with cardiotoxic cancer therapies. A heart-healthy lifestyle, including the role of diet and exercise, should be discussed as part of long-term follow-up care.