SCREENING, RISK STRATIFICATION AND EARLY DETECTION STRATEGY

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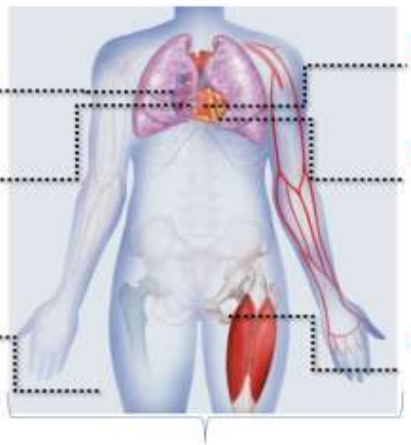
Agenda

- Introduction
- Risk factors for cardiotoxicity
- Diagnostic Tools for early Detection of Cardiotoxicity
- Assessing the risk of cardiac toxicity
- Cardiotoxicity prevention plan

Introduction

- Advances in cancer treatment have led to improved survival of patients, but have also increased morbidity and mortality due to treatment side effects. Cardiovascular diseases are one of the most frequent of these side effects.
- The incidence of cancer treatment-induced CV injury varies widely, depending on the specific cancer therapy used, duration of therapy, and underlying patient comorbidities.

Cancer Therapy Effects on CV System



- Coronary artery disease / MI
- Valvular / pericardial disease
- Peripheral artery disease
- Cardiomyopathy / heart failure
- Conduction dz / arrhythmia / autonomic dysfunction
- Venous thrombosis
- Exacerbation of known CV risk factors

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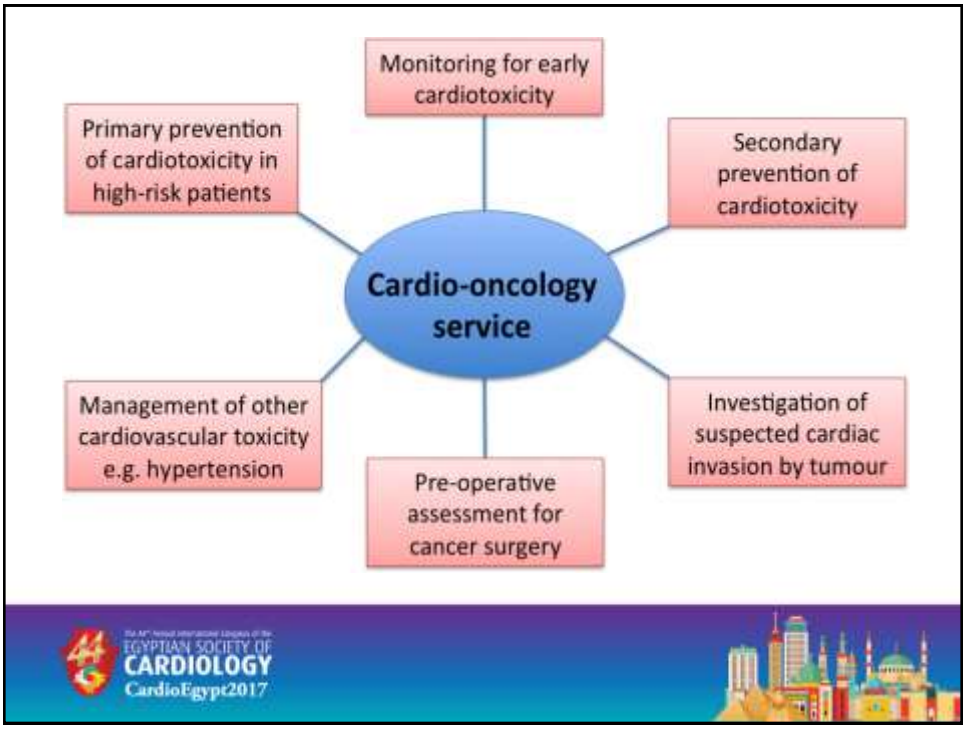

Risk factors for cardiotoxicity

- **Factors related to the patient:**

➢Younger than 18 or older than 65 at the time of treatment.

➢Risk factors for CV disease (smoking, DM, HTN, dyslipidemia).

➢Current myocardial disease.

➢Family history of premature CV disease (<50 years).

➢Previous cardiotoxic cancer treatment

Risk factors for cardiotoxicity

- **Factors related to therapy:**

➢Rapid drug infusion

➢Combination of drugs

➢Receiving radiation therapy to the head , neck and thorax

➢Receiving increasing or cumulative doses of some chemotherapeutics

Risk factors for cardiotoxicity

- **Factors related to the disease:**

➢**Some cancers need aggressive therapy**

✓ Leukemias

✓ Certain types of lymphomas

✓ Lung cancer

➢**Some cancers are potentially curable**

✓ Breast cancer

✓ Hodgkin's disease

Giving the patient the chance to live so many years allowing the development of long term CV complications

Diagnostic Tools for early Detection of Cardiotoxicity

- Electrocardiography.
- Echocardiography.
- Nuclear cardiac imaging
- Cardiac magnetic resonance (CMR).
- Cardiac biomarkers.

ELECTROCARDIOGRAPHY(ECG)

- ECG is recommended in all patients before and during treatment
- ECG signs of cardiac toxicity:

- Resting tachycardia.
- ST-T wave changes.
- QT interval prolongation.
- Arrhythmias.

- Not specific and can be related to other factors

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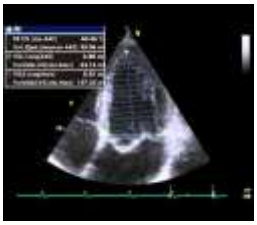
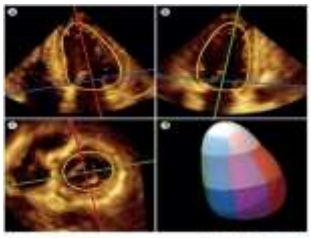
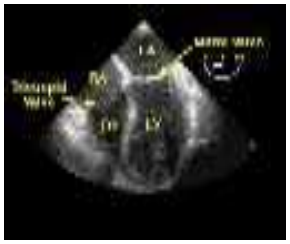
ECHOCARDIOGRAPHY

- Echocardiography is the method of choice for the detection of myocardial dysfunction with cancer therapy.
- 3D echocardiography is the best method for measuring LVEF.
- Also 2D biplane Simpson method is recommended for estimation of LV volumes and ejection fraction





ECHOCARDIOGRAPHY



- **Advantage:**

-Wide availability.

- Lack of radiation.

-Assessment of haemodynamics and other cardiac structures.

- **Major limitations:**

-Inter-observer variability.

-Image quality

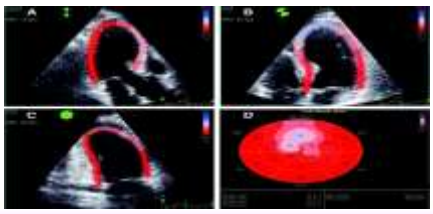
-No considerable change in LVEF occurs until a critical amount of myocardial damage

ECHOCARDIOGRAPHY

- Cancer therapeutics–related cardiac dysfunction is defined as a decrease in the LVEF of>10 % to a value below the lower limit of normal.
- This decrease should be confirmed by repeated cardiac imaging done 2–3 weeks after the baseline diagnostic study showing the initial decrease in LVEF

ECHOCARDIOGRAPHY

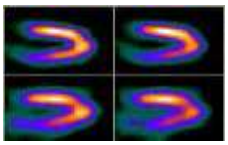
- Global systolic longitudinal myocardial strain has been reported to accurately predict a subsequent decrease in LVEF.
- Reduction of GLS of 15% from baseline is considered abnormal and a marker of early LV subclinical dysfunction



ECHOCARDIOGRAPHY

- Baseline echo assessment of LV function is recommended before initiation of any cardiotoxic cancer treatment in all patients.
- For low-risk patients (normal baseline echocardiogram, no clinical risk factors), repeat of echocardiography every 4 cycles of anti-HER2 treatment or after 200 mg/m2 of treatment with anthracyclines.
- More frequent surveillance may be considered for patients with abnormal baseline echocardiography and those with higher baseline clinical risk (e.g. prior anthracyclines, previous MI, treated HF).

NUCLEAR CARDIAC IMAGING



- **Advantage:**

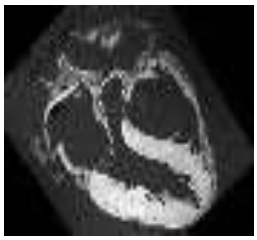
- MUGA is preferred for patients with poor windows on echo
- Low interobserver variability

- **Major Limitation:**

- Cumulative radiation exposure.
- Limited structural and functional information on other cardiac structure.
- Costly

CARDIAC MAGNETIC RESONANCE

- MRI is considered the gold standard for the evaluation of LV volumes , mass and function.
- Typically used if other techniques are non diagnostic or to confirm the presence of LV dysfunction if LVEF is borderline



CARDIAC BIOMARKERS

- Newly elevated cardiac troponin I from a normal baseline may identify those who develop cardiac dysfunction with a poor prognosis, particularly when troponin elevation persists.
- BNP and NT-pro BNP may be useful, but their role in routine surveillance to define the high-risk patient is not established

CARDIAC BIOMARKERS

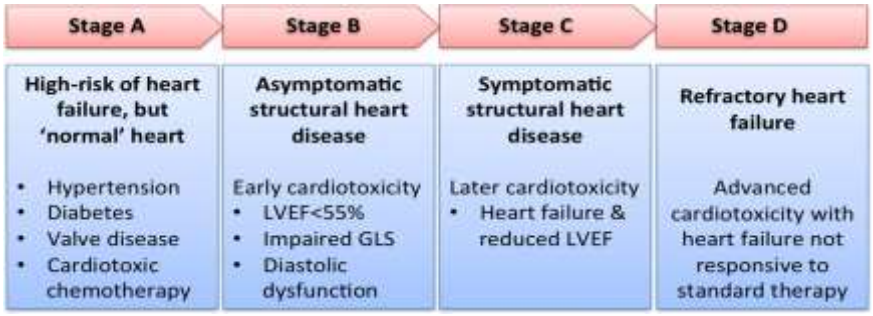
- There is currently no clear evidence to withhold or interrupt chemotherapy or targeted therapies based on a new abnormal cardiac biomarker result
- However, an abnormal biomarker result is indicative of an increased risk of cardiotoxicity

Assessing the risk of cardiac toxicity

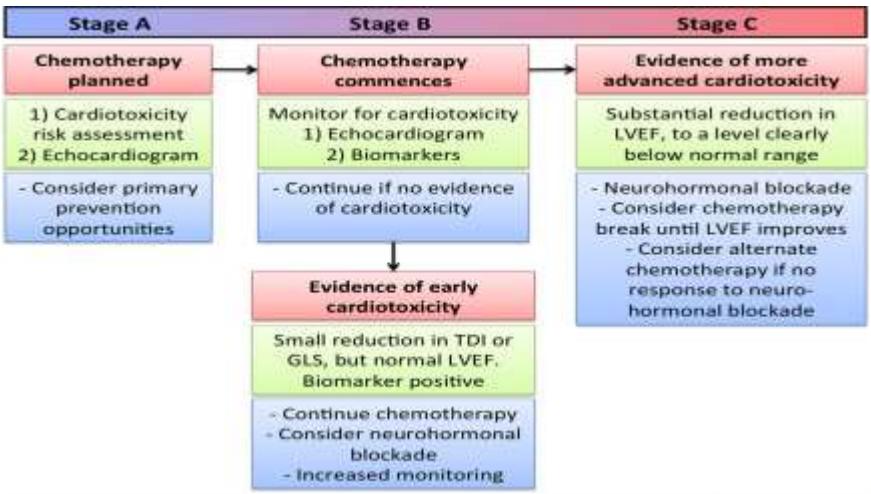
- During cancer treatment, close cardiovascular monitoring should be applied for the early detection of cardiac toxicity, re-evaluation of the initial therapeutic plan, and early treatment of any cardiac dysfunction

Assessing the risk of cardiac toxicity

- The AHA Heart Failure staging system provides a useful framework to consider the opportunities to detect and prevent chemotherapy-associated cardiotoxicity.



Cardiotoxicity prevention plan

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