Cardio-Oncology: What Survivors Need to Know

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TJUH-SKMC

Cancer Nation Survivorship Conference

2022 Cardio-Oncology Guidelines—ESC

JOURNAL ARTICLE GUIDELINES

2022 ESC Guidelines on cardio-oncology developed in collaboration with the European Hematology Association (EHA), the European Society for Therapeutic Radiology and Oncology (ESTRO) and the International Cardio-Oncology Society (IC-OS): Developed by the task force on cardio-oncology of the European Society of Cardiology (ESC) FREE

Alexander R Lyon ✉, Teresa López-Fernández ✉, Liam S Couch, Riccardo Asteggiano, Marianne C Aznar, Jutta Bergler-Klein, Giuseppe Boriani, Daniela Cardinale, Raul Cordoba, Bernard Cosyns ... Show more

Author Notes

European Heart Journal, Volume 43, Issue 41, 1 November 2022, Pages 4229–4361,
https://doi.org/10.1093/eurheartj/ehac244

Published: 26 August 2022

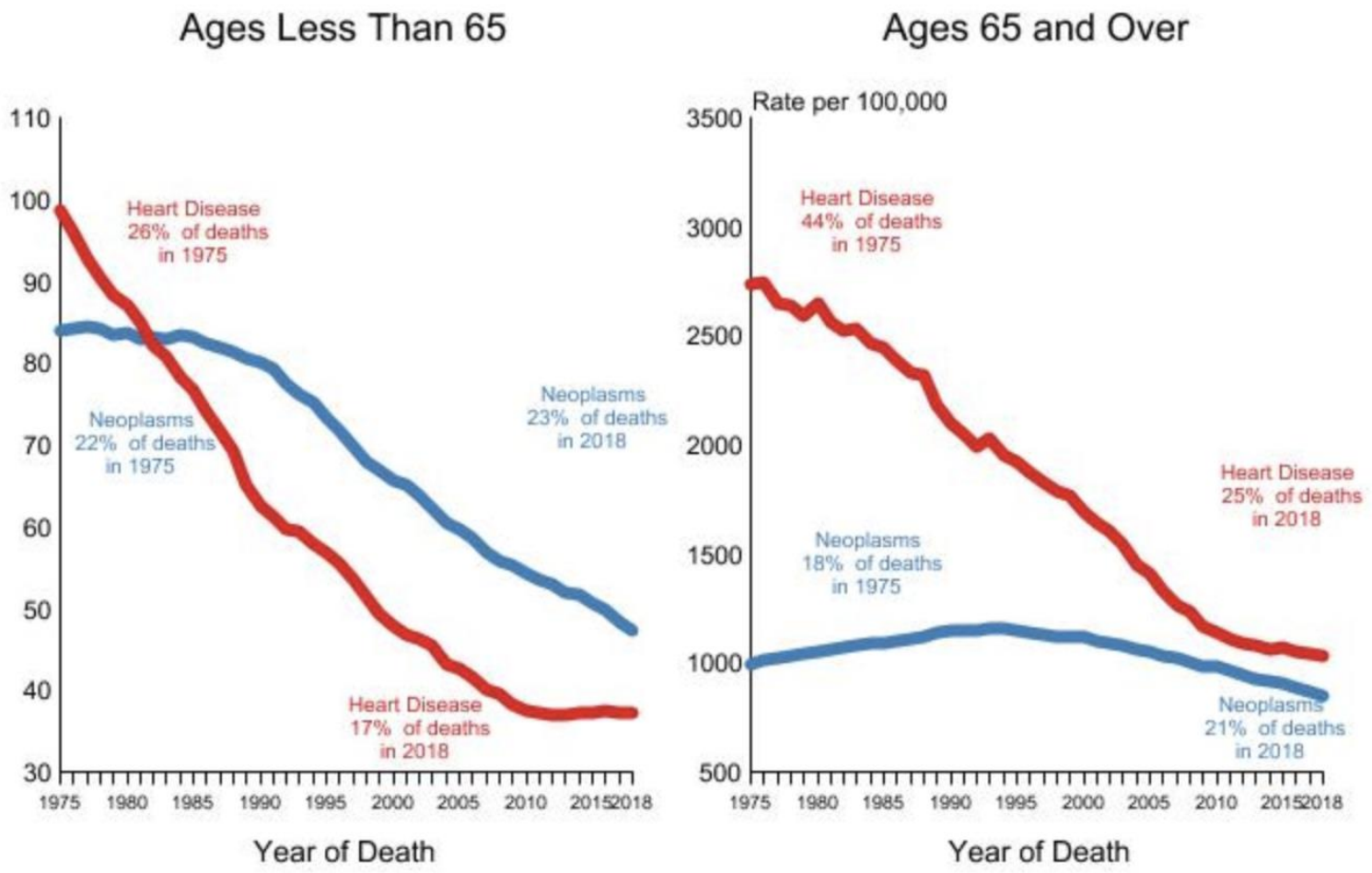
Outline

- Facts about Cancer
- Heart and the Cardiovascular System
- Epidemiology
- Offending Agents
- Management

Facts About Cancer

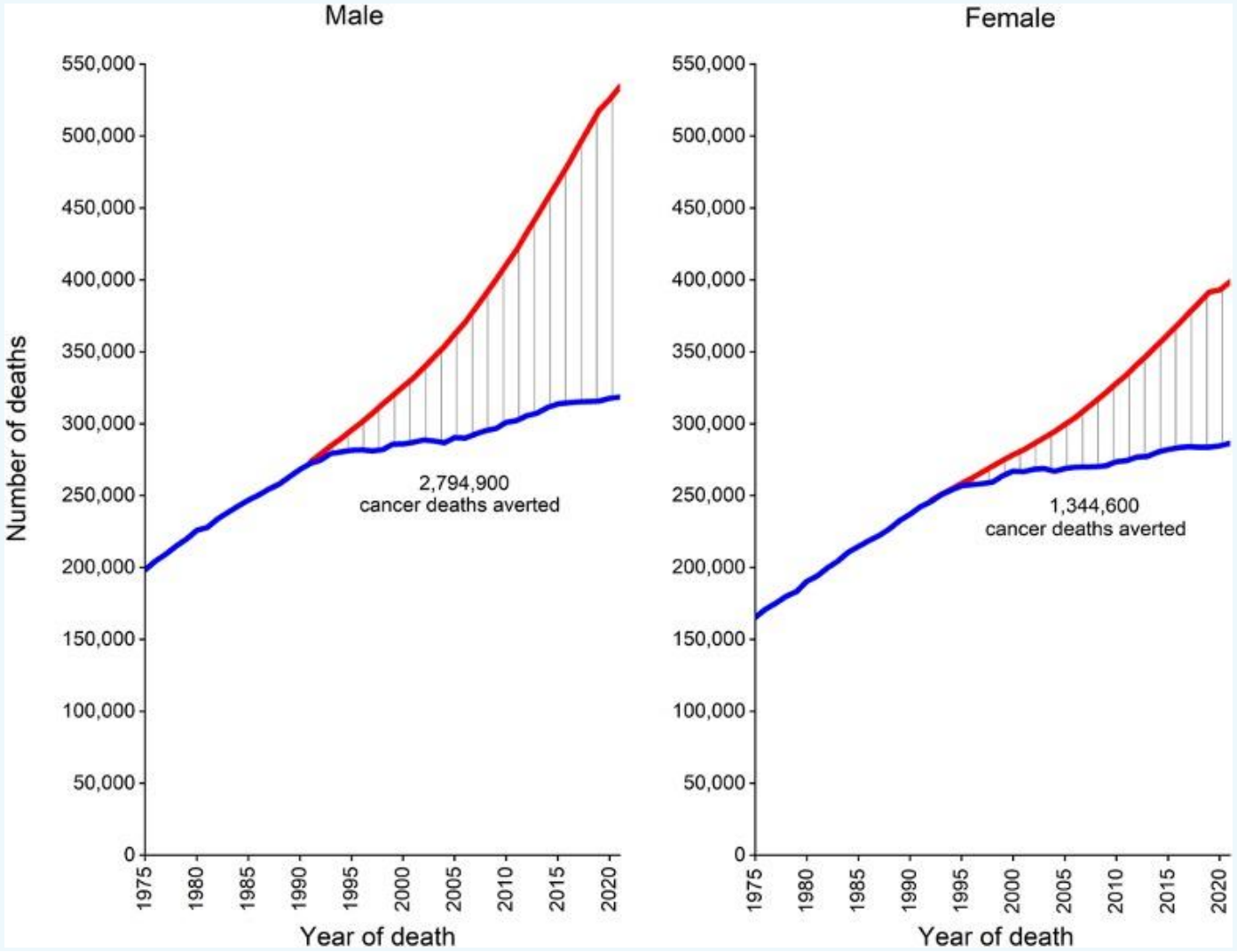
- Approximately 39.5% of men and women will be diagnosed with cancer at some point during their lifetimes (based on 2015–2017 data).
- In 2020, approximately 16,850 children and adolescents ages 0 to 19 were diagnosed with cancer and roughly 1,730 died of the disease.
- As of January 2019, there were an estimated 16.9 million cancer survivors in the United States. The number of cancer survivors is projected to increase to 22.2 million by 2030.

US Death Rate in Heart Disease vs Neoplasm between 1975-2018



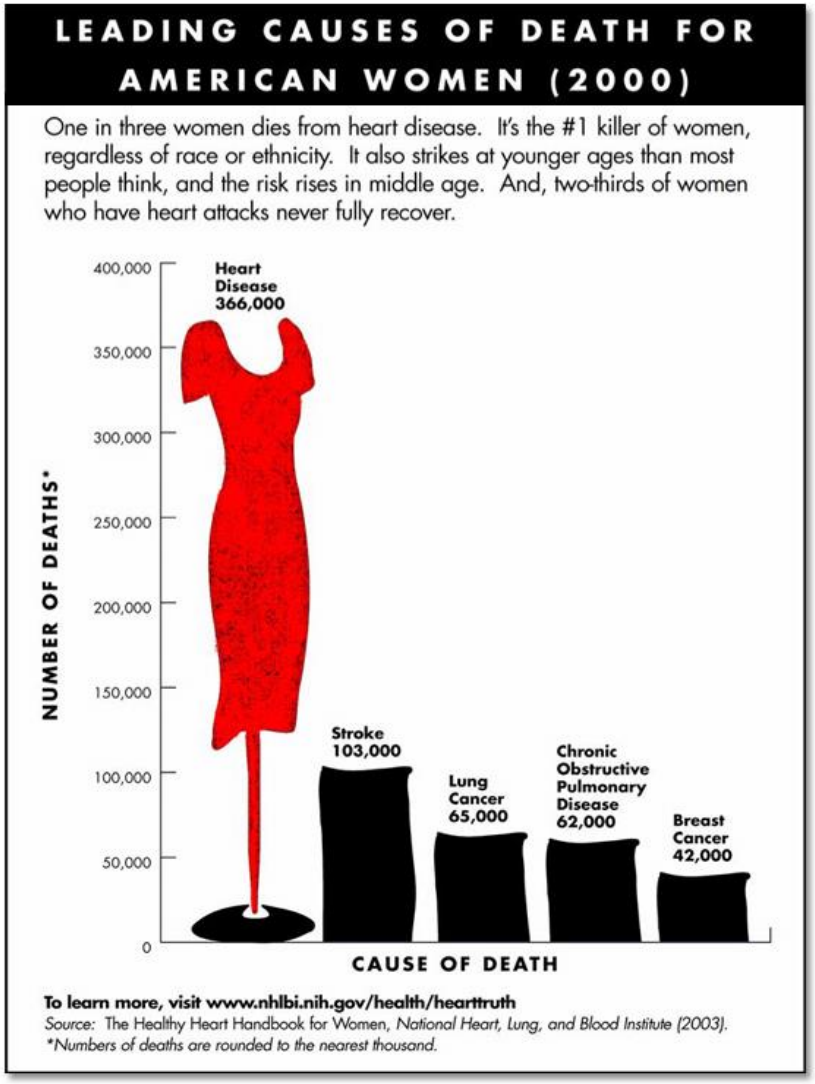
Source: US Mortality Files, National Center for Health Statistics, Centers for Disease Control and Prevention.
Rates are per 100,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1103).

Number of Cancer Deaths Averted between 1990-2021



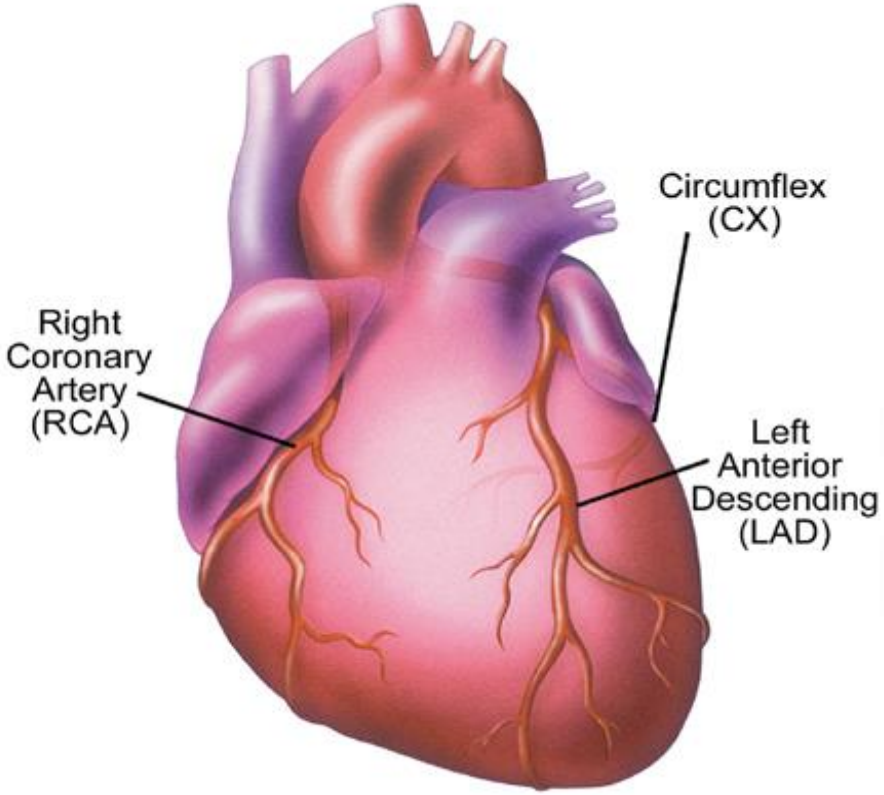
CA A Cancer J Clinicians, Volume: 74, Issue: 1, Pages: 12-49, First published: 17 January 2024, DOI: (10.3322/caac.21820)

Leading Causes of Death in Women



The Cardiovascular System—The Heart

- Four chambered pump
  - Right atrium/right ventricle
  - Left atrium/left ventricle
- Right side and left side do NOT communicate.
- Like all pumps it needs energy
  - It gets its energy from the oxygen and glucose (sugar) in the blood
- Has its own blood supply:
  - Left Main-> LAD/LCx
  - Right Coronary Artery (RCA) .



The Cardiovascular System—The Blood Vessels

- -Arteries carry oxygen-rich blood from the heart to all the cells in the body
- -Veins carry oxygen-poor blood that has given up oxygen to the cells back to the heart
- -The right side of the heart pumps venous blood to the lungs to pick up oxygen and remove carbon dioxide
- -The left side of the heart pumps arterial blood around the body

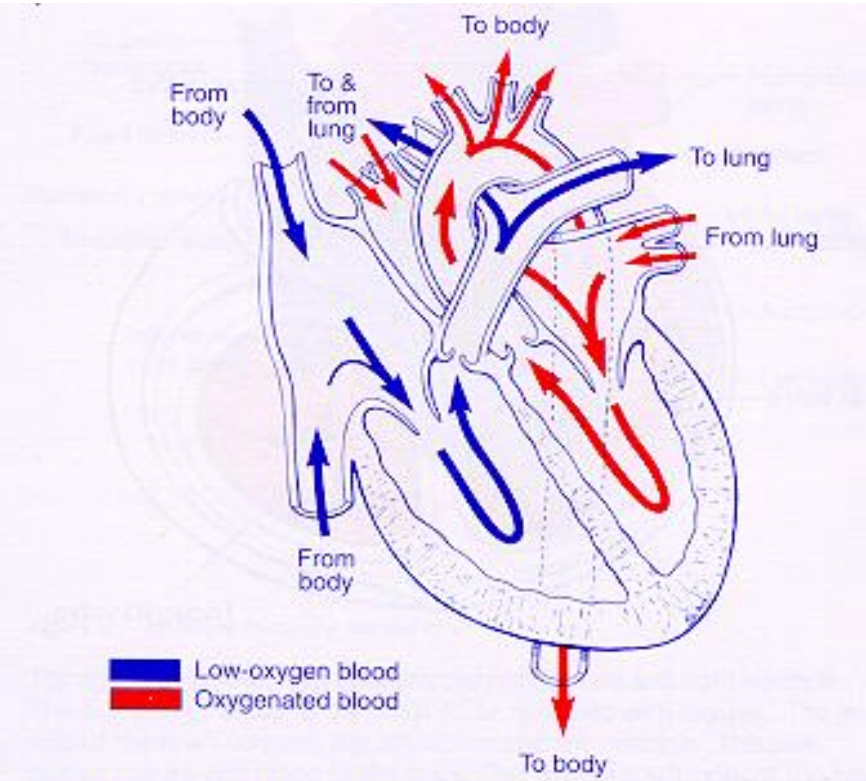
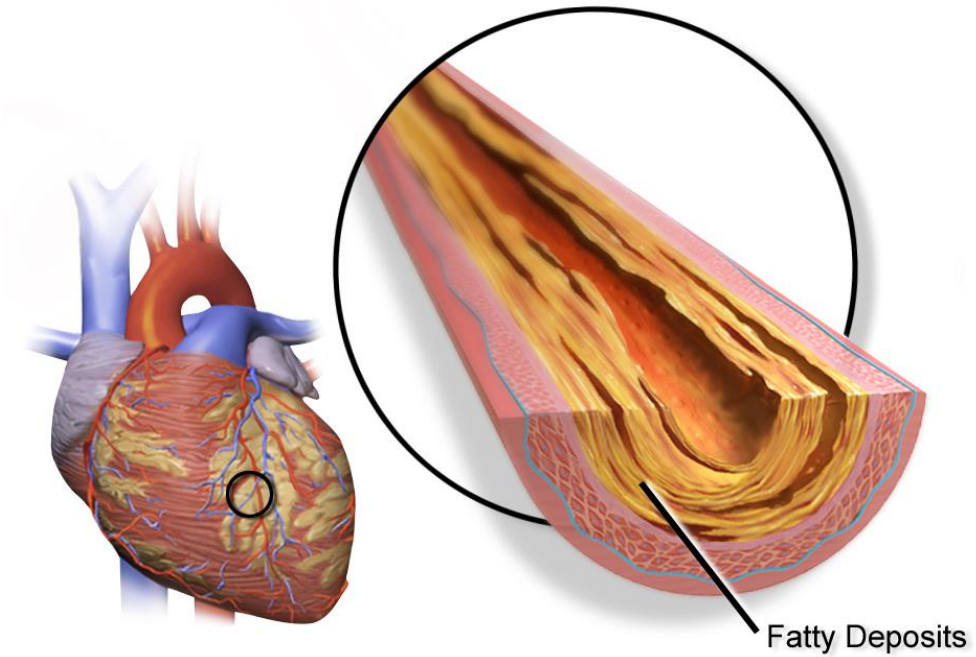


Figure 8. Circulation of Blood through the Heart

Cardiovascular Disease is disease of the heart or blood vessels

Coronary Artery Disease is disease (arteriosclerosis) of the inner lining of the arteries that supply blood to the heart.

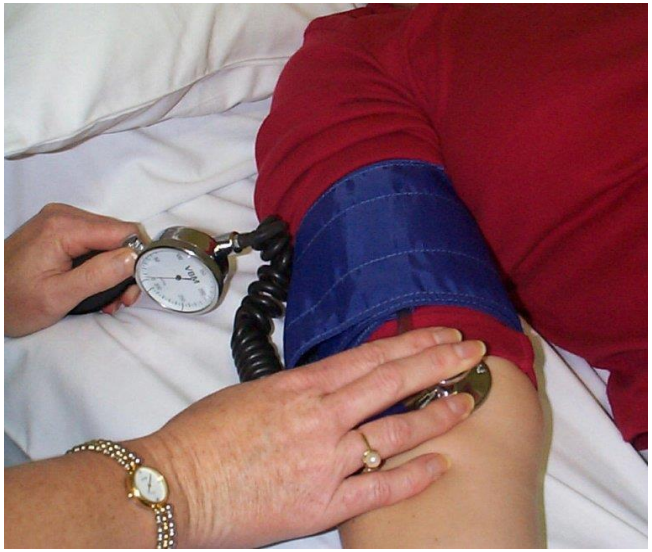
CAD is a major cause of illness and death.



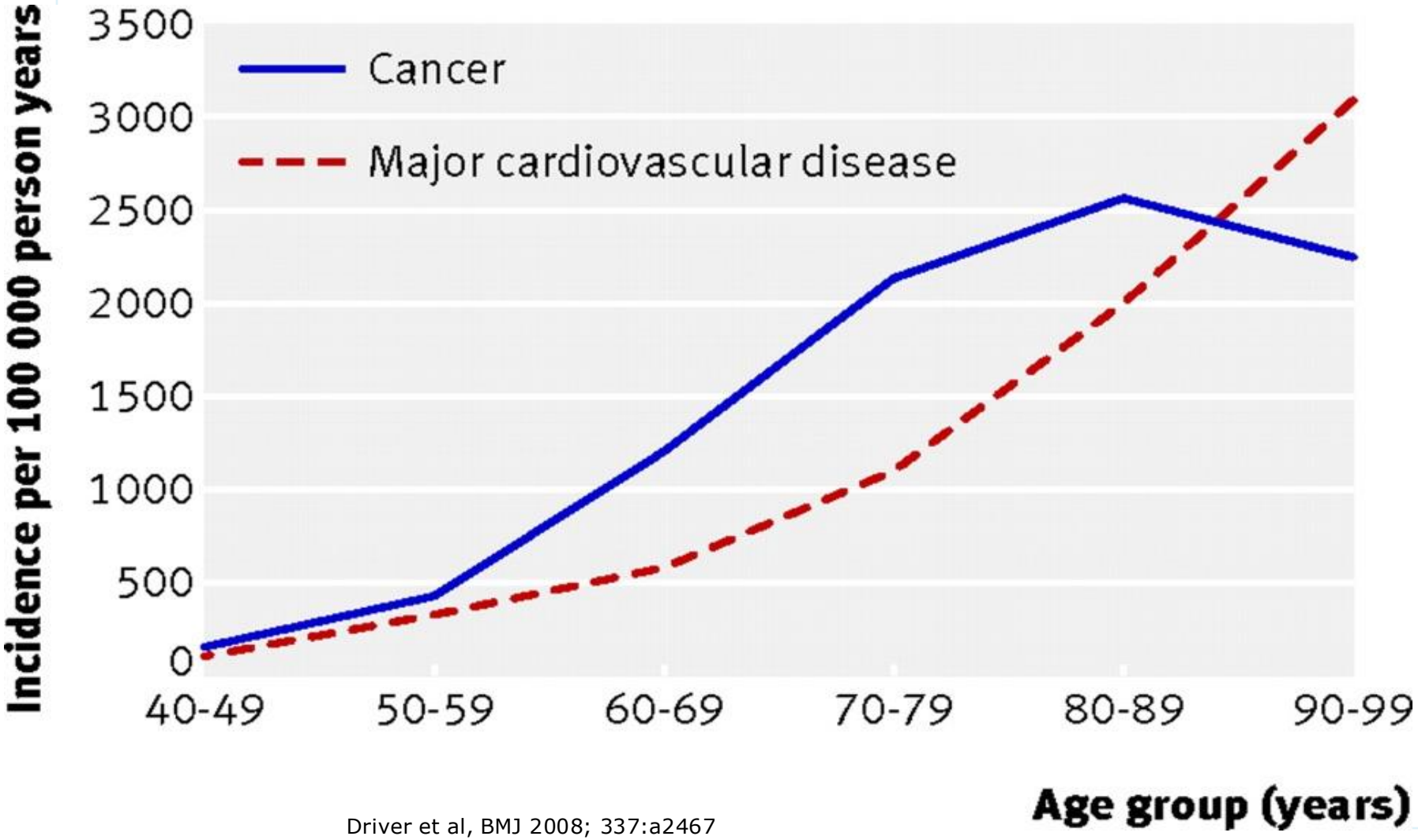
By BruceBlaus. When using this image in external sources it can be cited as:Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. - Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=29738538

What, treat blood pressure? But I have cancer.

- High Blood Pressure—Hypertension:
  - Causes the heart to work harder
  - Causes the heart to enlarge
  - Causes the heart to fail
  - Accelerates arteriosclerosis
  - Causes strokes
  - Causes kidney damage and failure



Incidence of Cancer and Heart Disease Increase with Age and May Occur Concurrently: Physicians Health Study



Driver et al, BMJ 2008; 337:a2467

Oncologic Treatments Associated With Cardiovascular Toxicities

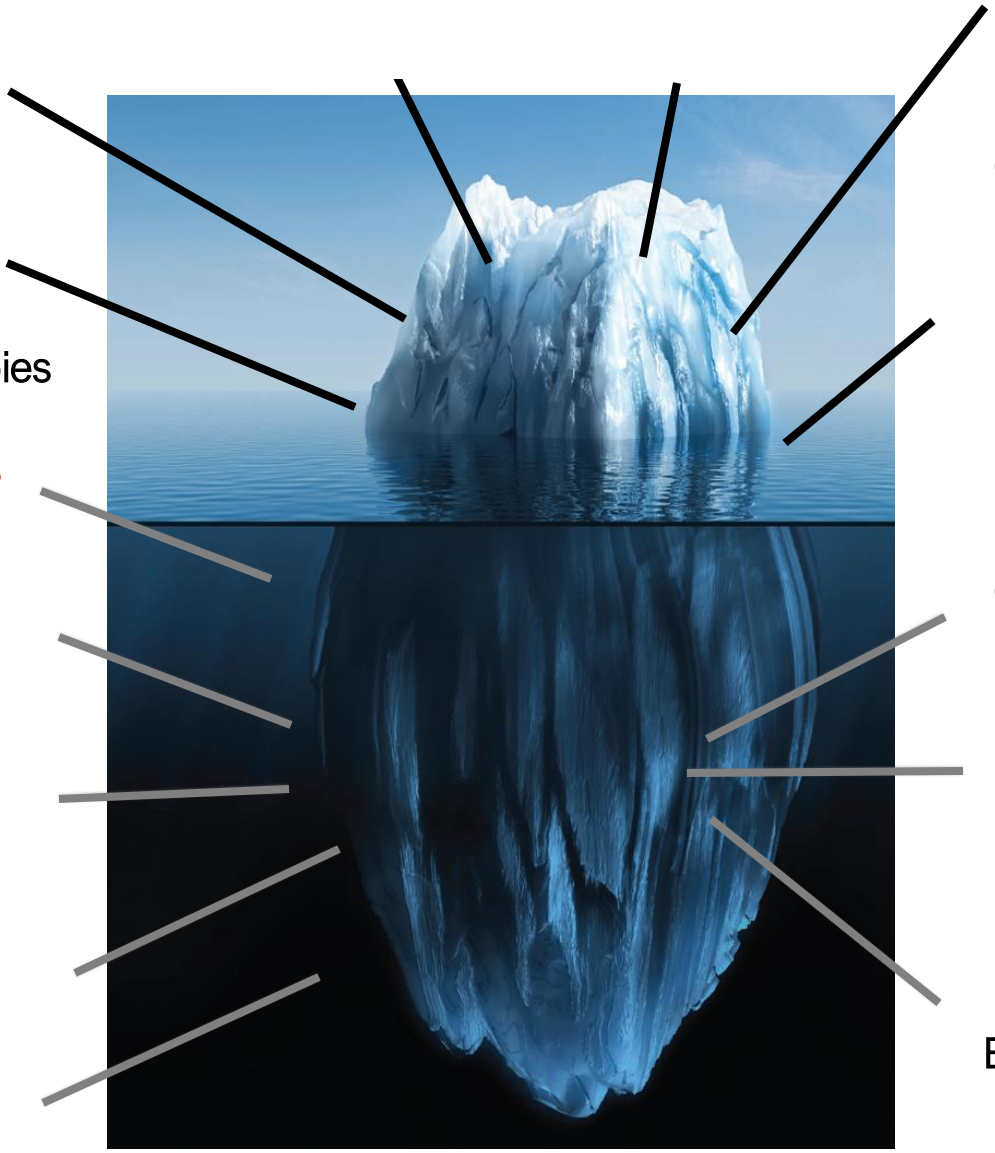
Oncologic Treatments Associated with Cardiovascular Toxicities

Radiation

Anthracyclines

Anti-metabolites (5FU)

VEGF Inhibitors



Her2 Targeted Therapies

Cancer Immunotherapies (Immune Checkpoint Inhibitors):Myocarditis

Immunomodulators (IMiDs):

Proteasome inhibitors

MEK/RAF TKI

Cancer Survivorship

CML TKIs

CDK4/6 inhibitors

PI3K Inhibitors

BTK Inhibitors

Adapted from Moslehi, Cheng. *Science Translational Medicine*, 2013. Moslehi, *NEJM*. 2016.

Oncologic Treatments Associated with Cardiovascular Toxicities

Radiation
Pericarditis, CAD
Valvular Stenosis

Anthracyclines
Cardiomyopathy
Heart Failure

Anti-metabolites (5FU)
Ischemia
Vasospasm

VEGF Inhibitors
Hypertension
Heart Failure
Thrombosis

Her2 Targeted Therapies
Cardiomyopathy

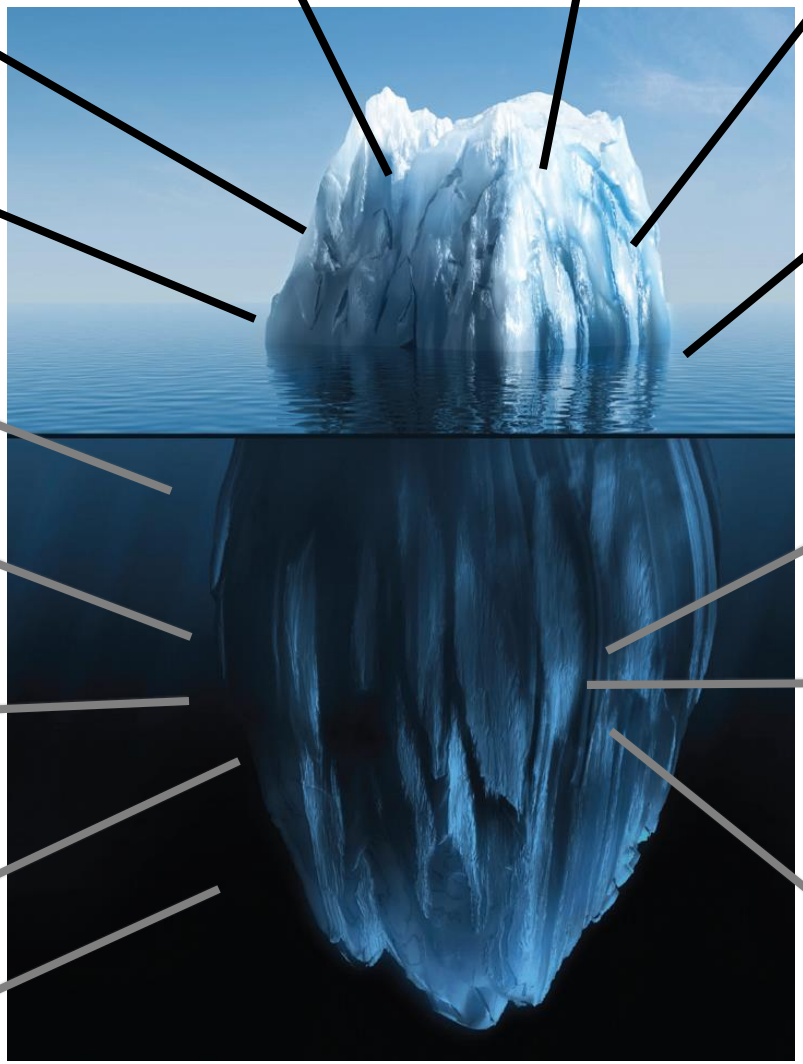
Cancer Immunotherapies (Immune Checkpoint Inhibitors):Myocarditis

Immunomodulators (IMiDs): thrombosis

Proteasome inhibitors
?vascular

MEK/RAF TKI
Cardiomyopathy

Cancer Survivorship



CML TKIs
Imatinib: ?protective
Dasatinib/Nilotinib/
Bosutinib/Ponatinib:
PAH/Vascular/
Atherosclerosis

CDK4/6 inhibitors
?Arrhythmia

PI3K Inhibitors
Hyperglycemia
Metabolic
?Myocardial/
Arrhythmia

BTK Inhibitors
Arrhythmias

Adapted from Moslehi, Cheng. *Science Translational Medicine*, 2013. Moslehi, *NEJM*. 2016.

Oncologic Treatments Associated with Cardiovascular Toxicities

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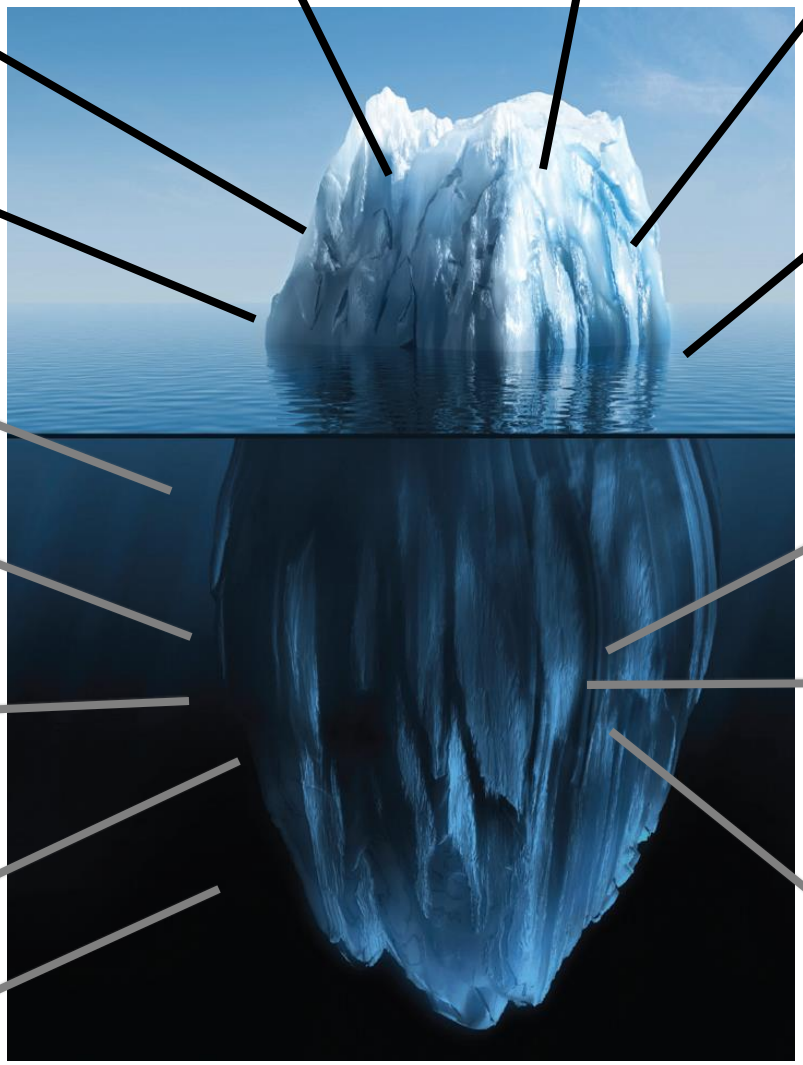


Immune Checkpoint Inhibitors: Myocarditis

CDK4/6 inhibitors
Arrhythmia

Immunomodulators (IMiDs): thrombosis

PI3K Inhibitors:
Hyperglycemia
Metabolic
?Myocardial/
Arrhythmia

Proteasome inhibitors
?vascular

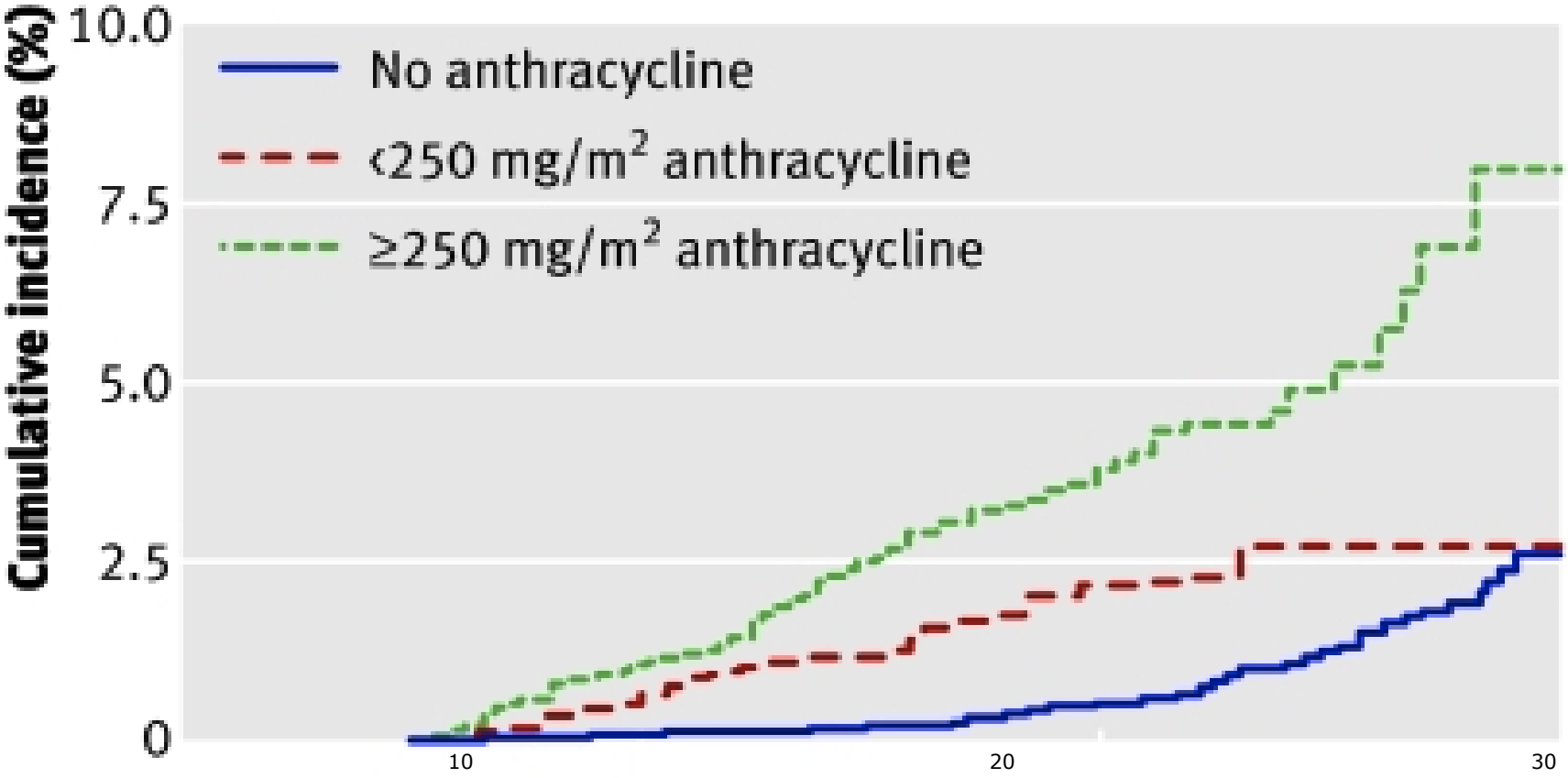
MEK/RAF TKI
Cardiomyopathy

BTK Inhibitors
Arrhythmias

Cancer Survivorship

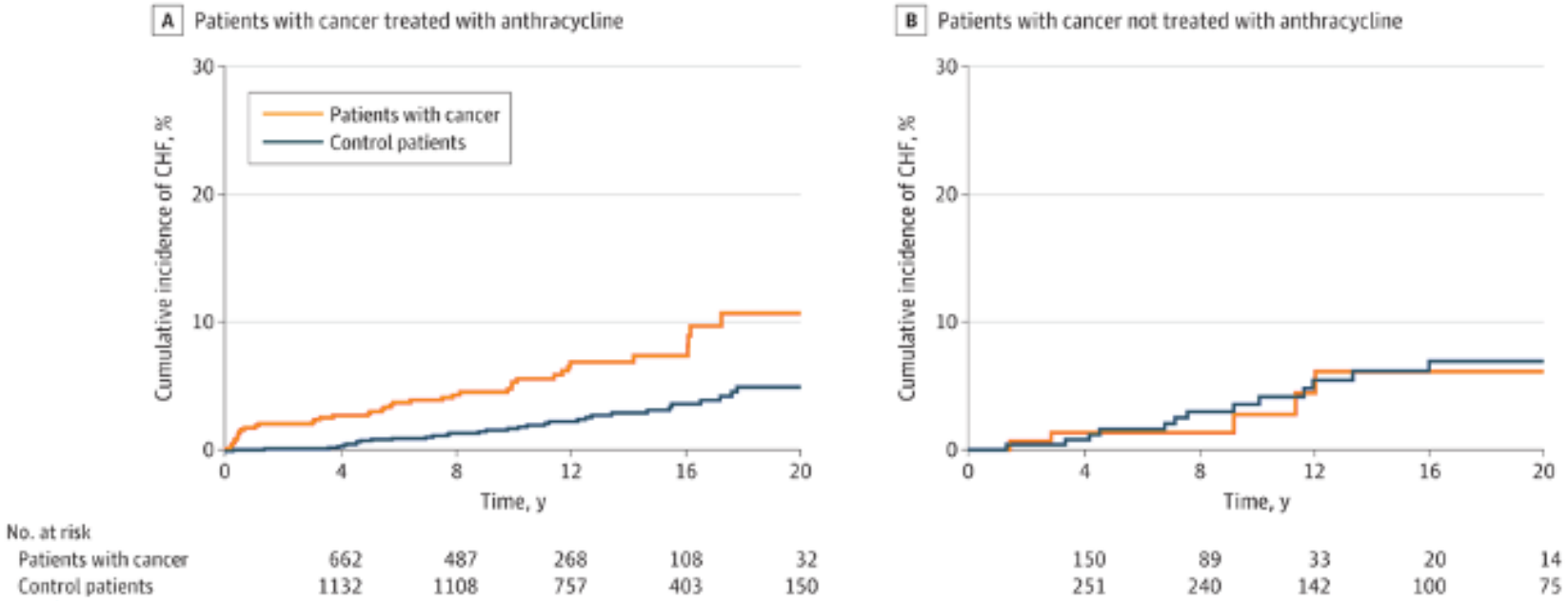
Adapted from Moslehi, Cheng. *Science Translational Medicine*, 2013. Moslehi, *NEJM*. 2016.

Cumulative Incidence of Congestive Heart Failure Among Childhood Cancer Survivors by Anthracycline Dose



Adapted from Mulrooney et al, BMJ 2009; 339:b4606

Cumulative Incidence of Congestive Heart Failure In Adults Over Time Treated with Anthracycline



In this case-control study among 2196 individuals, including 812 participants with cancer and 1384 control participants, the cumulative incidence of HF in participants withcancer treated with anthracycline was 7.4% over 15 years, more than 2 times higher than in matched controls,and was not significant for a subgroup of participants with cancer not treated with anthracycline compared with controls

From: **Association of Anthracycline With Heart Failure in Patients Treated for Breast Cancer or Lymphoma, 1985-2010**

JAMA Netw Open. 2023;6(2):e2254669. doi:10.1001/jamanetworkopen.2022.54669

Risk Factors for Developing Anthracycline Cardiotoxicity and CHF

- Chemo dose and schedule dependent
- Mode of administration
- Sex--Women >> Men
- Underlying cardiac risk factors (age, hypertension, hyperlipidemia, family history, diabetes, tobacco history)
- Underlying cardiac disease
- mediastinal radiation
- concurrent or sequential Herceptin use or other cardiotoxic agent use such as paclitaxel.
- increased length of time since anthracycline completion.
- lack of exercise/sedentary lifestyle.

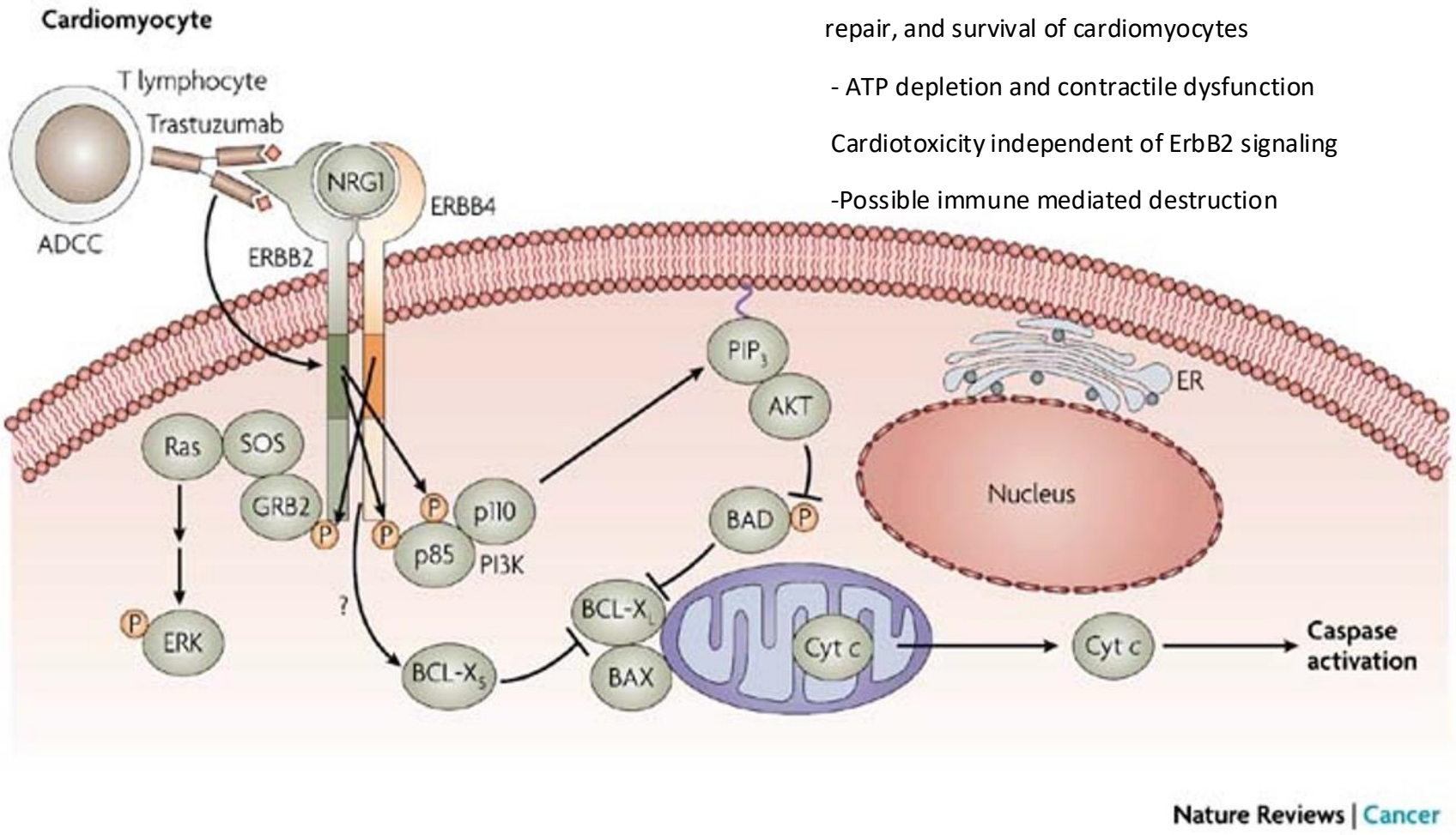
Mechanisms of Trastuzumab Cardiotoxicity

Inhibition of ErbB2 in cardiomyocytes: interferes with growth, repair, and survival of cardiomyocytes

- ATP depletion and contractile dysfunction

Cardiotoxicity independent of ErbB2 signaling

-Possible immune mediated destruction



Risk Factors for Developing Trastuzumab Toxicity

- Standard risk factors for developing structural heart disease.
- Previous doxorubicin exposure
- Previous chest wall irradiation
- Obesity

Reversibility—

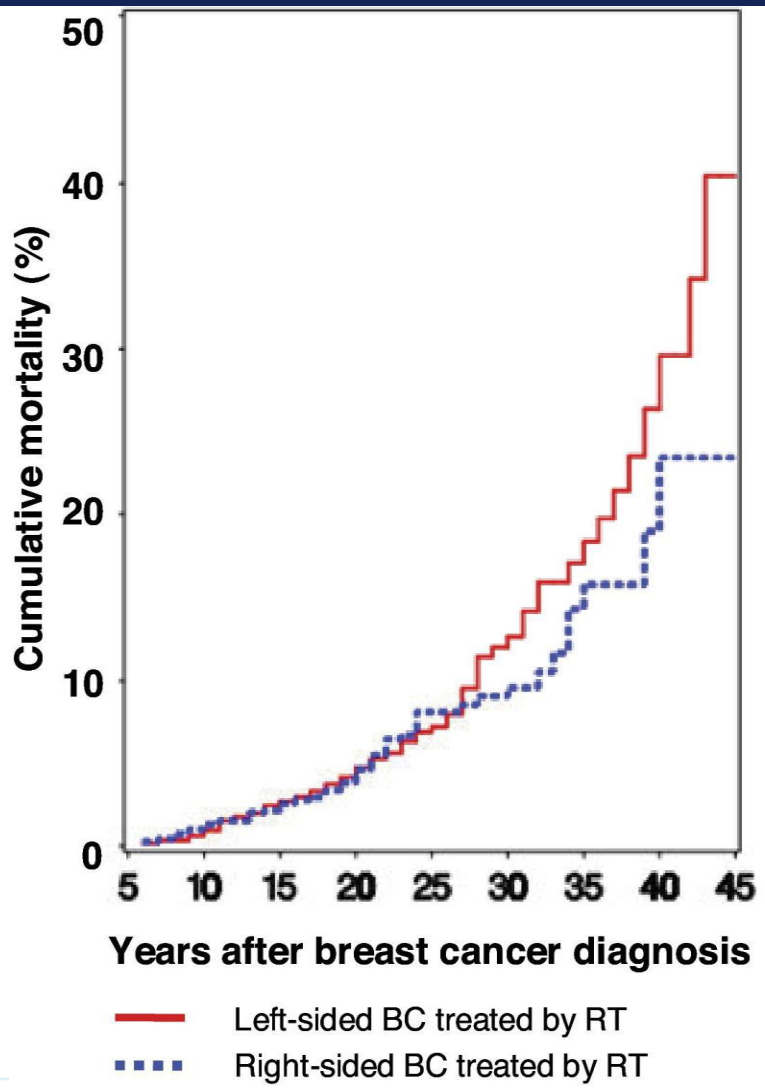
- largely possible but not necessarily 100%

Prevention—

- treatment of underlying risk factors prior to initiating Trastuzumab.

Radiation Therapy

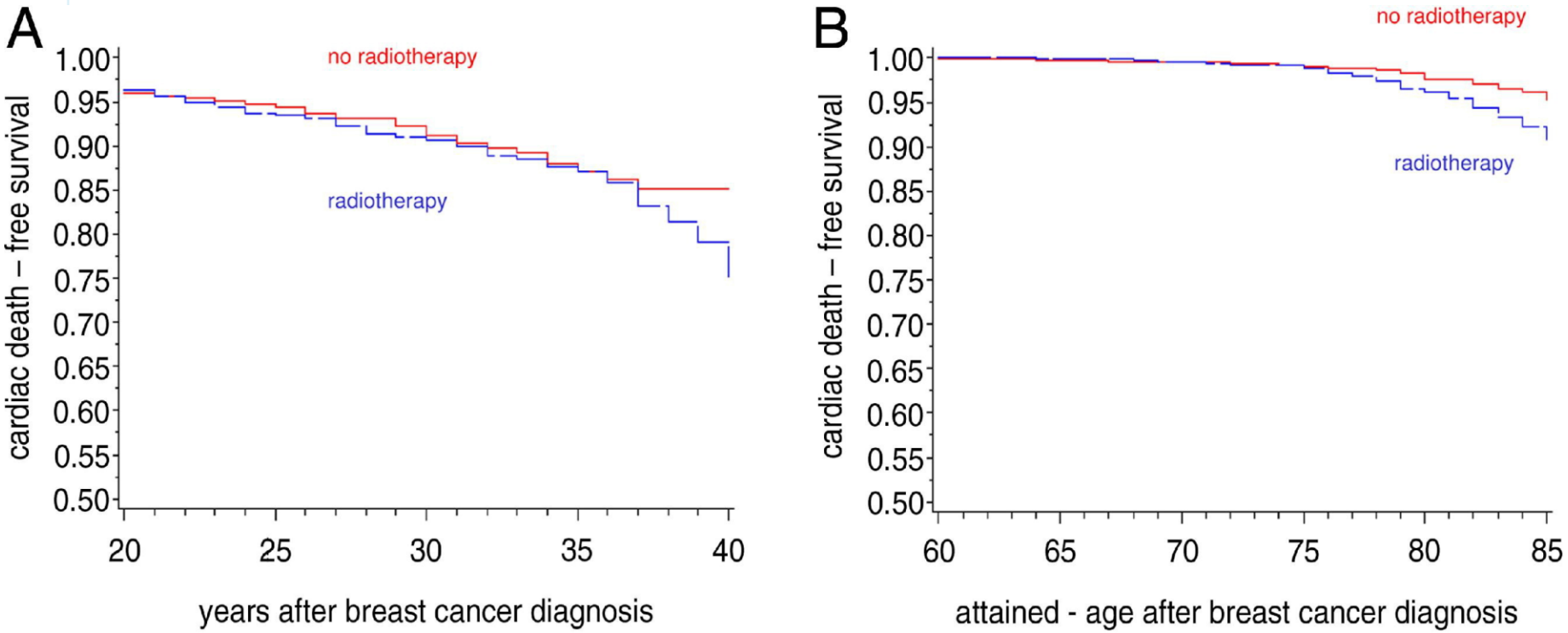
Cumulative Mortality Due to Cardiac Disease According to Breast Cancer Laterality



4500 women—radiation of IMC at Institute Gustave Roussy, France

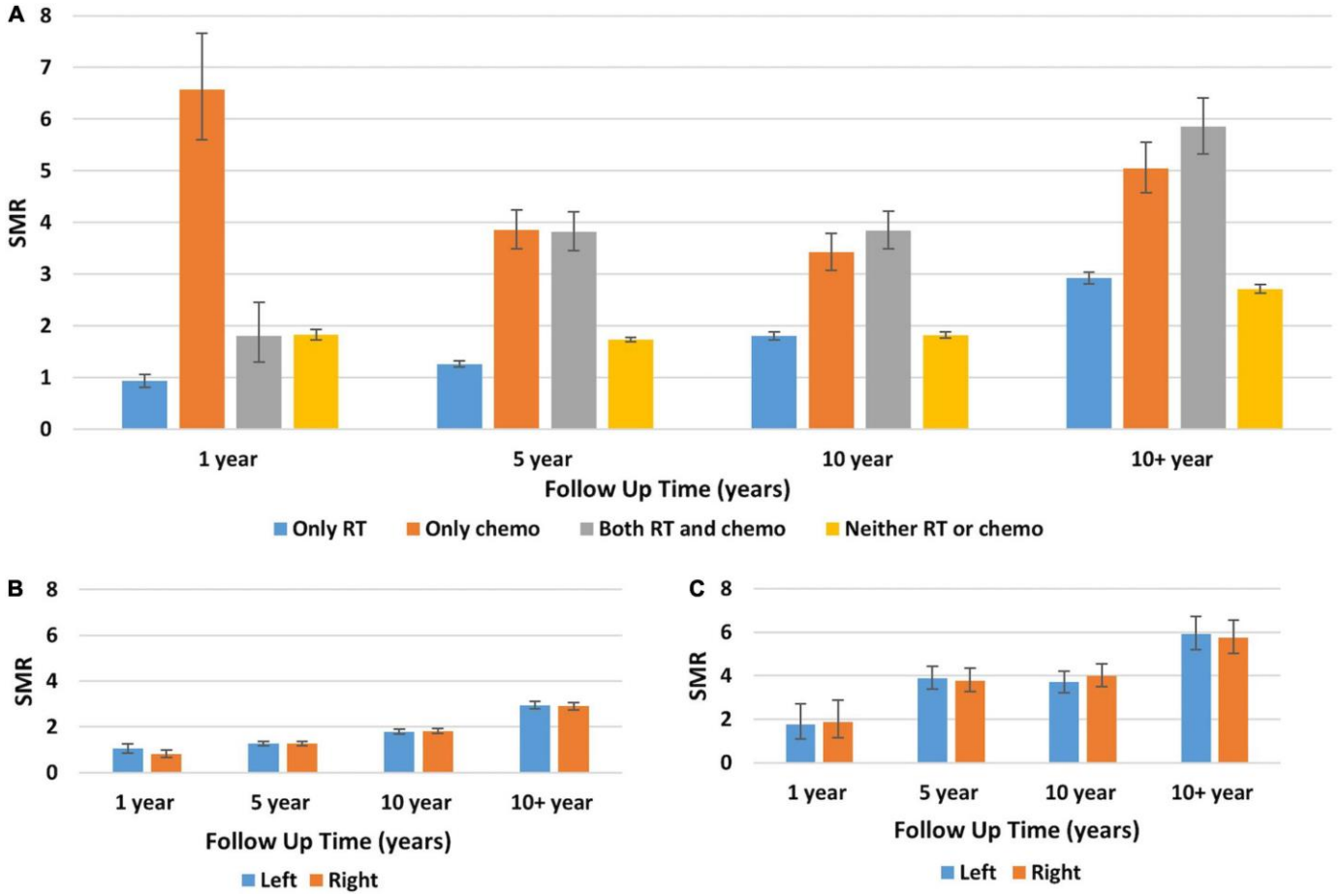
Bouillon, K., et al. Journal of the American College of Cardiology, (2011) Volume 57 (4); 445-452.

Cardiac Death-Free Survival According to Radiotherapy Status



Bouillon, K., et al. Journal of the American College of Cardiology, (2011) Volume 57 (4); 445-452.

Standard Mortality Ratios for Death from Heart Disease in Breast Cancer Patients Based on Treatment, Disease Laterality, and Era of Diagnosis



SEER Database: Woman diagnosed from 1992 to 2014

Agha, A. et al. Front. Cardiovasc. Med., 13 April 2022
Sec. Cardio-Oncology
Volume 9 - 2022 | https://doi.org/10.3389/fcvm.2022.784409

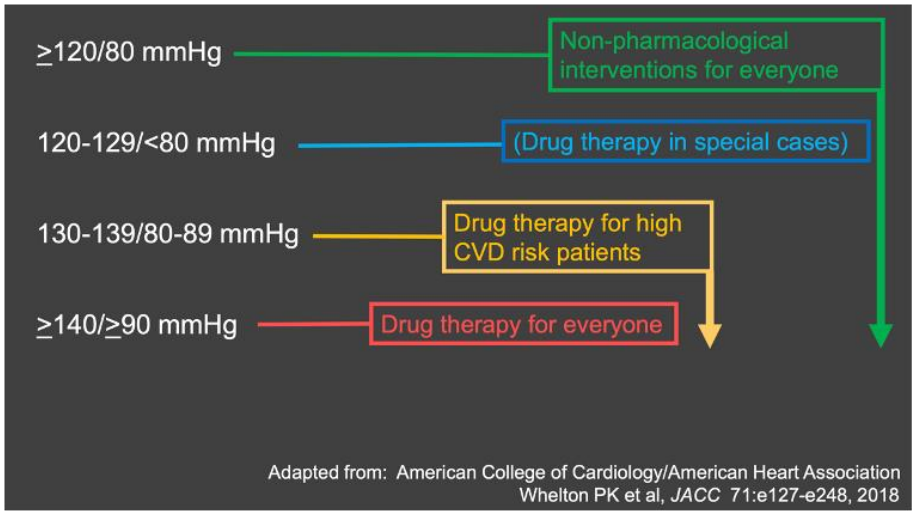
Chemotherapy and Hypertension—Is there a link?

2017 Update on Guidelines for BP Management

Blood Pressure Categories

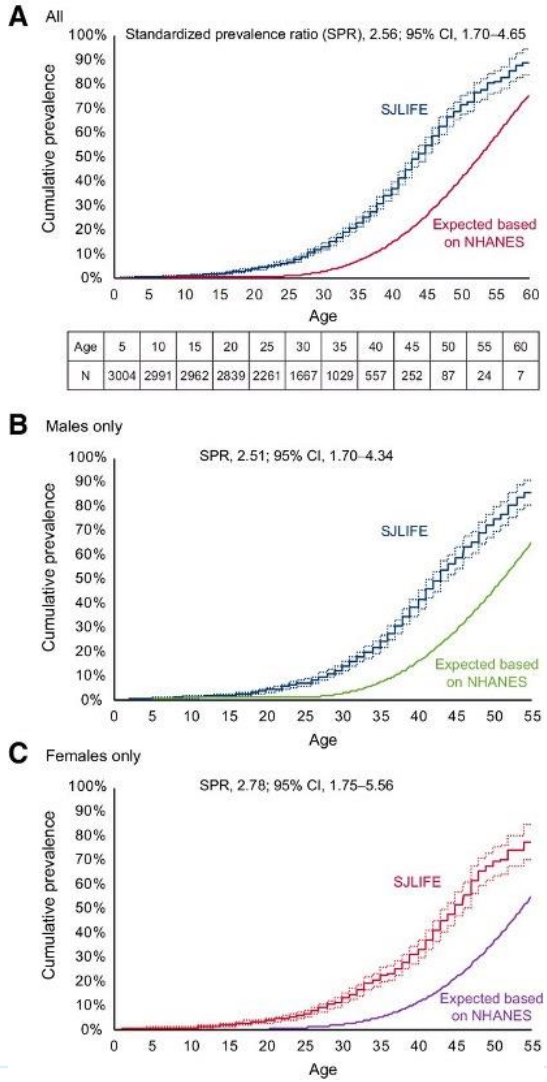
American Heart Association | American Stroke Association

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

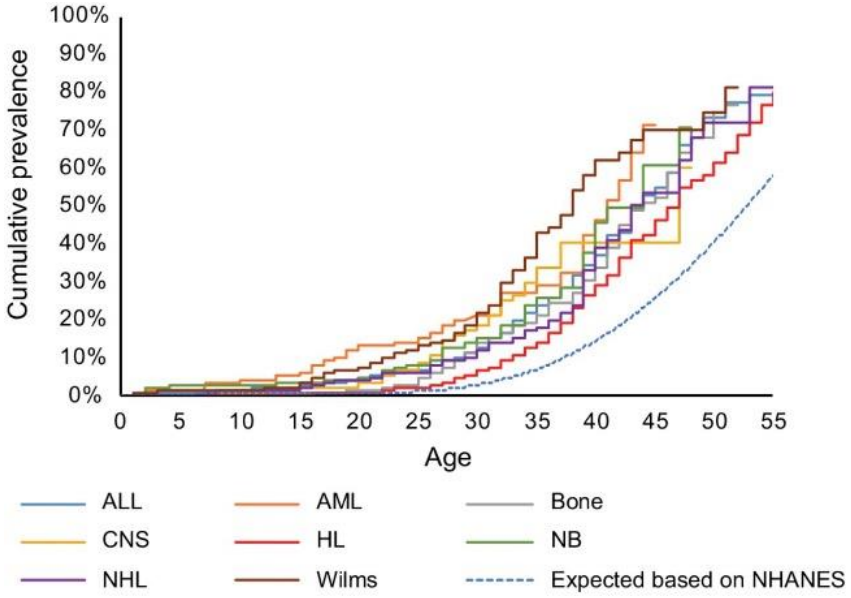


Whelton PK et al, *JACC* 71:e127-e248, 2018

Blood Pressure Status in Adult Survivors of Childhood Cancer: A Report from the St. Jude Lifetime Cohort Study



Age	5	10	15	20	25	30	35	40	45	50	55	60
N	3004	2991	2962	2839	2261	1667	1029	557	252	87	24	7



Cancer Epidemiol Biomarkers Prev. 2017;26(12):1705-1713. doi:10.1158/1055-9965.EPI-17-0510

Prevalence of Cardiovascular Risk Factors Increase with Age

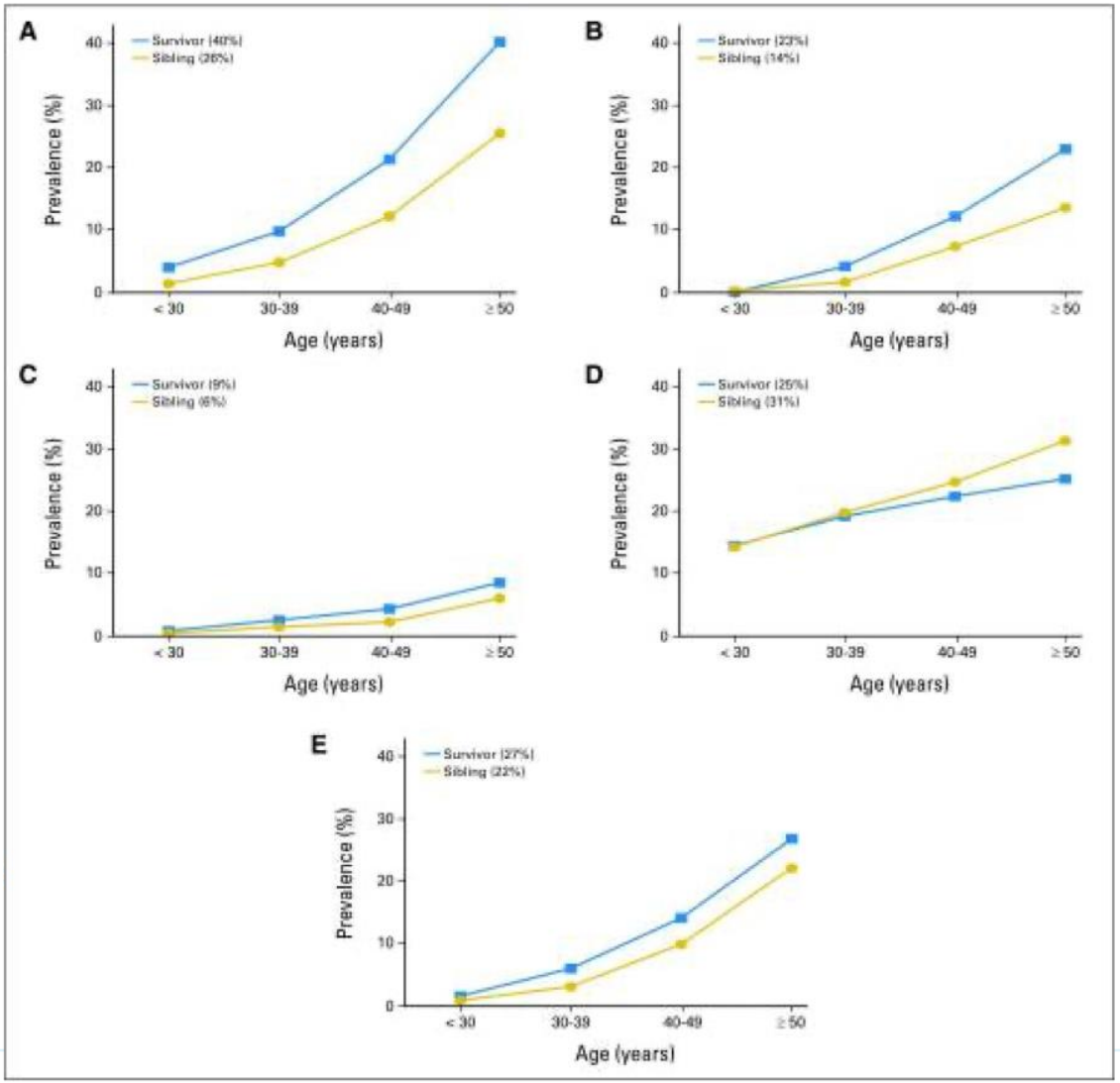
(A) hypertension

(B)dyslipidemia

(C) diabetes

(D) obesity

(E) Multiple cardiac risk factors



Armstrong GT, et al. Modifiable risk factors and major cardiac events among adult survivors of childhood cancer. *J Clin Oncol*. 2013;31(29):3673-3680

Cancer Therapy Associated with Hypertension

- Anti-metabolites
  - Decitabine—affects DNA methylation, nucleic acid synthesis inhibitor
- Alkylating Agents
  - Cisplatin
- Monoclonal Antibodies
  - Rituximab—anti-CD 20
- Tyrosine Kinase Inhibitors
  - Monoclonal antibodies vs small molecules
- mTOR Inhibitors
  - Everolimus
- Proteosome Inhibitors
  - Bortezomib

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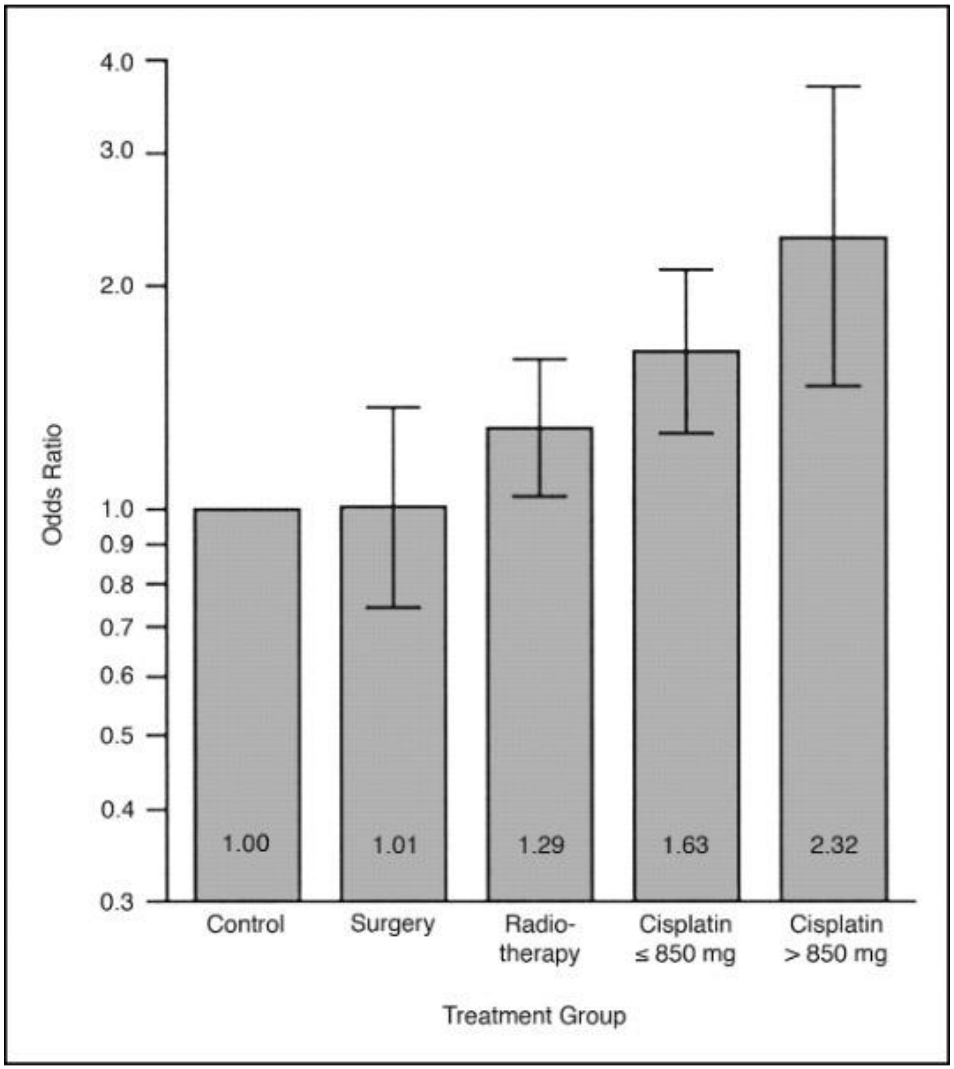
Age Adjusted Odds Ratio (OR) of having Hypertension in Long Term Survivors of Testicular Cancer compared with healthy individuals.



H. Sagstuen; et al; *Journal of Clinical Oncology* 2005 234980-4990. DOI: 10.1200/JCO.2005.06.882

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  - Bortezomib

Tyrosine Kinase Inhibitors Associated with Hypertension

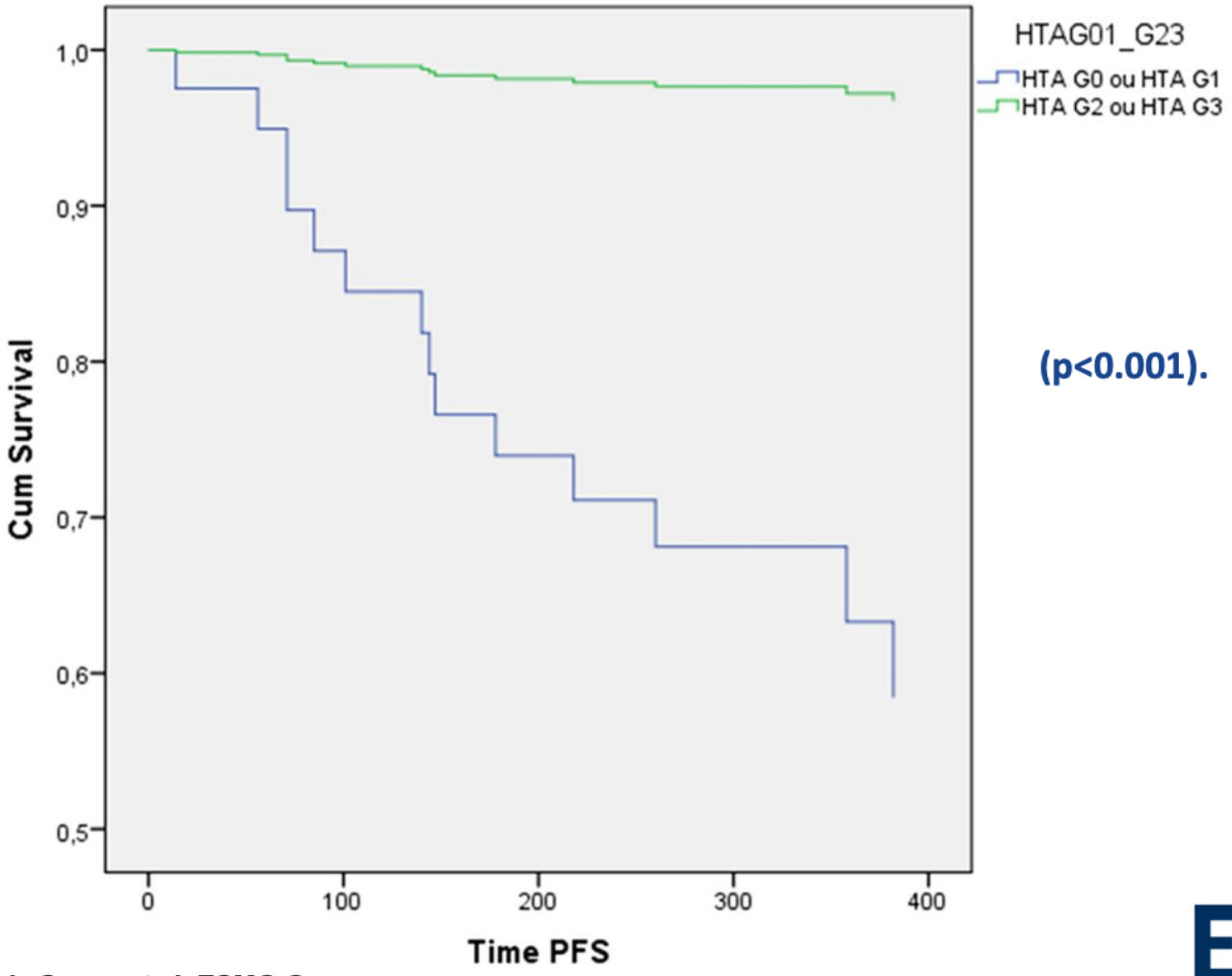
- Monoclonal Antibody-based Tyrosine Kinase Inhibitors

- Small molecule tyrosine kinase inhibitors

Tyrosine Kinase Inhibitors Associated with Hypertension

- **Monoclonal Antibody-based Tyrosine Kinase Inhibitors**
  - **Bevacizumab (Avastin)**
- HF 1-3%
- Ischemia (ATE) – 0.6- 1.5%
  - Risk factors age>65 and previous history
- HTN 4-35%

Progression Free Survival of Patients with Colorectal Cancer with and without Grade 2-3 bevacizumab-induced HTN

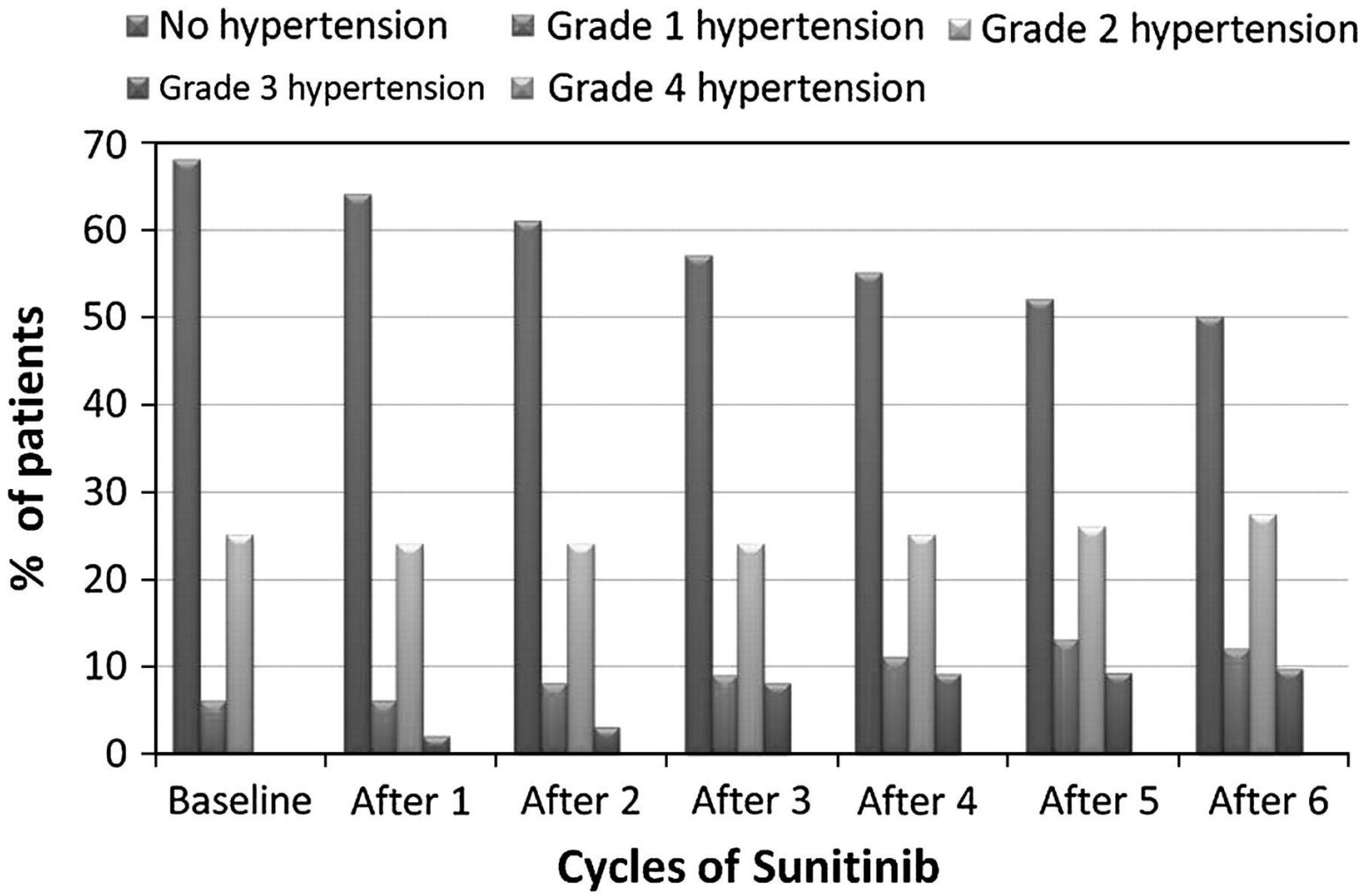


(p<0.001).

Isabel José Dionísio de Sousa et al. ESMO Open 2016;1:e000045

ESMO Open Cancer Horizons

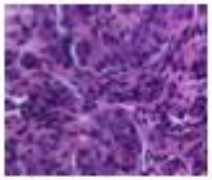
Cardiovascular Toxicity Following Sunitinib Therapy in Metastatic Renal Carcinoma: A Multicenter Analysis



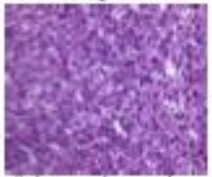
G. Di Lorenzo et al. Ann Oncol 2009;20:1535-1542

Systemic Effects of Anti-VEGF Therapy

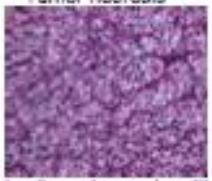
Tumor Tissues
(VEGF upregulated)



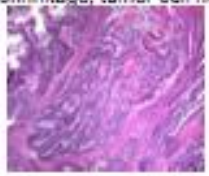
Lung cancer (bevacizumab)
Inhibition of tumor growth, tumor cavitation



Hepatocellular carcinoma (sorafenib)
Tumor necrosis



Renal cell carcinoma (sunitinib)
Tumor shrinkage, tumor cell necrosis



Colorectal cancer (bevacizumab)
Deceleration of tumor growth
efficient chemotherapy delivery

Normal Tissues
(VEGF constitutively expressed)

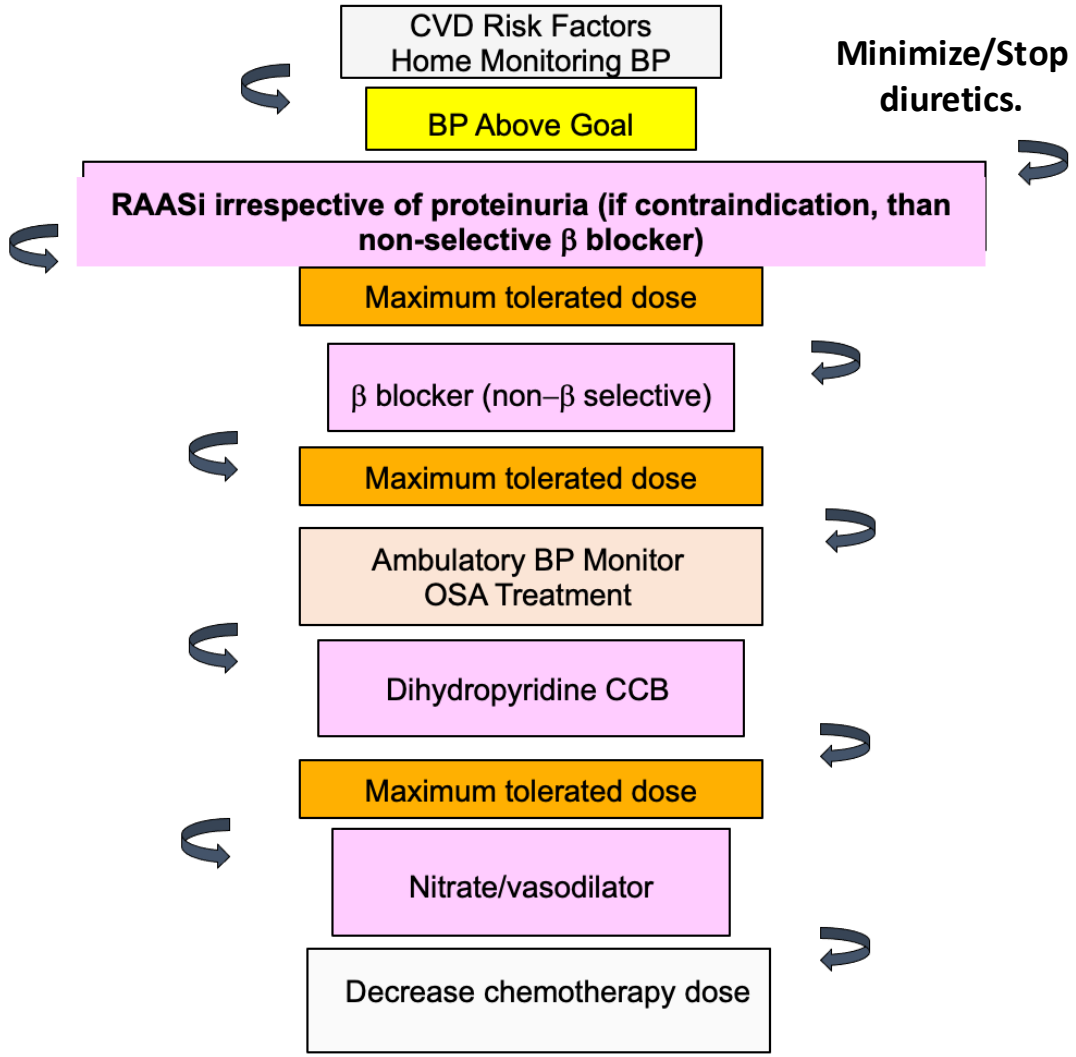
Hypertensive remodeling
Microvascular rarefaction
Cardiomyopathy (sunitinib and sorafenib)

Microcirculation: 1. normal arteriole, 2. functional rarefaction
(endothelial dysfunction,vasoconstriction), 3. anatomic rarefaction

Thrombotic microangiopathy
Glomerulopathy / glomerulonephritis
Proteinuria
Hypertensive nephropathy

Vaklavos et al, Oncologist 2010, p130.

Proposed Approach to Hypertension Management During and Post Cancer Treatment



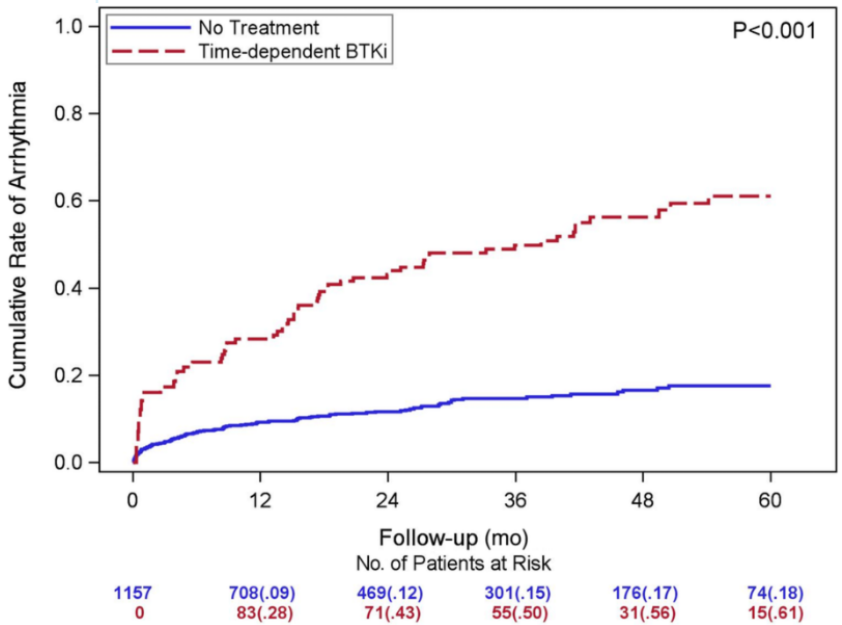
JACC CardioOncology An Open Access Journal

Adapted from Jordana B. Cohen et al. J Am Coll Cardiol CardioOnc 2019;1:238-251

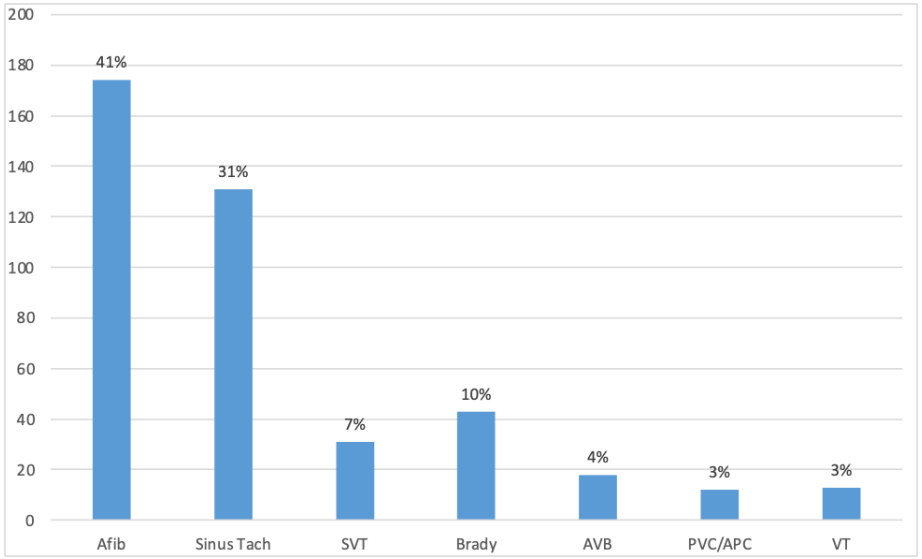
Chemotherapy and risk of arrhythmias

Arrhythmogenic Cardiotoxicity Associated with Contemporary Treatments of Lymphoproliferative Disorders.

Cumulative Rate of any arrhythmic event following initiation of lymphoma treatment

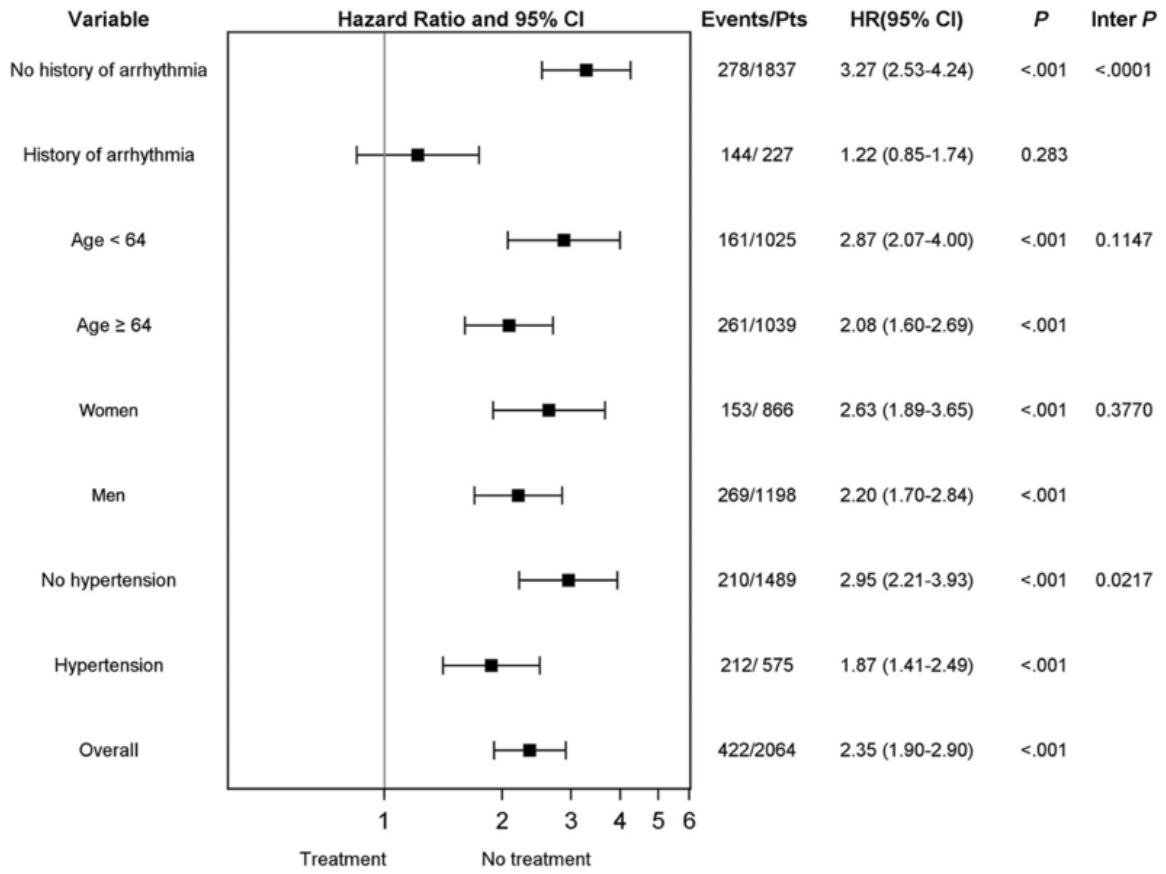


Distribution of Arrhythmia Types



Sherazi, et al. Journal of the American Heart Association. Arrhythmogenic Cardiotoxicity Associated With Contemporary Treatments of Lymphoproliferative Dis

Arrhythmogenic Cardiotoxicity Associated with Contemporary Treatment of Lymphoproliferative Disorders



The risk of arrhythmia during lymphoma treatment was significantly higher among patients who did not have prior history of arrhyt

Sherazi, S., et al. Journal of the American Heart Association. Arrhythmogenic Cardiotoxicity Associated With Contemporary Treatments of Lymphoproliferative D

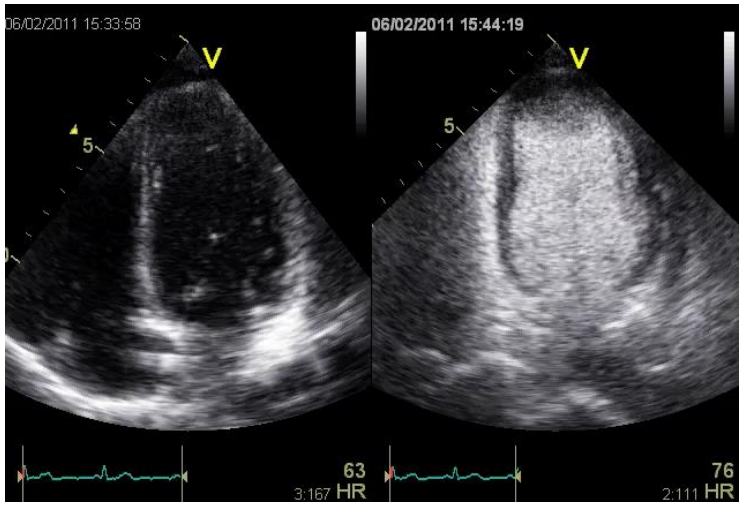
Imaging Techniques in Managing Patients Undergoing Chemotherapy

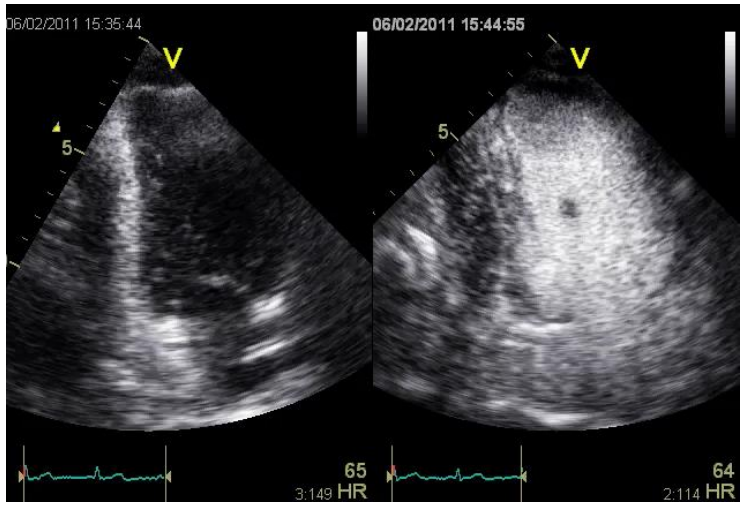
Echocardiography

Nuclear

MRI

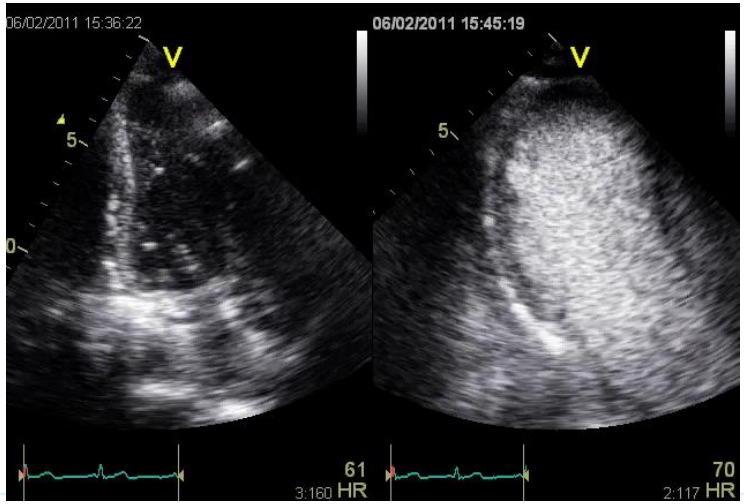
Contrast Echo Imaging



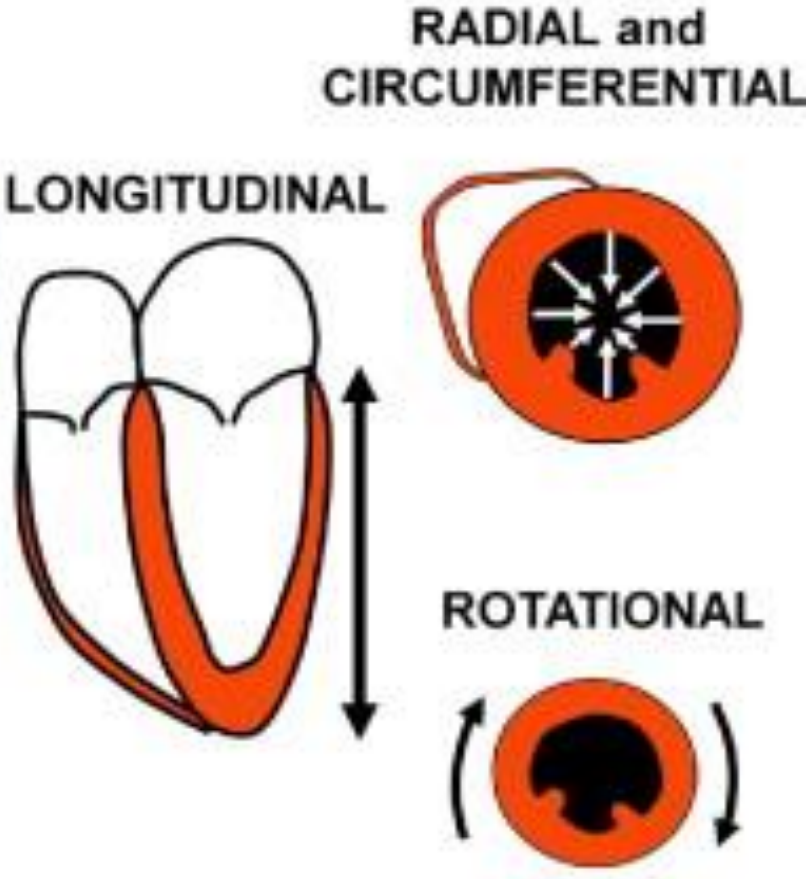


Echo contrast indications

- -Incomplete endocardial visualization
- -Inadequate Doppler signal quality
- -Dimension/volume quantification
- -High pretest probability stress echo
- -Resting WMA stress echo
- -Extreme sensitivity wall motion assessment

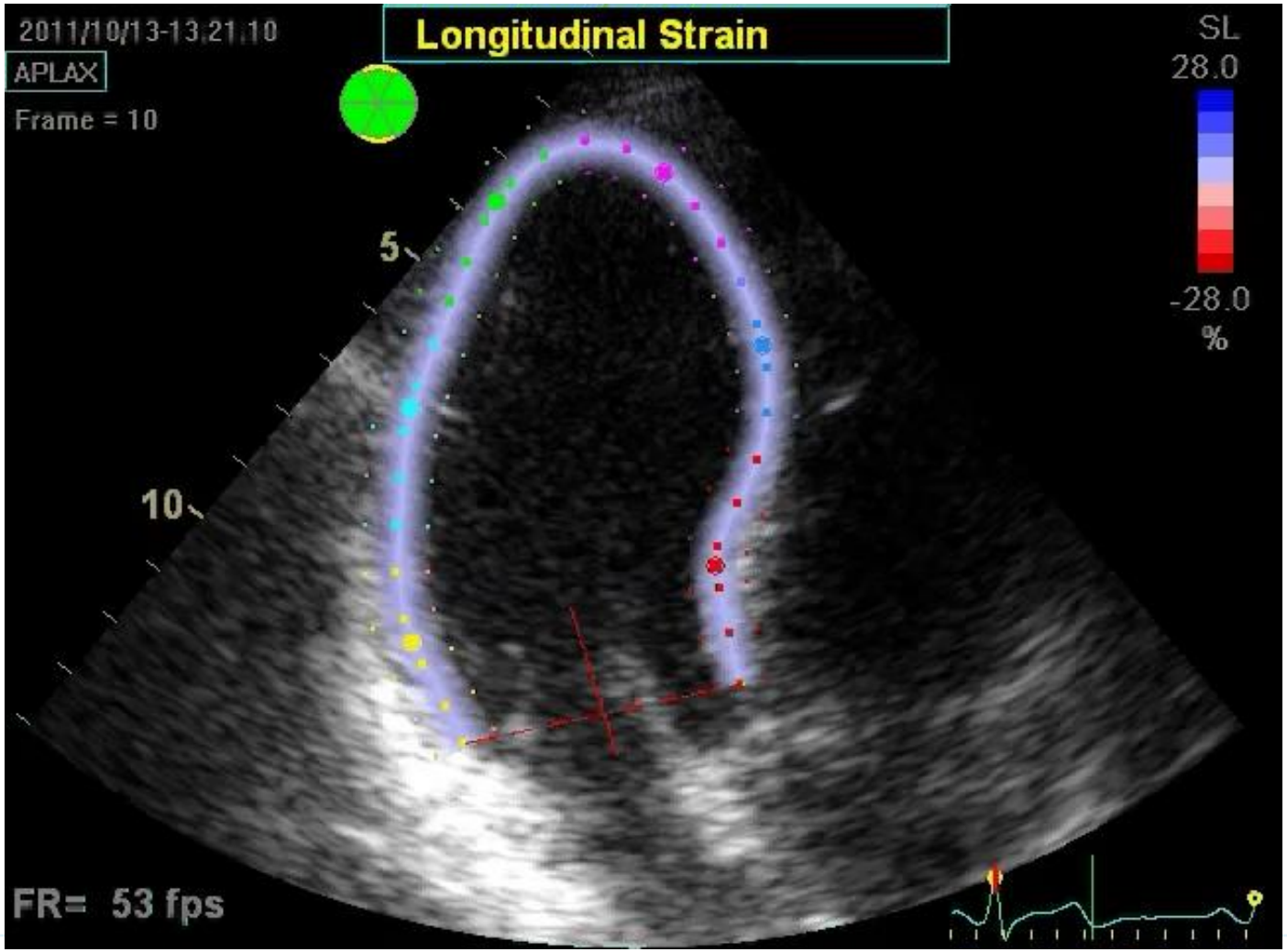


Echocardiographic Strain Imaging

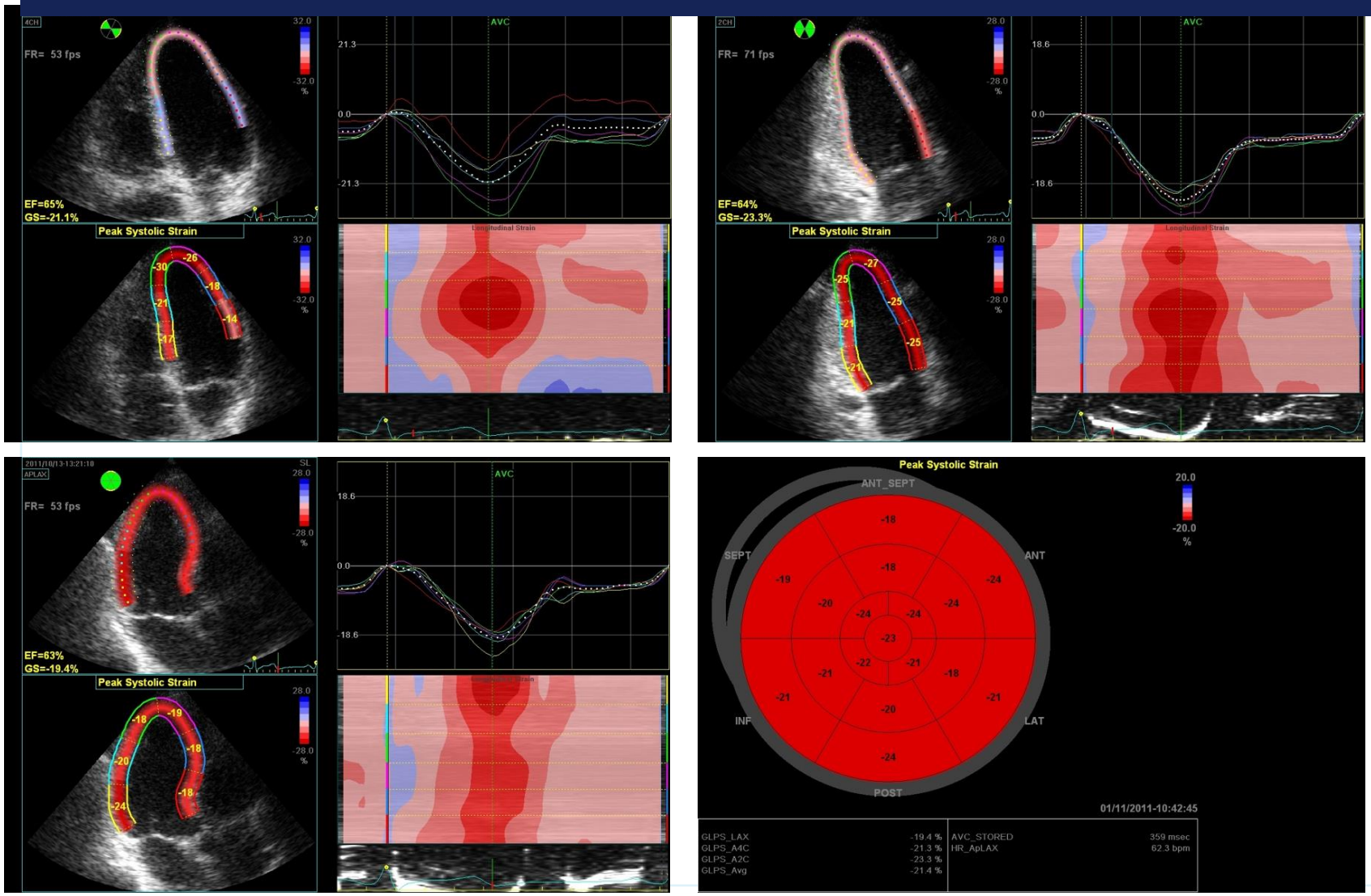


Gorcsan and Tanaka JACC (2011) 58(14): 1401-1413

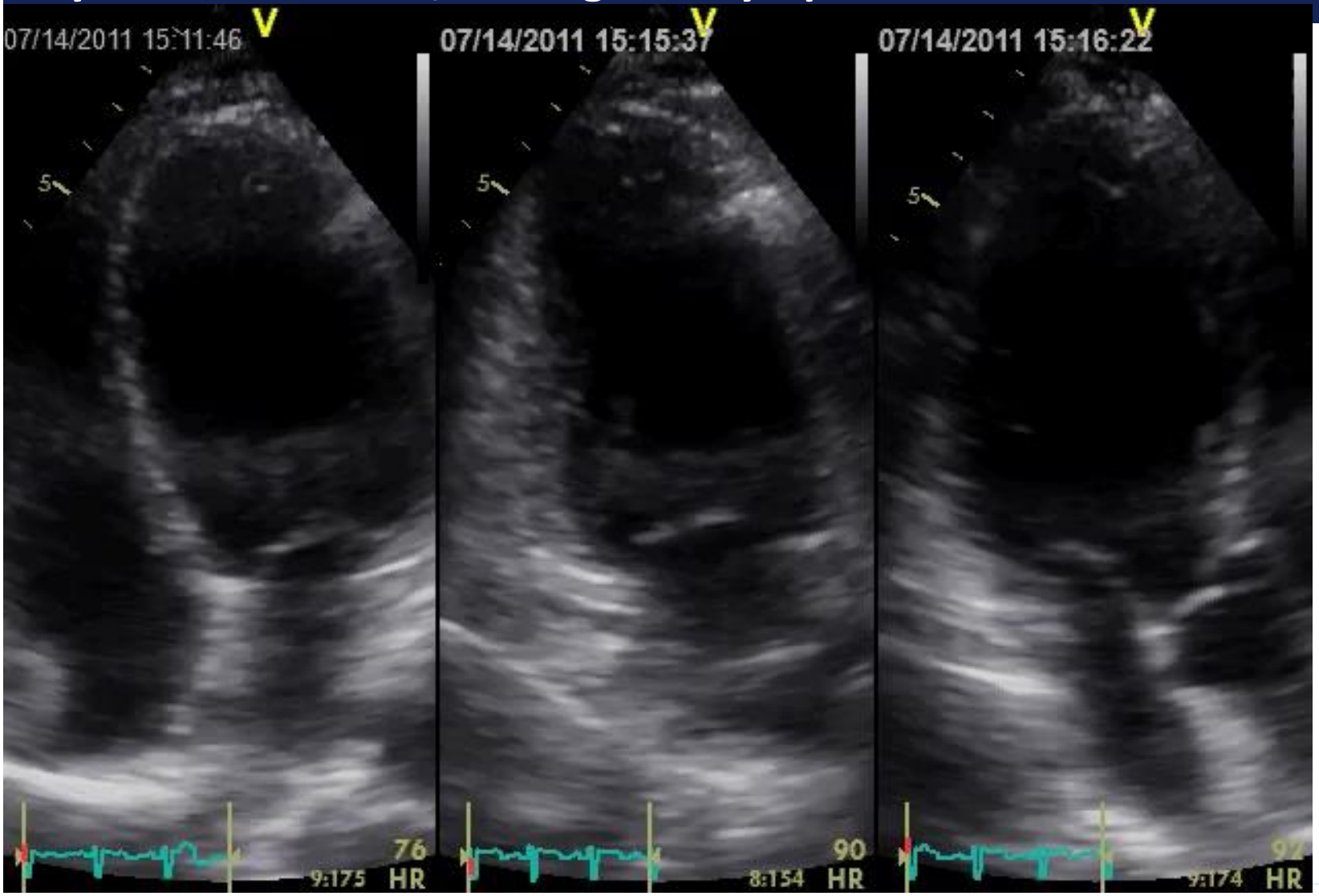
Longitudinal Strain in Motion



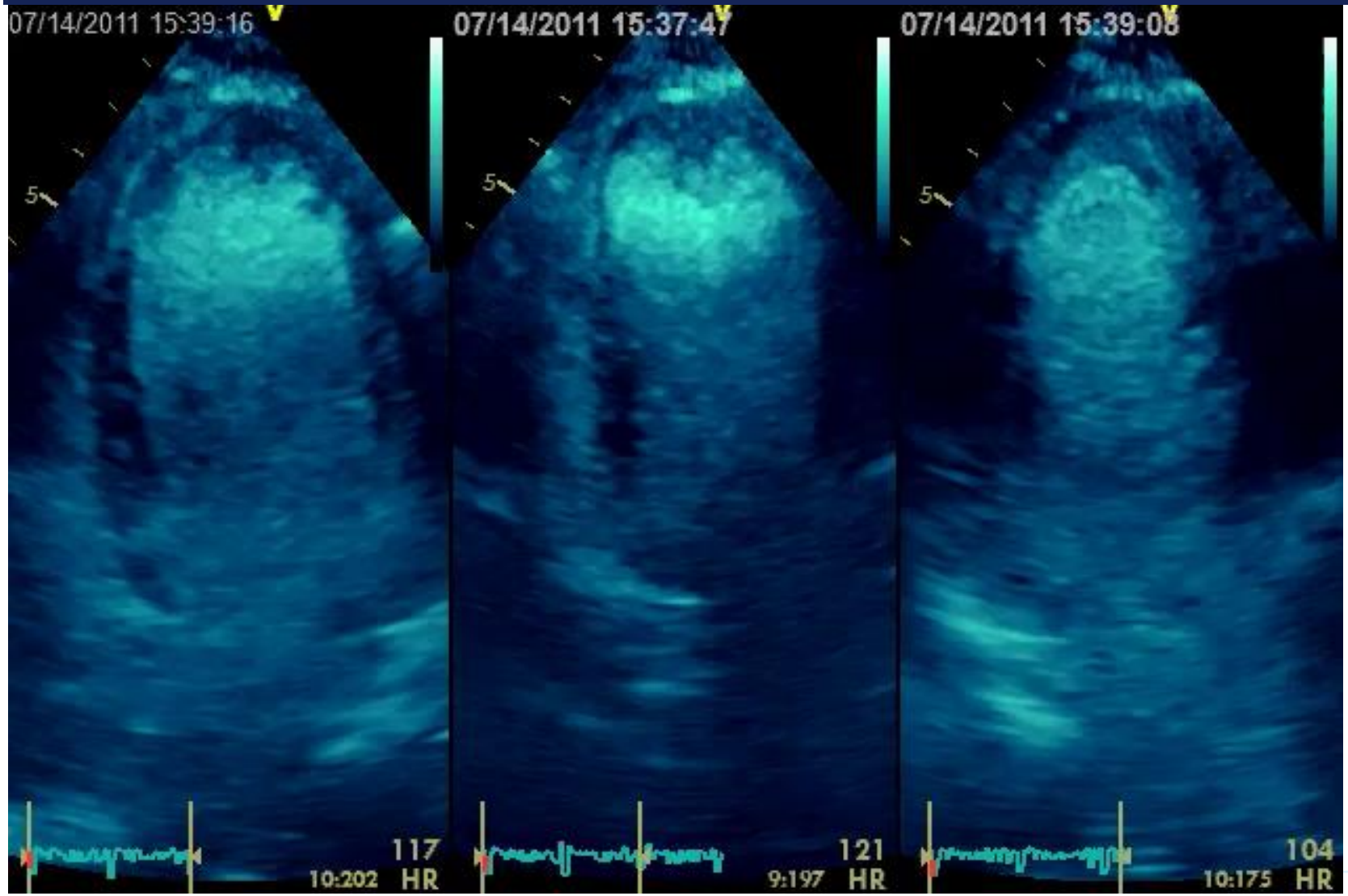
Longitudinal Strain--Composite



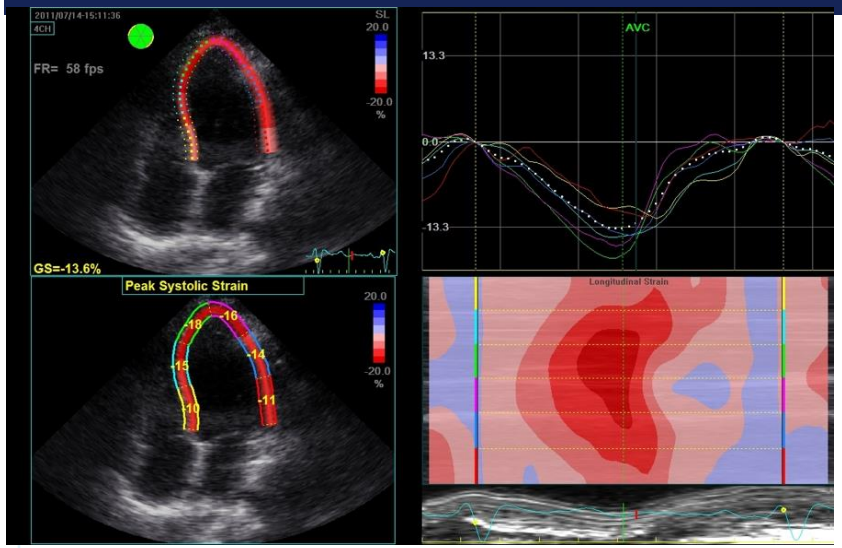
24 yo Female with h/o Hodgkin's Lymphoma

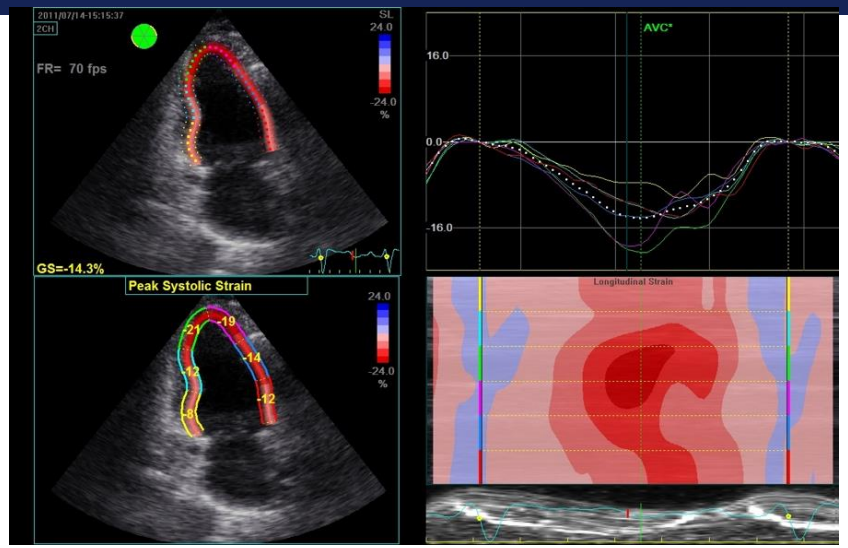


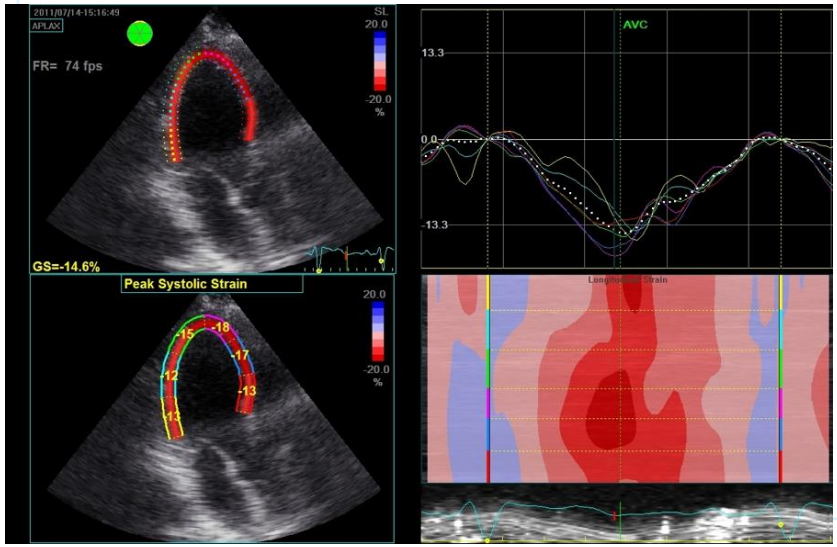
24 year old with h/o Hodgkin's Lymphoma

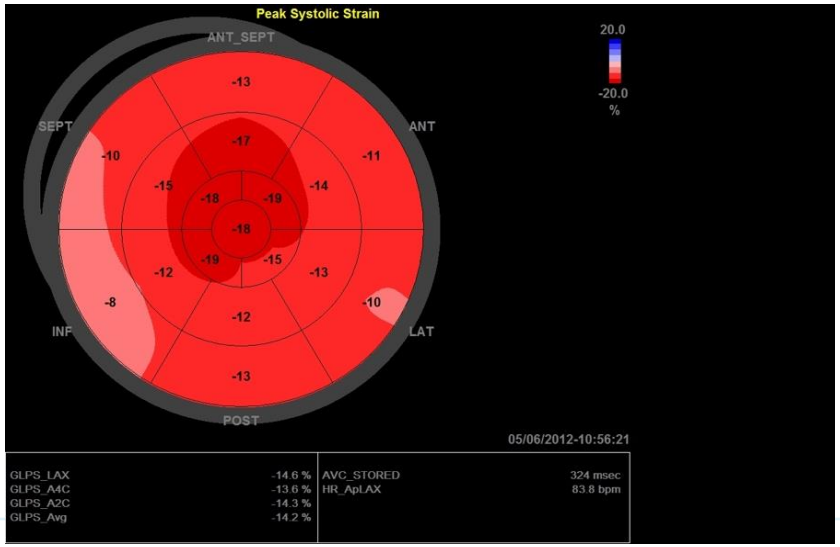


Normal LVEF but abnormal strain

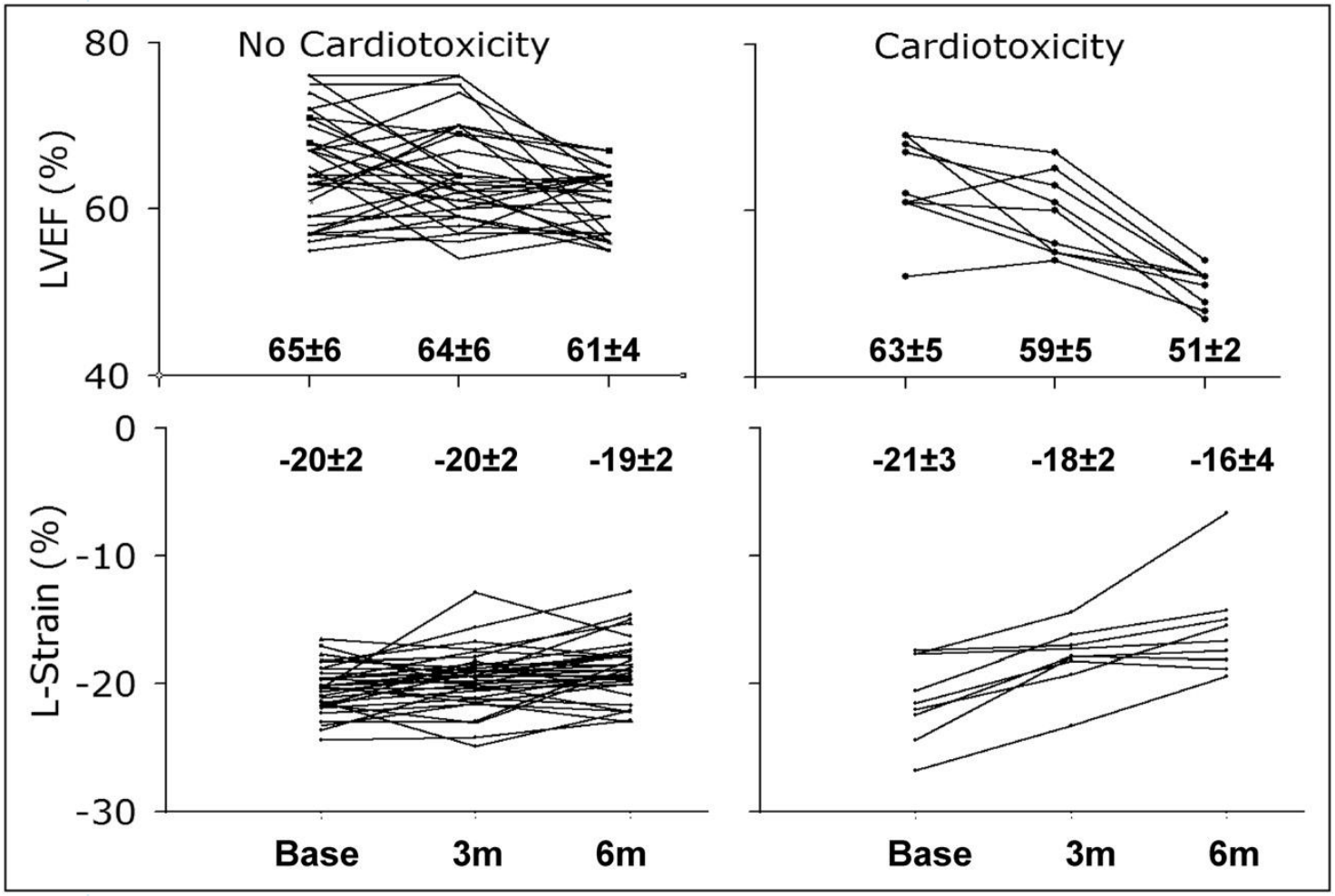








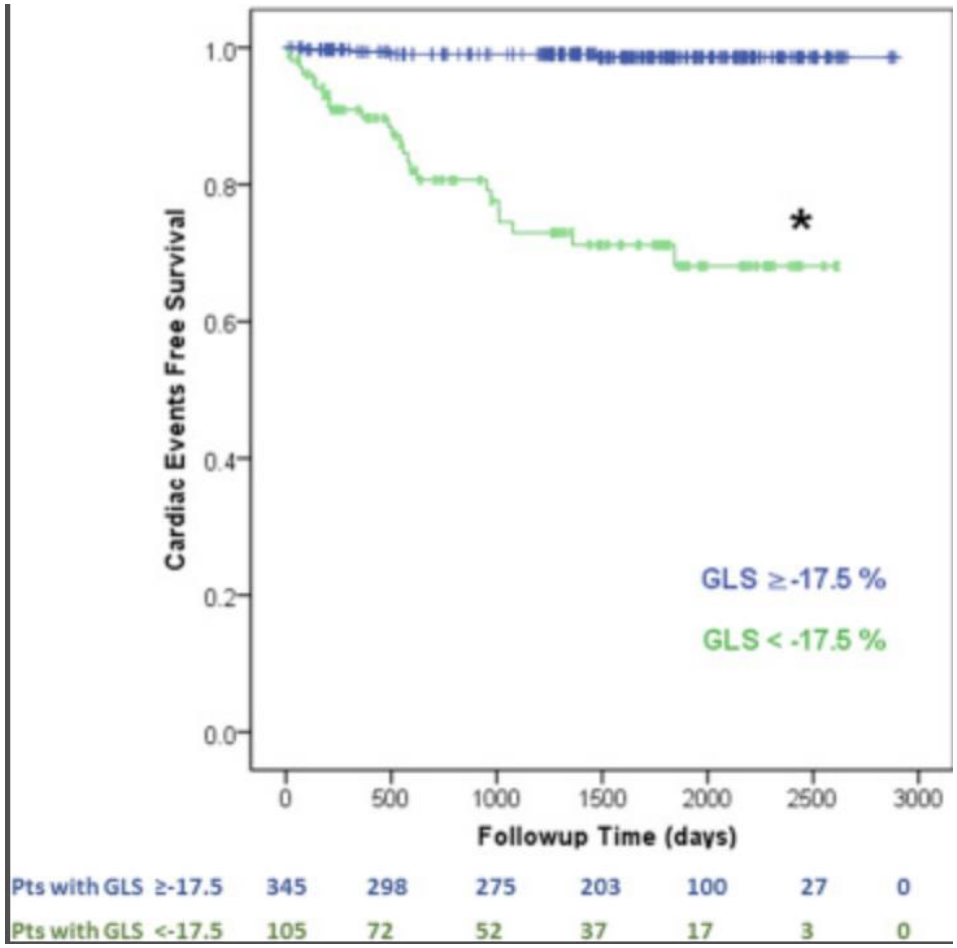
Early Detection and Prediction of Cardiotoxicity in Chemotherapy Treated Patients



- 43 patients with breast cancer
- Treated with anthracycline and trastuzumab
- Drop in Global Longitudinal Strain at 3 months, appears to have predicted toxicity at 6 months.

Sawaya H et al , Am J Cardiol 2011, Volume 107 (9): 1375-1380

Myocardial Strain is Associated with Adverse Clinical Cardiac Events in Patients Treated with Anthracyclines

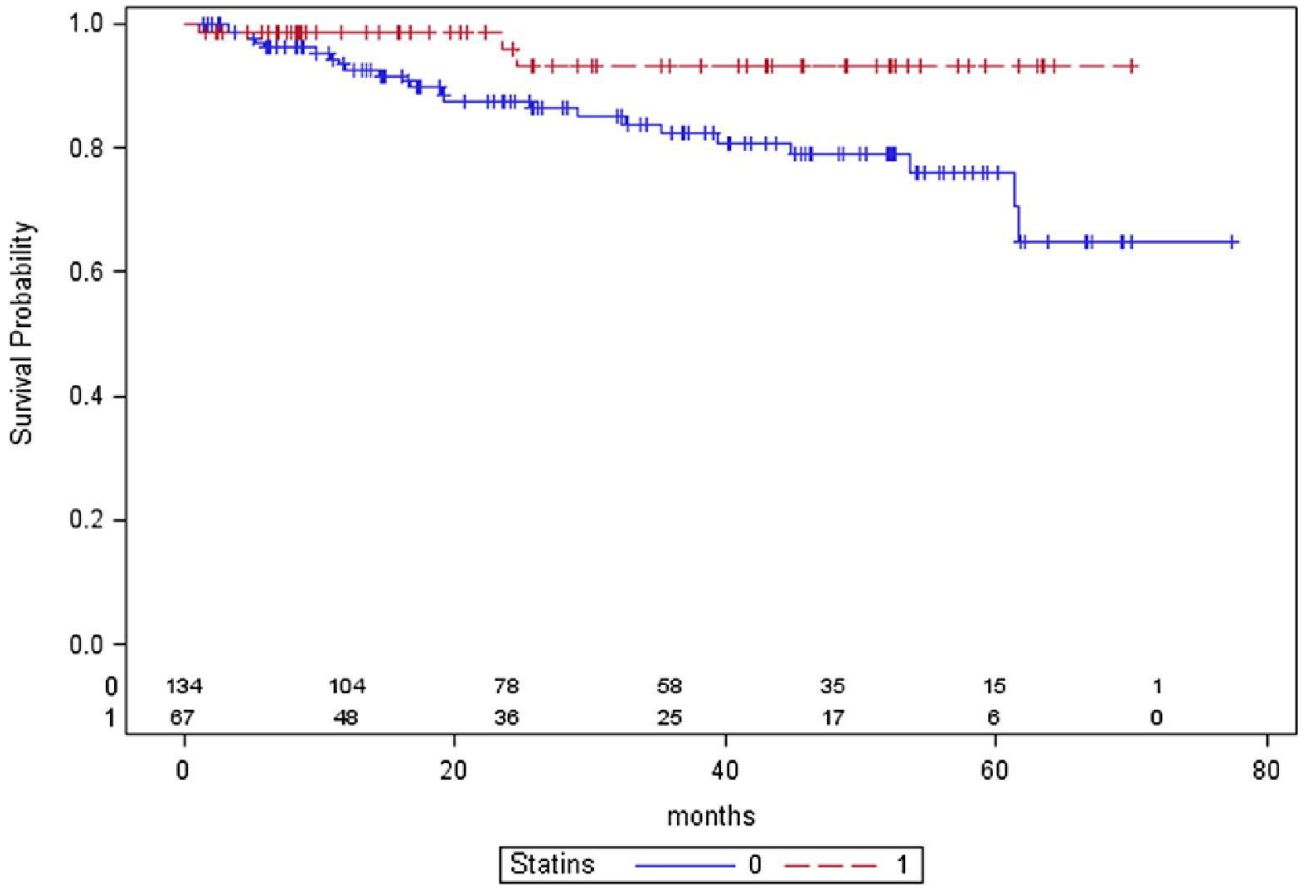


Ali MT, et al,JASE 2016(29) 522-527

Possible Medication Interventions to Prevent Cardiovascular Complications

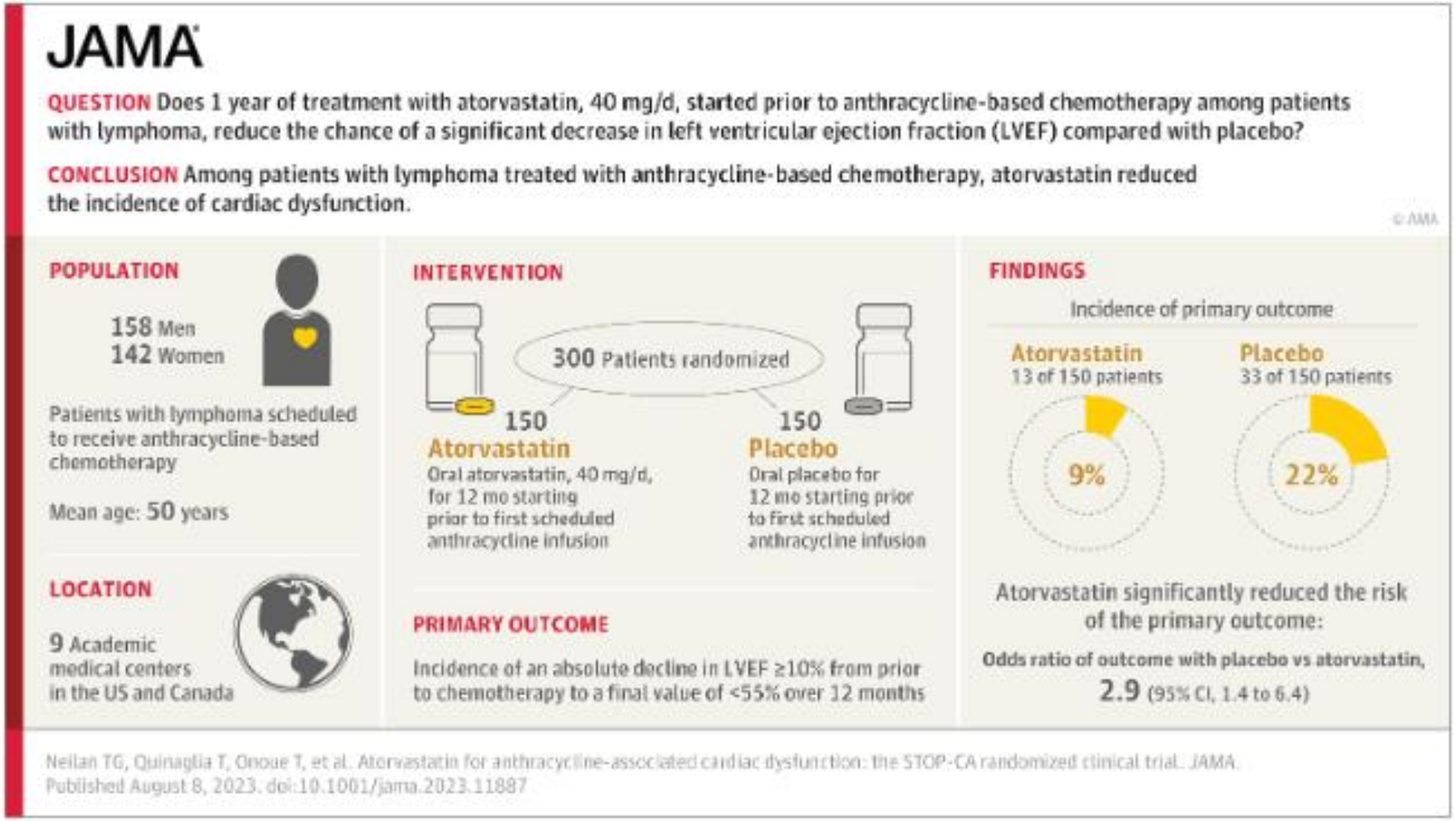
Effect of Statin Therapy on the Risk for Incident Heart Failure in Patients with Breast Cancer Receiving Anthracycline Chemotherapy

An Observational Clinical Cohort Study



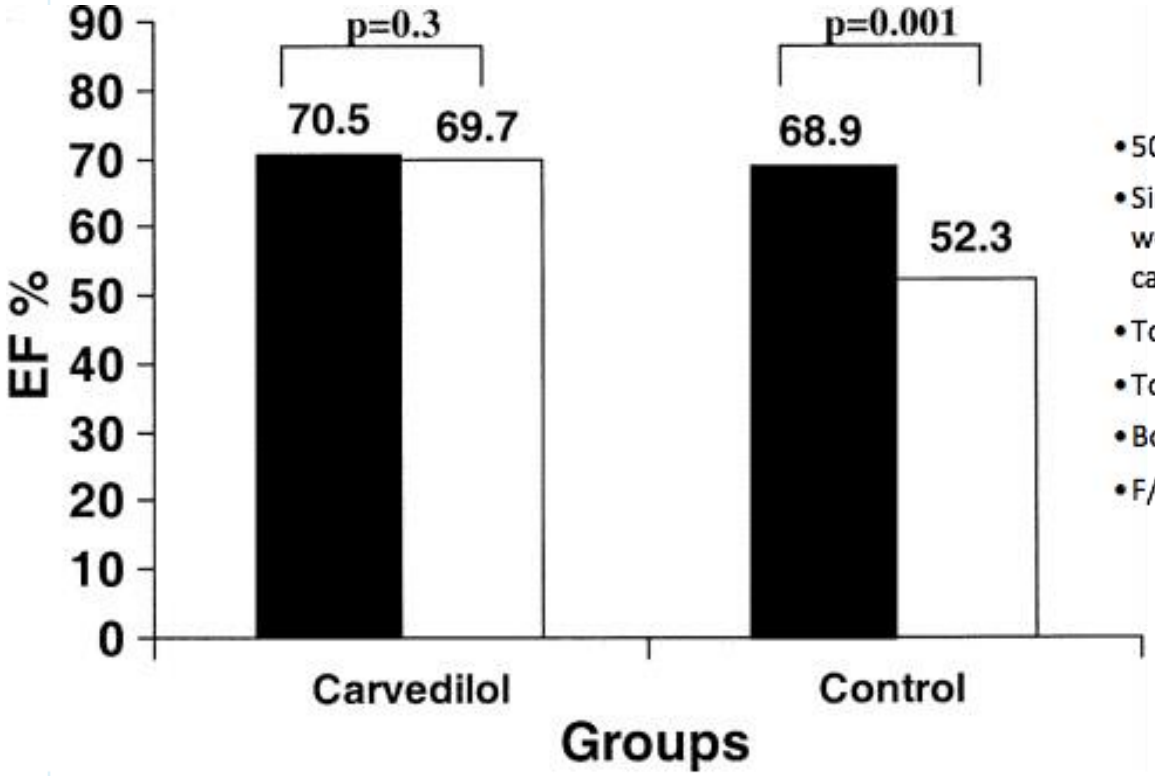
Seicean et al. J Am Coll Cardiol. 2012;60(23):2384-2390.

STOP-CA—Atorvastatin for Anthracycline Associated Cardiac Dysfunction



Neilen, T.G., JAMA. 2023;330(6):528-536. doi:10.1001/jama.2023.11887

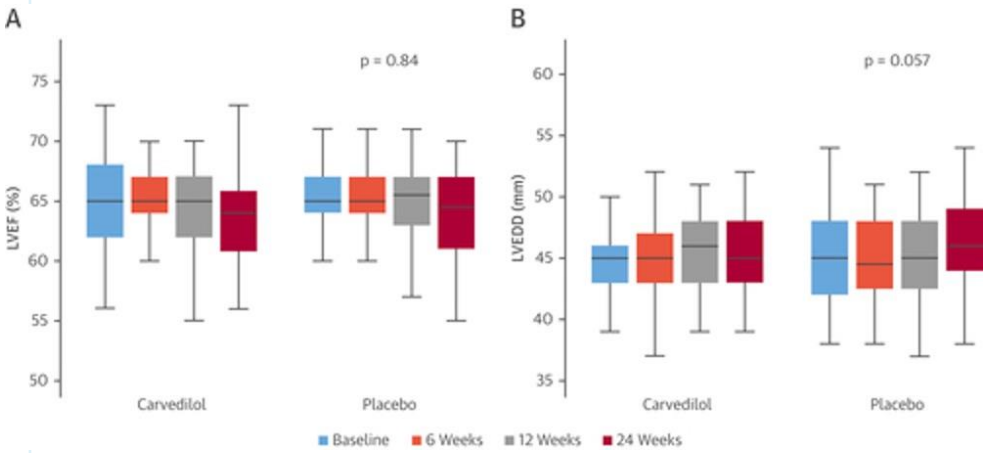
Protective Effects of Carvedilol Against Anthracycline Induced Cardiotoxicity

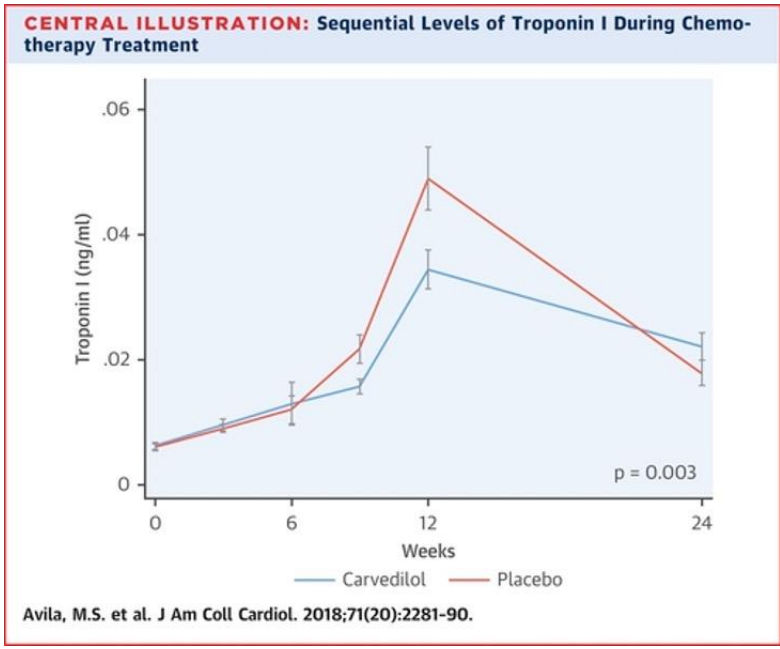


- 50 patients (breast, lymphoma, other)
- Single blind, control trial in which 25 patients were blindedly assigned to 12.5 mg daily carvedilol or placebo
- Total adriamycin dose was ~ 530mg/m2
- Total epirubicin was ~790mg/m2
- Both groups had a total of 6 cycles of CHOP.
- F/u was 6 months after randomization.

Kalay et al. J.A.C.C. (2006) 48; 11: 2258-2262

CECCY Trial: Carvedilol for Prevention of Chemotherapy-Related Cardiotoxicity





Total Adriamycin dose 240 mg/m2

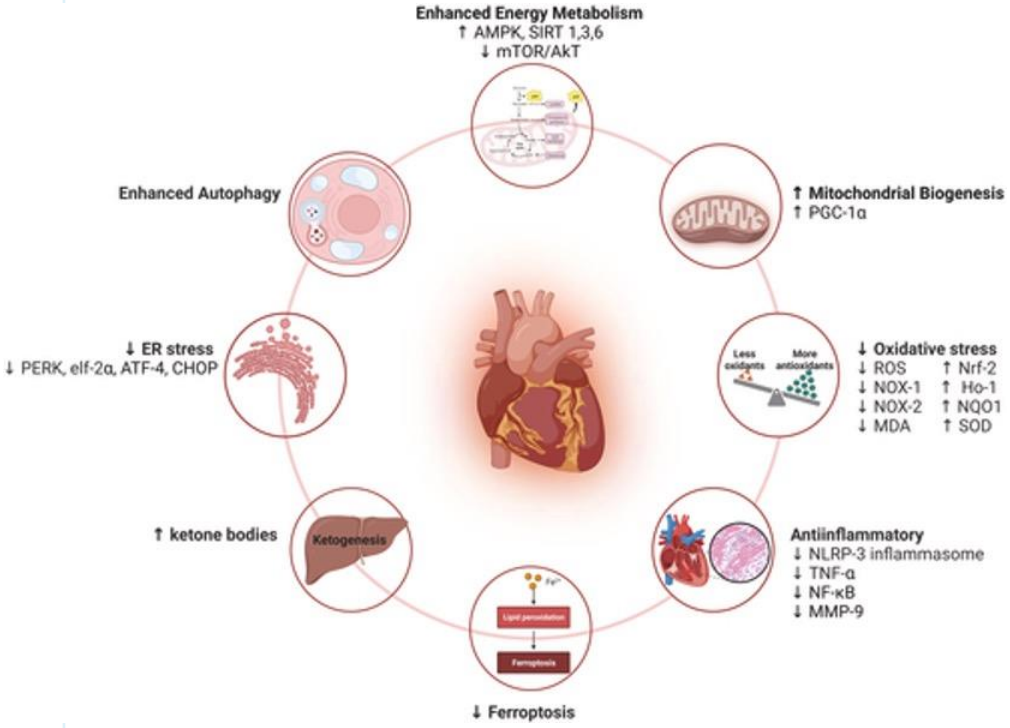
Primary endpoint: LVEF < 10% decrease at 6 months

Secondary endpoint: Effects of carvedilol on troponin I, B-type natriuretic peptide, and diastolic dysfunction.

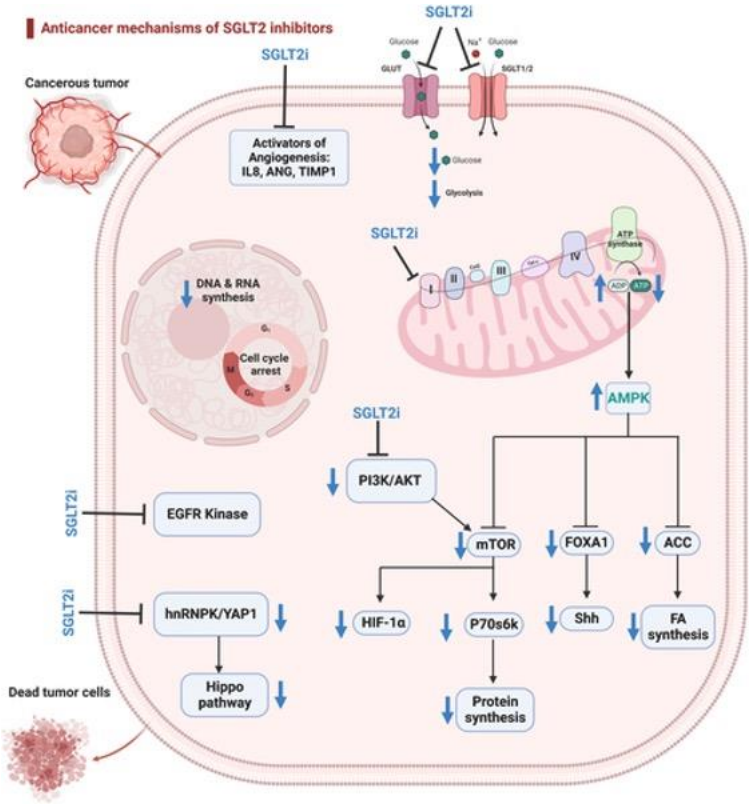
Primary endpoint occurred in 14 patients (14.5%) in the carvedilol group and 13 patients (13.5%) in the placebo group (p = 1.0).
Secondary Endpoint: No differences in changes of LVEF or B-type natriuretic peptide were noted between groups.
A significant difference existed between groups in troponin I levels over time, with lower levels in the carvedilol group (p = 0.003).
Additionally, a lower incidence of diastolic dysfunction was noted in the carvedilol group (p = 0.039)

SGLT2 inhibitors

Cardio-protective



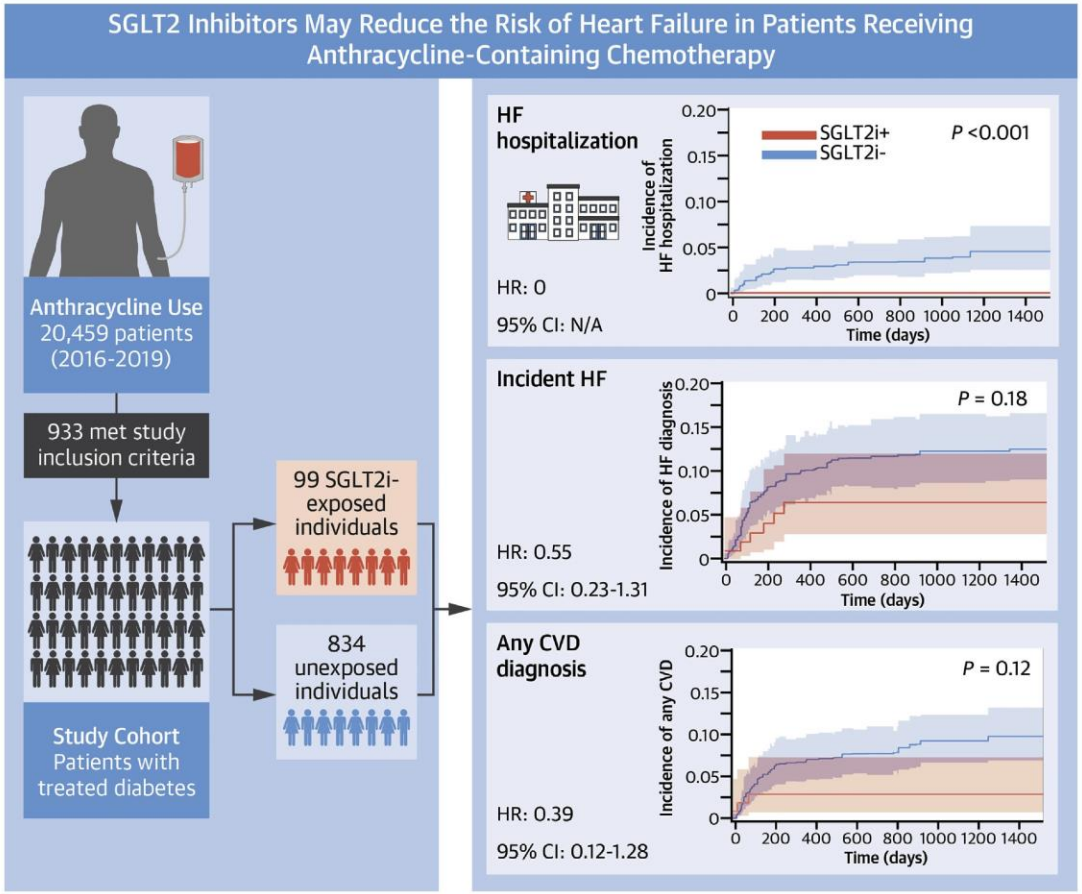
Tumor-Destroying



Mohamed S. Dabour et al. *J Am Coll Cardiol CardioOnc* 2024; 6:159-182

Do SGLT2-I reduce Anthracycline Cardiotoxicity?

CENTRAL ILLUSTRATION: The Association Between Sodium-Glucose Cotransporter 2 Inhibitors and Anthracycline Cardiotoxicity



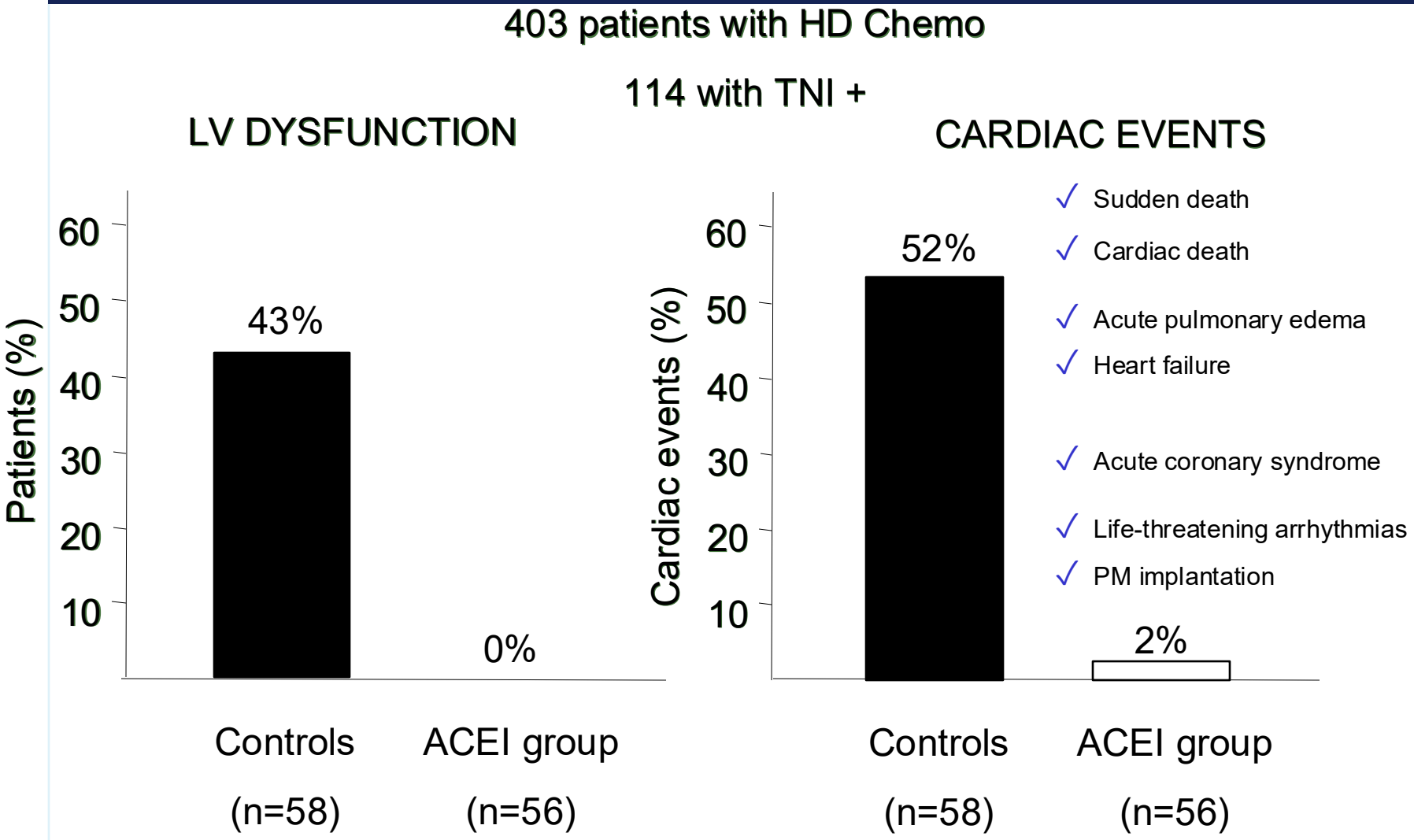
Abdel-Qadir H, et al. J Am Coll Cardiol CardioOnc. 2023;5(3):318-328.

Management Chemotherapy Induced Cardiovascular Toxicity

Enalapril prevents cardiac dysfunction and cardiac events in TNI+ patients

403 patients with HD Chemo

114 with TNI +



Cardinale et al. Circulation 2006

Effects of Sacubitril/Valsartan on Prevention of Cardiotoxicity in High Risk Patients Undergoing Anthracycline Chemotherapy: The SARAH Trial

PRIMARY ENDPOINT

SARAH Trial met the Primary Endpoint

Primary Endpoint	ARNi (n=56)	Placebo (n=56)	OR (95% CI)	P value
GLS decrease >15%, n (%)	4 **(7.1%)**	14 **(25%)**	**0.23** (0.07 to 0.75)	**0.015**

Relative Risk Reduction = 77%

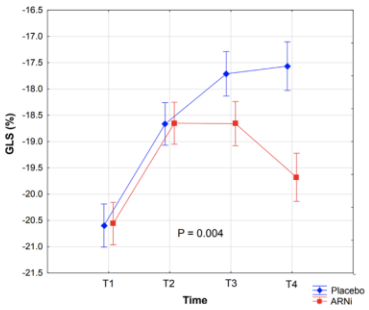
NNT = 5.59

The differences between groups occurred independently of risk factors such as: mean indexed cumulative dose of ANT, HER2 positivity, presence of hypertension and age

SECONDARY ENDPOINT

GLS variation after 24 Weeks

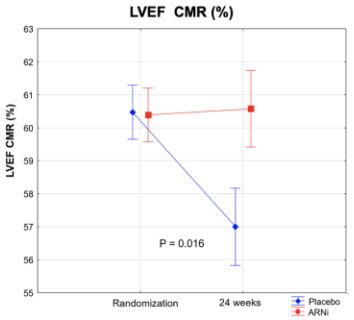
Secondary Endpoints	ARNi (n=56)	Placebo (n=56)	P value
GLS (%)			
End of treatment	-19.5 ± 3.1	-17.6 ± 3.6	0.004
Absolute change	-0.5 (-12.7 to 10.3)	1.5 (-12.2 to 12.7)	<0.001
Percentual change	**Improvement 2.5 %**	**Decline 7.6 %**	**<0.001**



SECONDARY ENDPOINTS

Echo and CMR parameters after 24 Weeks

Secondary Endpoints	ARNi (n=56)	Placebo (n=56)	P value
LVEF decrease >10% with final value <53%			
• **ECHO**, n (%)	4 **(7.1%)**	4 **(7.1%)**	**1**
• **CMR**, n (%)	2 **(3.7%)**	6 **(11.3%)**	**0.161**
LVEF			
• **ECHO** (%)	**64** (42 to 79)	**62** (28.5 to 72)	**0.052**
• **CMR** (%)	**61** (27 to 73)	**58** (23 to 70)	**0.027**
LVEDV (ECHO) (mL)	**83.1** (42 to 160)	**92.4** (47.4 to 182)	**0.026**
LVESV (CMR) (mL)	**43** (19 to 166)	**48** (24 to 190)	**0.036**



Other secondary endpoints, such as variations in Echo or CMR parameters, were similar between groups.

Interventional Cancer Trials in Progress

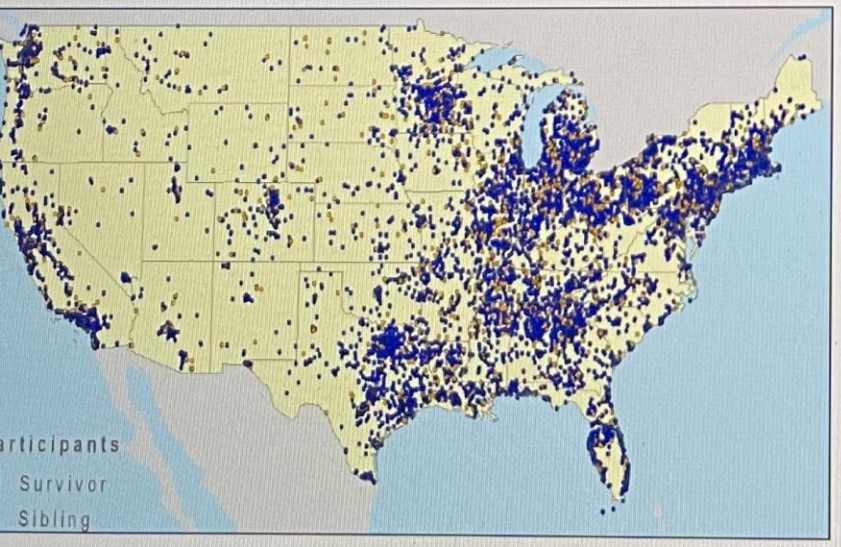
Intervention (study name, estimated study completion)	Study population	Estimated enrollment	Trastuzumab patients included?	Endpoints	Follow-up (months)
Bisoprolol/Ramipril (SAFE Trial, 2023)	Breast cancer	480	Yes	Primary: Change in LVEF Secondary: Not reported	24
Carvedilol (TACTIC Trial, 2024)	Breast cancer	450	Yes	Primary: Rate of asymptomatic and symptomatic cardiac dysfunction, rate of reversible cardiac function decline Secondary: Change in LVEF, genetic variation and risk of cardiotoxicity and response to therapy	24
Lisinopril (PLAID Trial, 2020)	Any cancer type	200	N/A	Primary: Change in GLS/GLS rate Secondary: LVD with HF symptoms	12
Sacubitril/valsartan (PRADA II Trial, 2022)	Breast cancer	300	Yes	Primary: Change in LVEF Secondary: Change in GLS and LVESV	18
Ivabradine (N/A, 2020)	Any cancer type	128	N/A	Primary: Change in GLS Secondary: Incidence of myocardial injury, incidence of LVD, incidence of symptomatic HF	6
Ivabradine (IPAC Trial, 2021)	Any cancer type	160	N/A	Primary: Reduction in GLS Secondary: Composite of mortality and major cardiac outcomes (AMI, HF, IST, arrhythmia), incidence of myocardial injury, incidence of LVD	12
Atorvastatin (SPARE-HF Trial, 2022)	Breast cancer, aggressive lymphoma, leukemia or sarcoma	112	N/A	Primary: Change in LVEF Secondary: Change in LVEDV and LVESV	4
Atorvastatin (STOP-CA Trial, 2022)	Non-Hodgkin's lymphoma	300	N/A	Primary: Change in LVEF Secondary: Incidence of new onset HF	24
Atorvastatin (PREVENT Trial, 2020)	Breast cancer	279	N/A	Primary: Change in LVEF Secondary: Cognitive function, self-reported quality of life	24

Vedeer, JA, et al. Pharmacotherapy, (2021) 41 (12) 1066-180

Cardiovascular Risk Prediction Calculator

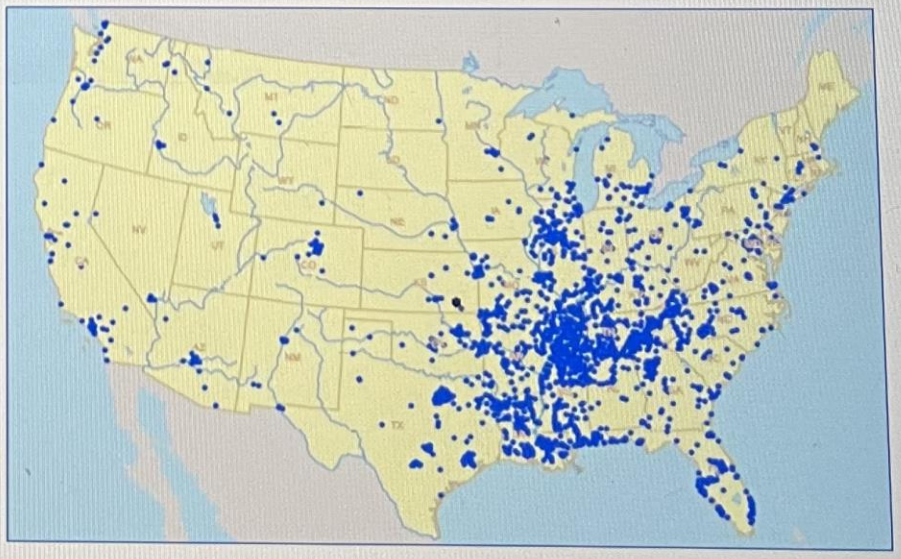
CCSS

Childhood Cancer Survivor Study Cohort
U24 CA55727 (PI: Armstrong)
38,036 Survivors (25,665 participants)



SJLIFE

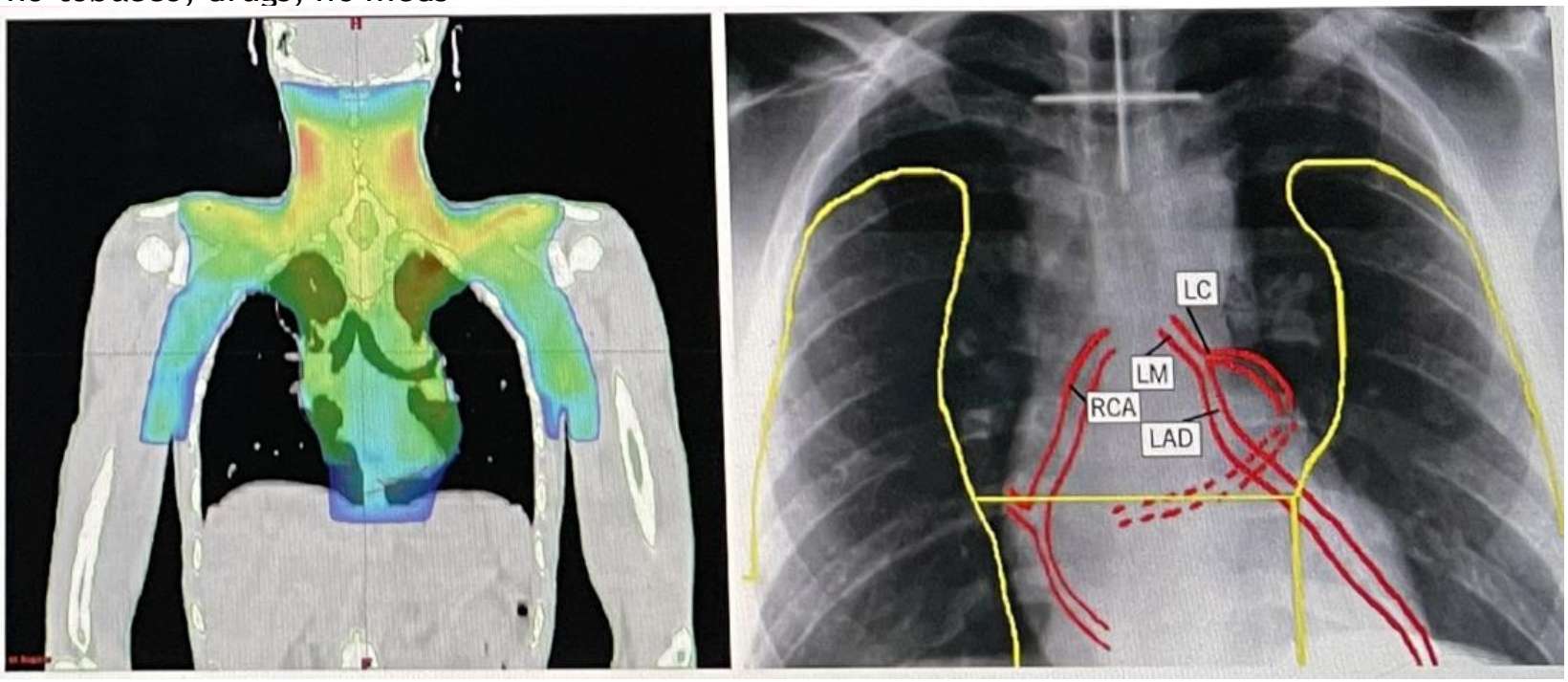
St. Jude Lifetime Cohort
U01 CA195547 (MPI: Hudson/Ness)
10,020 Survivors (6000+ clinically assessed)



from Dr. Stephanie Dixon, St. Jude's Hospital

Case Study

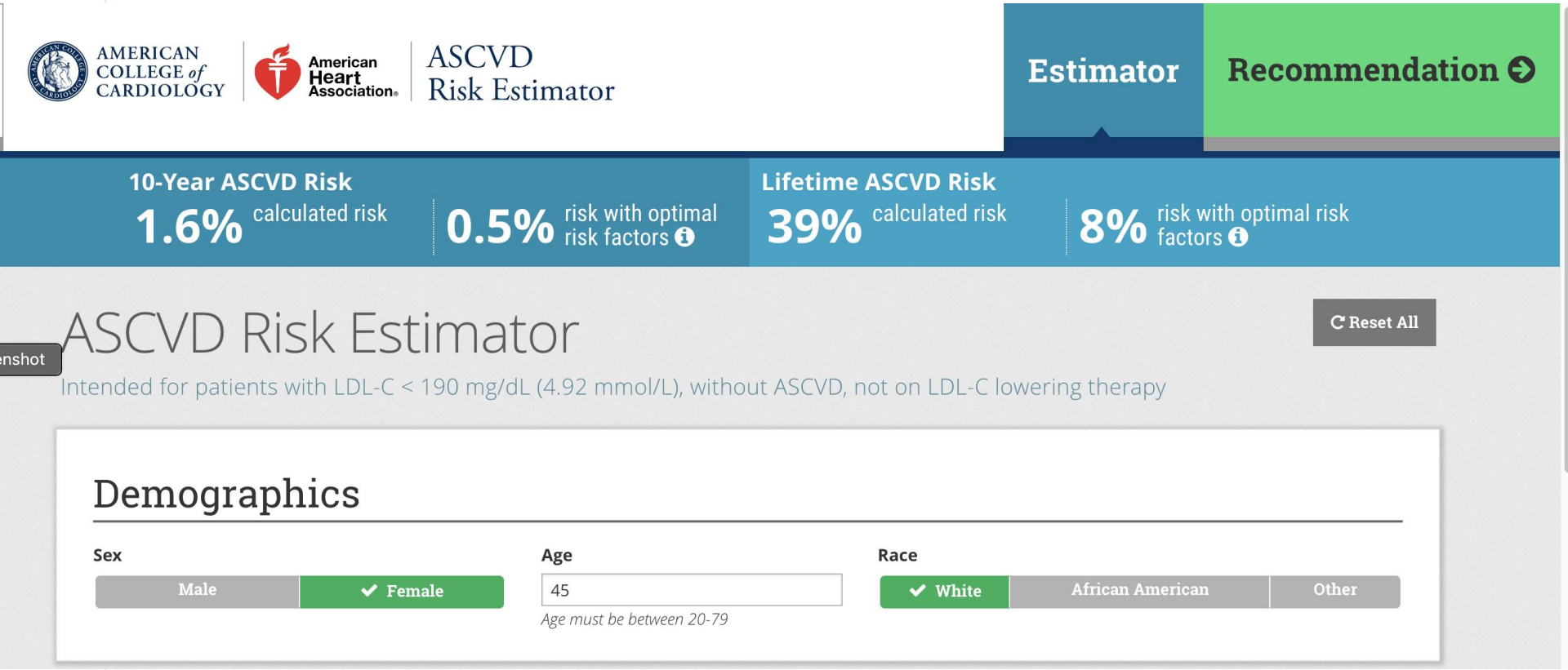
- 45 yo female Hodgkin's doxorubicin (300 mg/m2) followed by 21 Gy mediastinal radiation at age 16
- Total Chol 210, HDL 40, LDL 115, TG 165, HgA1c is 5.5% BMI >30
- no tobacco, drugs, no meds



What do you estimate her 10 year CVD risk to be?

Adapted from Dr. Stephanie Dixon, St. Jude's Hospital

ASCVD Estimator



CCSS Estimator

Using the **Standard Model** for survivors who are 5-years from cancer diagnosis::

- **Risk Group is High**
- The overall risk score is **7**
- The estimated probability of developing Heart Failure by 50 years of age is **12.4%** (95% confidence interval = **9.3-15.6%**)
- The relative risk of developing Heart Failure compared to a non-cancer sibling comparison is **41.5** (95% confidence interval = **22.7-75.9**)
- Data Used For Calculation
  - Gender? **Female**
  - Patient's age at diagnosis? **≥ 15**
  - Were any anthracyclines used? **Yes, cumulative dose known**
  - What was the anthracycline dose? **≥ 250 mg/m^2**
  - Was there radiation to the chest? **Yes, chest radiation dose known**
  - What was the chest radiation dose? **15 - 34 Gy**

Ischemic Heart Disease

Using the **Standard Model** for survivors who are 5-years from cancer diagnosis:

- **Risk Group is Moderate**
- The overall risk score is **2**
- The estimated probability of developing Ischemic Heart Disease by 50 years of age is **11.9%** (10-year probability = **8.6-15.3%**)
- The relative risk of developing Ischemic Heart Disease compared to a non-cancer sibling comparison group is **7.2** (95% confidence interval = **4.7-11.**
- Data Used For Calculation
  - Gender? **Female**
  - Was there radiation to the chest? **Yes, chest radiation dose known**
  - What was the chest radiation dose? **15 - 34 Gy**

https://ccss.stjude.org/resources/calculators/cardiovascular-risk-calculator.html

Prevention of Cancer Treatment Related Cardiovascular Complications

- **Cardiovascular Risk Factor Modification**
  - Healthy Lifestyle—Nutrition—Mediterranean Diet or such—fruits, vegetables, lean meats or fish, protein intake, reduce salt intake.
  - Moderate Intensity Exercise for 30 mins at a time for 4-5 times per week.
  - Know your numbers—blood pressure, lipids (cholesterol), blood glucose (sugar)
  - Optimizing baseline inflammation--Inflammation increases the likelihood of plaque build-up in the arteries
    - -The level of CRP predicts cardiovascular risk independently of other risk factors
    - -High levels of CRP (greater than 3 mg/L) predict cardiovascular risk in women better than high levels of LDL cholesterol
    - -Studies are underway to see if lowering CRP reduces cardiac risk
- Tobacco Cessation
- Moderate alcohol intake
- Optimize medical treatment of hypertension and high cholesterol when lifestyle changes are not sufficient.

Questions?

Jefferson Health

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

JEFFERSON 200