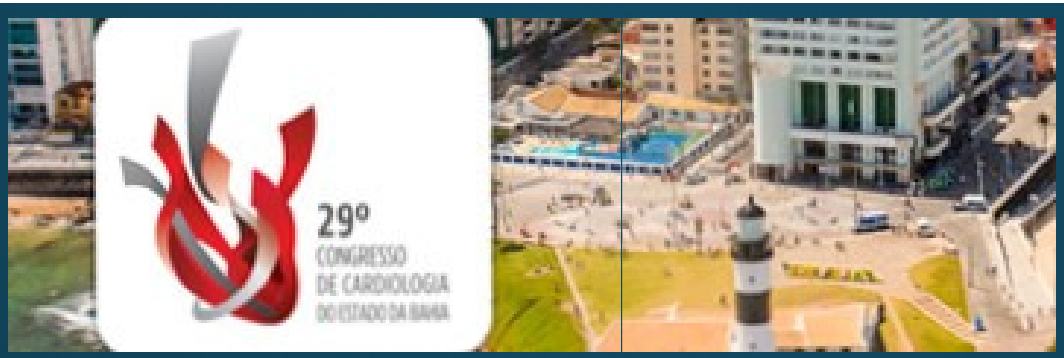


Tratamento da disfunção ventricular esquerda por quimioterápicos - como e até quando?

Israel Reis

Cardiologista/Ecocardiografista - SBC/AMB/DIC

Cardiologista do Ambulatório de Cardio-oncologia do GECON/Santa Casa de Misericórdia de FSA

Sem conflitos de interesse

Doxorubicin-Induced Congestive Heart Failure in Adults

MOHAMED M. HAQ, MD, SEWA S. LEGHA, MD,* JANAK CHOKSI, MD, GABRIEL N. HORTOBAGYI, MD
ROBERT S. BENJAMIN, MD, MICHAEL EWER, MD, AND MOHAMED ALI, MD

The prognosis of doxorubicin-induced congestive heart failure (CHF) is reported to be poor. To define the clinical course of doxorubicin-induced CHF, the authors reviewed their experience with 43 patients with this diagnosis. The median age of the total group was 55 years (range, 23–69); the median cumulative dose of doxorubicin was 450 mg/m^2 (range, 200 mg/m^2–1150 mg/m^2). A majority of the patients had a diagnosis of breast cancer. The median survival of the whole group estimated by means of a Kaplan-Meier plot was 112 weeks. Twelve of 43 patients (28%) died of CHF, 7 of them (16%) because of fulminant failure in less than 8 weeks and the remaining 5 because of a more protracted course with recurrent episodes of cardiac decompensation. Twenty-five of the 43 patients (58%) achieved complete control of CHF. In the remaining 6 patients (14%), CHF had improved but was not completely controlled at the time of death, which was secondary to progressive tumor. Treatment consisted of standard therapy with digitalis and diuretics. Survival was significantly shorter in patients who presented with class IV dyspnea and in those who developed CHF less than 4 weeks after administration of the last dose of doxorubicin. The authors conclude that in a majority of patients, doxorubicin-induced CHF is easily treatable and frequently controlled with digitalis and diuretics.

***Cancer* 56:1361–1365, 1985.**

ble 3. Guideline Recommendations for Cardiac Monitoring

ideline	Year	Recommendation	Level of Evide
rdiology			
American College of Cardiology/ American Heart Association Management of Heart Failure[49]	2013	The incidence and reversibility of chemotherapy-related cardiotoxicity are not well documented, and meaningful interventions to prevent injury have not yet been elucidated	Not stated
European Society of Cardiology[50]	2012	Pre- and postevaluation of EF is essential in patients receiving cardiotoxic chemotherapy Patients developing LVSD should not receive further chemotherapy and should receive standard treatment for HFrEF	Not stated
American Society of Echocardiography[52]	2003	Baseline and re-evaluation examinations in patients receiving cardiotoxic chemotherapeutic agents	Class I
cology			
Canadian Trastuzumab Working Group[43]	2008	Cardiac imaging (echo or MUGA) at baseline and 3-mo intervals until completion of therapy at minimum with more frequent/stringent monitoring for higher risk patients	Not stated
American Society of Clinical Oncology: Cardiac and Pulmonary Late Effects[1]	2007	The optimal duration, frequency, and method of cardiac monitoring during trastuzumab and anthracycline treatment remains unknown	Not stated
sition statements			
American Society of Echocardiography/European Association of Cardiovascular Imaging: Multimodality Imaging Evaluation[36]	2014	Treatment with anthracycline⟶baseline LVEF assessment with 3D or 2D Echo, GLS, and troponin I measurement. If abnormal, cardiology consultation. Follow-up at completion of therapy and 6 mo later for doses <240 mg/m² -Treatment with trastuzumab⟶baseline LVEF assessment with 3D or 2D Echo, GLS, and TROPONIN I measurement. If abnormal, cardiology consultation. Follow-up every 3 and 6 mo later.	Not stated
ESMO Clinical Practice Guidelines[37]	2012	In patients receiving anthracyclines±trastuzumab⟶serial monitoring of cardiac function at baseline, 3, 6, and 9 mo during treatment, 12 and 18 mo after start of treatment	Level I, Grade A
		In patients with metastatic disease⟶monitor EF at baseline and infrequently in absence of symptoms	Level II, Grade A
		Measurement of troponin, BNP at baseline, and periodically during therapy	Level III, Grade
		Cardiac function assessment 4–10 y after anthracycline in patients treated at <15 yoa or >15 with cumulative dose doxorubicin >240 mg/m²	Level II, Grade B
		LVEF drop <50% during anthracycline-containing ⟶reassess in 3 wk. If confirmed, hold chemotherapy and consider therapy for LVSD	Level II, Grade B
		LVEF drop <50% during trastuzumab therapy⟶reassess in 3 wk. If confirmed, continue trastuzumab and consider therapy for LVSD	Level II, Grade B
Heart Failure Association of the European Society of Cardiology: Cardiovascular Side Effects of Cancer Therapies[48]	2011	Regular cardiovascular evaluation should be part of routine care in patients receiving treatment regimens known to be associated with cardiotoxicity Follow-up beyond completion of therapy should be considered, particularly in those receiving high doses of anthracyclines Use of troponin and BNP should be strongly considered	Not stated

sition Paper
cancer treatments
d cardiovascular toxicity
veloped under the auspices
the ESC Committee
Practice Guidelines

rt Journal doi:10.1093/eurheartj/ehw211 - EHJ 2016;37:2768-2801

EUROPEAN SOCIETY OF CARDIOLOGY®

I Diretriz Brasileira de Cardio-Oncologia da Sociedade Brasileira de Cardiologia

Realização

Grupo de Estudos em Insuficiência Cardíaca da Sociedade Brasileira de Cardiologia (GEIC/SBC)

Sociedade Brasileira de Oncologia Clínica

Instituto do Coração – Faculdade de Medicina da Universidade de São Paulo

Instituto do Câncer do Estado de São Paulo – Faculdade de Medicina da Universidade de São Paulo

Esta diretriz deverá ser citada como: Kalil Filho R, Hajjar LA, Bacal F, Hoff PM, Diz M del P, Galas FRB
I Diretriz Brasileira de Cardio-Oncologia da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol 2011; 96(2

I Diretriz Brasileira de Cardio-Oncologia Pediátrica da Sociedade Brasileira de Cardiologia

Realização

Sociedade Brasileira de Oncologia Pediátrica (SOBOPE) e Departamento de Cardiopatias Congênitas e Cardiologia Pediátrica da Sociedade Brasileira de Cardiologia

Santos M.V.C., Paiva M.G., Macedo C.R.D.P., Petrilli A.S., Azeka E., Jatene I.B. et al. I Diretriz Brasileira de Cardio-Oncologia Pediátrica da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol. 2013; 100(5Supl.1): 1-68

Manifestações clínicas de cardiotoxicidade

- Insuficiência cardíaca
- Arritmias ventriculares e supraventriculares
- Isquemia miocárdica com ou sem supra de ST
- Disfunção ventricular esquerda assintomática
- Hipertensão arterial sistêmica
- Doença pericárdica
- Eventos tromboembólicos

Kalil Filho R et al. I Diretriz Brasileira de Cardio-Oncologia da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol 2011; supl.1): 1-52.

Cardiotoxicidade

Definição de cardiotoxicidade (segundo o NIH):

- – Grau I: redução assintomática da FE VE entre 10-20%
- – Grau II: redução da FE VE > 20% ou abaixo do normal
- – Grau III: insuficiência cardíaca sintomática

Kalil Filho R et al. I Diretriz Brasileira de Cardio-Oncologia da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol 2011; 9 supl.1): 1-52.

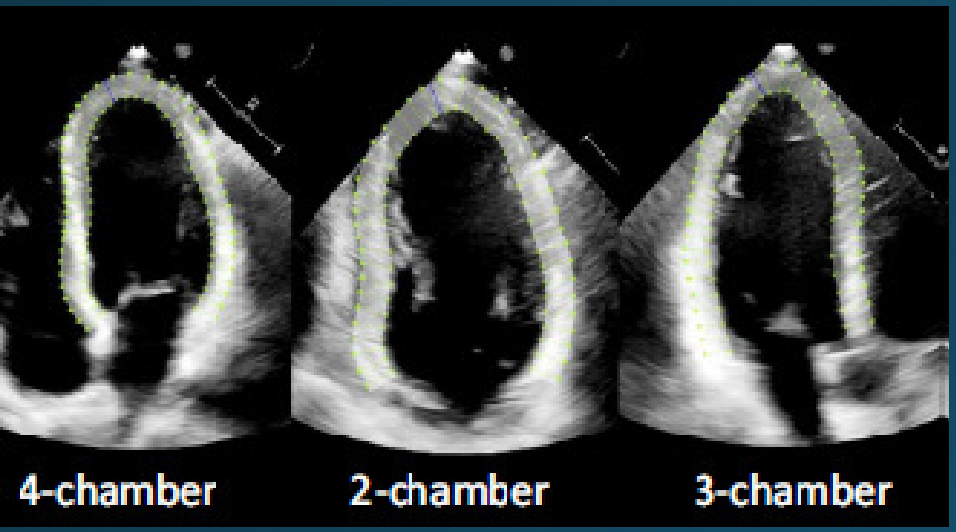
FRAÇÃO DE EJEÇÃO !

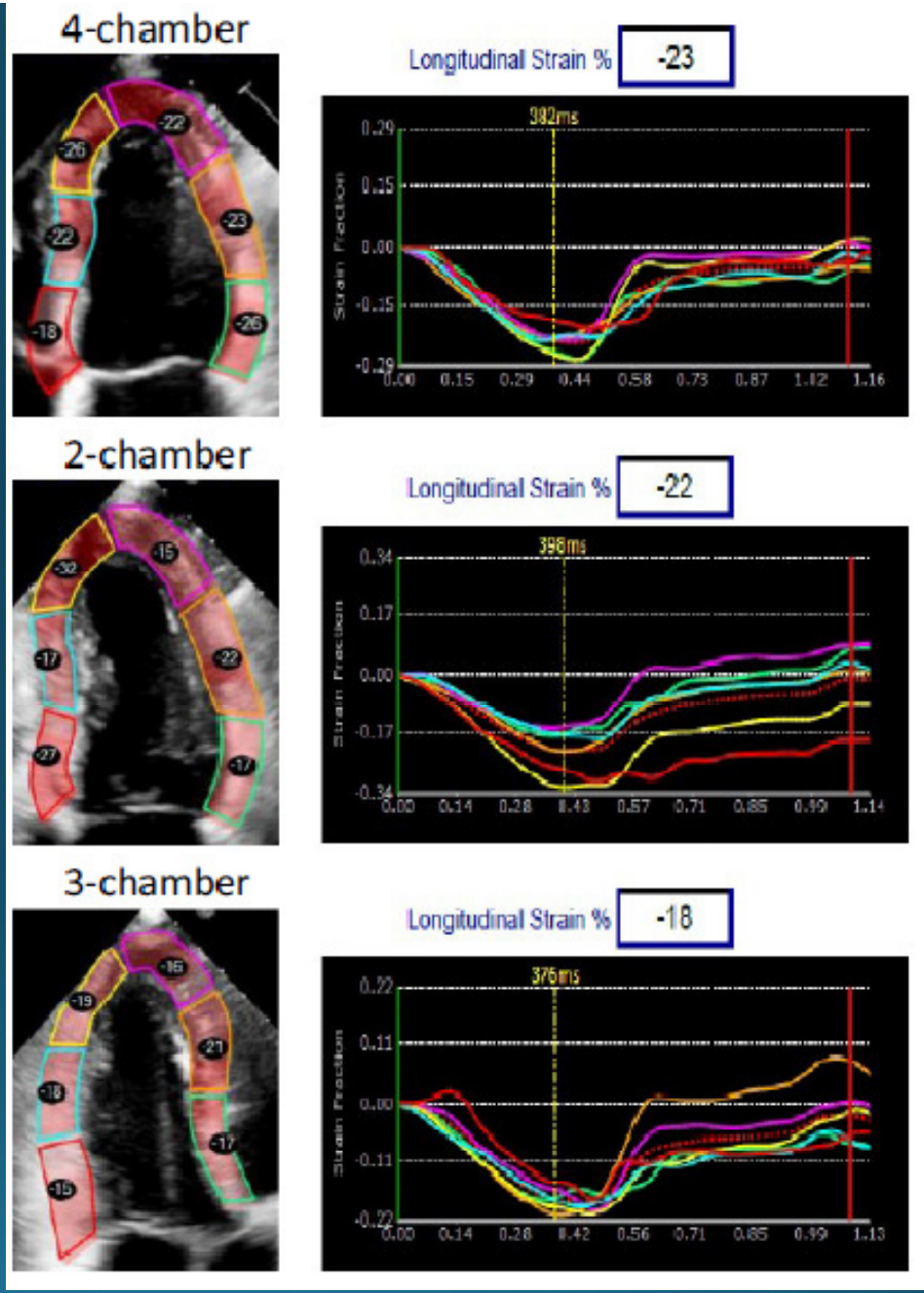
WILEY Echocardiography

Reproducibility and experience dependence of echocardiographic indices of left ventricular function: Side-by-side comparison of global longitudinal strain and ejection fraction

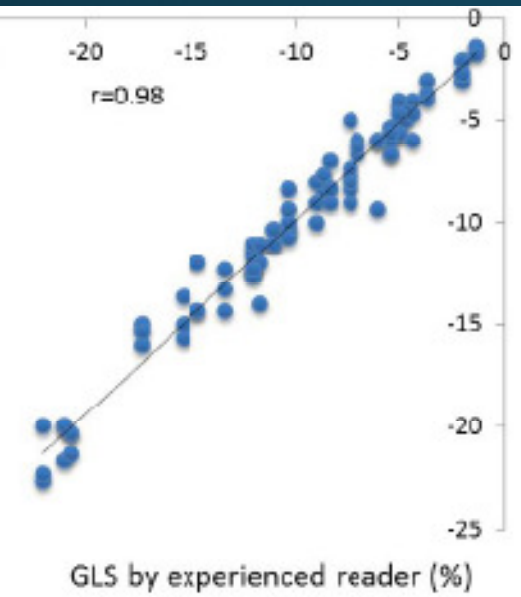
Diego Medvedofsky MD | Kalie Kebed MD | Luke Laffin MD | Jeremy Stone MD | Karima Addetia MD | Roberto M. Lang MD | Victor Mor-Avi PhD

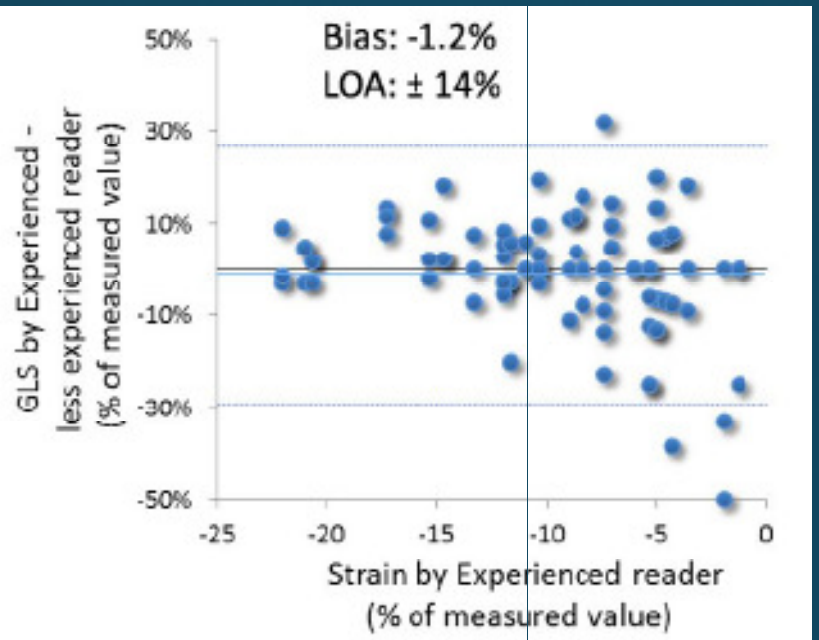
Echocardiography 2017; 34: 365–370

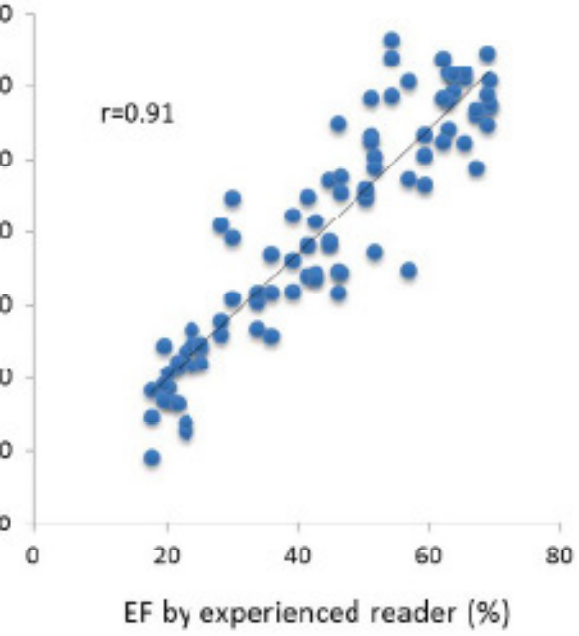




Echocardiography 2017; 34: 365–







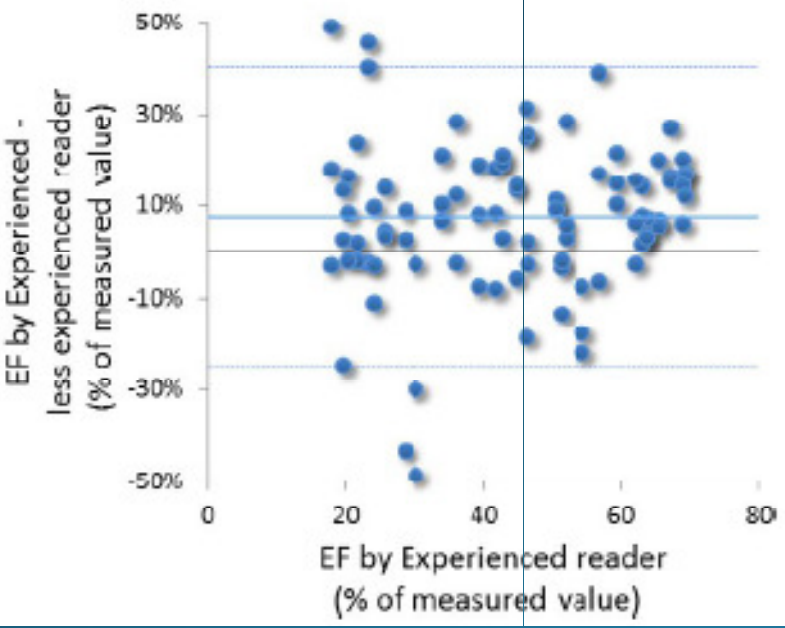


TABLE 2 Comparison of the experienced to the less experi readers (N=30)

	EF (%)	GLS
Experienced reader	44±17	−9.
Less experienced readers	41±16	−9.
Correlation	.91	.9
Bias (mean, mL)±SD	−3.5±6.7	−0.
Standardized bias (% mean)±SD	−7.3±16	−1.

EF=ejection fraction; GLS=global longitudinal strain.

TABLE 3 Reproducibility of EF and GLS parameters (N=30

	EF
Intra-observer	
% variability	12±6
ICC	.95
Inter-observer	
% variability	14±12
ICC	.89

ICC=intraclass correlation; EF=ejection fraction; GLS=global long strain.

EXPERT CONSENSUS STATEMENT

Expert Consensus for Multimodality Imaging Evaluation of Adult Patients during and after Cancer Therapy: A Report from the American Society of Echocardiography and the European Association of Cardiovascular Imaging

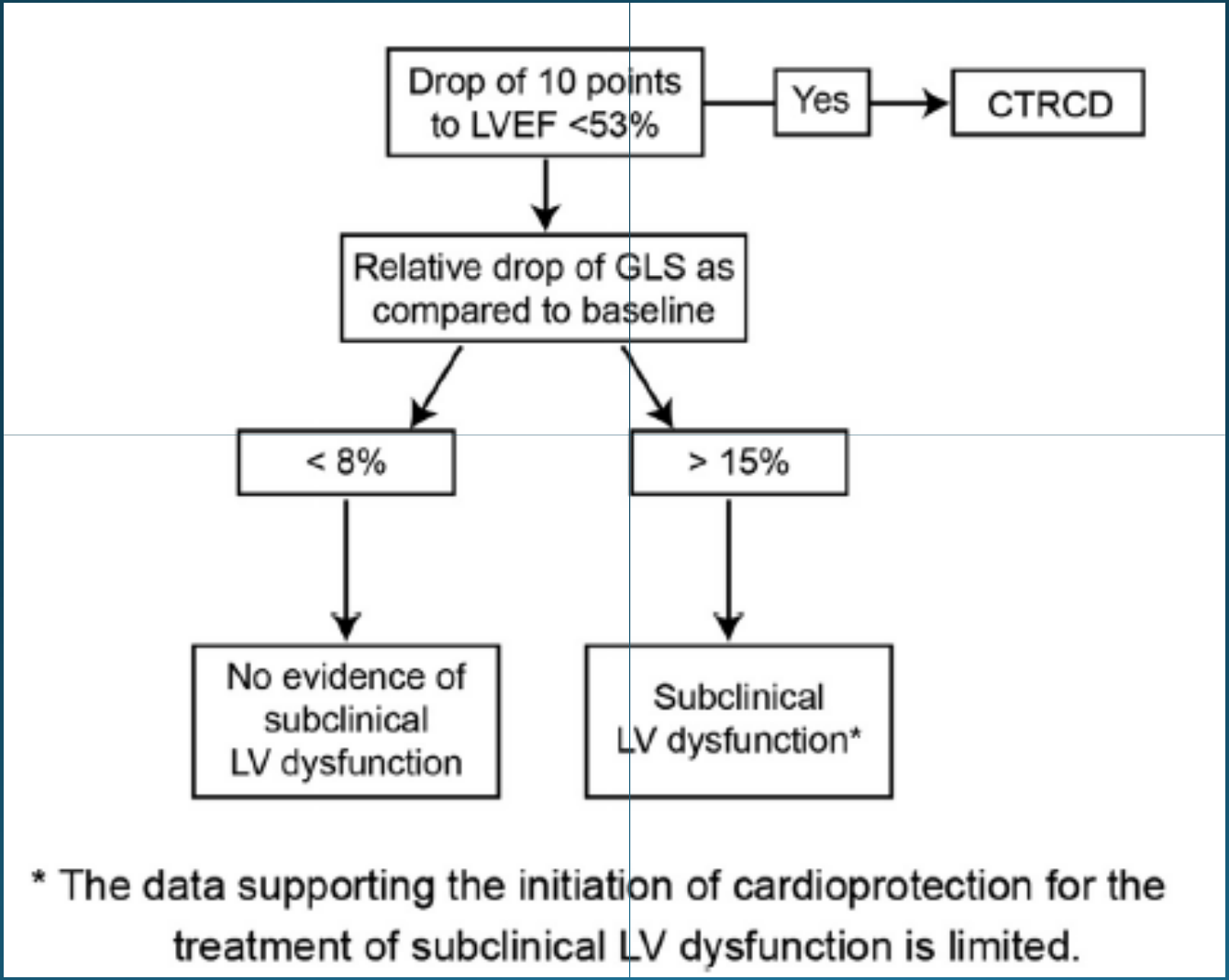
Juan Carlos Plana, MD, FASE, Chair, Maurizio Galderisi, MD, FESC, Co-Chair, Ana Barac, MD, PhD, Michael S. Ewer, MD, JD, Bonnie Ky, MD, FASE, Marielle Scherrer-Crosbie, MD, PhD, FASE, Javier Ganame, MD, PhD, FASE, Igal A. Sebag, MD, FASE, Deborah A. Agler, RCT, RDCS, FASE, Luigi P. Badano, MD, PhD, FESC, Jose Banchs, MD, FASE, Daniela Cardinale, MD, PhD, FESC, Joseph Carver, MD, Manuel Cerqueira, MD, Jeanne M. DeCara, MD, FASE, Thor Edvardsen, MD, PhD, FESC, Scott D. Flamm, MD, MBA, Thomas Force, MD, Brian P. Griffin, MD, Guy Jerusalem, MD, PhD, Jennifer E. Liu, MD, FASE, Andreia Magalhães, MD, Thomas Marwick, MBBS, PhD, MPH, Liza Y. Sanchez, RCS, FASE, Rosa Sicari, MD, PhD, FESC, Hector R. Villarraga, MD, FASE, and Patrizio Lancellotti, MD, PhD, FESC, *Cleveland, Ohio; Naples, Padua, Milan, and Pisa, Italy; Washington, District of Columbia; Houston, Texas; Philadelphia, Pennsylvania; Boston, Massachusetts; Hamilton, Ontario and Montreal, Quebec, Canada; Chicago, Illinois; Oslo, Norway; Liege, Belgium; New York, New York; Lisbon, Portugal; Hobart, Australia; Rochester, Minnesota*

(J Am Soc Echocardiogr 2014;27:911-39.)

DEFINIÇÃO ECOCARDIOGRÁFICA DE CARDIOTOXICIDADE

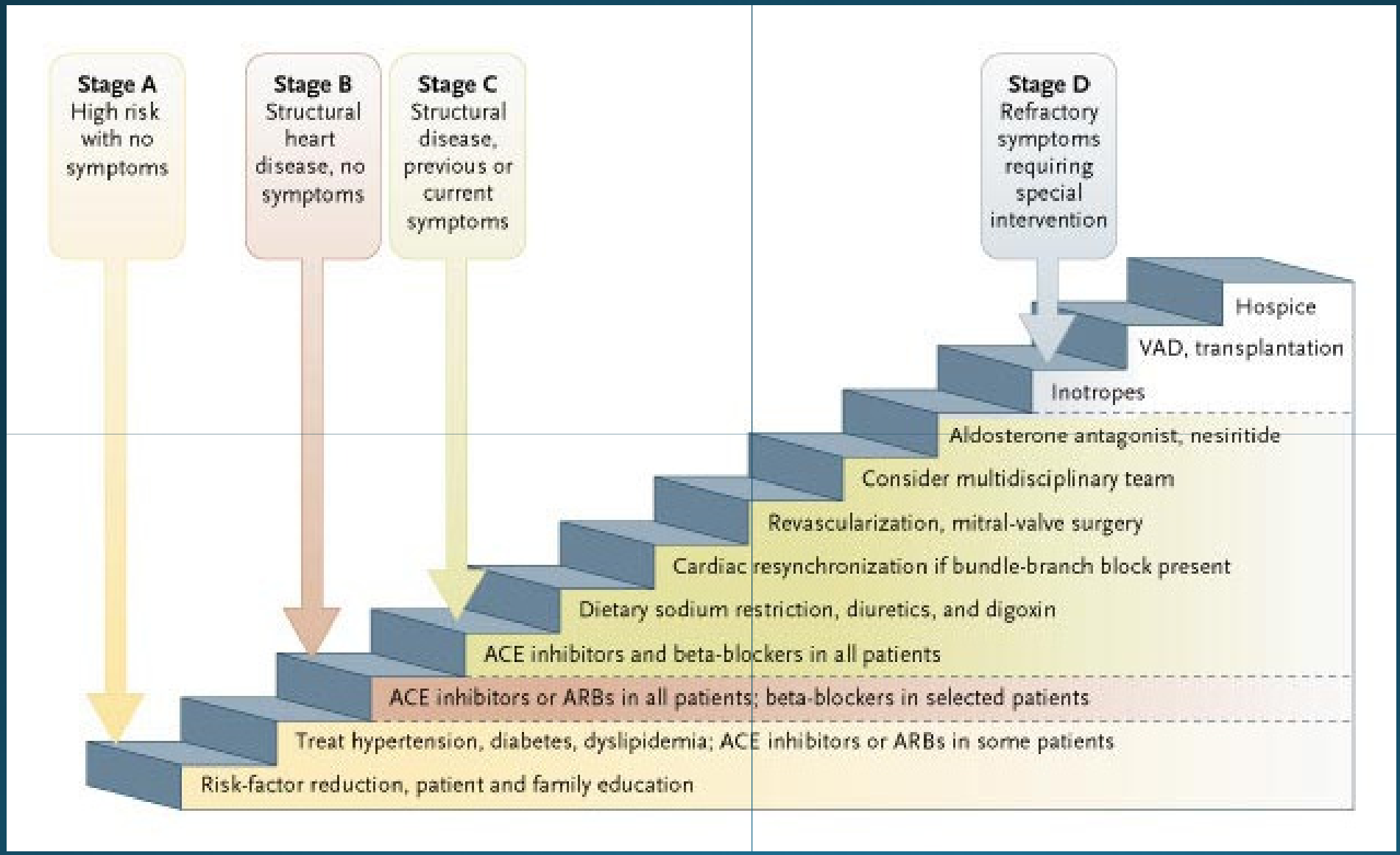
FRAÇÃO DE EJEÇÃO VENTRICULAR ESQUERDA e GLS / STE (Global Longitudinal Strain / Speckle Tracking Echocardiography / Echo Strain)
Grau I: ≥ 10% de redução assintomática da FEVE em comparação com o exame basal (VN ≥ 53 a 73%) **GLS : Mais de 15%** de queda relativa do Strain comparado ao exame basal
Grau II: > 20% de redução assintomática da FEVE em comparação com exame basal; ou FEVE < 53%
Grau III: Insuficiência cardíaca clinicamente sintomática

Expert Consensus for Multimodality Imaging Evaluation of Adult Patients during and after Cancer Therapy: A Report from the American Society of Echocardiography and the European Association of Cardiovascular Imaging



Plana JC et al; JASE 201

Stages of Heart Failure and Treatment Options for Systolic Heart Failure



Jessup M and Brozena S. N Engl J Med 2003;348:20

Incidence of left ventricular dysfunction associated with chemotherapy drugs

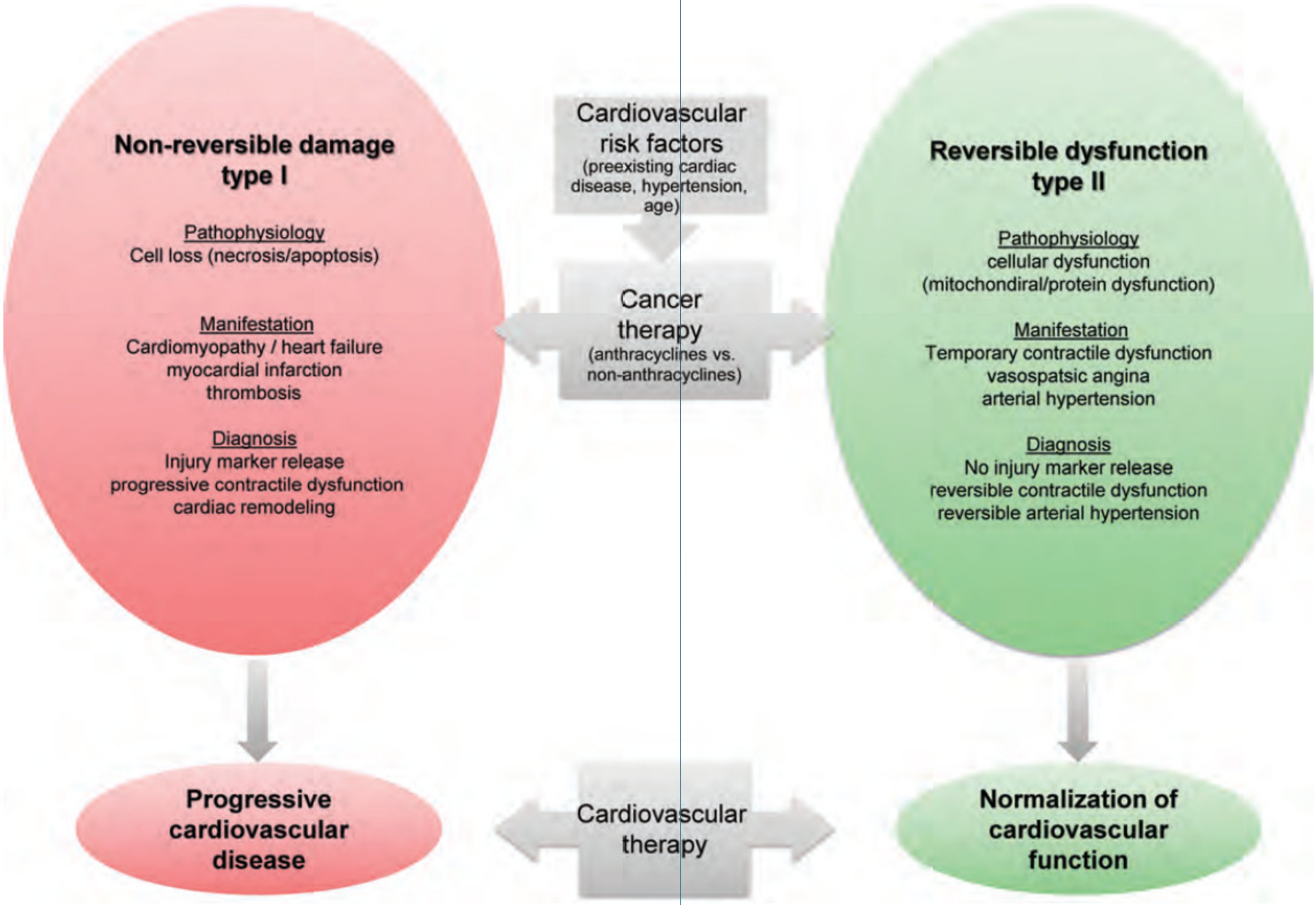
Chemotherapy agents	Incidence (%)
Anthracyclines (dose dependent)	
Doxorubicin (Adriamycin) 400 mg/m² 550 mg/m² 700 mg/m²	 3–5 7–26 18–48
Idarubicin (>90 mg/m²)	5–18
Epirubicin (>900 mg/m²)	0.9–11.4
Mitoxanthone >120 mg/m²	2.6
Liposomal anthracyclines (>900 mg/m²)	2
Alkylating agents	
Cyclophosphamide	7–28
Ifosfamide <10 g/m² 12.5–16 g/m²	 0.5 17
Antimetabolites	
Clofarabine	27
Antimicrotubule agents	
Docetaxel	2.3–13
Paclitaxel	<1

Chemotherapy agents	Incidence (%)
Monoclonal antibodies	
Trastuzumab	1.7–20.1
Bevacizumab	1.6–4
Pertuzumab	0.7–1.2
Small molecule tyrosine kinase inhibitors	
Sunitinib	2.7–19
Pazopanib	7–11
Sorafenib	4–8
Dasatinib	2–4
Imatinib mesylate	0.2–2.7
Lapatinib	0.2–1.5
Nilotinib	1
Proteasome inhibitors	
Carfilzomib	11–25
Bortezomib	2–5
Miscellanous	
Everolimus	<1
Temsirolimus	<1

www.escardio.org/guidelines

EUROPEAN SOCIETY OF CARDIOLOGY®

European Heart Journal doi:10.1093/eurheartj/ehw211 - EHJ 2016;37:2768-2801

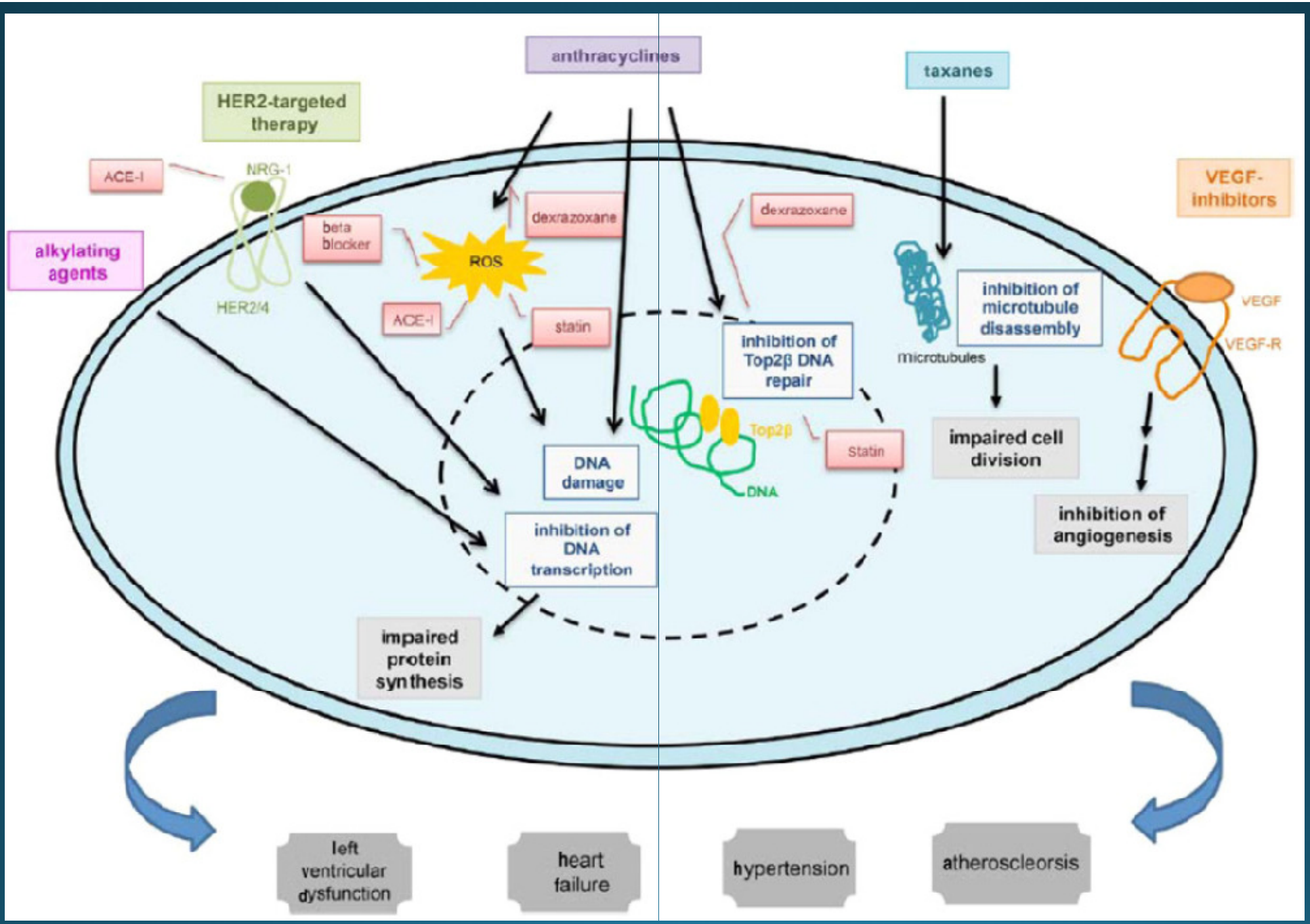


Suter et al., Eur Heart J 2

Como iniciar o tratamento?

Cancer	Potential Cardioprotective Therapies	Hypothesized Biologic Mechanisms of Action	Available Evidence
yclines	Dexrazoxane	• Decreased ROS formation via prevention of anthracycline–iron complex formation • Reduced anthracycline-induced DNA damage via inhibition of Top2–DNA cleavage complexes	• In vitro and in vivo animal studies • Randomized clinical trials • Meta-analyses
	HMG-CoA reductase inhibitors	• Reduced cell death and Top2β-mediated DNA damage via Rac1 inhibition	• In vitro and in vivo animal studies • Retrospective clinical studies and small randomi clinical trial
	β-Blockers	• Increased prosurvival signaling via recruitment of β-arrestin and transactivation of EGFR • Mitigation of oxidative stress • Enhanced lusitropy	• Small randomized clinical trials, including combi ACE inhibitor and β-blocker therapy
	ACE inhibitors	• Attenuated oxidative stress and interstitial fibrosis • Improved intracellular calcium handling • Improved cardiomyocyte metabolism • Improved mitochondrial function	• Randomized clinical trials, including combination ACE-inhibitor and β-blocker therapy
	Exercise training	• Decreased ROS formation • Reduced pro-apoptotic signaling • Improved calcium handling • Improved myocardial energetics via augmented AMPK activity	• In vivo animal studies
	Bivalent neuregulin	• Biased ErbB signaling	• In vitro and in vivo animal studies from single laboratory
umab	ACE inhibitors	• Decreased angiotensin-induced blockade of NRG-1/ErbB pathway	• Retrospective clinical studies (in combination wi β-blockers)
	β-Blockers	• Increased prosurvival signaling via recruitment of β-arrestin and transactivation of EGFR	• Retrospective clinical studies (one in combinatio ACE inhibitors
	Exercise	• Enhanced NRG-1/ErbB signaling • Increased myocardial Akt • Inhibition of TGF-β signaling	• Small, single group study with failure to demons an attenuation of trastuzumab-induced LV dilati
b	Thalidomide	• Improved pericyte function via PDGFR signaling	• In vivo animal studies from single laboratory
	AMPK activators	• Restoration of favorable myocardial energetics	• Controversial in vitro and in vivo data

Hahn et al., J Am Heart Assoc. 2014;3



Thavendiranathan et al., Clinical Science (2016) 131, 113–121 doi: 10.1042/CS20160

Table 2. Treatment of ASLVD in Adult Patients with Cardiotoxic Chemotherapy

Reference	Type of Study	Patient Population an Cancer Therapy	N	Cardiac Treatment Modality	Timing of Initiation of Treatment	Mean Follow-Up	Results
Cardinale et al[34]	Prospective	201 patients with LVEF ≤45% due to anthracylcines	201	Enalapril up to 20 mg/d and coreg up to 50 mg /d; of note: mean dose enalapril 11 mg/d and coreg 14 mg/d	Rx initiated immediately after detection of ASLVD	Echo at baseline, every month for 3 mo, and every 3 mo during following 3 y, every 6 m thereafter Mean follow-up 36 mo	Primary EP: LVEF response to therapy Responders,* 42%; partial responders, 13%; nonresponders, 45% Responders showed lower rate of cum cardiac events than partial and nonresponders (5%, 31%, 29%, $P<0.001$)
Cardinale et al[35]	Prospective	Mix of cancer, non-Hodgkin's lymphoma Chemotherapy naive patients scheduled for anthracyclines (note excluded high-dose anthracycline or trastuzumab)	2625	Enalapril alone (before 1999) enalapril and β-blockers carvedilol or bisoprolol (after 1999)	Therapy promptly administered and uptitrated to maximal tolerated doses	Echo at baseline, every 3 mo during chemotherapy, at end of treatment (within 1 mo, every 3 mo during first year following chemotherapy, every 6 mo during the following 40 y, yearly afterward) Median follow-up 5.2 y	Anthracycline-induced cardiotoxicity occurred in 9% of adult treated patients (dose dependent; highest incidence in first year after completion of chemotherapy) Median time between last dose of anthracycline and development of cardiotoxicity was 3.5 mo, 98% of cases within the first-year follow-up 82% of patients recovered from cardiotoxicity (11% full recovery; 71% partial recovery)

ASLVD indicates asymptomatic left ventricular dysfunction; EP, end point; LVEF, and left ventricular ejection fraction.
*Responders had a significantly shorter time to initiation of therapy.

Circulation

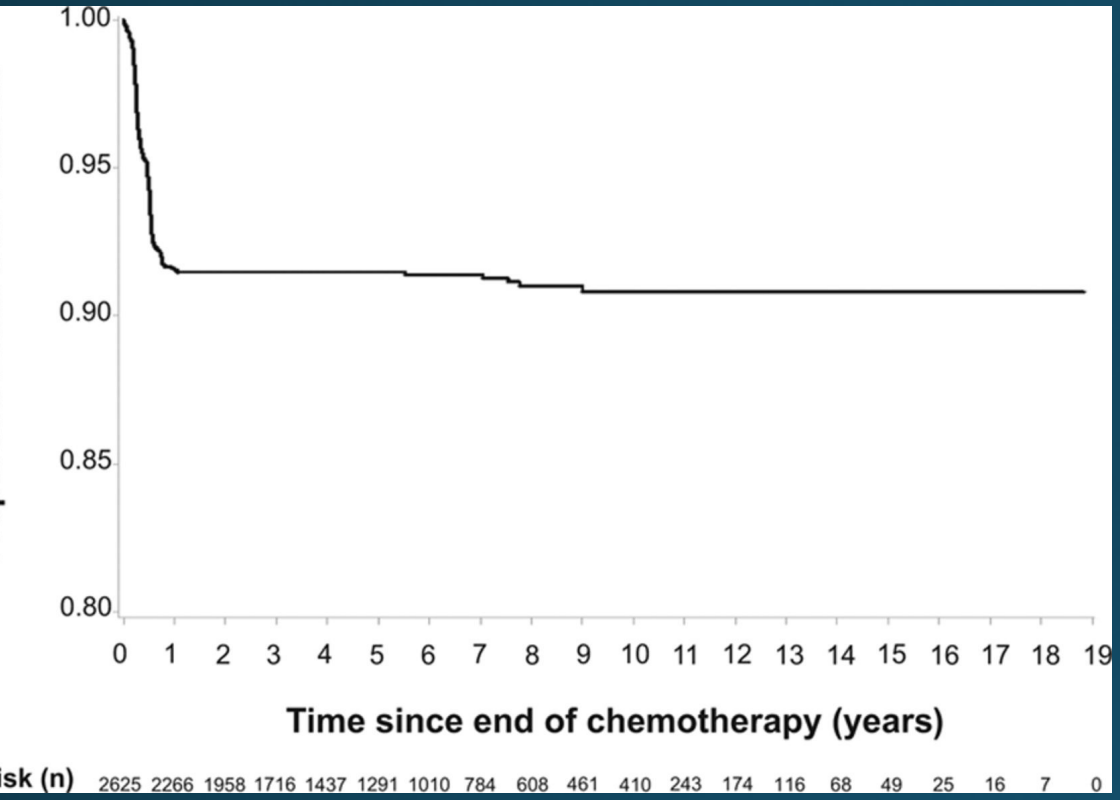
American Heart Association

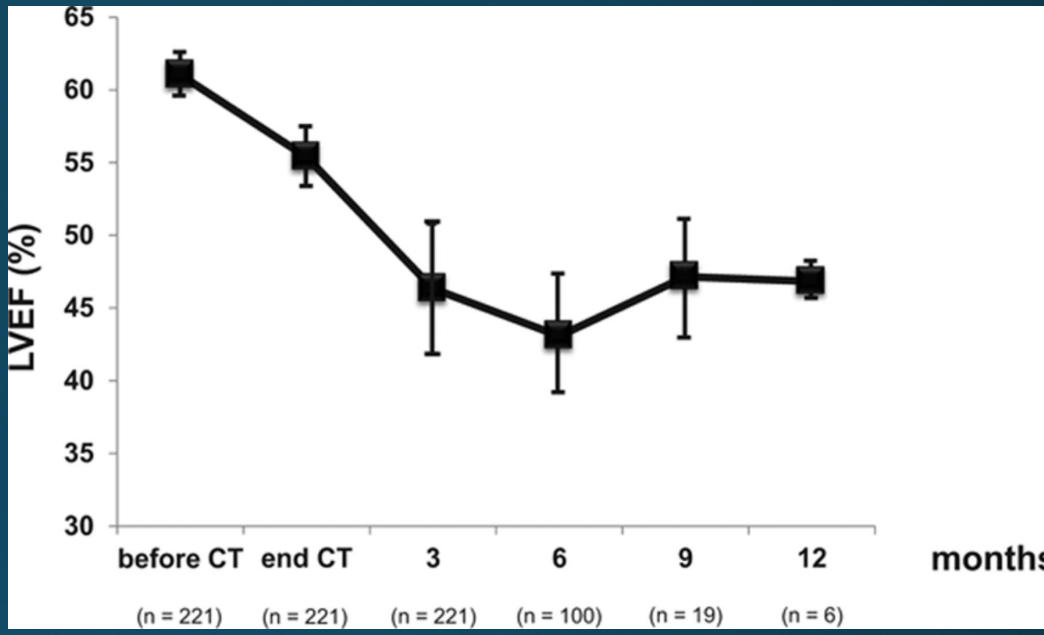
Early Detection of Anthracycline Cardiotoxicity and Improvement With Heart Failure Therapy

Daniela Cardinale, Alessandro Colombo, Giulia Bacchiani, Ines Tedeschi, Carlo A. Meroni, abrizio Veglia, Maurizio Civelli, Giuseppina Lamantia, Nicola Colombo, Giuseppe Curiglian Cesare Fiorentini and Carlo M. Cipolla

Circulation. 2015;131:1981-1988; originally published online May 6, 2015;

- 2625 Pacientes tratados com antraciclina
- Seguimento médio de 5,2 anos
- Desfecho primário: tempo de aparecimento de cardiotoxicidade (queda >10 pontos percentuais da FE ou FE<50%).
- Em caso de Cardiotoxicidade : Enalapril (até 1999) enalapril e BB (após 1999)

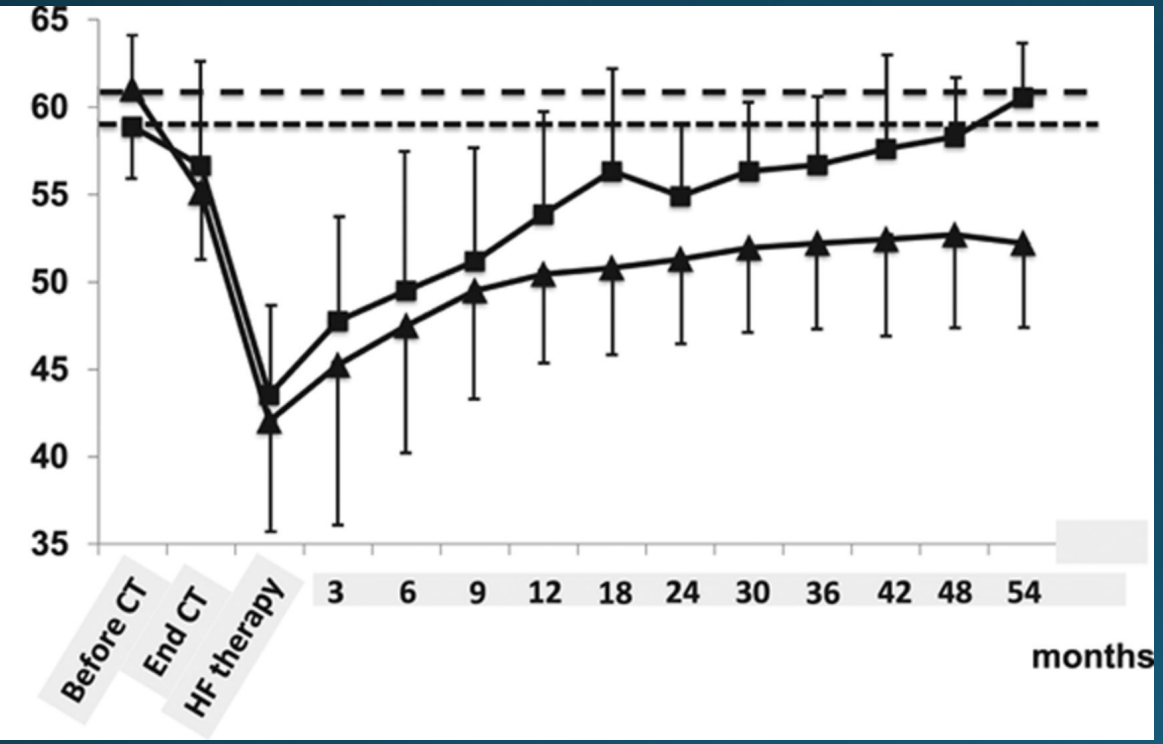




- Incidência de cardiotoxicidade de 9% (226 pcts): 98% dos caso no dentro do primeiro ano (média de 3,5 meses)

Daniela Cardinale et al. Circulation. 2015;131:1981

Left ventricular ejection fraction (LVEF) in patients with cardiotoxicity and with partial (triangle) or full (square) recovery with heart failure therapy.



- 11% (25) tiveram recuperação completa da fu ventricular
- 71% recuperação parcial (aumento da > 5 por absolutos na FE)

Daniela Cardinale et al. Circulation. 2015;131:1981

of the American College of Cardiology
by the American College of Cardiology Foundation
ed by Elsevier Inc.

Vol. 55, No.
ISSN 0735-1097/10
doi:10.1016/j.jacc.2009

Heart Fail

CME

Anthracycline-Induced Cardiomyopathy

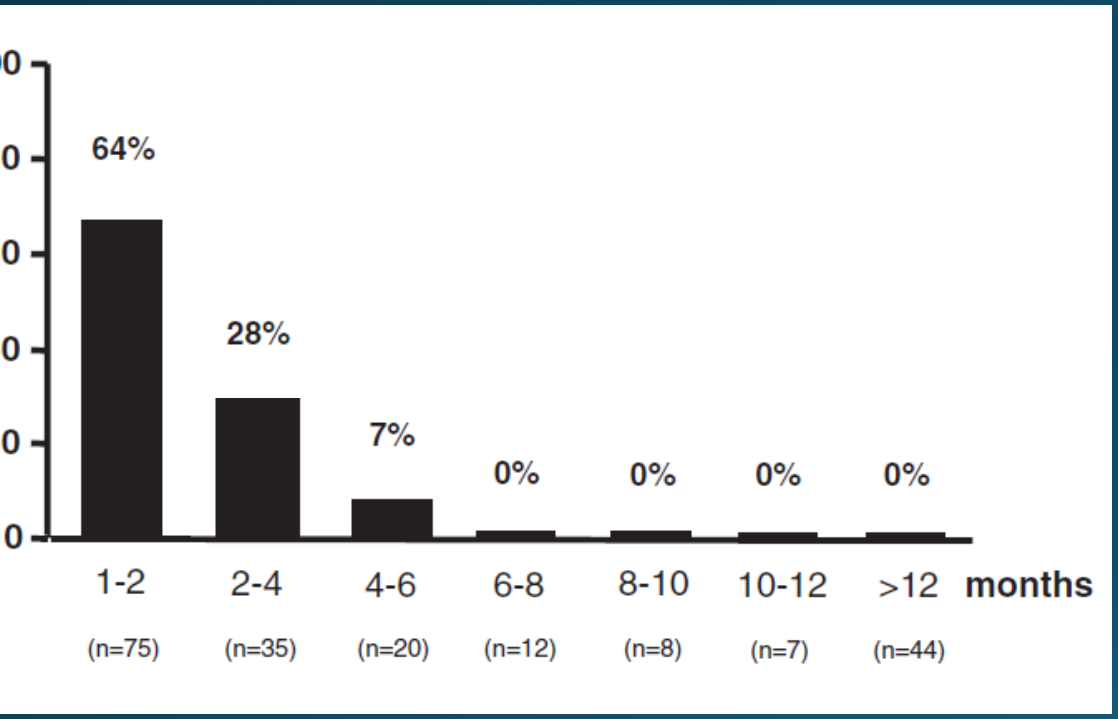
Clinical Relevance and Response to Pharmacologic Therapy

Daniela Cardinale, MD, PHD,* Alessandro Colombo, MD,* Giuseppina Lamantia, MD,*
Nicola Colombo, MD,* Maurizio Civelli, MD,* Gaia De Giacomi, MD,* Mara Rubino, MD,†
Fabrizio Veglia, PHD,† Cesare Fiorentini, MD,† Carlo M. Cipolla, MD*

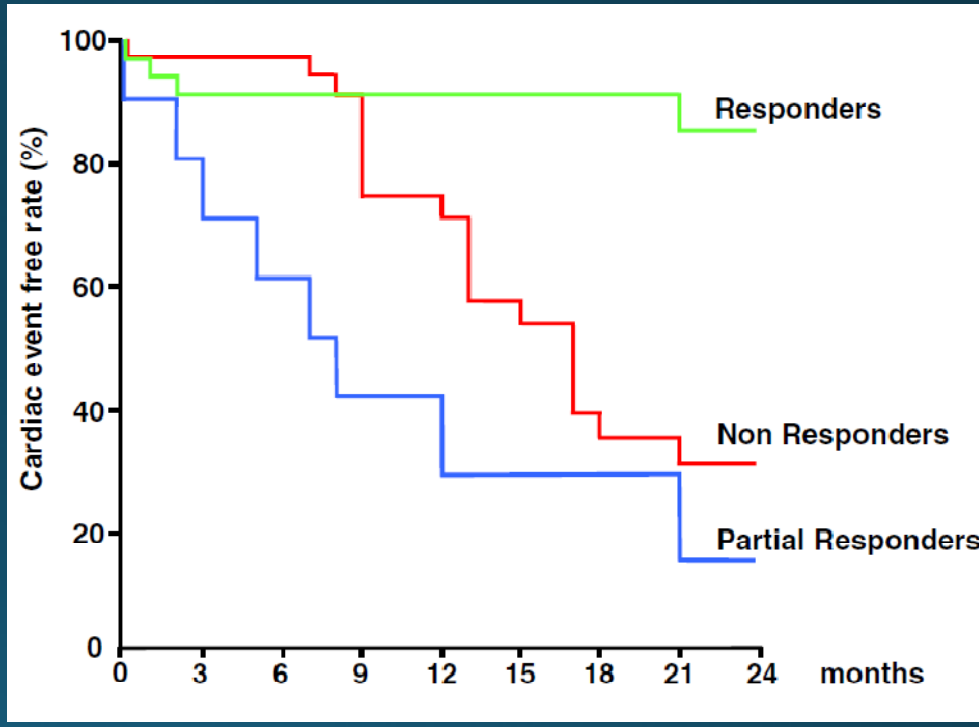
Milan, Italy

- 201 pctes com FE<45% - Cardiomiopatia por antracíclicos
- Enalapril e/ou Carvedilol ("quando possível") – 11 mg/14 mg
- Tempo de seguimento: 36 meses
- Desfecho primário : resposta da FEVE com a terapia.
  - Respondedor FE>50%
  - Respondedor parcial: aumento de pelo menos 10 pontos absolutos na FE, mas sem alcançar o limite 50%
  - Não respondedor: aumento na FE <10 pontos e não alcança o limite de 50%.

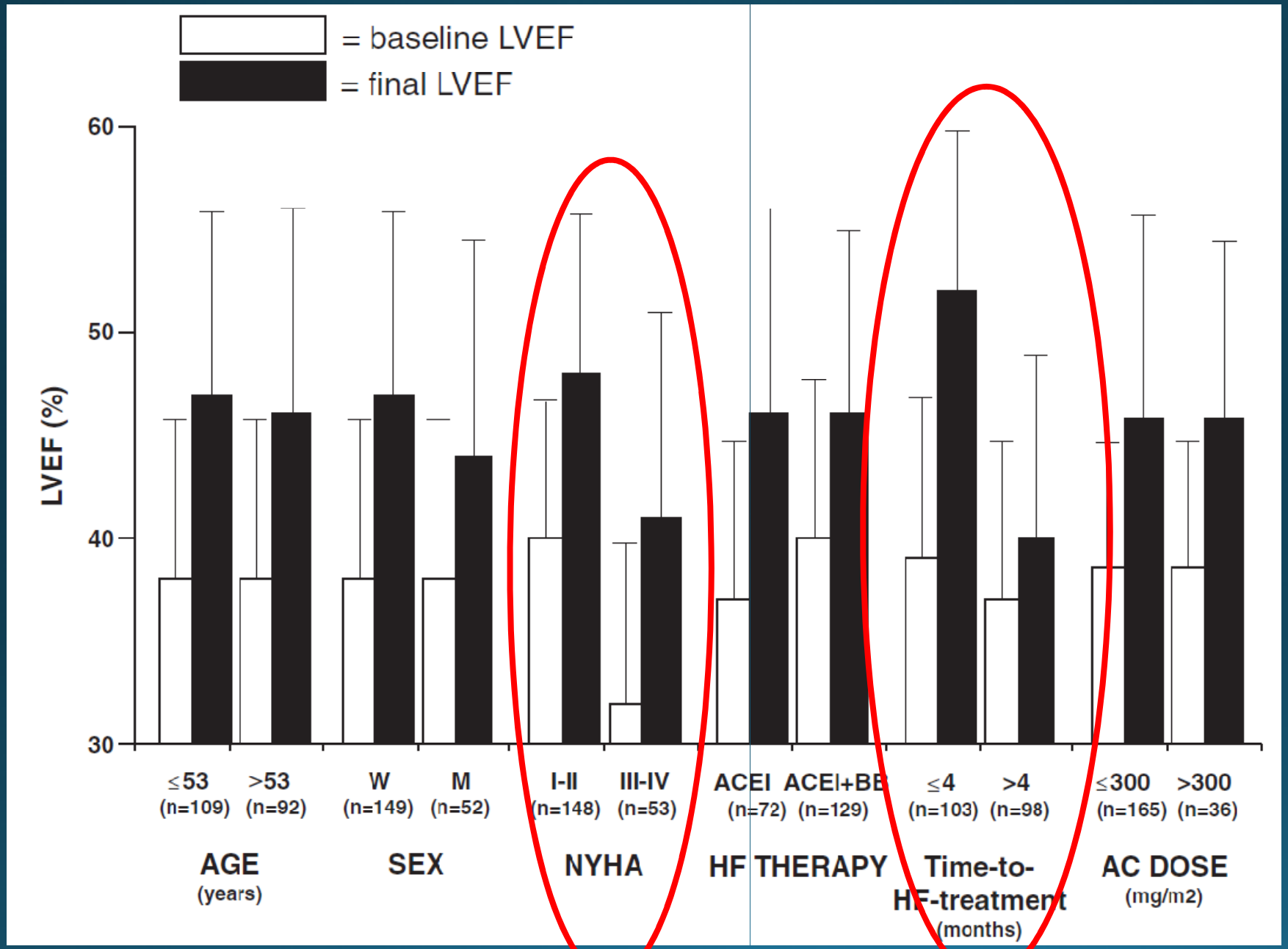
ercentage of Responders According to the ime Elapsed From AC Administration and Start of HF Therapy



Cumulative Cardiac Event Rate During the Study Follow-Up



Cardinale et al., J Am Coll Cardiol 2010:55:213–20



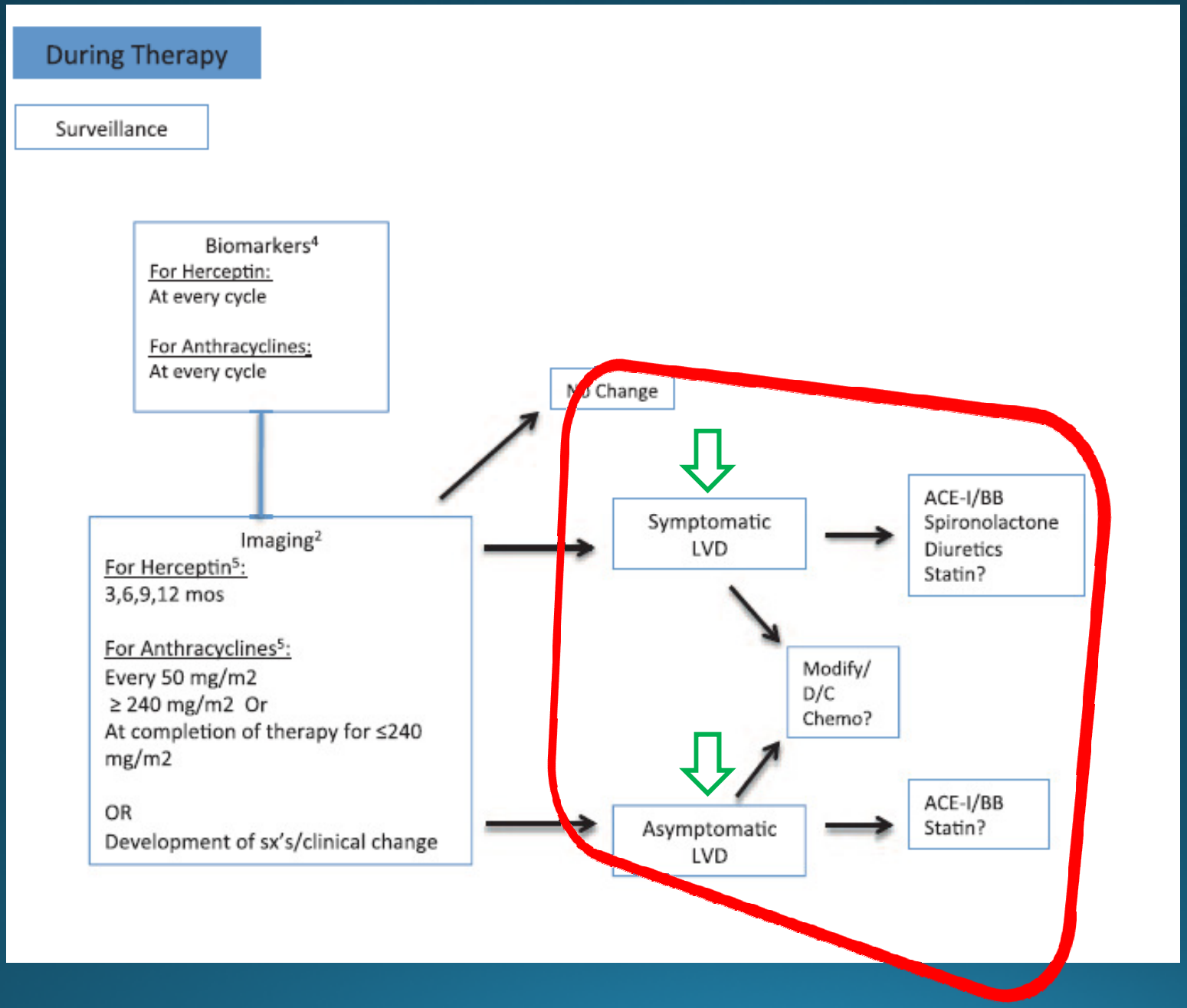
Cardinale et al., J Am Coll Cardiol 2010:55:213

Management of Heart Failure in Cancer Patients and Cancer Survivors

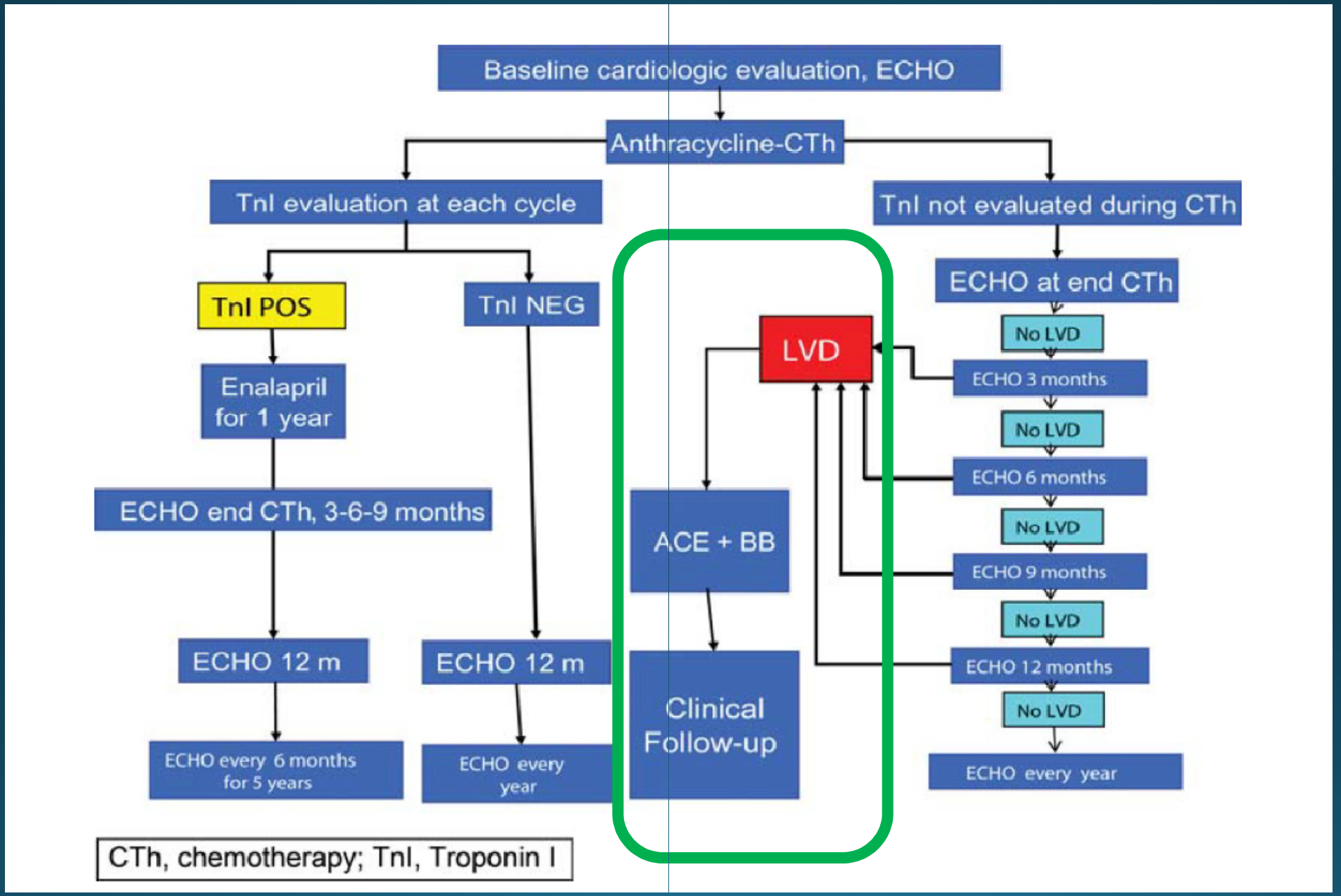
Jose Emanuel Finet, MD

Table 5
Cardioprotective agents for chemotherapy-induced cardiomyopathy

Agent Type	Preclinical Studies	Clinical Studies	Approved for Clinical Use (FDA)
Chelating agent	Dexrazoxane	Dexrazoxane	Dexrazoxane
β-Blockers	Carvedilol Nebivolol	⇨ Carvedilol Nebivolol	
ACEI	Enalapril	⇨ Enalapril	
ARB	Valsartan	Valsartan Candesartan Telmisartan	
MRA		Spironolactone	
Statins	Atorvastatin	Atorvastatin	

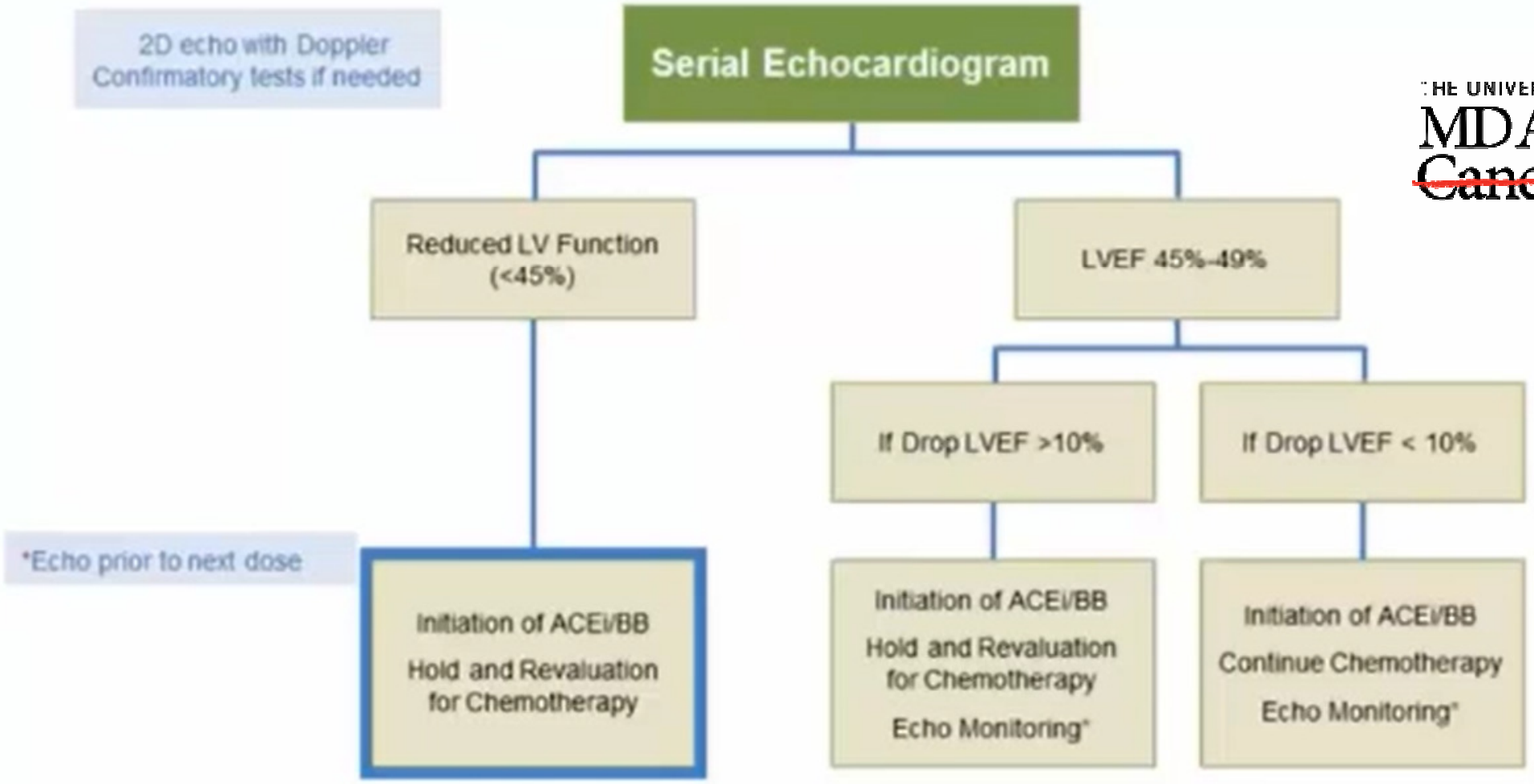


Hamo et al., Circ Heart Fail. 2016;9:e002843



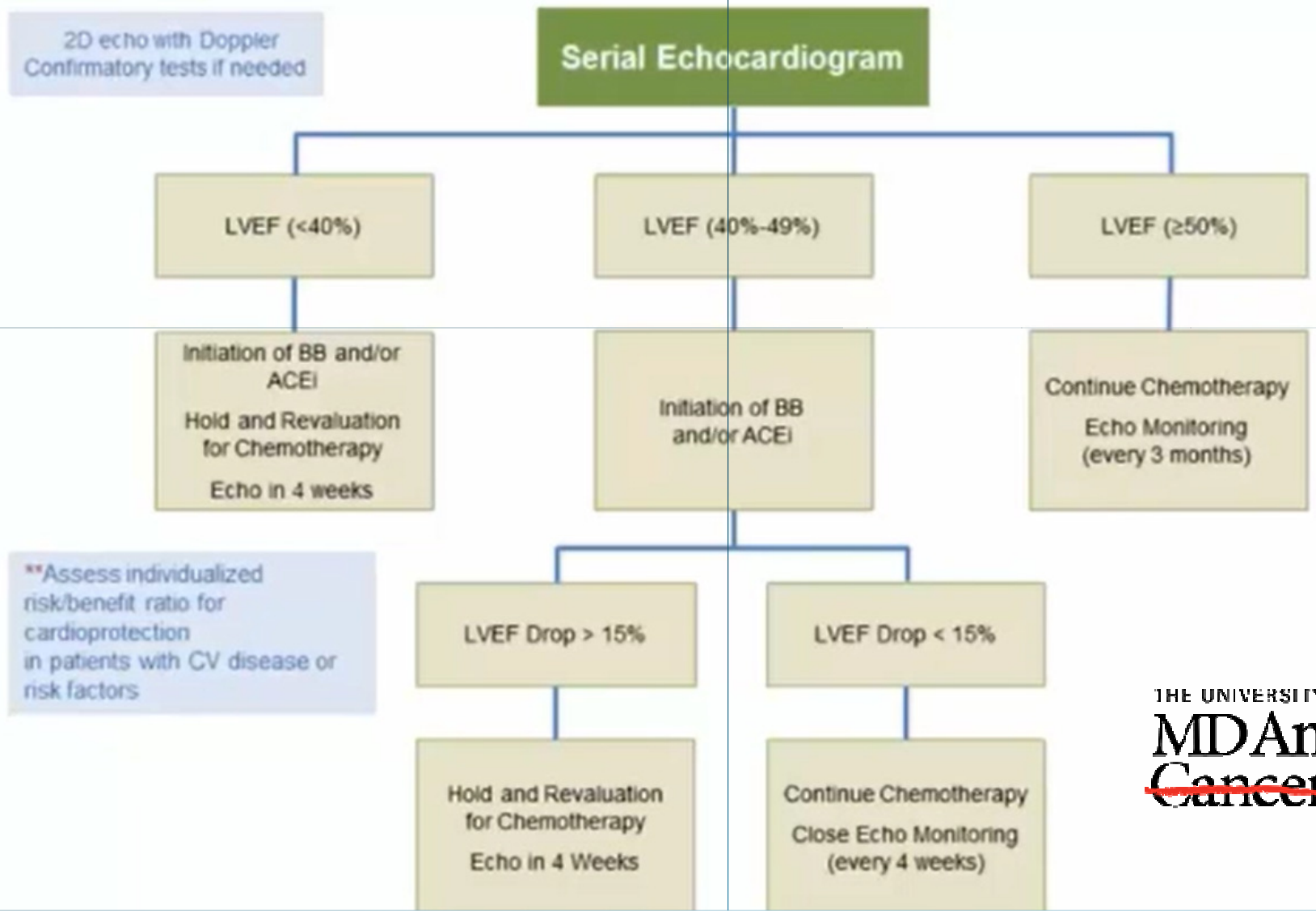
Curigiliano et al., Annals of Oncology 23 (Supplement 7): vii1
2012

Monitoring and Management of Chemotherapy-induced Cardiomyopathy with Echocardiography (Anthracyclines)



THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center

Monitoring and Management of Chemotherapy-induced Cardiomyopathy with Echocardiography (Trastuzumab)



THE UNIVERSITY OF TEXAS
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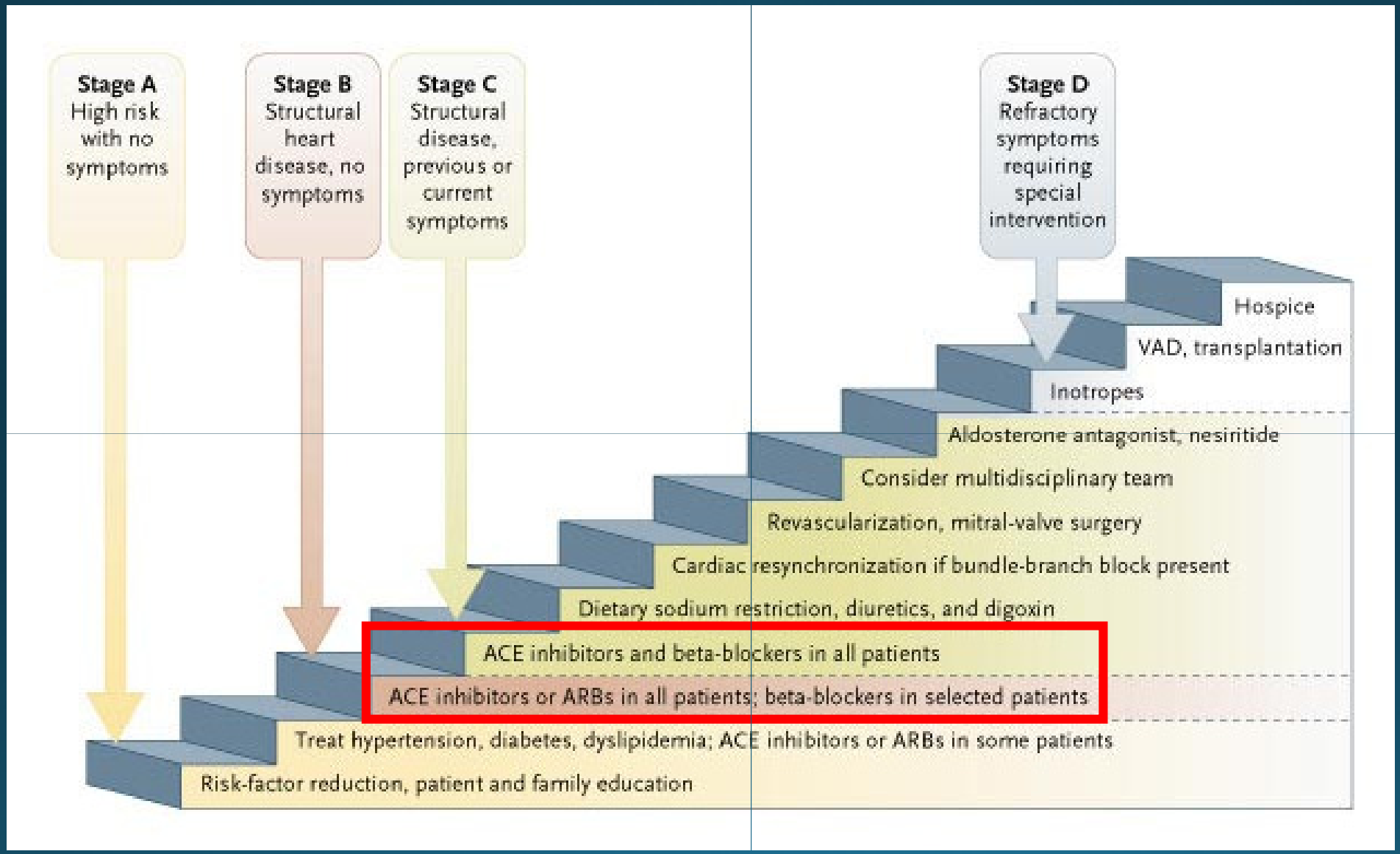
Stages of Heart Failure and Treatment Options for Systolic Heart Failure



Jessup M and Brozena S. N Engl J Med 2003;348:20

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ACC/AHA/HFSA Heart Failure Focused Update

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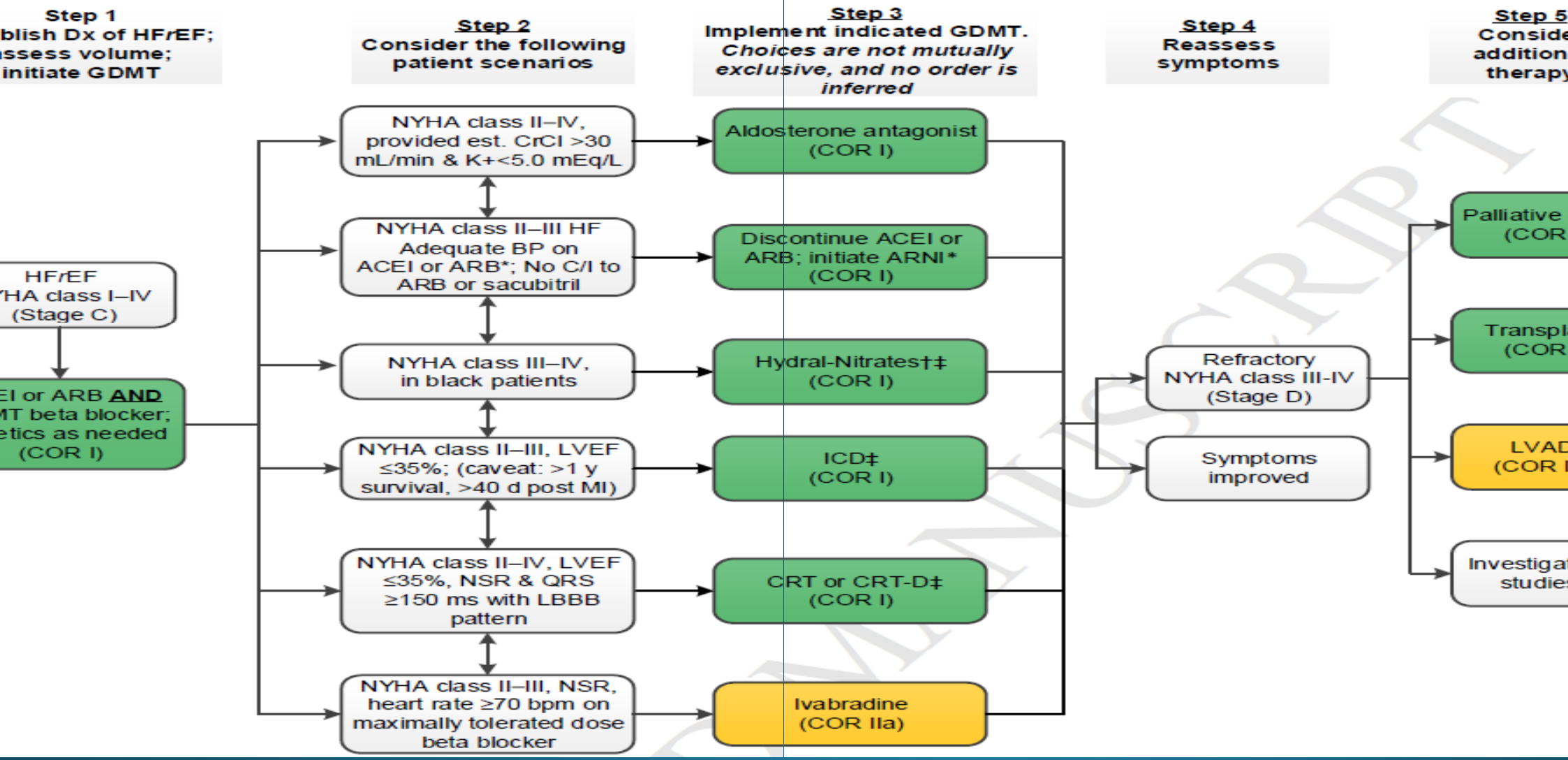


Table 3. Summary of Outcomes of Ventricular Assist Devices in Chemotherapy-Induced Cardiomyopathy

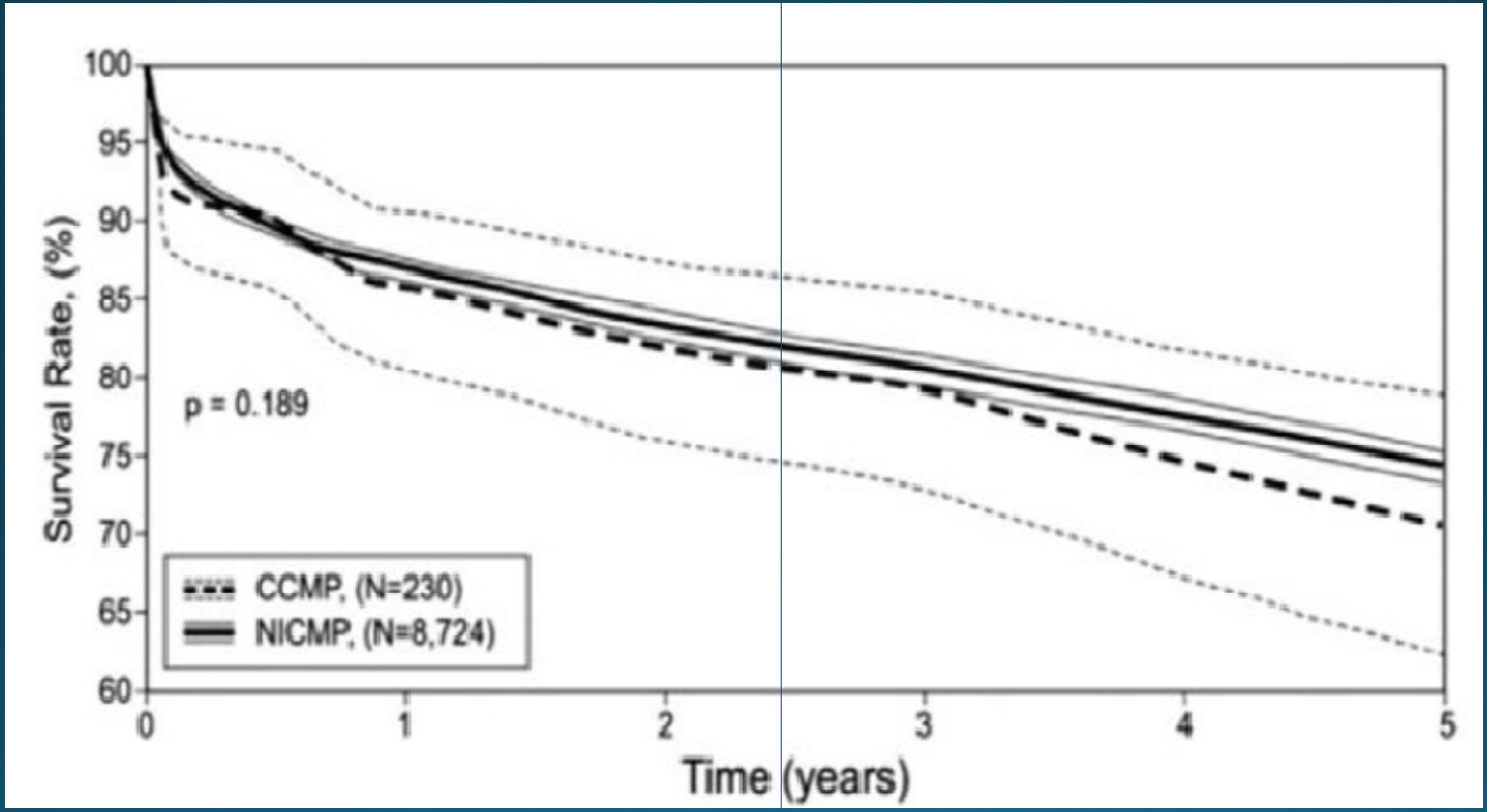
Author	Year	Patient	Device	Strategy	Treatment Period	Outcome
Musci et al[62]	1997	2	BiVAD (Berlin)	BTT	4–7 wk	Transplant
Casarotto et al[63]	2003	1	BioMedicus and Novacor LVAD	BTT	50 mo	Transplant
Simsir et al[64]	2005	1	HM LVAD	DT	≥6 mo	Improvement of symptoms
Potapov et al[65]	2005	1	Extracorporeal BiVAD (Berlin)	BTT	420 d	Transplant
Castells et al[43]	2009	1	LV axial pump (Incor; continuous flow)	BTR	135 d	LV recovery; device explantation
Freilich et al[44]	2009	1	LVAD (continuous flow)	BTT	12 mo	LV recovery; device explantation
Pak et al[42]	2010	13	LVAD (continuous flow)	BTT (7); DT (6)		3 died within 2 mo 5 patients with DT switched to BTT. 7 patients received OHT
Kurihara et al[46]	2011	1	LVAD	BTR	239 d	LV recovery; device explantation
Khan et al[45]	2012	1	HM II LVAD (continuous flow)	BTT	15 mo	Improvement in EF and removal of device
Oliveira et al[27]	2013	75	Variety of devices (84% continuous flow)	BTT (64%); DT (33%)	Not reported	Death (25%); transplant (29%); and recovery (1%)

BiVAD indicates biventricular assisted device; BTR, bridge to recovery; BTT, bridge to transplant; DT, distention therapy; EF, ejection fraction; HM, HeartMate; LVAD, left ventricular assisted device; and OHT, orthotopic heart transplantation.

Table 4. Summary of the Main Outcomes of Heart Transplant in Chemotherapy-Induced Cardiomyopathy

Author	Year	Patient	Follow-up, Mo	Outcome
Grady et al[72]	1987	1	...	Good outcome
Goenen et al[73]	1988	1	9	Good short-term outcome without infection or rejection
Aricò et al[74]	1988	1	7	Normal heart function and NYHA class I. Postoperative graft rejection treated with cyclosprine
Aldouri et al[75]	1990	1	...	Uneventful recovery but needed methylprednisolone at 2 wk for rejection
Edwards et al[76]	1990	7	21	1 Relapsed, good short-term survival in rest
Armitage et al[77]	1990	11	18	100% short-term survival
Aricò et al[78]	1991	1	36	Good outcome. No cancer recurrence.
Hinkamp et al[79]	1991	2	36 and 60	NYHA class I. No cancer recurrence
Lüthy et al[80]	1992	1	36	Good outcome. No secondary neoplasm
McManus and O'Hair[81]	1992	1	14	No relapsed
Jenney and Jones[82]	1992	1	...	Good outcome
Rosado et al[83]	1994	5	49	Good short-medium term survival
Deng et al[84]	1994	1	18	Favorable outcome despite preoperative cerebellar infarct
Goldstein et al[85]	1995	11	43	1 recurrence, good medium-term survival
Dorent et al[86]	1995	9	4–92	High 5-year survival, no cancer recurrence, 1 developed liver B-cell LPD, 1 required retransplant for chronic rejection, 2 had increase creatinine, 1 developed ESKD and required HD
Dechslin et al[87]	1996	3	43.5	One died in postsurgical period. Good medium-term survival in the rest
Levitt et al[88]	1996	14	4–165	5-y survival was 74%. There was no recurrence of the original malignancy
Koerner et al[89]	1997	20	32	Similar short to medium-term survival between CCMP and non-CCMP
Musci et al[62]	1997	5	37–65	100% survival. No rejection. No malignancy recurrence. No LPD
Taylor et al[90]	2000	34	120	Only lymphoma. Excellent survival in NHL and poor results in HL
Morgan and Pahl[91]	2002	1	60	On day 25 prednisone increased for rejection. Five-year follow-up graft normal function and NYHA class I and no tumor recurrence
Ward et al[92]	2004	17	60	Pediatric population. Eight survived, 7 died after OHT, 1 cancer recurrent, and 2 lost to follow-up
Ladowski et al[93]	2006	13	92	Similar long-term survival between CCMP and non-CCMP
Mangat et al[94]	2007	1	...	AML relapsed 2 mo after HT and underwent successful bone marrow transplant
Sack et al[95]	2007	12	8–60	Cardiac amyloidosis. One died and the rest had excellent survival and 3 AL-amyloidosis in remission after stem cell transplant
Frenandez-Vivancos et al[96]	2010	12	171	Similar long-term survival between CCMP and non-CCMP
Oliveira et al[25]	2012	232	60	Similar short and long-term survival between CCMP and non-CCMP
DePasquale et al[68]	2012	35	120	Worse outcome compare to other restrictive cardiomyopathy subgroups
Lenneman et al[26]	2013	453	120	Similar long-term survival between CCMP and non-CCMP

Post-transplant survival of chemotherapy-induced cardiomyopathy (CCMP) compared to other patients with nonischemic cardiomyopathy (NICMP): Kaplan–Meyer survival curves are shown for number of patients alive at baseline and 1, 2, 3, 4, and 5 years.



Oliveira et al., Circ Heart Fail. 2014;7:1050-1058.

ATÉ QUANDO TRATAR ?

- Ausência de evidencia.
- Recomendação (ESC): continuar a terapia indefinidamente ao menos que a função ventricular permaneça estável após a cessação da terapia para IC ou nenhum tratamento para o câncer seja planejado.
- Trastuzumab - disfunção frequentemente reversível – interrupção do tratamento pode ser considerado.

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Conclusões

- Existem poucas evidencias.
- Terapia precoce.
- IECA e Beta bloqueadores são a base do tratamento para a disfunção ventricular esquerda assintomática.
- Para pacientes com IC vale o tratamento padrão recomendado nos guidelines e testados para outras etiologias.
- Tempo de tratamento com IECA e BB: indeterminado!
- Terapias para ICC avançada (Ressincronizador, dispositivo de assistência ventricular, Transplante) tem sido realizadas com resultados similares ao de outras cardiomiopatias.


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