Monitoraggio della cardiotossicità della terapia antineoplastica.

Come prevenirla, individuarla, curarla.

Daniela Cardinale

Direttore – Unità di Cardioncologia

Istituto Europeo di Oncologia - Milano

Milano, 11 Aprile 2018

The Good News

More and more effective cancer treatment options over the past 20 yrs

Cancer death rates declined 28% from 2001 to 2010

Increase of n. cancer survivors after oncologic therapy:

≈ 14.000.000 pts → **= 19.000.000**

≈ 21.000.000 pts → **= 25.000.000**

DeSantis C. CA Cancer J Clin 2014

Rowland J. Eur J Cancer 2015

The Bad News

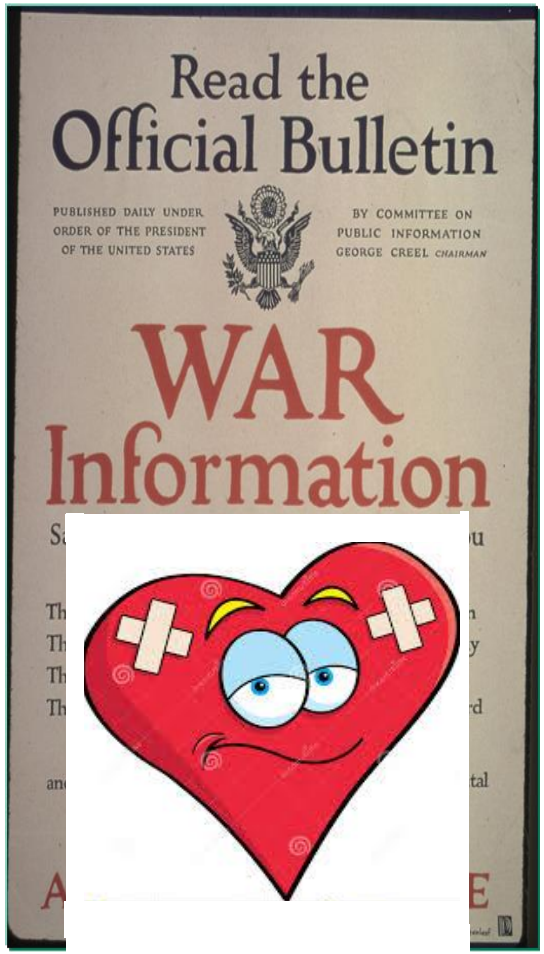
1	Chemotherapy Associated With Left Ventricular Dysfunction
2	Chemotherapy Associated With Ischemia
3	Chemotherapy Associated With Hypertension
4	Chemotherapy Associated With Venous Thromboembolism
5	Chemotherapy Associated With Bradycardia*
6	Chemotherapy Associated With QT Prolongation*

The Price Paid

Table 1 Anticancer agents associated with left ventricular dysfunction [2•, 5]

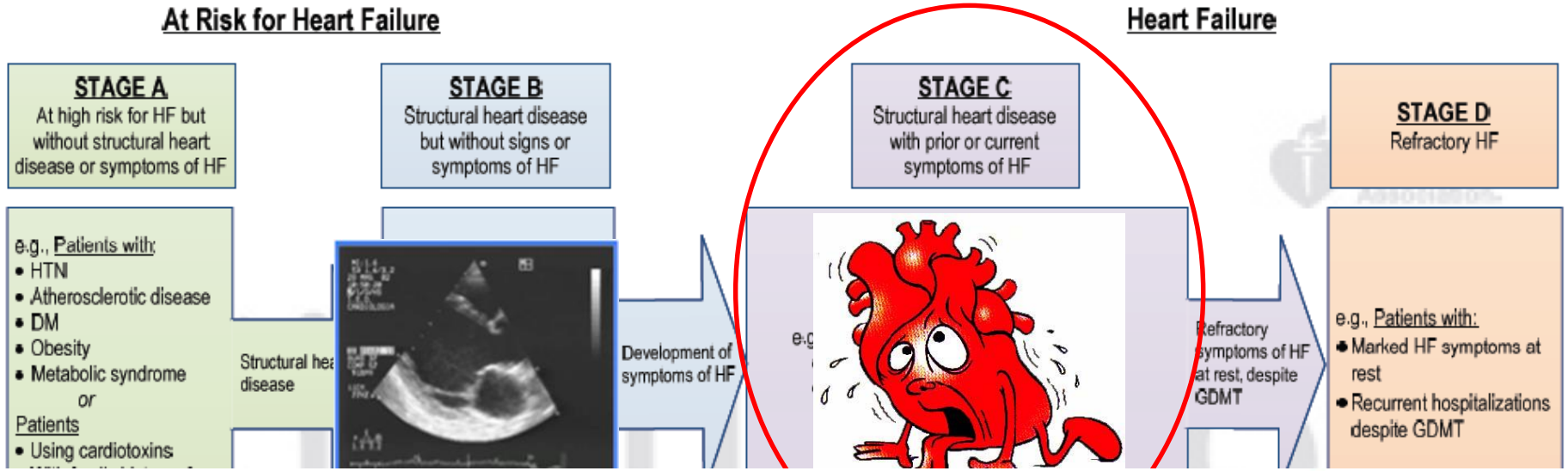
Class	Drug	Incidence
Anthracyclines/analogues	Doxorubicin	++/+++
	Daunorubicin	++
	Epirubicin	+/++
	Idarubicin	++/+++
	Mitoxantrone	+/++
	Liposomal anthracyclines	+
Alkylating agents	Cyclophosphamide	++/+++
	Ifosfamide	+++
Antimicrotubule agents	Paclitaxel	+
	Docetaxel	+/++
Monoclonal antibody-based tyrosine kinase inhibitors	Trastuzumab	++/+++
	Bevacizumab	+/++
	Pertuzumab	++
	Trastuzumab emtansine (T-DM1)	+/++
Small molecule tyrosine kinase Inhibithors	Lapatinib	+/++
	Dasatinib	++
	Imatinib	+/++
	Nilotinib	+/++
	Pazopanib	+/++
	Sunitinib	++/+++
	Sorafenib	+/++
	Bortezomib	+/++

+ <1%; ++ = 1-10%; +++ >10%



Cardinale et al. Curr Cardiol Rep 2016

Figure 3. Stages in the development of HF and recommended therapy by stage.



Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association

2013 ACCF/AHA Guideline for the Management of Heart Failure : A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

appropriate patients for vascular disease or DM
• Statins as appropriate

In selected patients
• ICD
• Revascularization or valvular surgery as appropriate

Treatment
• Diuresis to relieve symptoms of congestion
• Follow guideline driven indications for comorbidities, e.g., HTN, AF, CAD, DM
• Revascularization or valvular surgery as appropriate

Drugs for use in selected patients
• Hydralazine/isosorbide dinitrate
• ACEI and ARB
• Digoxin

In selected patients
• CRT
• ICD
• Revascularization or valvular surgery as appropriate

• Heart transplant
• Chronic inotropes
• Temporary or permanent MCS
• Experimental surgery or drugs
• Palliative care and hospice
• ICD deactivation

Editorial Comment

Identification of Anthracycline Cardiotoxicity: Left Ventricular Ejection Fraction Is Not Enough

Benjamin W. Eidem, MD, FASE, *Rochester, Minnesota*

Journal of the American Society of Echocardiography
December 2008

VOLUME 26 · NUMBER 8 · MARCH 10 2008

JOURNAL OF CLINICAL ONCOLOGY

E D I T O R I A L

Left Ventricular Ejection Fraction and Cardiotoxicity: Is Our Ear Really to the Ground?

Michael S. Ewer and Daniel J. Lenihan, *Department of Cardiology, The University of Texas M.D. Anderson Cancer Center, Houston, TX*

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 pts with AC-induced CMP
- treatment: ACEI + BB
- mean follow-up: 36±27 months
- ↑ LVEF 50%: 42% = Responders
- ↑ ≥10 abs.points: 13% = Partial Responders
- ↑ ≤10 abs.points: 45% = No Responders

Inverse relationship between Time-to-heart-failure therapy and LVEF increase

JACC 2010

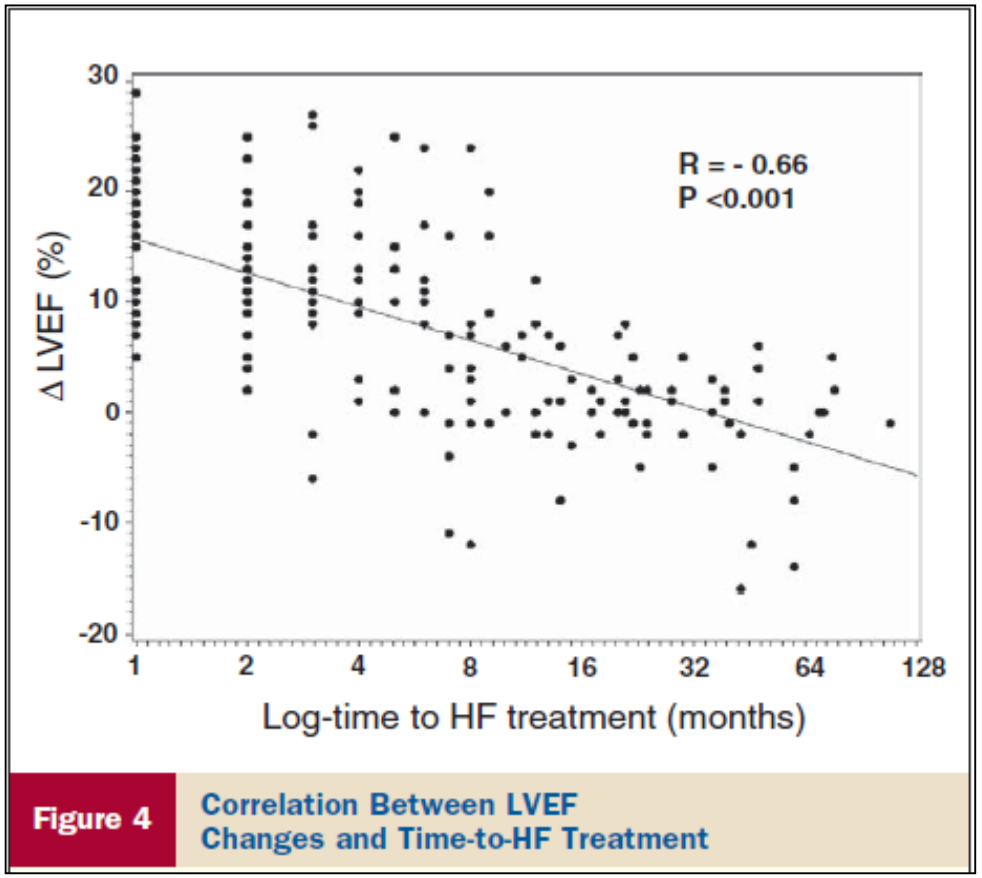


Figure 4 Correlation Between LVEF Changes and Time-to-HF Treatment

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 pts with AC-induced CMP
- treatment: ACEI + BB
- mean follow-up: 36±27 months

- pts treated within 6 months:
  = ↑ LVEF 50%: 71%

The more time passes, the less recovery possibility we have

JACC 2010

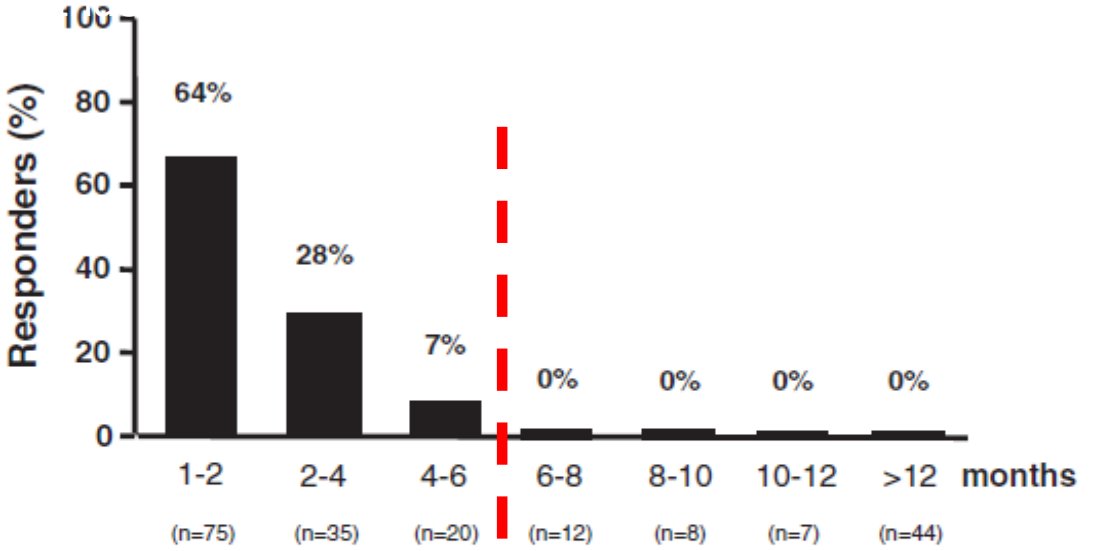


Figure 1 Percentage of patients with complete cardiac function recovery according to time elapsed from AC administration and start of HF therapy

AC = anthracyclines; HF = heart failure.

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 pts with AC-induced CMP
- treatment: ACEI + BB
- mean follow-up: 36±27 months

- pts treated within 6 months:
  = ↑ LVEF 50%: 71%

The clinical benefit was more evident in asymptomatic patients

JACC 2010

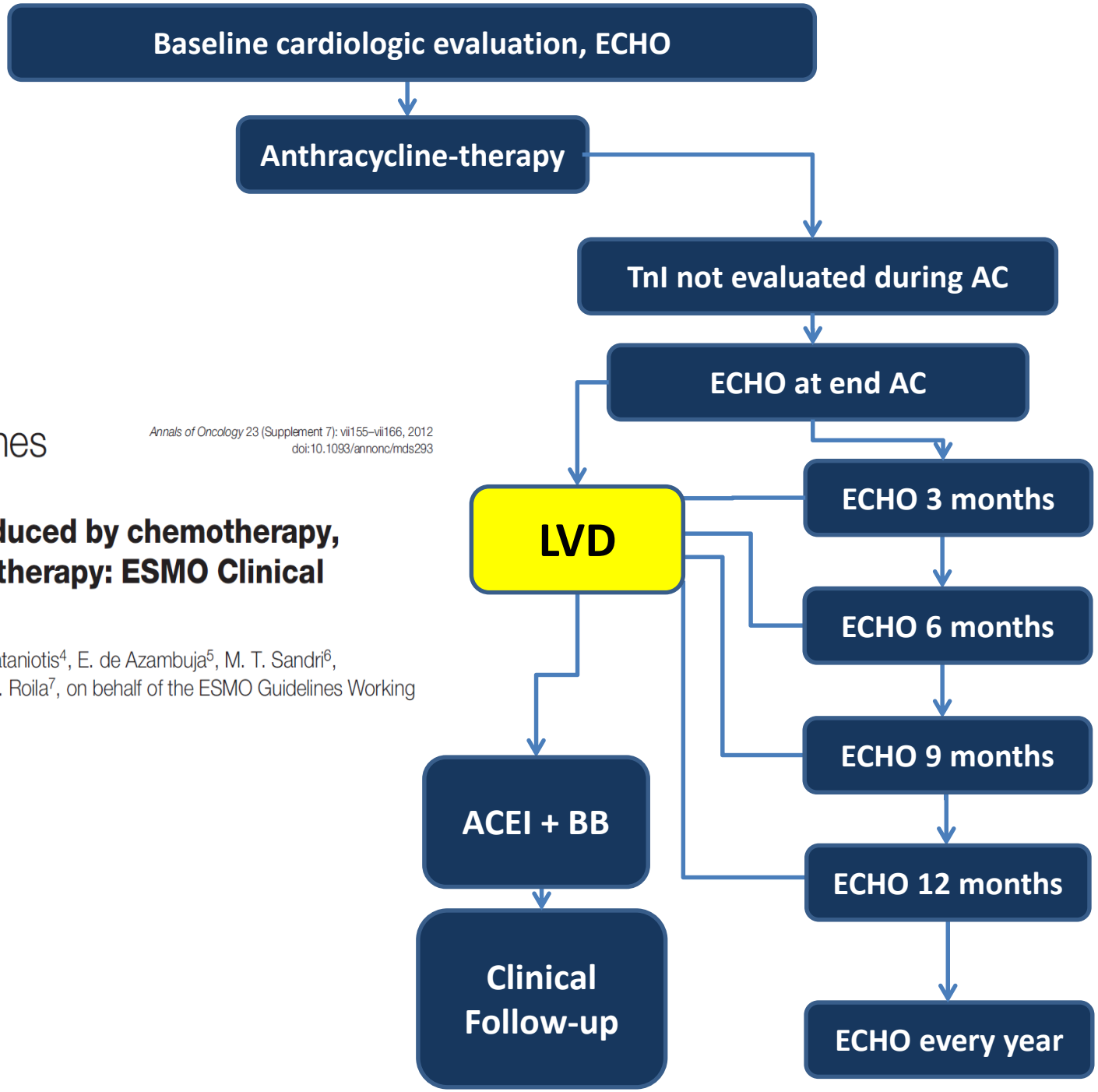
Independent predictors of NO LVEF recovery			
	Adjusted OR	95% IC	P value
Time-to-HF treatment	3.9	12.7-5.7	<0.001
NYHA III-IV class	8.7	3.0-25	<0.001

clinical practice guidelines

Annals of Oncology 23 (Supplement 7): vii155–vii166, 2012
doi:10.1093/annonc/mds293

Cardiovascular toxicity induced by chemotherapy, targeted agents and radiotherapy: ESMO Clinical Practice Guidelines†

G. Curigliano[1], D. Cardinale[2], T. Suter[3], G. Plataniotis[4], E. de Azambuja[5], M. T. Sandri[6], C. Criscitiello[1], A. Goldhirsch[1], C. Cipolla[2] & F. Roila[7], on behalf of the ESMO Guidelines Working Group*



Original Article

Early Detection of Anthracycline Cardiotoxicity and Improvement With Heart Failure Therapy

Daniela Cardinale, MD, PhD, FESC; Alessandro Colombo, MD; Giulia Bacchiani, MD; Ines Tedeschi, MSc; Carlo A. Meroni, MD; Fabrizio Veglia, PhD; Maurizio Civelli, MD; Giuseppina Lamantia, MD; Nicola Colombo, MD; Giuseppe Curigliano, MD, PhD; Cesare Fiorentini, MD; Carlo M. Cipolla, MD

- **Inclusion criteria:**
  - ✓ AC-chemotherapy (CT-naïve pts.)
- **Prospective LVEF monitoring:** at baseline, end-CT, every 3 months during the first year, every 6 months during the first 5 years, every 12 months thereafter, or whenever required by the clinical situation.
- **Study end-point:** occurrence of cardiotoxicity, defined as an absolute decrease >10 percent points in rest LVEF, associated with a decline below the normal limit value (50%).
- **HF therapy:** ACE-inhibitors (ACEI) + beta-blockers (BB) up-titrated to maximal tolerated dose.

Circulation 2015

Study population

- 2625 pts (1949 women; 74%) enrolled
- mean age: 50±13 yrs (range 18 to 82)
- mean baseline LVEF: 63±4% (range 50 to 78%)
- mean AC cumulative dose: 252±86 mg/mq (range 30-900)
- mean follow-up: 5.2 yrs (IQ range 2.6-8.0)
  (range 4 months -19 yrs)

Circulation 2015

Early Detection of Anthracycline Cardiotoxicity and Improvement With Heart Failure Therapy

Daniela Cardinale, MD, PhD, FESC; Alessandro Colombo, MD; Giulia Bacchiani, MD; Ines Tedeschi, MSc; Carlo A. Meroni, MD; Fabrizio Veglia, PhD; Maurizio Civelli, MD; Giuseppina Lamantia, MD; Nicola Colombo, MD; Giuseppe Curigliano, MD, PhD; Cesare Fiorentini, MD; Carlo M. Cipolla, MD

RESULTS:

- CTX: 226/2625 pts (9%)
- NYHA I-II: 283 (81%)
- Mean time from end CT to CTX: 3.5 months (IQ 3-6)

CTX = cardiotoxicity

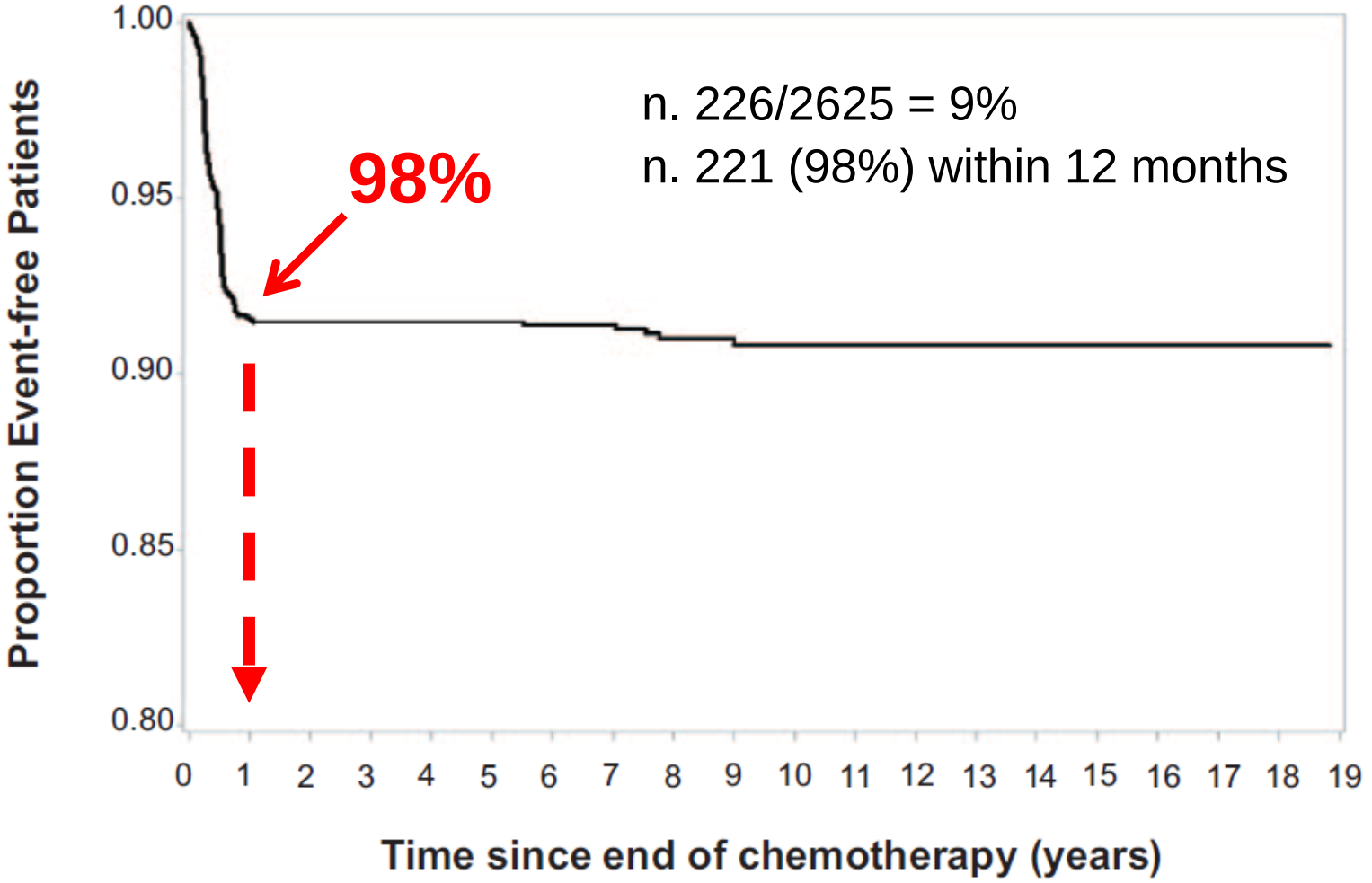
Circulation 2015

Table 1. Clinical Characteristics of Patients Developing or Not Developing Anthracycline-Induced Cardiotoxicity

	Cardiotoxicity (n=226)	No Cardiotoxicity (n=2399)	*P* Value
Age, y	51±13	49±13	0.02
Female sex, n (%)	170 (75)	1779 (74)	0.83
Hypertension, n (%)	59 (26)	508 (21)	0.08
Diabetes mellitus, n (%)	13 (6)	68 (3)	0.012
Hypercholesterolemia, n (%)	20 (9)	142 (6)	0.10
Current or past smokers, n (%)	36 (16)	483 (20)	0.14
Coronary artery disease	8 (4)	50 (2)	0.09
Family history of CAD, n (%)	20 (9)	123 (5)	0.01
Baseline LVEF, %	61±3.6	63±3.7	<0.001
End-chemotherapy LVEF, %	55±4.6	61±4.0	<0.001
Chest wall RT (left),* n (%)	49 (27)	392 (16)	0.06
Mediastinum radiotherapy, † n (%)	16 (7)	154 (6)	0.65
Oncological disease, n (%)			<0.001‡
Breast cancer	131 (58)	1213 (51)	
Hodgkin disease	10 (4)	113 (5)	
Non-Hodgkin lymphoma	46 (20)	695 (29)	
Myeloma	8 (4)	144 (6)	
Ovarian	2 (1)	67 (3)	
Other hemato-oncologic diseases	10 (4)	76 (3)	
Other solid tumors	19 (8)	91 (4)	
Cumulative anthracycline dose, §‖ mg/m^2	359±172	299±144	<0.001

Cardinale et al. Circulation 2015

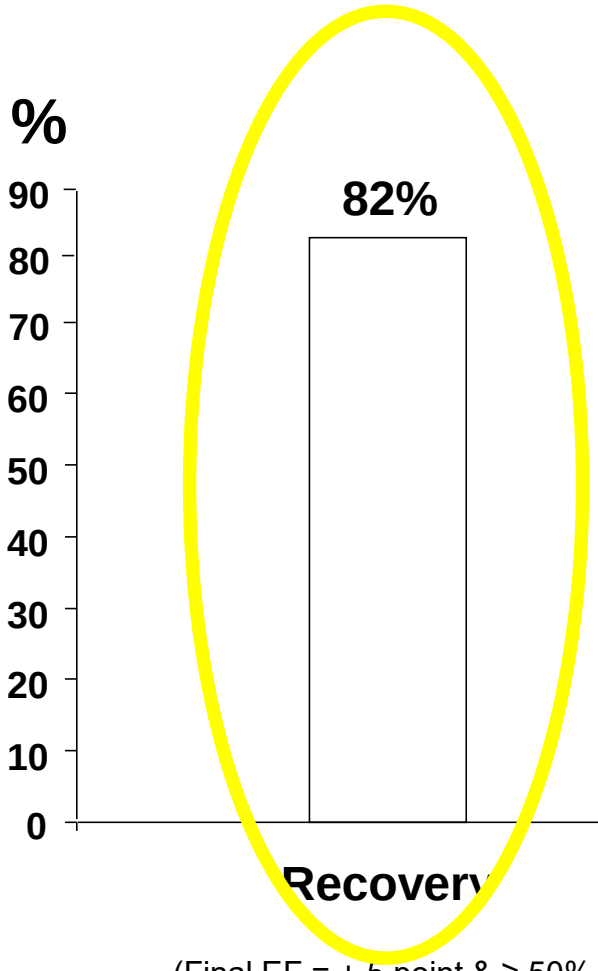
Cumulative incidence of cardiotoxicity



Pts.at risk (n)	2625	2266	1958	1716	1437	1291	1010	784	608	461	410	243	174	116	68	49	25	16	7	0
Cumulative incidence (%)	0	98	98	98	98	98	99	99	99	100	100	100	100	100	100	100	100	100	100	100

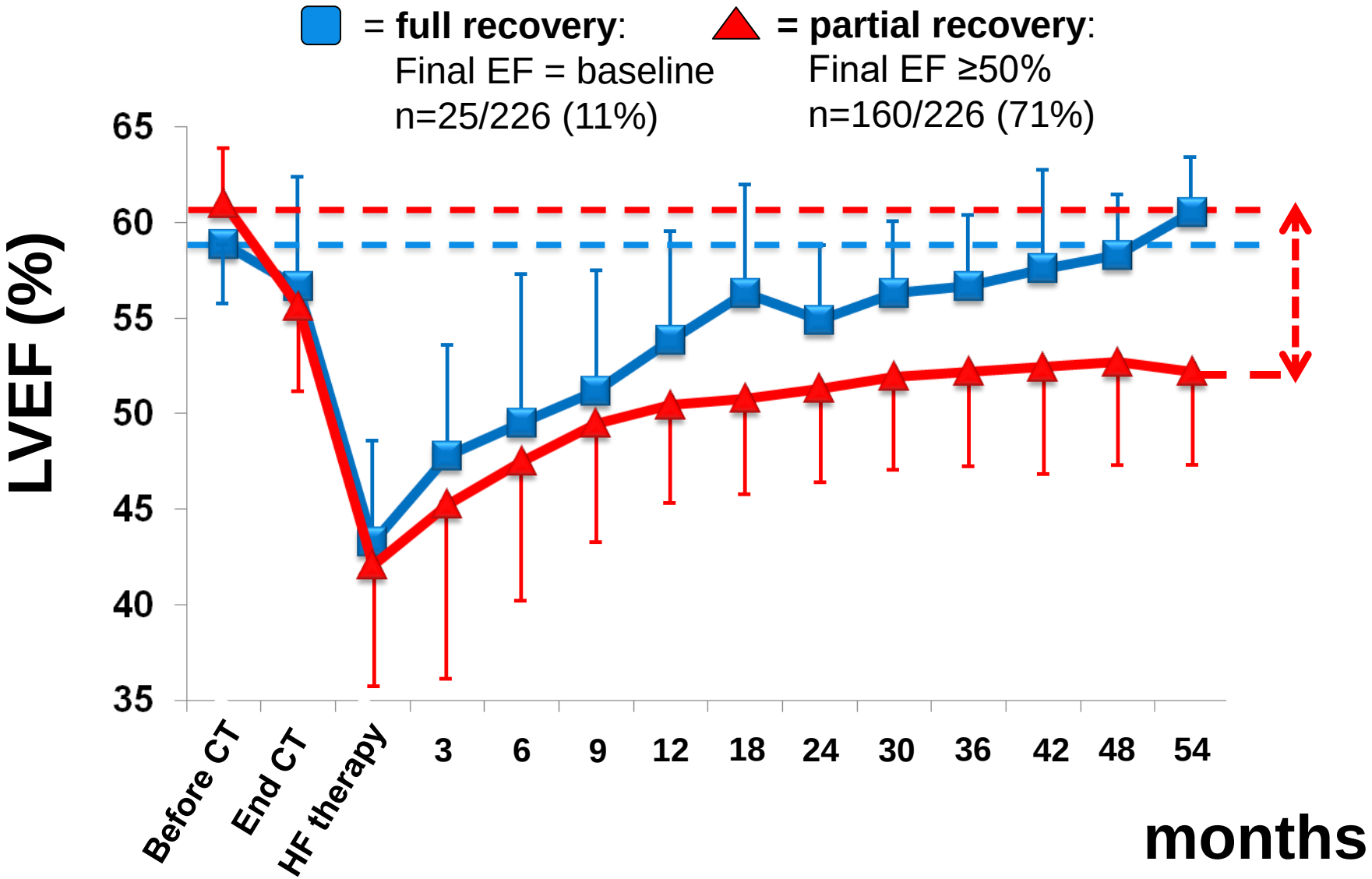
Recovery

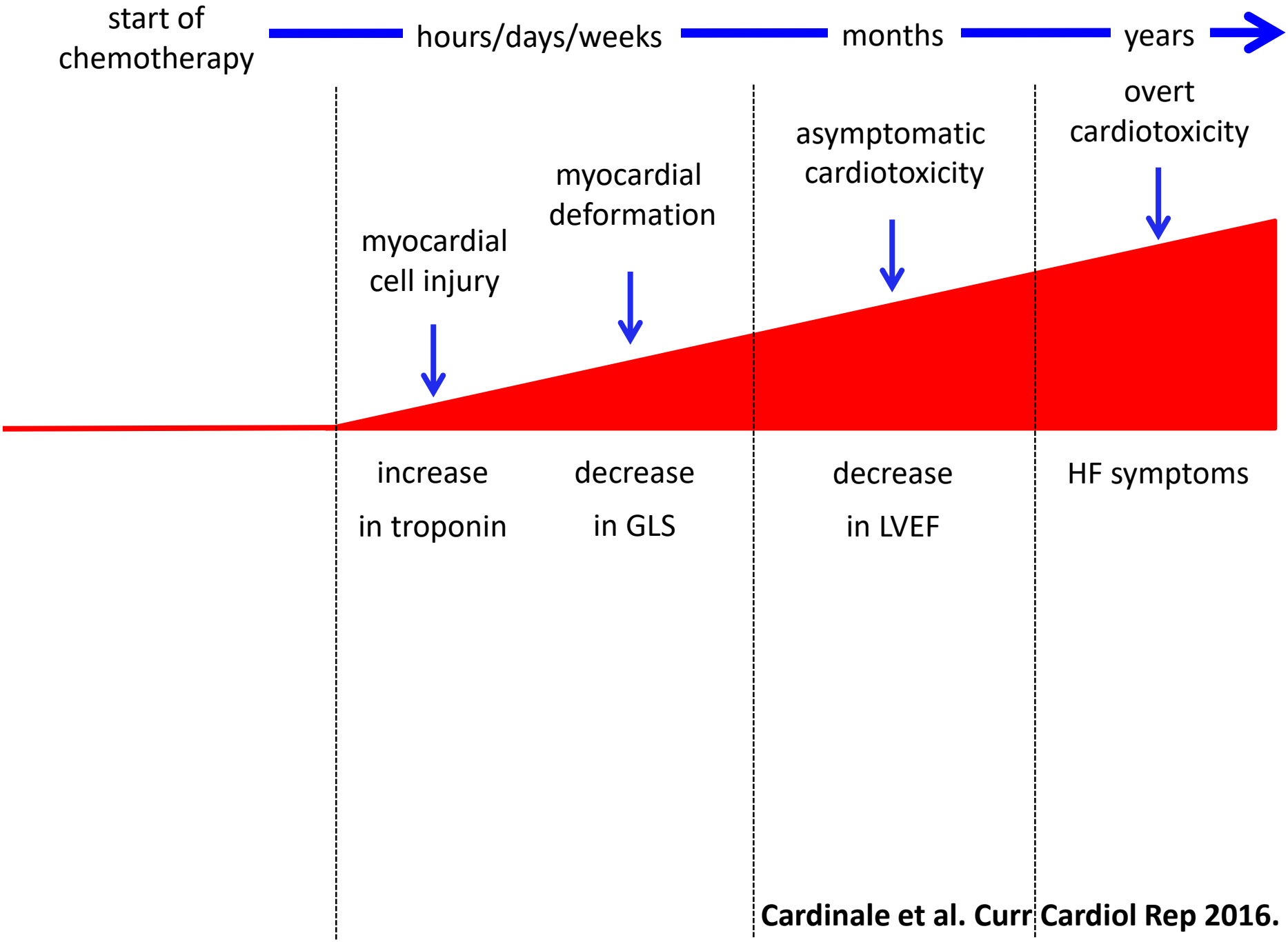
Daniela Cardinale, MD, PhD, FESC; Alessandro Colombo, MD; Giulia Bacchiani, MD; Ines Tedeschi, MSc; Carlo A. Meroni, MD; Fabrizio Veglia, PhD; Maurizio Civelli, MD; Giuseppina Lamantia, MD; Nicola Colombo, MD; Giuseppe Curigliano, MD, PhD; Cesare Fiorentini, MD; Carlo M. Cipolla, MD



- 226 pts with CTX
- ACEI and BB in 90% pts
- Recovery = final LVEF ≥50% in 185 (82%) pts
- Mean time to LVEF normalization = 8±5 months

Recovery


= full recovery:
Final EF = baseline
n=25/226 (11%)
= partial recovery:
Final EF ≥50%
n=160/226 (71%)
LVEF (%)
65
60
55
50
45
40
35
Before CT
End CT
HF therapy
3
6
9
12
18
24
30
36
42
48
54
months



Cardinale et al. Curr Cardiol Rep 2016.

Left Ventricular Dysfunction Predicted by Early Troponin I Release After High-Dose Chemotherapy

Daniela Cardinale, MD, Maria Teresa Sandri, MD,† Alessandro Martinoni, MD, Alessio Tricca, LabTech,† Maurizio Civelli, MD, Giuseppina Lamantia, MD, Saverio Cinieri, MD,* Giovanni Martinelli, MD,* Carlo M. Cipolla, MD, Cesare Fiorentini, MD

Milan, Italy

- 204 pts
- High-dose chemotherapy
- TnI 0,12,24,48,72 h after CT
- N. 65 (32%) TnI +
- N. 139 (68%) TnI -

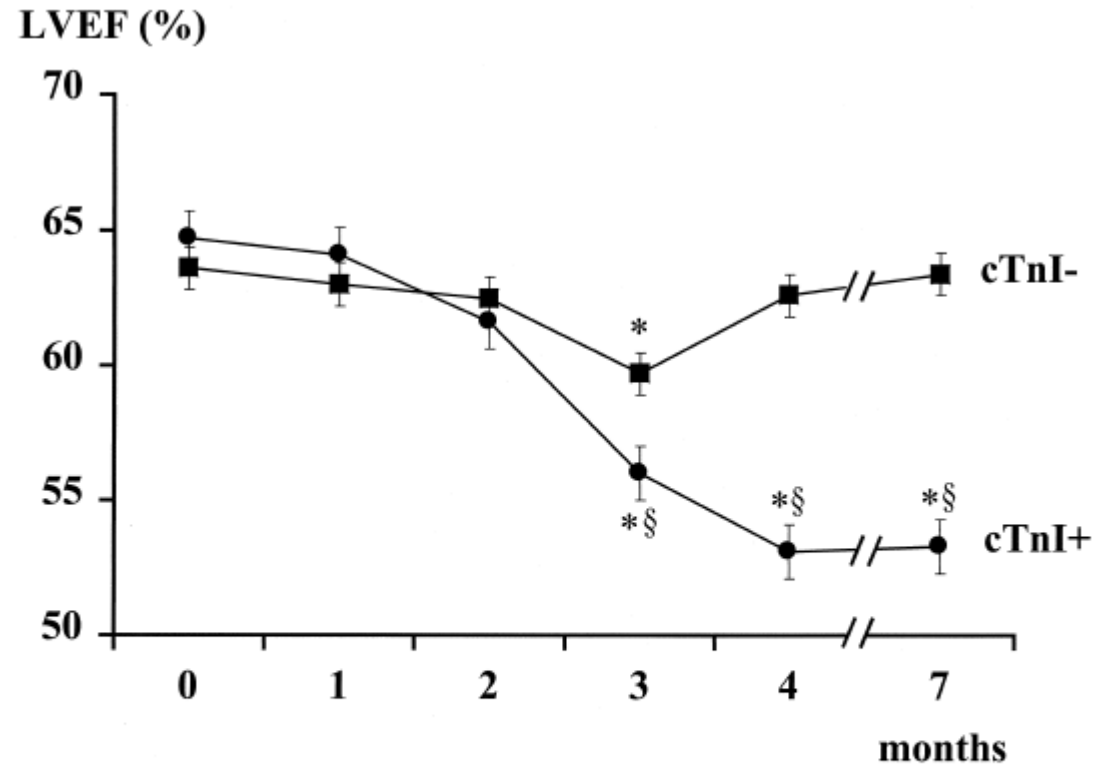


Figure 2. Left ventricular ejection fraction (LVEF) at baseline and during the seven months of follow-up of troponin I positive (cTnI+; **solid circle**) and negative (cTnI−; **solid square**) patients. *$p < 0.001$ vs. baseline (month 0); §$p < 0.001$ vs. cTnI− group. Data are shown as mean ± 95% confidence interval.

J Am Coll Cardiol 2000

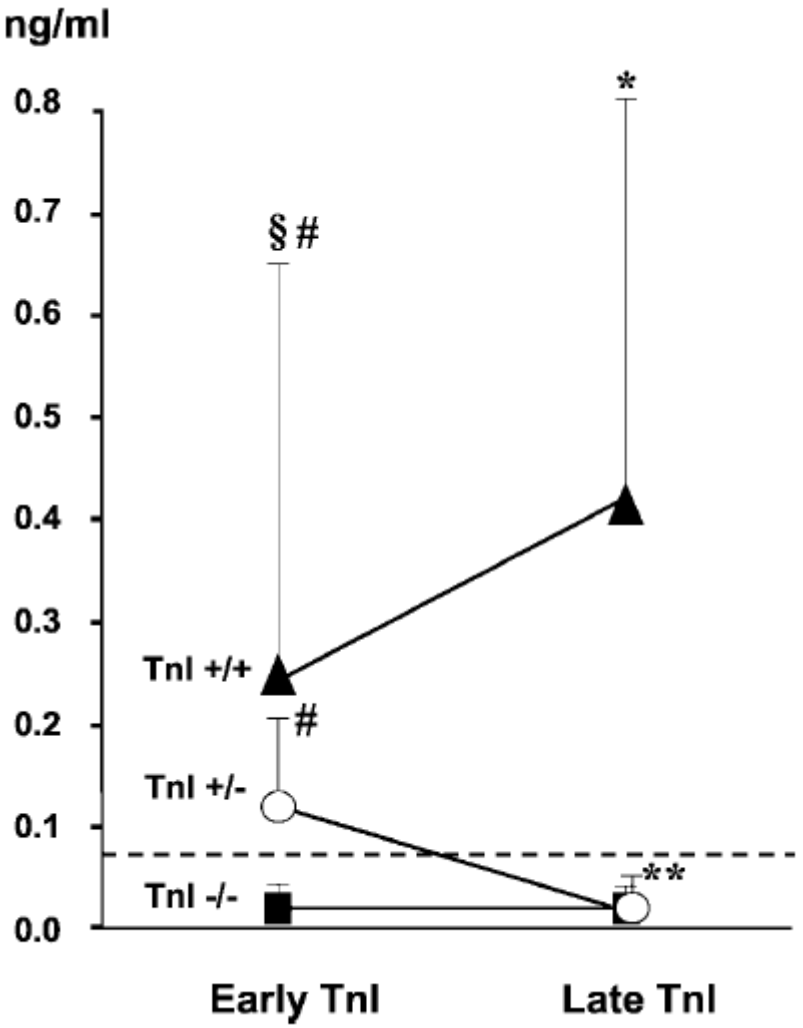
Pattern of TnI release identifies pts at different cardiac risk

- ✓ 703 patients
- ✓ age 47±12 years
- ✓ treated with HDC
- ✓ poor prognosis malignancies

- ♫ follow-up = 48 months
- ♫ MACE incidence

¥ TnI before, soon after, 1 month after HDC:

- TnI -/- = n. 495 (70%)
- TnI +/- = n. 145 (21%)
- TnI +/+ = n. 63 (9%)



Cardinale et al. Circulation 2004

Pattern of TnI release identifies pts at different cardiac risk

Considered Events

3.5 year-follow-up

Sudden death
Cardiac death
Acute pulmonary edema
Heart failure
Asymptomatic ↓ LVEF >25%
Life-threatening arrhythmias
Conduction disturbances requiring PM implantation

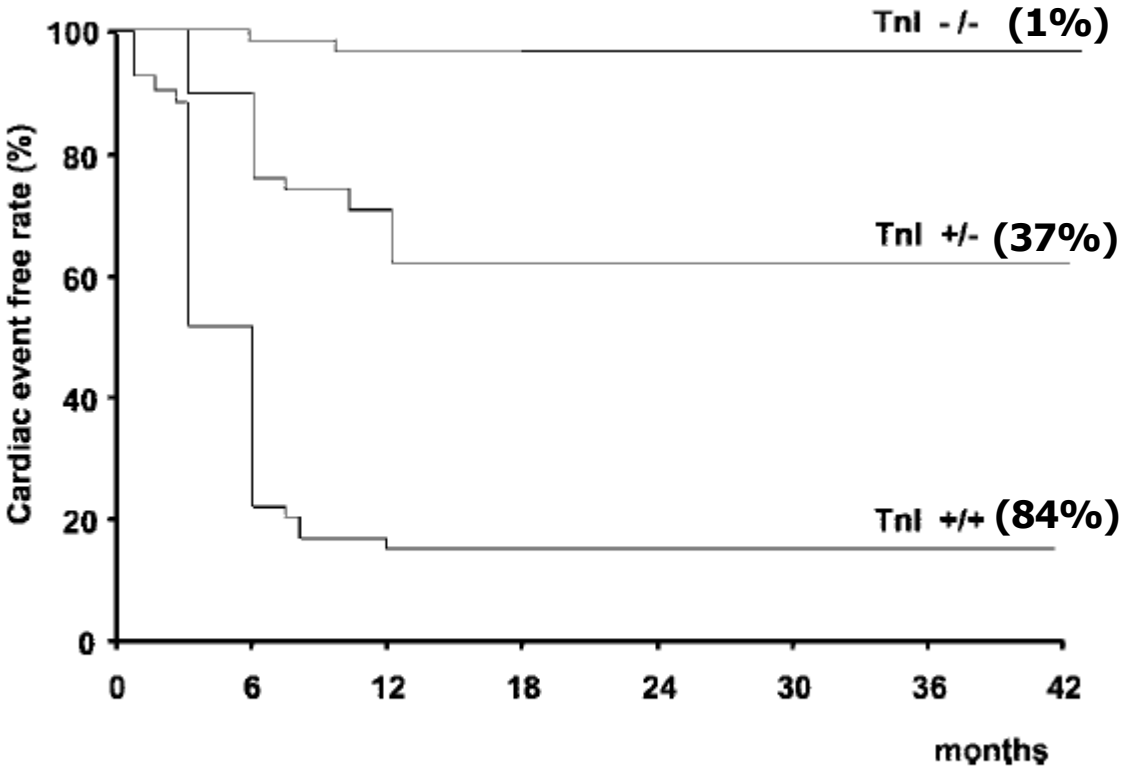


Figure 3. Cumulative cardiac events rate in 3 study groups. $P<0.001$ for $TnI^{+/+}$ vs $TnI^{-/-}$ and $TnI^{+/-}$, and for $TnI^{+/-}$ vs $TnI^{-/-}$.

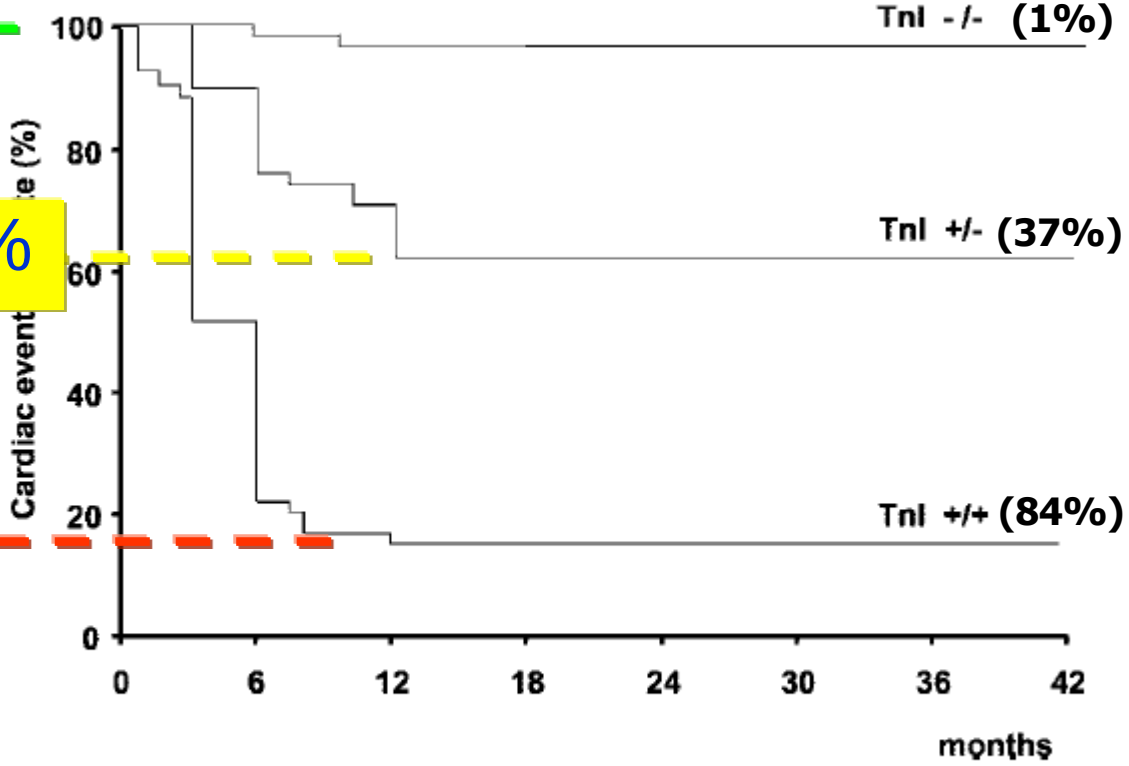
Circulation 2004

Pattern of TnI release identifies pts at different risk

Low risk: 70%

Intermediate risk: 21%

High risk: 9%

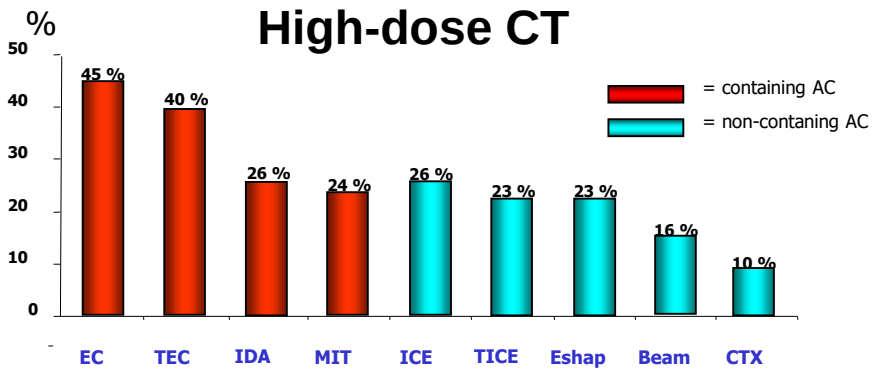


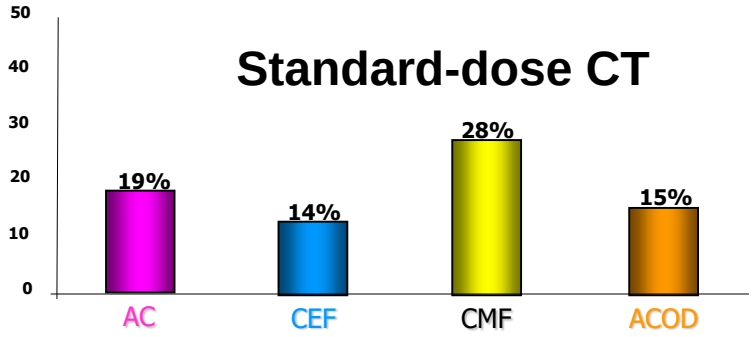
Positive predictive value = 84%

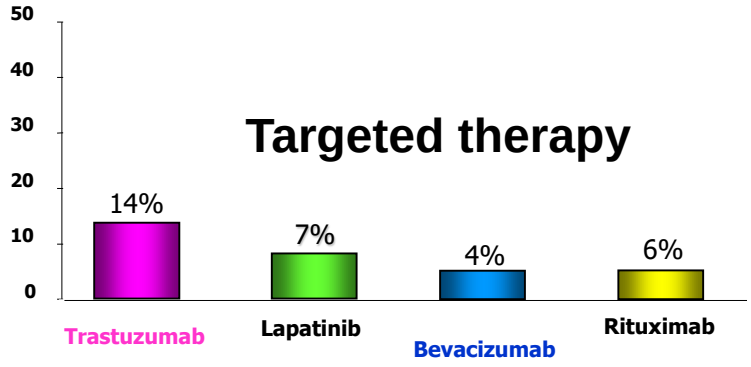
Negative predictive value = 99%

Circulation 2004

TnI positivity in different schedules







IEO experience

Diagnosis of cardiotoxicity

Patients undergoing Adriamicin and Cyclophosphamide x 4

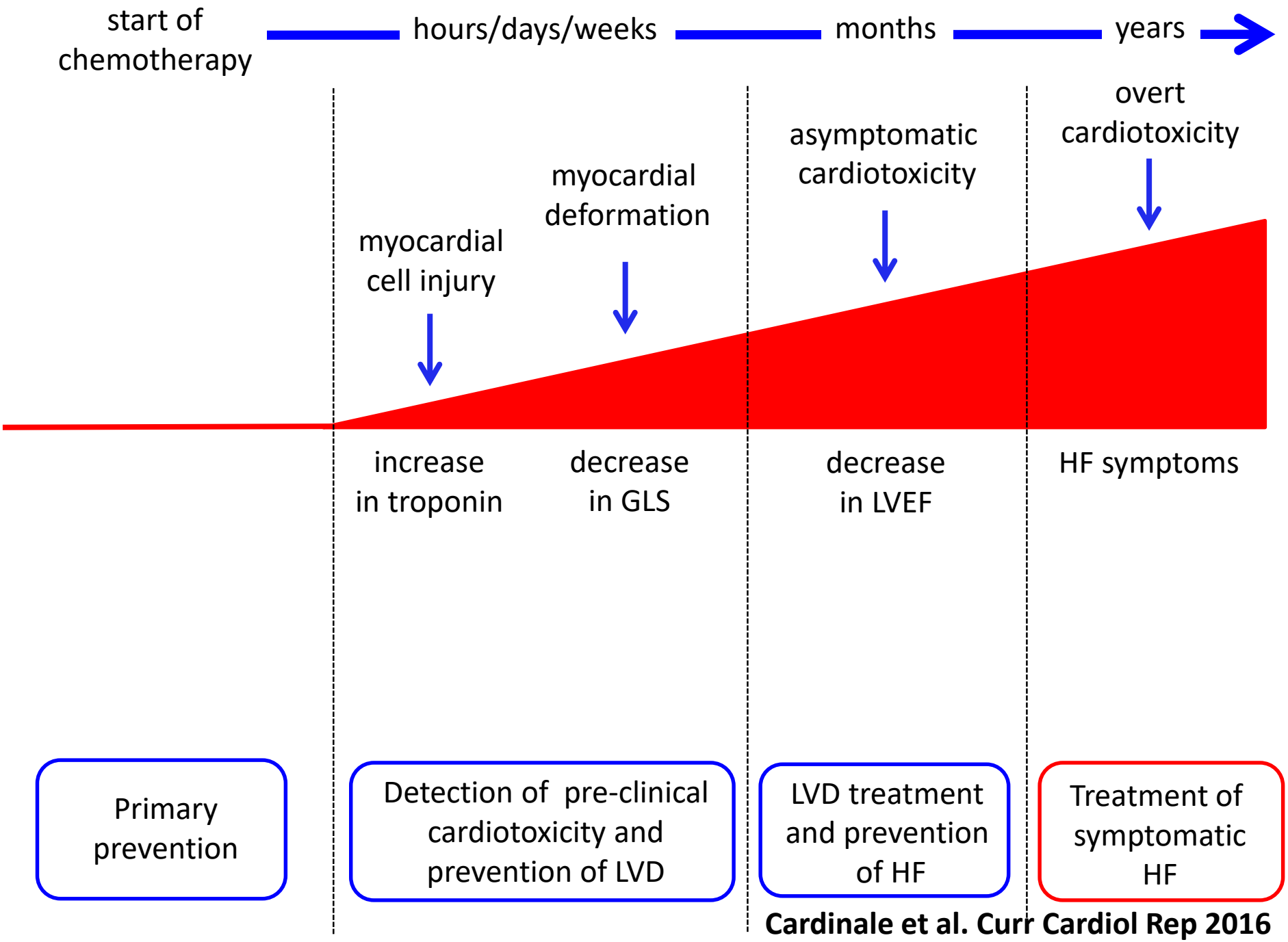
- ✓ **Troponin I assessment :**
  - **immediately before**
  - **immediately after each AC cycle**

→

- ✓ **LVEF assessment:**
  - **at baseline**
  - **at the end of AC therapy**
  - **in case of Troponin increase**

	TnI before	TnI after		LVEF%
AC 1°	0.02	0.01	n.v.<0.08	62
AC 2°	0.02	0.03		
AC 3°	0.06	0.10		66
AC 4°	0.10	0.11		63
after	2 months	→		45

Prevention



Cardinale et al. Curr Cardiol Rep 2016

Table 27.4.3 Drugs showing a prophylactic effect against anticancer therapy-induced left ventricular dysfunction in studies in adult cancer populations

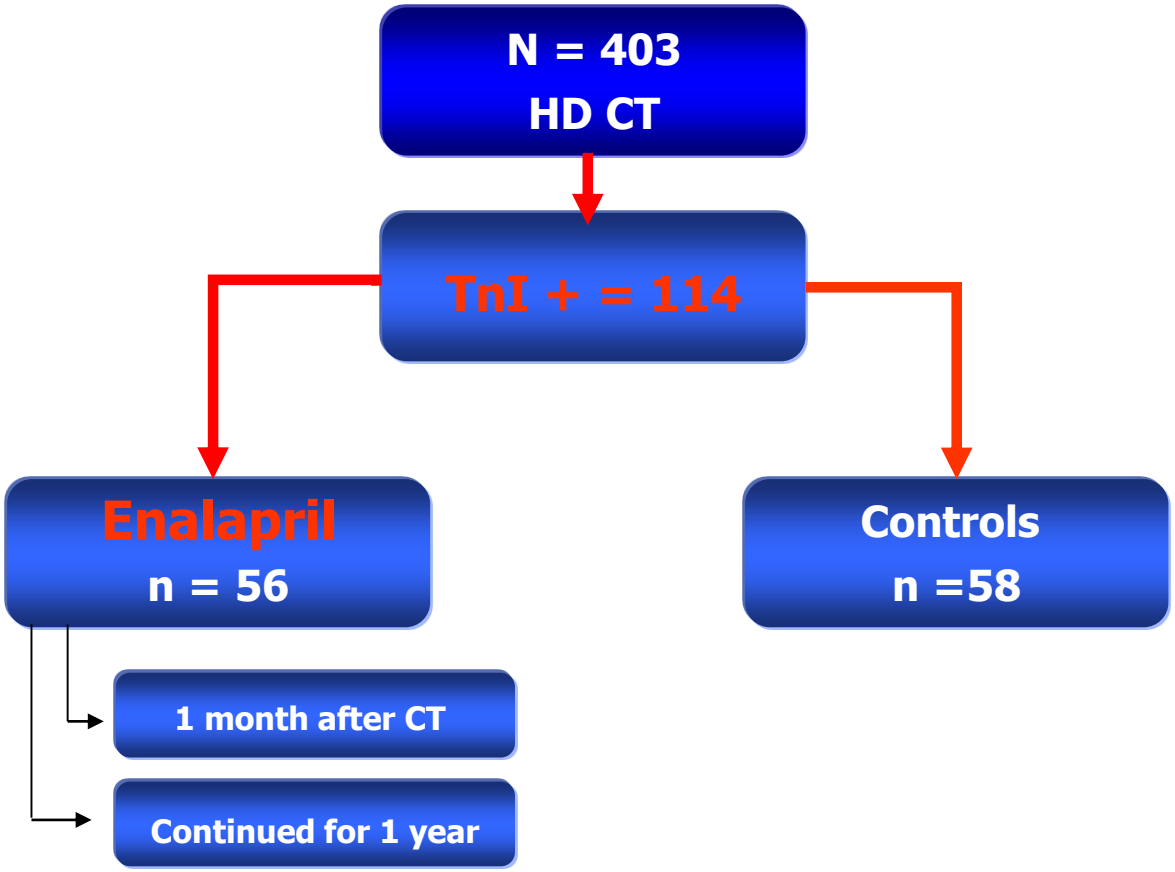
Lead author (year)	Study design/follow-up	Patients (*n*)	Cancer type	Drugs	Intervention	Results
Beta blockers						
Kalay (2010.25 pt06)[51]	RCT/6 months	50	Various	AC	Carvedilol	No LVEF ↓
Kaya (2012)[52]	RCT/6 months	45	Breast cancer	AC	Nebivolol	No LVEF and NT-proBNP ↑
Seicean (2013)[53]	Retrospective/5 years	318	Breast cancer	AC, TRZ	Beta blockers	HF ↓
Pituskin (2015)[54]	RCT/12 months	99	Breast cancer	AC + TRZ	Bisoprolol	No LVEF ↓
ACEI						
Cardinale (2006)[55]	RCT/12 months	114	Various	HD CT	Enalapril	No LVEF ↓; MACE incidence ↓
Pituskin (2015)[54]	RCT/12 months	99	Breast cancer	AC + TRZ	Perindopril	No LVEF ↓
ARB						
Nakamae (2005)[56]	RCT/7 days	40	NHL	AC	Valsartan	No LVEDD ↑; no BNP and ANP ↑; no QT ↑
Cadeddu (2010)[57]	RCT/18 months	49	Various	AC	Telmisartan	No peak strain rate ↓; no interleukin 6 ↑
Gulati (2015)[58]	RCT/1.5-16 months	120	Breast cancer	AC + Tx + TRZ	Candesartan	No LVEF ↓
Aldosterone antagonists						
Akpek (2015)[59]	RCT/6 months	83	Breast cancer	AC	Spironolactone	No LVEF ↓; no TNI and BNP ↑
ACEI + beta blockers						
Bosh (2013)[60]	RCT/6 months	90	Haematological	AC	Enalapril + Carvedilol	No LVEF ↓; death ↓; HF ↓
Statins						
Acar (2011)[61]	RCT/6 months	40	Haematological	AC	Atorvastatin	No LVEF↓
Seicean (2012)[53]	Retrospective/5 years	67	Breast cancer	AC	Statins	HF ↓

Cardinale D & Cipolla CM. In: The ESC Textbook of Cardiovascular Medicine 3rd edition. In press.

Prevention in selected high-risk pts

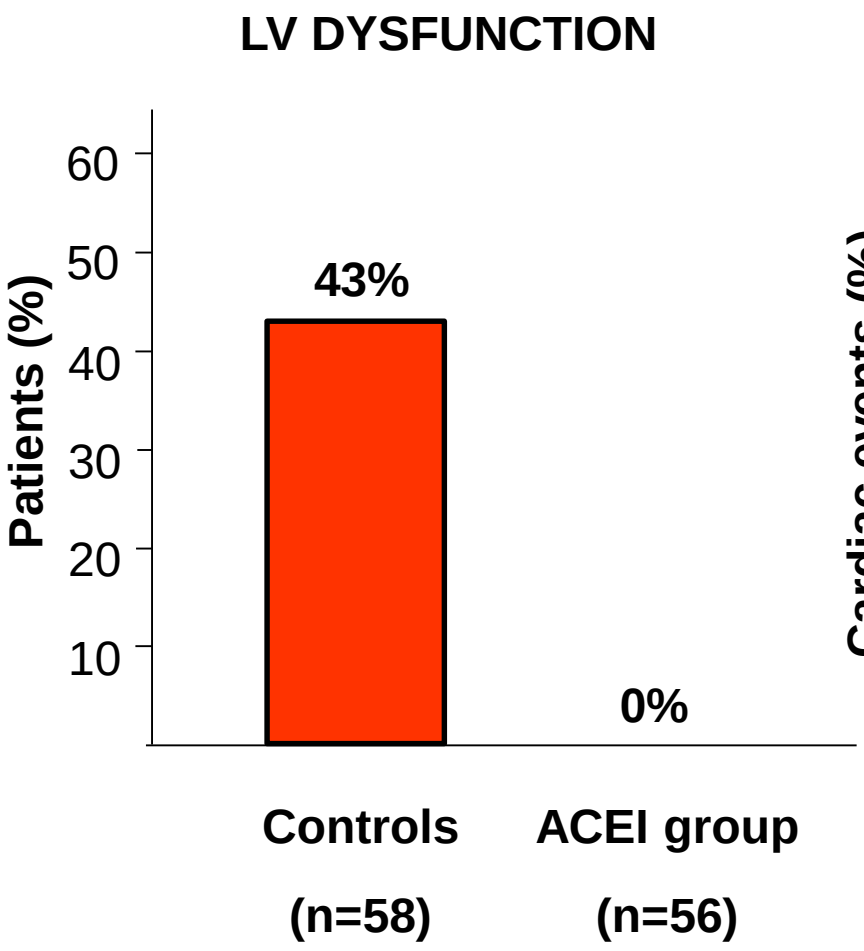
Prevention of High-Dose Chemotherapy–Induced Cardiotoxicity in High-Risk Patients by Angiotensin-Converting Enzyme Inhibition

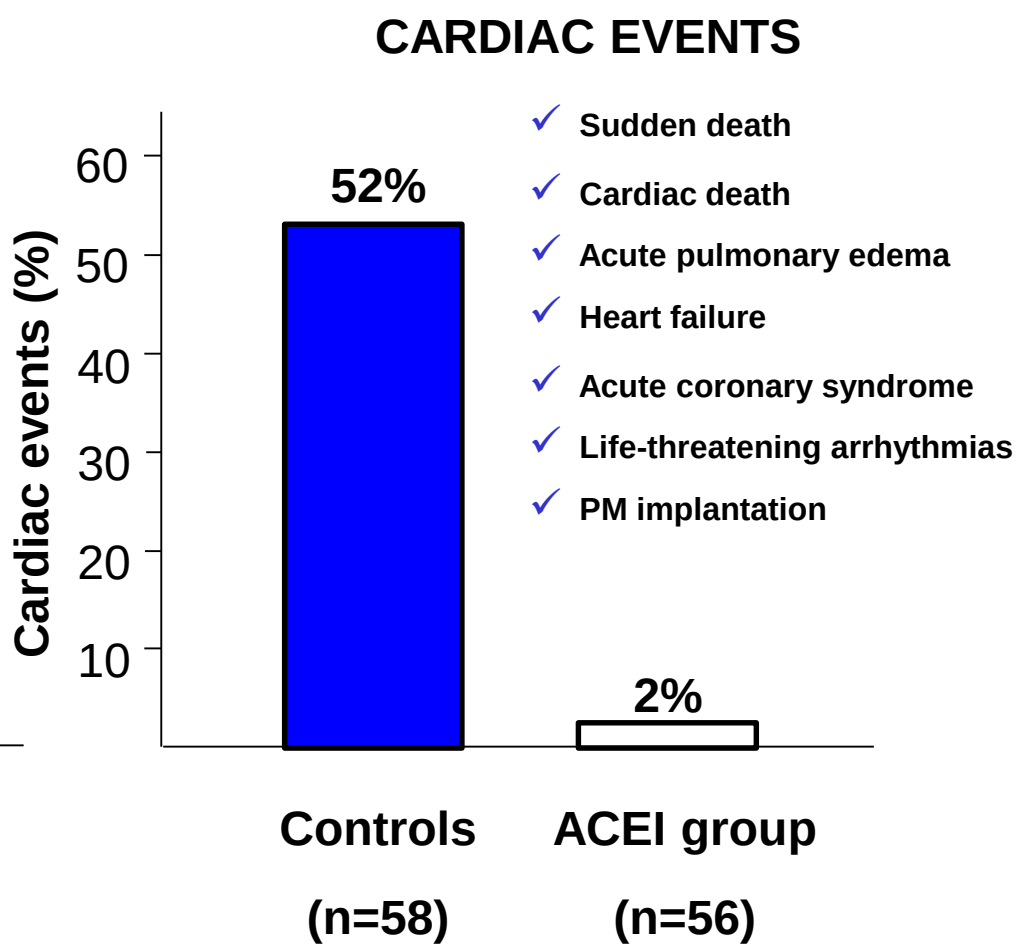
Daniela Cardinale, MD; Alessandro Colombo, MD; Maria T. Sandri, MD; Giuseppina Lamantia, MD; Nicola Colombo, MD; Maurizio Civelli, MD; Giovanni Martinelli, MD; Fabrizio Veglia, PhD; Cesare Fiorentini, MD; Carlo M. Cipolla, MD



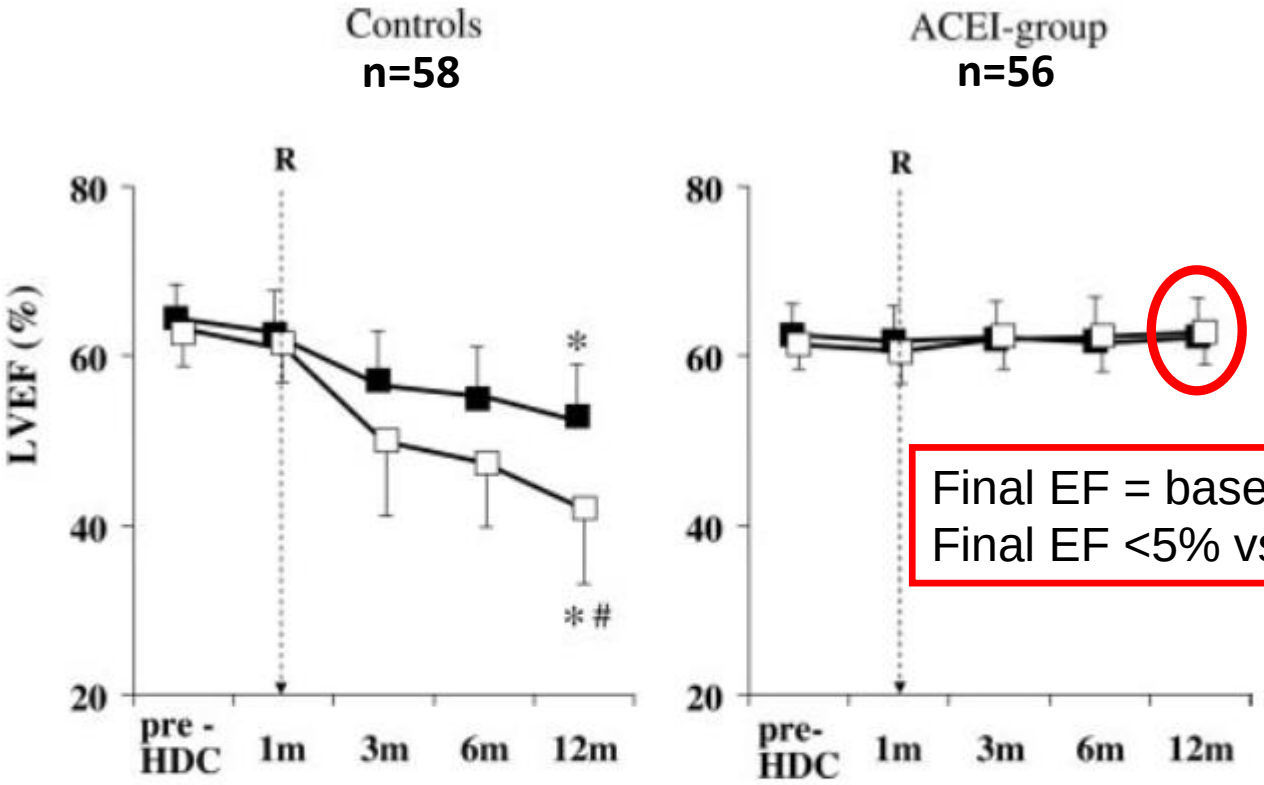
Circulation 2006

Enalapril prevents cardiac dysfunction and cardiac events in TNI+ patients





Modified from Cardinale et al. Circulation 2006



Final EF = baseline in 49 pts (88%)
Final EF <5% vs. baseline in 7 pts (12%)

Figure 1. LVEF at baseline and during the 12-month follow-up in control subjects (left) and the ACEI group (right) in patients with (□) or without (■) persistent TnI increase. For treatment effect, $P<0.001$; for effect of persistent TnI increase, $P<0.001$; for interaction between treatment and persistent TnI increase, $P<0.001$. R indicates randomization. *$P<0.001$ vs baseline and randomization for all time points; #$P<0.001$ vs patients without persistent TnI increase.

Modified from Cardinale et al. Circulation 2006

CARDIOLOGICAL MONITORING IN PATIENTS UNDERGOING CANCER THERAPY

Patients undergoing Adriamicin and Cyclophosphamide x 4

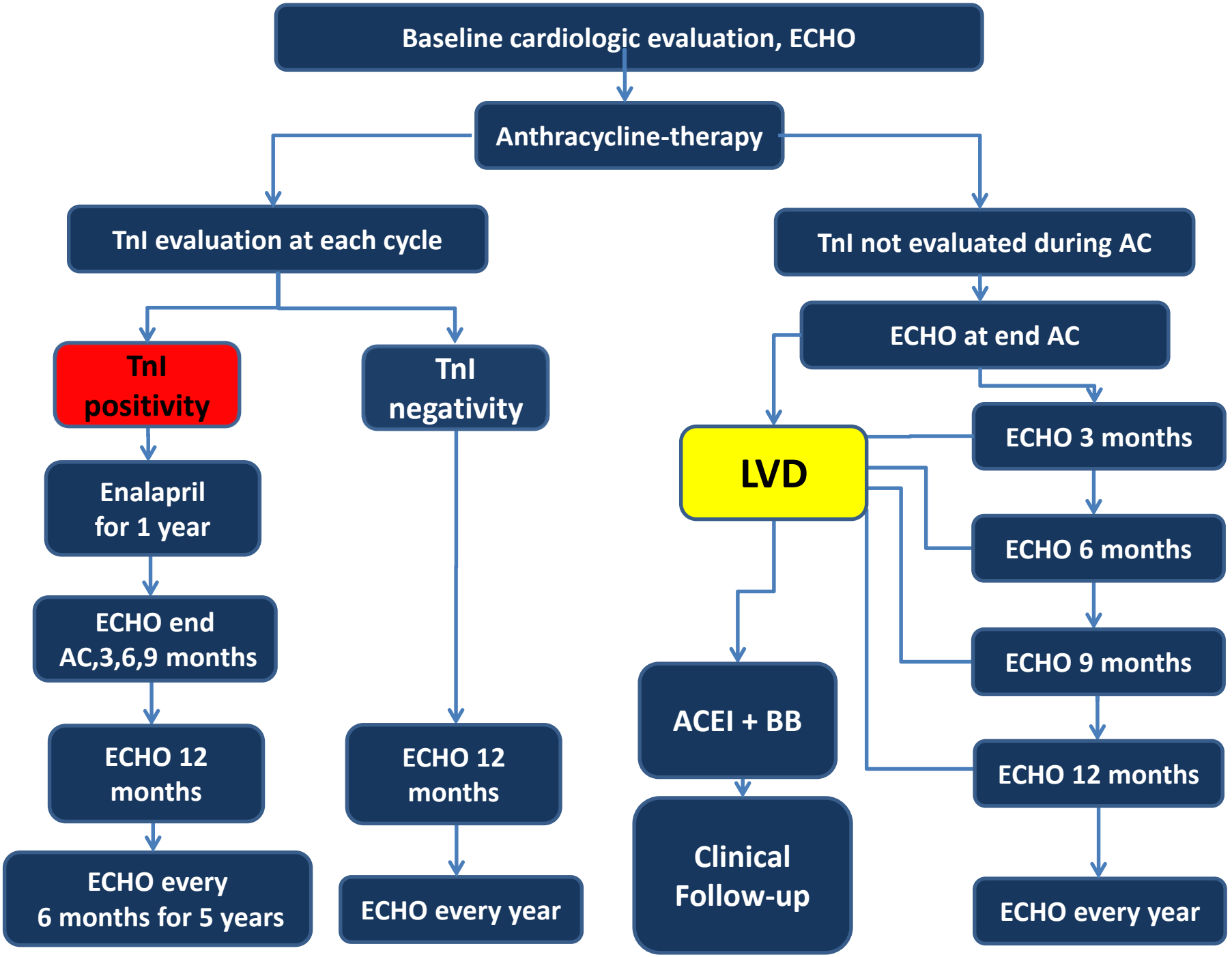
✓**Troponin I assessment :**
- **immediately before**
- **immediately after each AC cycle**

	TnI before	TnI after		LVEF%
AC 1°	0.002	0.001	n.v.<0.040	62
AC 2°	0.002	0.003		
AC 3°	0.007	0.080		66

WE DON'T STOP CHEMOTHERAPY

✓**LVEF assessment:**
- **at baseline**
- **at the end of AC therapy**
- **in case of Troponin increase**

Enalapril
Enalapril
Enalapril
Enalapril for 1 year


Baseline cardiologic evaluation, ECHO
Anthracycline-therapy
TnI evaluation at each cycle
TnI not evaluated during AC
TnI positivity
TnI negativity
ECHO at end AC
Enalapril for 1 year
ECHO end AC,3,6,9 months
ECHO 12 months
ECHO every 6 months for 5 years
ECHO 12 months
ECHO every year
LVD
ECHO 3 months
ECHO 6 months
ECHO 9 months
ECHO 12 months
ECHO every year
ACEI + BB
Clinical Follow-up

Primary vs. secondary prevention
What is better ??

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Original Research

Anthracycline-induced cardiotoxicity: A multicenter randomised trial comparing two strategies for guiding prevention with enalapril: The International CardioOncology Society-one trial

Daniela Cardinale [a], Fabio Ciceri [b], Roberto Latini [c,*], Maria Grazia Franzosi [c], Maria Teresa Sandri [d], Maurizio Civelli [e], GianFranco Cucchi [f], Elisabetta Menatti [g], Maurizio Mangiavacchi [h], Raffaele Cavina [i], Enrico Barbieri [j], Stefania Gori [k], Alessandro Colombo [a], Giuseppe Curigliano [l], Michela Salvatici [d], Antonio Rizzo [m], Francesco Ghisoni [n], Alessandra Bianchi [o], Cristina Falci [p], Michele Aquilina [q], Andrea Rocca [r], Anna Monopoli [s], Carlo Milandri [t], Giuseppe Rossetti [u], Marco Bregni [v], Marco Sicuro [w], Alessandra Malossi [x], Daniele Nassiacos [y], Claudio Verusio [z], Monica Giordano [aa], Lidia Staszewsky [c], Simona Barlera [c], Enrico B. Nicolis [c], Michela Magnoli [c], Serge Masson [c], Carlo M. Cipolla [e] on behalf of the ICOS-ONE Study Investigators [l]

ICOS-ONE

Prevention of anthracycline-induced cardiotoxicity

a multicentre randomized trial comparing two preventive strategies

Carlo M. Cipolla, M.D. , Daniela Cardinale, M.D. , Fabio Ciceri, M.D. , Roberto Latini, M.D.

BACKGROUND

Anthracycline-containing chemotherapy is well known to cause dose-dependent, progressive cardiac damage in particular left ventricular dysfunction evolving to heart failure. The development of cardiac dysfunction, even asymptomatic, leads to the exclusion of cancer patients from effective chemotherapy, with a possible negative impact on their oncologic prognosis.

Two different strategies could be implemented in order to reduce cardiotoxicity:

1. *use of enalapril in all cancer patients undergoing CT, in the attempt to prevent or blunt the rise of cTnI.*
2. *use of enalapril only in selected cancer patients showing an increase of cTn above the threshold after CT.*

These strategies alone and in comparison will be tested for the first time in the multicentre randomized trial ICOS-ONE.

OBJECTIVES OF THE STUDY

Primary Objective

To assess whether enalapril started concomitantly to AC-containing treatments can prevent cardiac toxicity more effectively than when enalapril is prescribed to selected patients showing laboratory evidences of injury after chemotherapy, during follow-up visits.

Secondary Objectives

to reduce

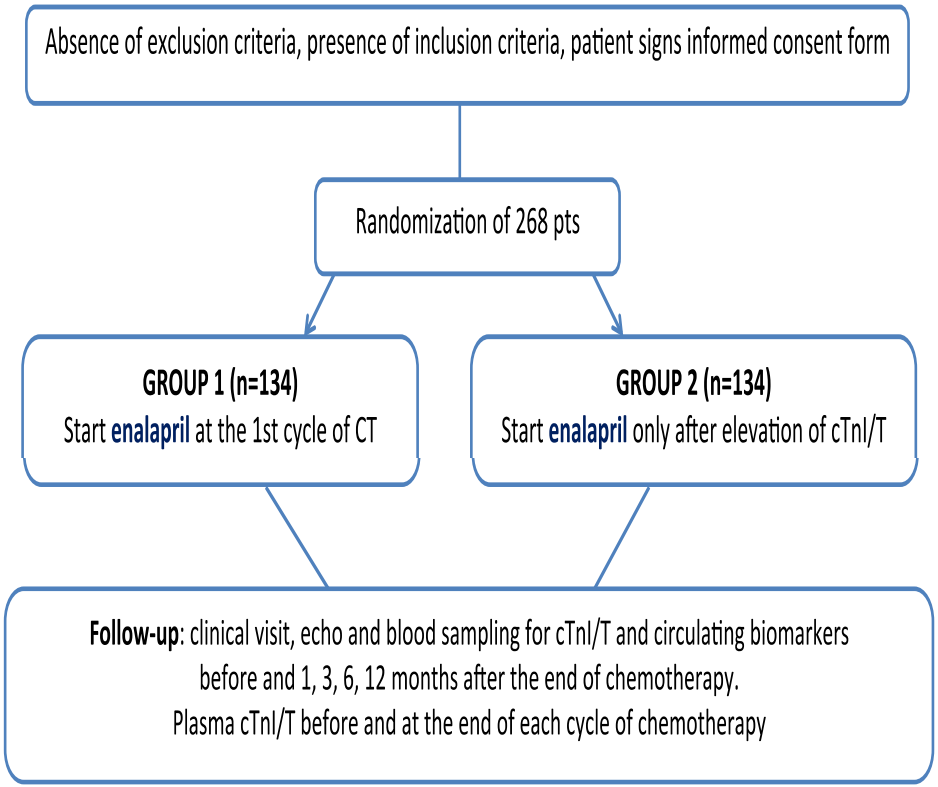
- admissions to hospital for cardiovascular causes
- deaths for cardiovascular causes
- new occurrence of hypo- or hyperkinetic arrhythmias

to find differences in

- cardiac structural and functional variables by echocardiography
- magnetic resonance imaging
- biomarkers such as NT-pro-BNP and PTX-3

STUDY DESIGN FLOW CHART

ClinicalTrials.gov Identifier:
NCT01968200



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ICOS-ONE

Prevention of anthracycline-induced cardiotoxicity

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LVEF%

	Enalapril at randomization	Enalapril after 1° cTn ↑	P
Baseline	63 ± 6	64 ± 6	NS
1 month follow up	62 ± 6	64 ± 6	NS
3 months follow up	63 ± 6	63 ± 6	NS
6 months follow up	63 ± 5	63 ± 6	NS
12 months follow up	62 ± 6	63 ± 5	NS

CARDIAC EVENTS

	Enalapril at randomization	Enalapril after 1° cTn ↑	P
Heart failure	0	0	NS
Asymptomatic LVEF drop	2 (1.5%)	2 (1.5%)	NS
Acute coronary sindrome	0	0	NS
Arrhythmias requiring treatment	1 (0.7%)	3 (2.2%)	NS

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Pros & Cons

Primary prevention with Enalapril (100%)

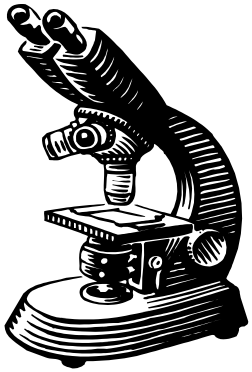
- very low incidence LVD & MACE
- TNI assessment not required
- monitoring during up-titration in 100%
- exposure to side effects to all pts
- FU monitoring required in all pts
- high cost-benefit ratio

Enalapril in TN+ patients (20%)

- very low incidence of LVD & MACE
- repeated TN assessment required
- monitoring during up-titration in 20% pts
- exposure to side effects only pts at high-risk
- FU monitoring not required in TNI neg pts (low risk)
- low cost-benefit ratio

Conclusions

Prevention	Complete or partial recovery	No recovery



Troponins

ECHO

Symptoms

Myocardial cell injury

LV dysfunction

Overt HF

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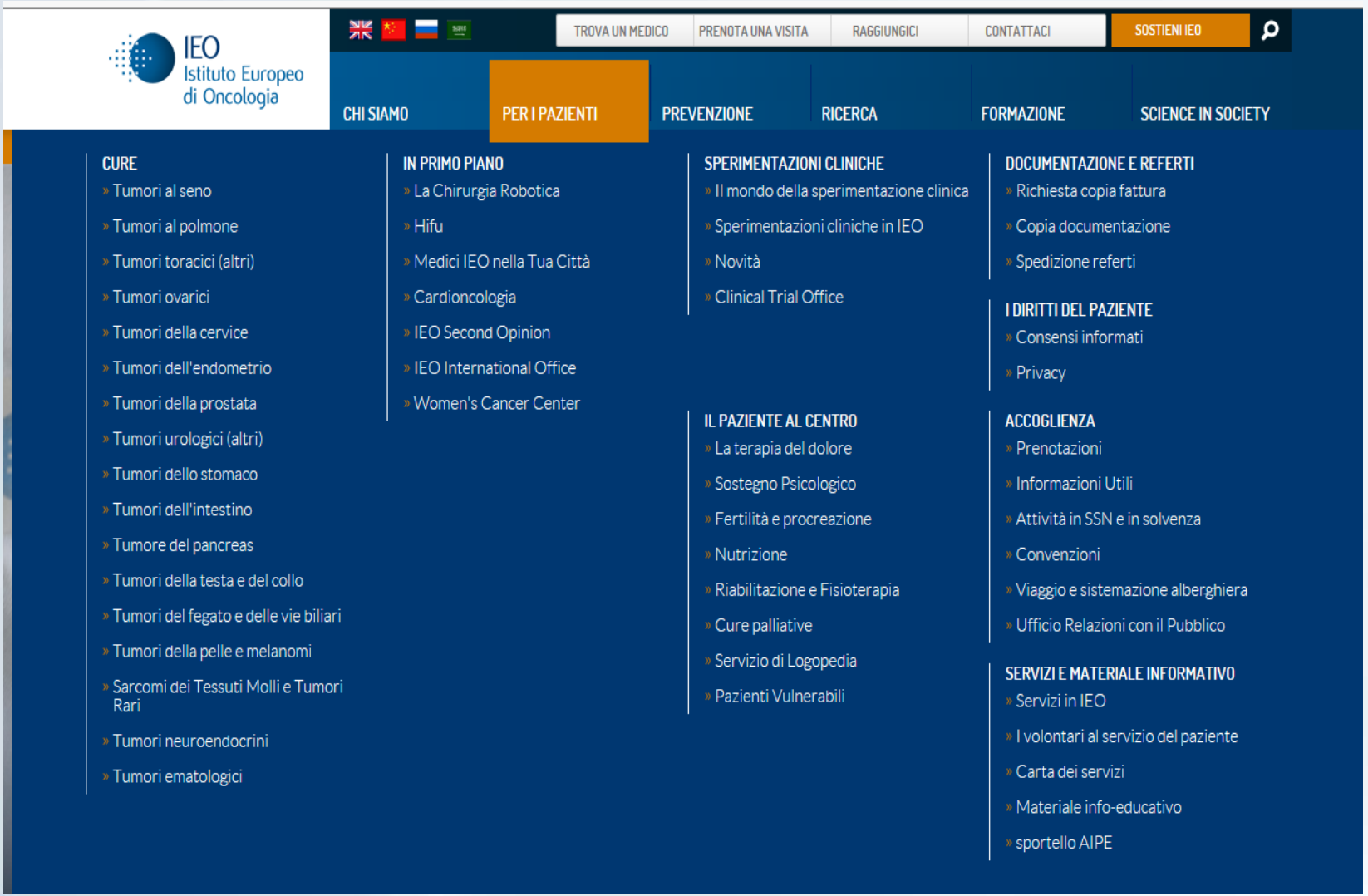
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Istituto Europeo di Oncologia
TROVA UN MEDICO
PRENOTA UNA VISITA
RAGGIUNGICI
CONTATTACI
SOSTIENI IEO
CHI SIAMO
PER I PAZIENTI
PREVENZIONE
RICERCA
FORMAZIONE
SCIENCE IN SOCIETY
CURE
» Tumori al seno
» Tumori al polmone
» Tumori toracici (altri)
» Tumori ovarici
» Tumori della cervice
» Tumori dell'endometrio
» Tumori della prostata
» Tumori urologici (altri)
» Tumori dello stomaco
» Tumori dell'intestino
» Tumore del pancreas
» Tumori della testa e del collo
» Tumori del fegato e delle vie biliari
» Tumori della pelle e melanomi
» Sarcomi dei Tessuti Molli e Tumori Rari
» Tumori neuroendocrini
» Tumori ematologici
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IL PAZIENTE AL CENTRO
» La terapia del dolore
» Sostegno Psicologico
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» Nutrizione
» Riabilitazione e Fisioterapia
» Cure palliative
» Servizio di Logopedia
» Pazienti Vulnerabili
DOCUMENTAZIONE E REFERTI
» Richiesta copia fattura
» Copia documentazione
» Spedizione referti
I DIRITTI DEL PAZIENTE
» Consensi informati
» Privacy
ACCOGLIENZA
» Prenotazioni
» Informazioni Utili
» Attività in SSN e in solvenza
» Convenzioni
» Viaggio e sistemazione alberghiera
» Ufficio Relazioni con il Pubblico
SERVIZI E MATERIALE INFORMATIVO
» Servizi in IEO
» I volontari al servizio del paziente
» Carta dei servizi
» Materiale info-educativo
» sportello AIPE

Cardioncologia: curare il cancro proteggendo il cuore

I trattamenti antitumorali sia tradizionali che più recenti possono danneggiare il cuore. La comparsa di tossicità cardiaca spesso rende necessaria la sospensione delle cure oncologiche con conseguenze negative sia dal punto di vista oncologico che cardiologico.

Per questo motivo i pazienti trattati allo IEO vengono sottoposti ad un attento e costante controllo dello stato di salute del loro cuore. Un'unità dedicata, l'Unità di Cardioncologia, ha sviluppato un approccio innovativo basato sulla valutazione di biomarcatori cardiaci, abbinato ad un trattamento preventivo, che si è dimostrato estremamente efficace prevenendo la cardiotossicità in più di 3000 pazienti che hanno ricevuto trattamenti oncologici potenzialmente tossici per il cuore presso il nostro istituto.

Sul sito IEO è possibile approfondire anche le modalità operative con cui viene effettuato il monitoraggio cardioncologico.

Approfondimento sul tema della cardiotossicità da antracicline

La cardiotossicità da antracicline è una temibile complicanza dei trattamenti antitumorali che può pesare negativamente sulla prognosi del paziente oncologico indipendentemente dal problema tumorale di base. Ancora oggi è considerata irreversibile perché ritenuta poco responsiva ai farmaci cardiologici.
Uno studio prospettivo su 2625 pazienti condotto allo IEO mette in discussione questa antica convinzione e dimostra invece che se la cardiotossicità viene diagnosticata precocemente e un trattamento cardiologico viene instaurato tempestivamente, è possibile ottenere un completo recupero della funzione cardiaca.

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EMAIL SEGRETERIA

PRENOTA UNA VISITA

Vai alle
Sperimentazioni Cliniche

HIGHLIGHT

L'Unità di Cardioncologia nasce nell'ambito della cardiologia IEO come unità operativa dedicata alle problematiche cardiovascolari del paziente oncologico, sia pre-esistenti che secondarie al trattamento antitumorale

Dal 1994 svolge attività di ricerca in ambito cardioncologico, raggiungendo importanti risultati che hanno permesso di sviluppare un modello di approccio clinico moderno e integrato rivolto a:

Le nostre attività

L'attività Clinica coinvolge sia Pazienti Esterni (l'Ambulatorio di Cardioncologia è aperto a SSN, Solvenza Istituzionale, Day Hospital), sia Pazienti Interni (Ricoverati per eseguire terapie antitumorali). Importanti studi coinvolgono la Ricerca Clinica e Traslazionale.

L'**Ambulatorio di Cardioncologia** svolge attività cliniche rivolte a pazienti sottoposti a trattamento antitumorale. Si pone l'obiettivo di riconoscere la cardiotossicità in una fase molto iniziale e asintomatica, per poter così impostare terapie preventive o trattamenti curativi in tempi molto precoci. Questi nel dettaglio i servizi offerti:

- **Stratificazione del rischio cardiologico** nel paziente che deve essere sottoposto a trattamento antitumorale

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Cardioncologia…

…..curare il cancro, proteggendo il cuore.

Grazie!!