CORSO EDUCAZIONALE COMMISSIONE ANZIANI

XIII EDIZIONE

Giardini Naxos - Marriott Delta Hotels
17-18 aprile 2026

IL PUNTO DI VISTA DEL CARDIO-ONCOLOGO

Dott. Stefano Oliva

UOSD Cardiologia di Interesse Oncologico IRCCS Istituto Tumori «Giovanni Paolo II» BARI

Chairperson Area CardiOncologia ANMCO

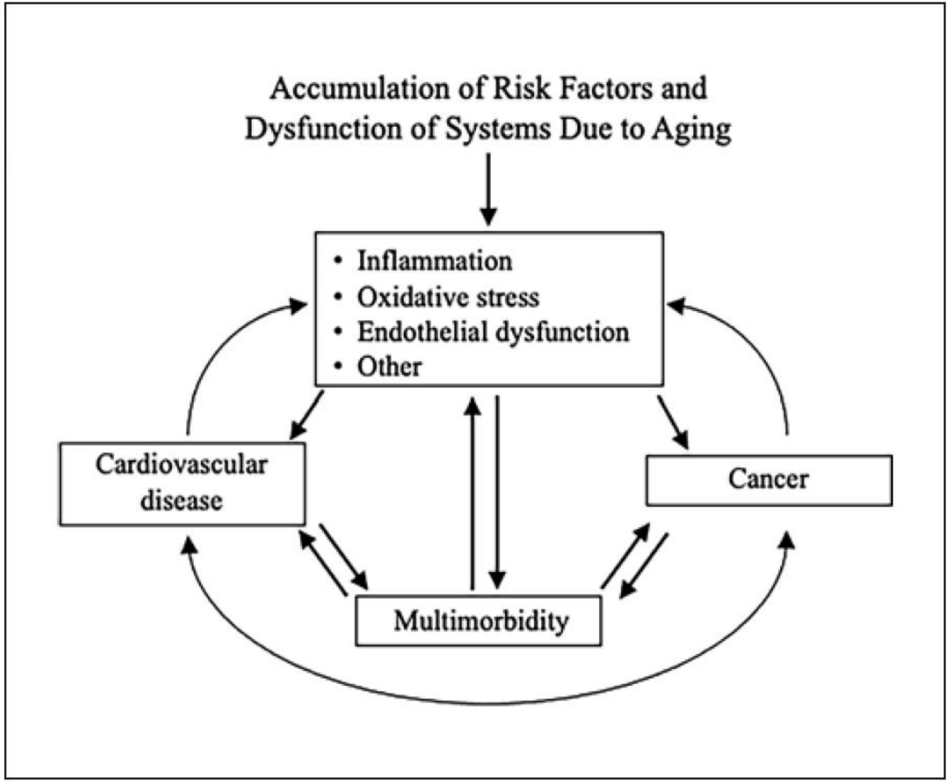
Disclosures of Stefano Oliva

Company name	Research support	Employee	Consultant	Stockholder	Speakers bureau	Advisory board	Other
Astra Zeneca					x		
Novartis					x		
Istituto Gentili	x				x		
Servier					x		
Johnson & Johnson					x		

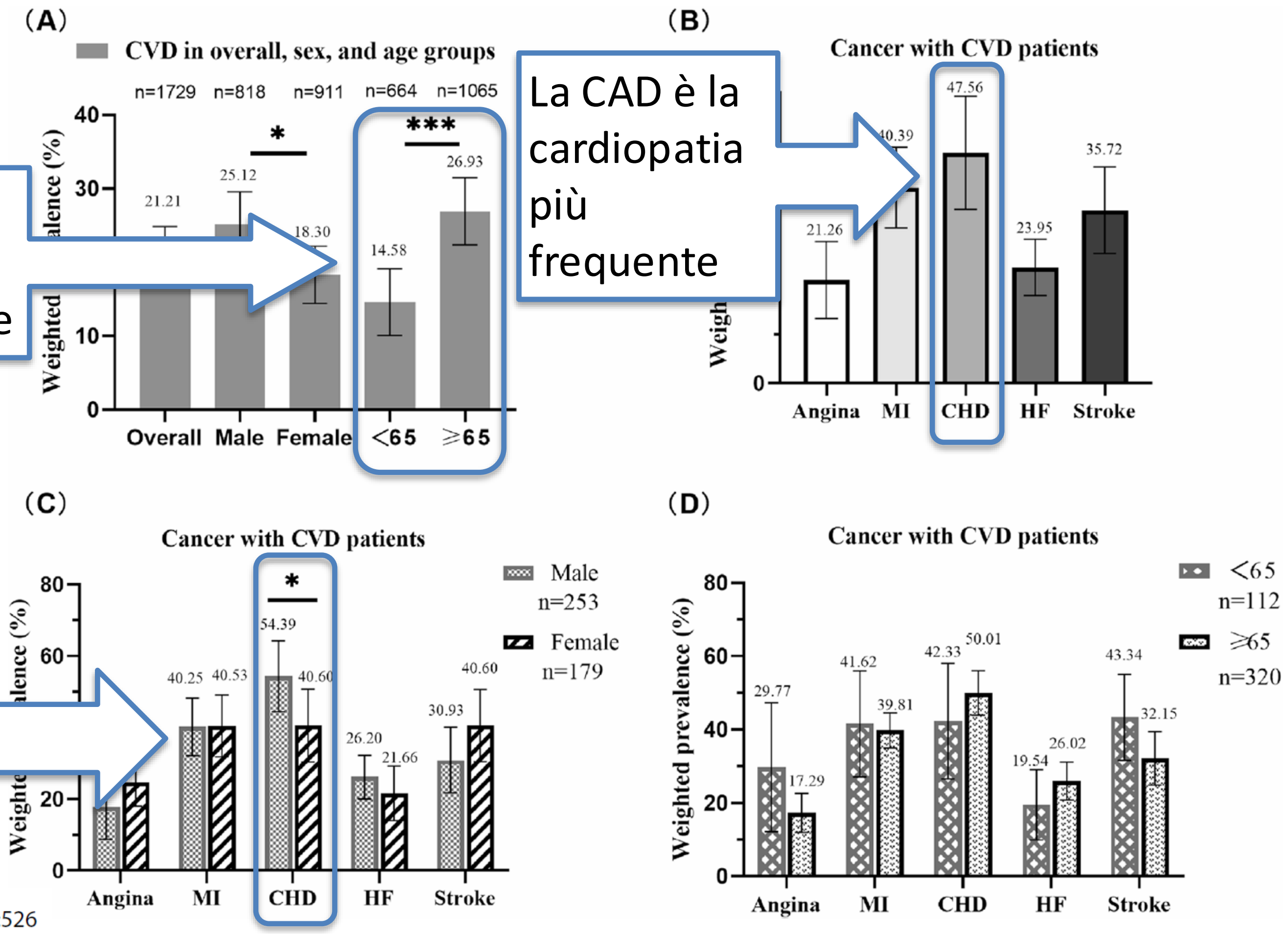
LA MIA AGENDA

- Scenario
- Stratificazione del rischio
- Strategie di gestione
- Prospettive future

Cardiovascular Disease, Cancer, and Multimorbidity Interactions: Clinical Implications



Boudoulas K.D. et al – Cardiology 2022



Nei pazienti over 65 la prevalenza di CVD è significativamente maggiore

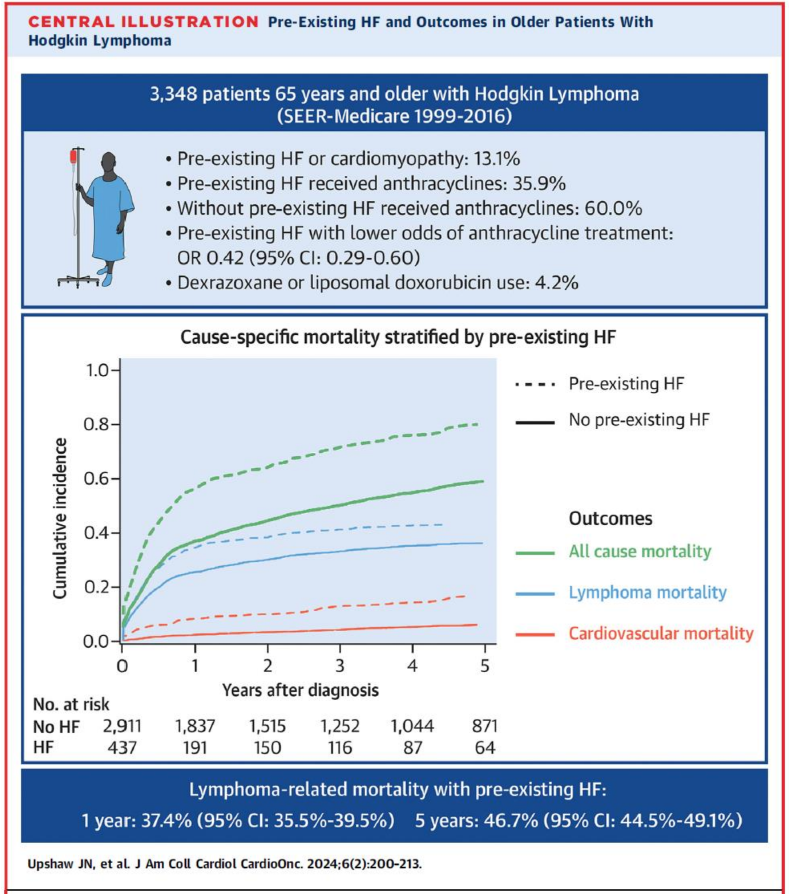
La CAD è la cardiopatia più frequente

Gli uomini più delle donne sono affetti da cardiopatie

Jiang *et al. BMC Cardiovascular Disorders* (2025) 25:526

Impact of Preexisting Heart Failure on Treatment and Outcomes in Older Patients With Hodgkin Lymphoma

Pre-existing heart failure is a significant challenge in older lymphoma patients. Among 3,348 patients aged 65 years and older with newly diagnosed Hodgkin lymphoma, pre-existing heart failure was present in 13.1% of cases and was associated with a lower likelihood of receiving anthracycline-based chemotherapy (OR: 0.42) and higher cardiovascular mortality rates (HR: 2.57)



https://doi.org/10.1016/j.jaccao.2024.02.003

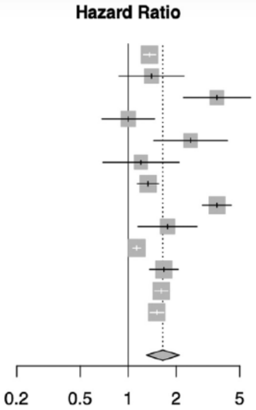
Cardiovascular Risk in Patients with Hematological Malignancies: A Systematic Review and Meta-Analysis

cancer → CVD

myocardial infarction

Study	HR	95%-CI
Adelborg et al, 2019	1.36	[1.25; 1.48]
Broesby–Olsen et al, 2016	1.40	[0.88; 2.24]
Liu et al, 2019	3.60	[2.22; 5.85]
Navi et al, 2017	1.00	[0.68; 1.46]
Lang et al, 2016	2.46	[1.44; 4.20]
Moser et al, 2006	1.20	[0.69; 2.08]
Ekberg et al, 2021	1.33	[1.14; 1.55]
Aleman et al, 2007	3.60	[2.92; 4.43]
Florido et al, 2022	1.76	[1.15; 2.69]
Zöller et al, 2012 (non–Hodgkin's)	1.13	[1.07; 1.20]
Zöller et al, 2012 (Hodgkin's)	1.67	[1.36; 2.05]
Zöller et al, 2012 (Myeloma)	1.61	[1.46; 1.77]
Zöller et al, 2012 (Leukaemia)	1.51	[1.37; 1.67]
Random effects model	**1.65**	**[1.29; 2.09]**

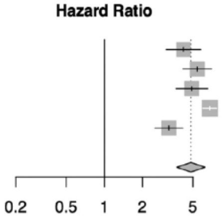
Heterogeneity: $I^2 = 93\%$, $\tau^2 = 0.1290$, $p < 0.001$



heart failure

Study	HR	95%-CI
Liu et al, 2019	4.20	[3.07; 5.74]
Moser et al, 2006	5.40	[4.16; 7.01]
Aleman et al, 2007	4.90	[3.68; 6.53]
Van Nimwegen et al, 2015	6.80	[5.99; 7.72]
Florido et al, 2022	3.22	[2.50; 4.16]
Random effects model	**4.82**	**[3.72; 6.25]**

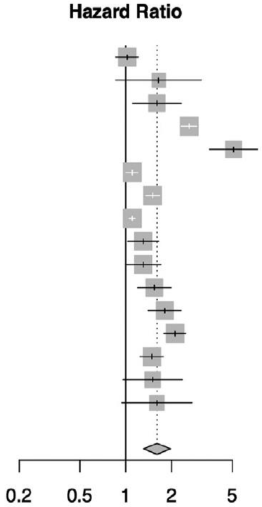
Heterogeneity: $I^2 = 87\%$, $\tau^2 = 0.0712$, $p < 0.001$



stroke

Study	HR	95%-CI
Adelborg et al, 2019 (non–Hodgkin's lymphoma)	1.02	[0.86; 1.21]
Adelborg et al, 2019 (Hodgkin's lymphoma)	1.64	[0.86; 3.13]
Broesby–Olsen et al, 2016	1.60	[1.11; 2.31]
Dhopeshwarkar et al, 2019	2.60	[2.32; 2.92]
Liu et al, 2019	5.10	[3.56; 7.31]
Zöller et al, 2012 (Myeloma)	1.10	[1.00; 1.20]
Zöller et al, 2012 (Leukaemia)	1.50	[1.35; 1.66]
Zöller et al, 2012 (non–Hodgkin's lymphoma)	1.10	[1.05; 1.15]
Zöller et al, 2012 (Hodgkin's lymphoma)	1.30	[1.03; 1.64]
Navi et al, 2017 (non–Hodgkin's lymphoma)	1.30	[1.00; 1.69]
Lang et al, 2016	1.54	[1.19; 1.99]
Bright et al, 2017 (non–Hodgkin's lymphoma)	1.80	[1.40; 2.31]
Bright et al, 2017 (Hodgkin's lymphoma)	2.10	[1.78; 2.47]
Strongman et al, 2019 (non–Hodgkin's lymphoma)	1.48	[1.24; 1.76]
Moser et al, 2006 (non–Hodgkin's lymphoma)	1.50	[0.96; 2.35]
Florido et al, 2022	1.60	[0.94; 2.72]
Random effects model	**1.60**	**[1.30; 1.97]**

Heterogeneity: $I^2 = 95\%$, $\tau^2 = 0.1305$, $p < 0.001$



Yong J.H. et al – Am J Cardiol 2024

Enrollment of Older Adults in Clinical Trials Evaluating Patients with Hematologic Malignancies - the Food and Drug Administration (FDA) Experience

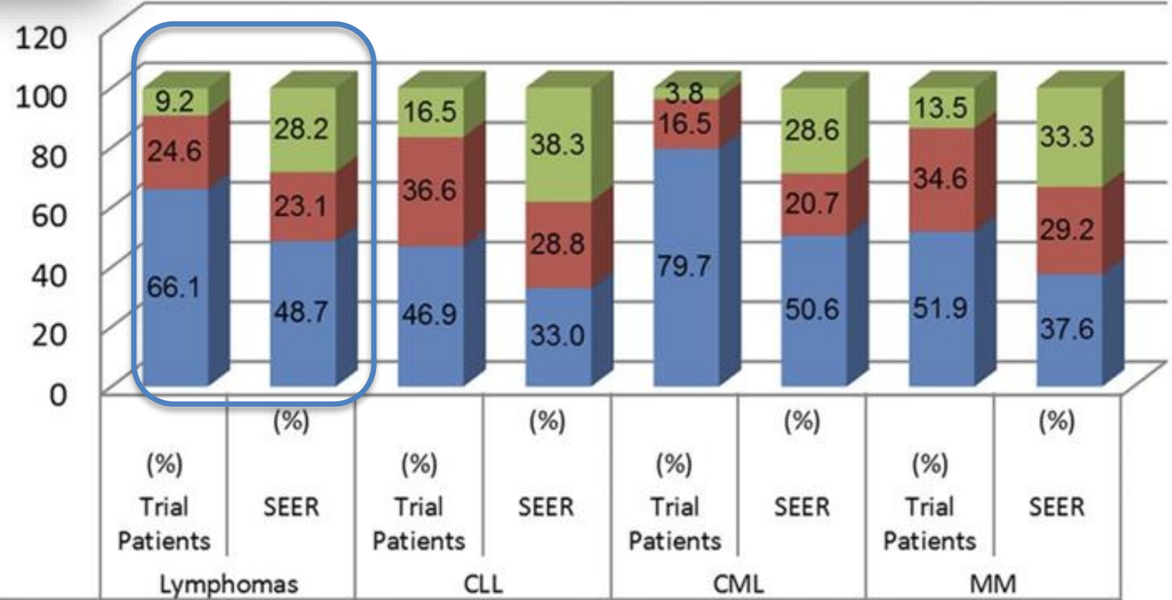
Diagnosis	Total	<65 years N (%)	65-74 years N (%)	≥75 years N (%)
Lymphoma (Excluding CLL)	11425	7561 (66.1)	2808 (24.6)	1056 (9.2)
CLL	8483	3976 (46.9)	3106 (36.6)	1401 (16.5)
CML	10465	8338 (79.7)	1726 (16.5)	401 (3.8)
MM	9605	4986 (51.9)	3319 (34.6)	1300 (13.5)
ALL	403	352 (87.3)	44 (10.9)	7 (1.7)
AML or MDS	1052	246 (23.4)	470 (44.7)	336 (31.9)
Other	2711	1565 (57.7)	822 (30.3)	324 (12.0)

Age distribution of partecipants enrolled in trials for haematological malignancies submitted to FDA, 2005-2015

http://doi.org/10.1182/blood.V130.Suppl_1.861.861

Enrollment of Older Adults in Clinical Trials Evaluating Patients with Hematologic Malignancies - the Food and Drug Administration (FDA) Experience

Tra i pazienti più anziani si concentra il numero di eventi maggiore rispetto ai pazienti più giovani



	Lymphomas (%) Trial Patients	Lymphomas (%) SEER	CLL (%) Trial Patients	CLL (%) SEER	CML (%) Trial Patients	CML (%) SEER	MM (%) Trial Patients	MM (%) SEER
>75	9.2	28.2	16.5	38.3	3.8	28.6	13.5	33.3
65-74	24.6	23.1	36.6	28.8	16.5	20.7	34.6	29.2
<65	66.1	48.7	46.9	33	79.7	50.6	51.9	37.6

distribution of trial patients compared to SEER incidence cases 2010-2015

http://doi.org/10.1182/blood.V130.Suppl_1.861.861

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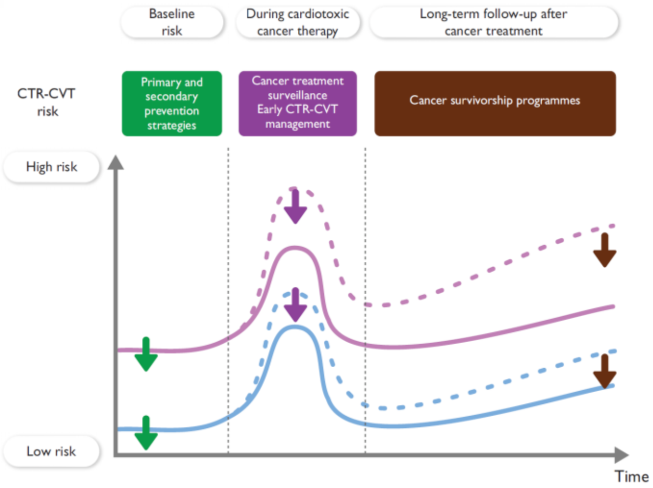
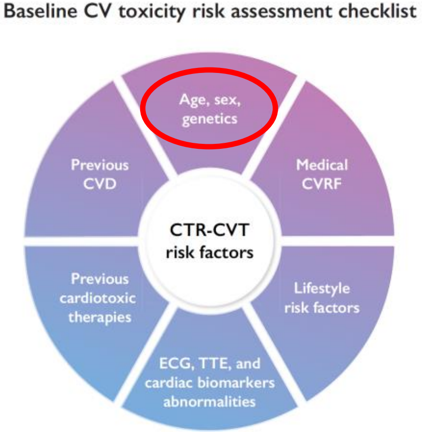
Developed by the task force on cardio-oncology of the European Society of Cardiology (ESC)

ESC European Society of Cardiology

ESC GUIDELINES

European Heart Journal (2022) **43**, 4229–4361
https://doi.org/10.1093/eurheartj/ehac244





Clinical assessment

- Cancer treatment history
- CV history
- CVRF
- Physical examination
- Vital signs measurement[a]

Complementary tests

- BNP or NT-proBNP[b]
- cTn[b]
- ECG
- Fasting plasma glucose / HbA1c
- Kidney function / eGFR
- Lipid profile
- TTE[c]

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Baseline CV toxicity risk factors	Anthracycline chemotherapy	HER2-targeted therapies	VEGF inhibitors	BCR-ABL inhibitors	Multiple myeloma therapies	RAF and MEK inhibitors
Age and CVRF						
Age ≥ 80 years	H	H	–	–	–	M1
Age 65–79 years	M2	M2	–	–	–	M1
Age ≥ 75 years	–	–	H	H	H	M1
Age 65–74 years	–	–	M1	M2	M1	M1
Age ≥ 60 years	–	–	–	M1	–	–
CVD 10-year risk score > 20%	–	–	–	H	–	–
Hypertension[c]	M1	M1	H	M2	M1	M2

istituto tumori IRCCS - Bari

Doxorubicin, Cardiac Risk Factors, and Cardiac Toxicity in Elderly Patients With Diffuse B-Cell Non-Hodgkin's Lymphoma

Dawn L. Hershman, Russell B. McBride, Andrew Eisenberger, Wei Yann Tsai, Victor R. Grann, and Judith S. Jacobson

JOURNAL OF CLINICAL ONCOLOGY | ORIGINAL REPORT

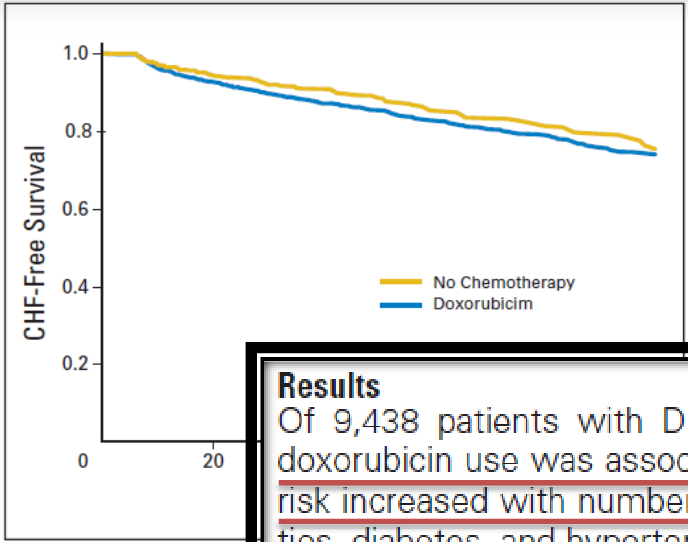

Fig 1. Weighted Kaplan-M... survival in patients treated w... chemotherapy (P = .001).

Results
Of 9,438 patients with DLBCL, 3,164 (42%) received doxorubicin-based chemotherapy. Any doxorubicin use was associated with a 29% increase in risk of CHF (95% CI, 1.02 to 1.62); CHF risk increased with number of doxorubicin claims, increasing age, prior heart disease, comorbidities, diabetes, and hypertension; hypertension intensified the effect of doxorubicin on risk of CHF (hazard ratio = 1.8; $P < .01$). In the 8 years after diagnosis, the adjusted CHF-free survival rate was 74% in doxorubicin-treated patients versus 79% in patients not treated with doxorubicin.

Hershman D.L. et al – JCO 2008

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Baseline CV toxicity risk factors	Anthracycline chemotherapy	HER2-targeted therapies	VEGF inhibitors	BCR-ABL inhibitors	Multiple myeloma therapies	RAF and MEK inhibitors

Current cancer treatment	
Dexamethasone > 160 mg/ month	–
Includes anthracycline before HER2-targeted therapy	–
Previous exposure to	
Anthracycline	H
Trastuzumab	–
RT to left chest or mediastinum	H
Non-anthracycline chemotherapy	M1
Lifestyle risk factors	
Current smoker or significant smoking history	M1
Obesity (BMI > 30 kg/m^2)	M1

Cardiac imaging	
LVEF < 50%	H
LVEF 50–54%	M2
LV hypertrophy	–
Cardiac amyloidosis	–
Cardiac biomarkers	
Elevated baseline cTn[b]	M1
Elevated baseline NP[b]	M1
Age and CVRF	
Age ≥ 80 years	H
Age 65–79 years	M2
Age ≥ 75 years	–
Age 65–74 years	–
Age ≥ 60 years	–
CVD 10-year risk score > 20%	–
Hypertension[c]	M1
Chronic kidney disease[d]	M1
Proteinuria	–
DM[e]	M1
Hyperlipidaemia[f]	–
Family history of thrombophilia	–

Previous CVD	
HF/cardiomyopathy/ CTRCD	VH
Severe VHD	H
MI or PCI or CABG	H
Stable angina	H
Arterial vascular disease	–
Abnormal ankle-brachial pressure index	–
PH	–
Arterial thrombosis with TKI	–
Venous thrombosis (DVT/PE)	–
Arrhythmia[a]	–
QTc ≥ 480 ms	–
450 ≤ QTc < 480 ms (men); 460 ≤ QTc < 480 ms (women)	–
Prior PI CV toxicity	–
Prior IMiD CV toxicity	–

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IRCCS - Bari

Lyon A.R. et al – Eur H Journal 2022

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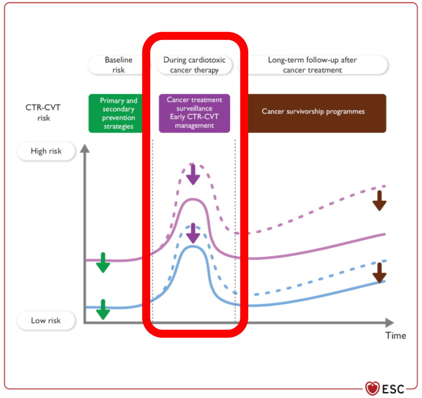

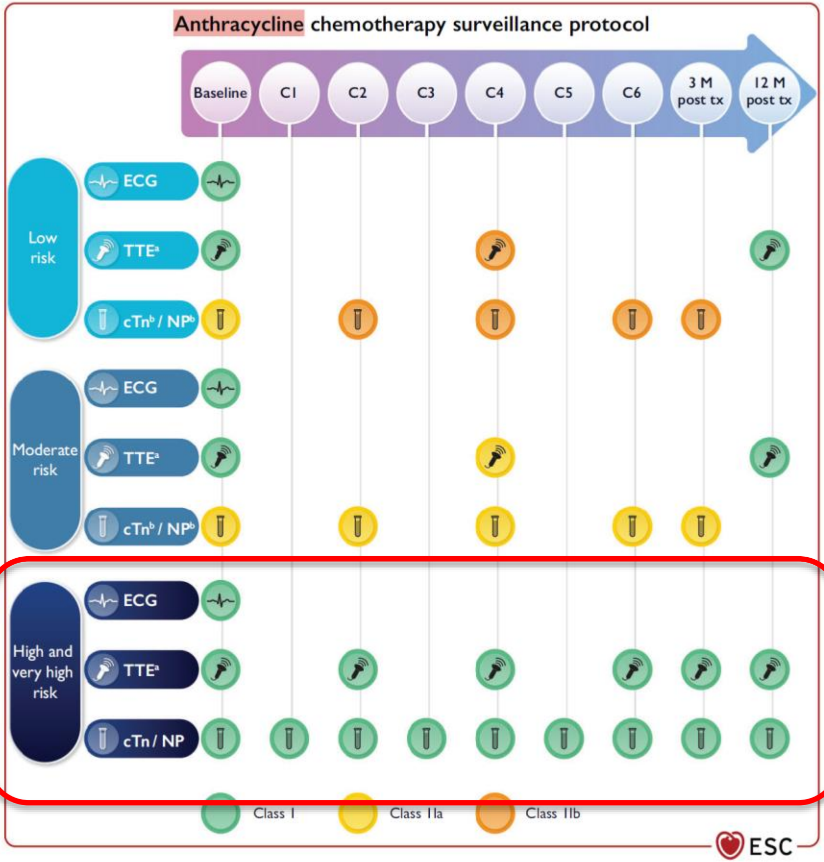

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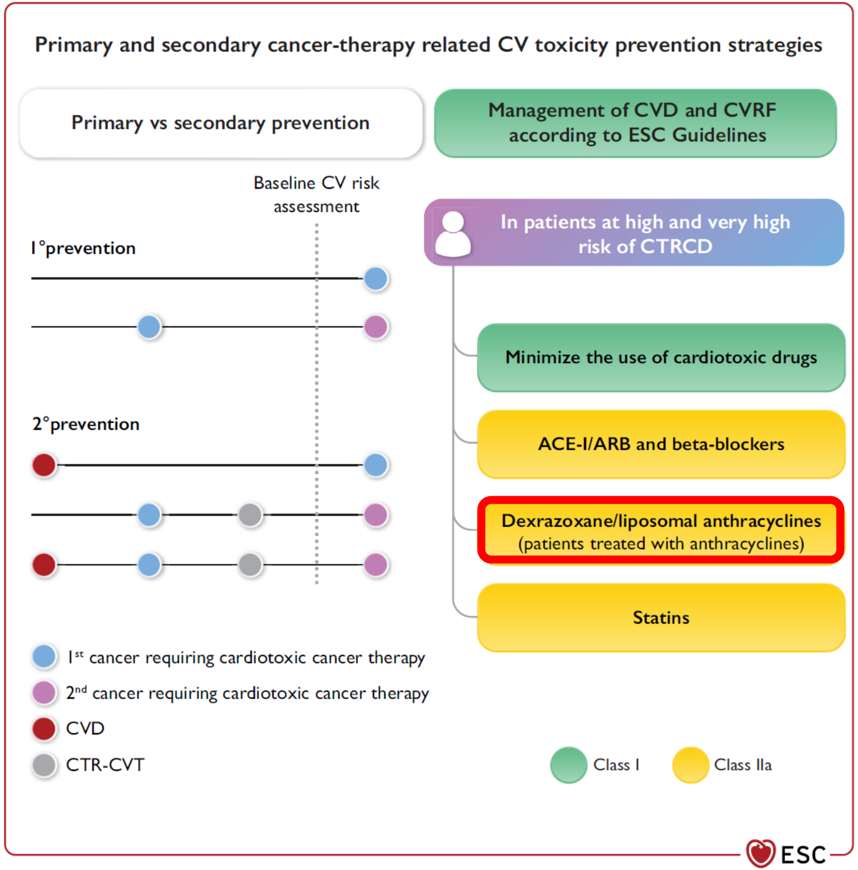
Prevenzione primaria e secondaria

Less cardiotoxic drugs

Preventive strategies



Lyon A.L. et al – Eur Heart J 2022

A Fondazione Italiana Linfomi cohort study of R-COMP vs R-CHOP in older patients with diffuse large B-cell lymphoma

Key Points

- R-COMP is a curative option for older patients with DLBCL and intermediate- to high-risk EPI, even in the presence of a baseline cardiopathy.
- R-CHOP is confirmed as the standard therapy for patients at low risk based on the EPI.

Table 2. Baseline cardiac comorbidities and cardiotoxicity after treatment based on R-CHOP and R-COMP

	Grade	R-CHOP	R-COMP	Total	
Comorbidities (n = 691)		n (%)	n (%)	n (%)	**P value**
Heart CIRS-G	0-1	351 (92)	209 (68)	560 (81)	< .001
	2-4	32 (8)	99 (32)	131 (19)	
Total		383	308	691	
Cardiopathy with CIRS-G 2/4		R-CHOP	R-COMP	Total	
Ischemic cardiopathy		5 (19)	28 (33)	33 (30)	.225
Atrial fibrillation		8 (30)	31 (37)	39 (35)	.644
Hypertension		3 (11)	4 (5)	7 (6)	.358
Ventricular hypertrophy		[illegible]	[illegible]	[illegible]	.632
Valvulopathy		7 (26)	5 (6)	12 (11)	.008
Arrhythmia		[illegible]	[illegible]	[illegible]	.248
LVEF <50%		[illegible]	3 (4)	3 (3)	
Other		–	7 (8)	7 (6)	
Missing		[illegible]	[illegible]	[illegible]	
CTCAE treatment (n = 175)	Grade	R-CHOP	R-COMP	Total	P value
	0	55 (86)	97 (87)	[illegible]	.484
	1	1 (2)	[illegible]	[illegible]	
	2	6 (9)	5 (4)	11 (6)	
	3-4	2 (3)	4 (4)	6 (3)	
Total		64	111	175	
	Any vs 0	9 (14)	14 (13)	23 (13)	.819
	3-4 vs 0-2	2 (3)	4 (4)	6 (3)	1.000

I pazienti trattati con R-COMP sono più anziani e comorbidi ma hanno lo stesso rischio di cardiotossicità dei pazienti giovani e FIT trattati con R-CHOP

https://doi.org/10.1182/bloodadvances.2023009839.

Mitoxantrone hydrochloride liposome-based chemotherapy plus rituximab in elderly patients older than 80 years with diffuse large B-cell lymphoma: case report and review of the literature

TABLE 2 Treatment regimen and outcomes for DLBCL patients aged ≥80 years.

Study	Population	Treatment	Outcomes	Cardiotoxicity
Hounsome et al. (22)	DLBCL patients aged ≥80 years (n = 2,983)	1 L R-CHOP or R-miniCHOP	3-year OS: 54%	NR
Shi et al. (23)	DLBCL patients aged ≥80 years (n = 57)	1 L RD-RCHOP, R-CHOP or R-miniCHOP; 2 L R-GDP, R-ICE; 3 L R-GemOx, lenalidomide	mOS: 28.4 months; 3-year PFS: 68.2% ± 6.9%; ORR: 80%; CR rate: 26.3% (IL)	Fatal cardiac failure 4%
Freudenberger et al. (27)	DLBCL patients aged ≥80 years (n = 45)	1 L CHOP	mOS: 7.9 years; mPFS: 1.09 years; ORR: 65%; CR rate: 35%	NR
de Pádua Covas Lage et al. (28)	DLBCL patients aged ≥80 years (n = 56)	1 L R-mini-CHOP-21	mOS:3.6 years	NR
Tucci et al. (29)	DLBCL patients aged ≥80 years (n = 370)	1 L R-B, R-CVP, chemotherapy without R	> 85 years: 2-year OS and 2-year PFS 48, 43% 80–84 years: 2-year OS and 2-year PFS 63, 56%	NR
Peyrade et al. (24)	DLBCL patients aged ≥80 years (n = 120)	1 L ofatumumab and reduced-dose CHOP	2-year OS and 2-year PFS 64·7, 57.2%; ORR, 68%; CR rate: 56%	Grade 3–4 AEs 3%; serious AEs 6%
Choi et al. (30)	DLBCL patients aged ≥80 years (n = 194)	1 L R-CHOP, R-CVP, CVP,	mOS:14 years; CR rate: 41.9%	3%
Juul et al. (31)	DLBCL patients aged ≥80 years (n = 608)	1 L R ± CHOP, R-CHOEP, CVP	> 85 years: mOS and mPFS 1.9 years, 1.8 years 80–84 years: mOS 2.6 months and mPFS 63%, 1.8 years	NR
Gobba et al. (32)	DLBCL patients aged ≥80 years (n = 281)	1 L R-CHOP or R-CHOP–like	mPFS and mOS: 1.3 years and 1.7 years	NR
Oki et al. (20)	DLBCL patients aged ≥80 years with cardiac disease (n = 10)	1 L DRCOP	3-year OS 74% for all patients (n = 80);	Symptomatic toxicity 4%; asymptomatic LVEF decrease 11% for all patients (n = 80)

NR, not reported; 1 L, first line; 2 L, second line; RD-RCHOP, rituximab, doxorubicin, cyclophosphamide, vincristine, and prednisone; R-GDP, rituximab with gemcitabine, dexamethasone and cisplatin; R-ICE, rituximab with ifosfamide, carboplatin and etoposide; R-GemOx, rituximab gemcitabine and oxaliplatin; R-B, rituximab plus either bendamustine; R-CVP, cyclophosphamide, vincristine, and prednisone; DRCOP, rituximab, cyclophosphamide, pegylated liposomal doxorubicin, vincristine, and prednisone.

TYPE Case Report
PUBLISHED 20 October 2025
DOI 10.3389/fmed.2025.1629168

Review

Appropriate Treatment Intensity for Diffuse Large B-Cell Lymphoma in the Older Population: A Review of the Literature

If preliminary efficacy and safety data are confirmed in future clinical trials, non-chemotherapy-based immunotherapy approaches could become an alternative potentially curative option in frail patients and those >80 years of age with DLBCL.

Table 1. First-line immunochemotherapy regimens for older patients with DLBCL.

Therapy Type	Age	Development Status	Reference(s)
R-CHOP	60–80 years	Phase 3 trial	Coiffier et al., 2002 [1]
R-mini-CHOP	≥80 years	Phase 2 trial	Peyrade et al., 2011 [28] Peyrade et al., 2017 [29]
Pola-R-CHP	<80 years	Phase 3 trial	Tilly et al., 2022 [5]
Pola-R-mini-CHP	≥80 years or frail patients aged ≥75 years	Phase 3 trial, ongoing	ClinicalTrials.gov Identifier: NCT04332822

Abbreviations: DLBCL, diffuse large B-cell lymphoma; R-CHOP, rituximab, cyclophosphamide, doxorubicin, vincristine, prednisone; R-mini-CHOP, attenuated-dose R-CHOP; Pola-R-CHP, of vincristine with polatuzumab vedotin (Pola), an antibody-drug-conjugated targeting CD79b, in the R-CHOP scheme.

Table 2. New, novel, and chemotherapy-free regimens.

Therapy Type	Example(s)	Development Status	Reference(s)
BTK inhibitor	Ibrutinib	Phase 2 trial	Xu et al., 2022 [63]
Tafa-Len	Tafa-Len	Phase 2 trial	Salles et al., 2020 [53] Duell et al., 2021 [54]
CD19 antibody–drug conjugate	Lonca	Phase 2 trial	Caimi et al., 2021 [55]
Bispecific antibody	Glofitamab Epcoritamab	Phase 2 trial	Dickinson et al., 2022 [64] Thieblemont et al., 2023 [65]
CAR T-cells	Axi-cel Liso-cel Tisa-cel	Phase 3 trial	Cocke et al., 2022 [68] Abramson et al., 2022 [69] Bishop et al., 2022 [70]

Abbreviations: BTK, Bruton's tyrosine kinase; Tafa, tafasitamab; Len, lenalidomide; Lonca, loncastuximab; CAR, chimeric antigen receptor.

Hematol. Rep. **2024**, *16*, 317–330. https://doi.org/10.3390/hematolrep16020032

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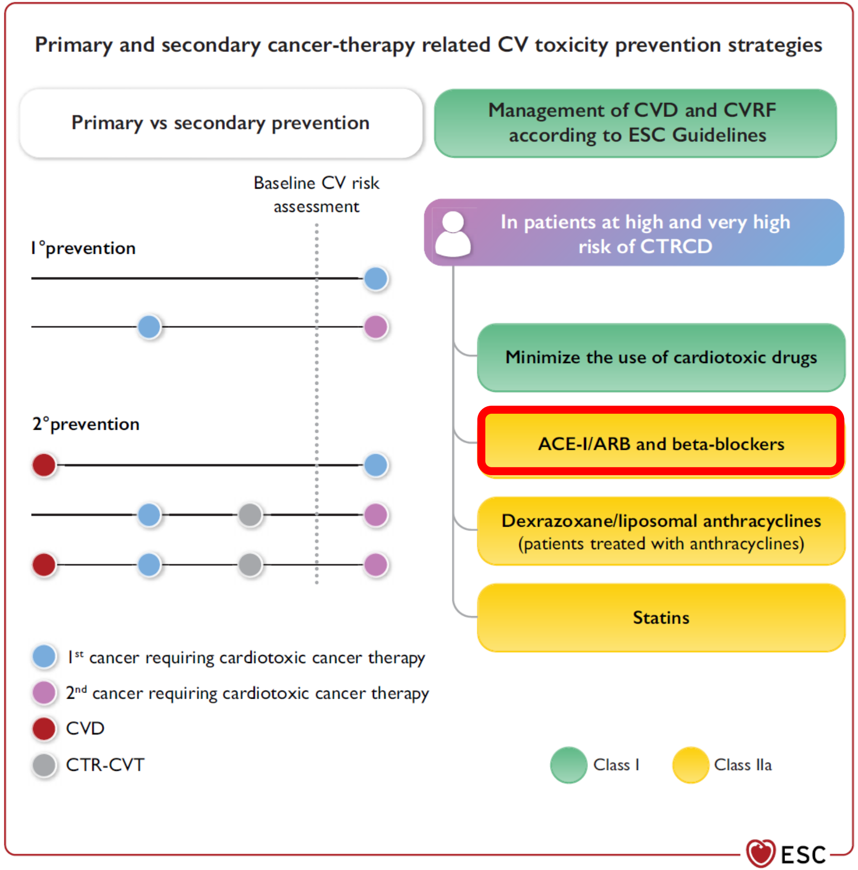


Lyon A.L. et al – Eur Heart J 2022

The Role of Cardioprotection in Cancer Therapy Cardiotoxicity

JACC: CardioOncology State-of-the-Art Review

Torbjørn Omland, MD, PhD, MPH,[a,b] Siri Lagethon Heck, MD, PhD,[b,c,d,*] Geeta Gulati, MD, PhD[b,d,e,*]

TABLE 1 Recent Randomized Controlled Trials on Cardioprotection During Anthracycline Therapy

Trial	Trial Design	Trial Intervention	Imaging Method	N	Result of Primary Endpoint and Follow-Up Results	Result of Key Secondary Endpoints and Follow-Up Results
Pharmacologic intervention						
PRADA[22-24]	Randomized Placebo-controlled Double-blind 2 × 2 factorial	Metoprolol Candesartan Metoprolol plus candesartan Placebo	CMR	130	Primary trial: candesartan attenuated the reduction in LVEF Follow-up: no difference in change in LVEF from baseline to extended follow-up in either treatment arm	Primary trial: metoprolol attenuated the rise in troponins Follow-up: no difference in change in troponins from baseline to extended follow-up in either treatment arm
CECCY[25,26]	Randomized Placebo-controlled Double-blind	Carvedilol Placebo	Echocardiography	200	Primary trial: no effect on reduction of LVEF ≥10% from baseline Follow-up: no difference in change of LVEF at 2-y follow-up	Primary trial: carvedilol attenuated the rise in troponin I
SAFE[27]	Randomized Placebo-controlled Double-blind	Bisoprolol/enalapril/ bisoprolol plus enalapril/placebo	Echocardiography (3D)	174	Bisoprolol, enalapril, and bisoprolol plus enalapril attenuated the reduction in LVEF Bisoprolol and enalapril prevented worsening in peak GLS	

JACC Cardioncology 2022

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)

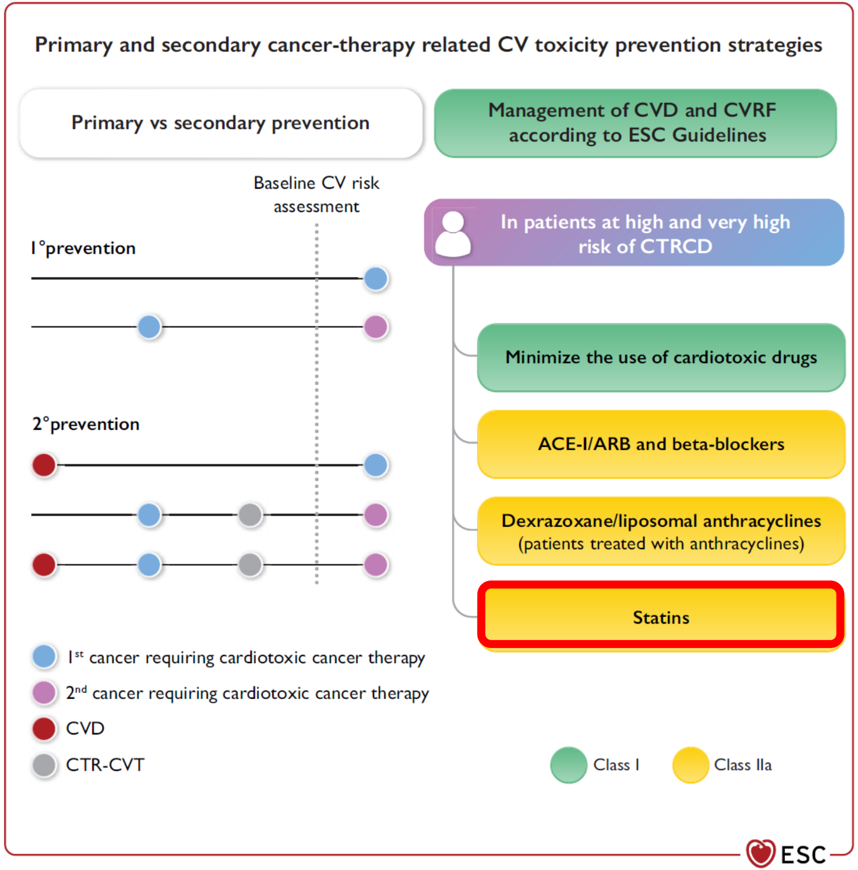
Developed by the task force on cardio-oncology of the European Society of Cardiology (ESC)

Prevenzione primaria e secondaria

ESC European Society of Cardiology

Less cardiotoxic drugs

Preventive strategies



Lyon A.L. et al – Eur Heart J 2022

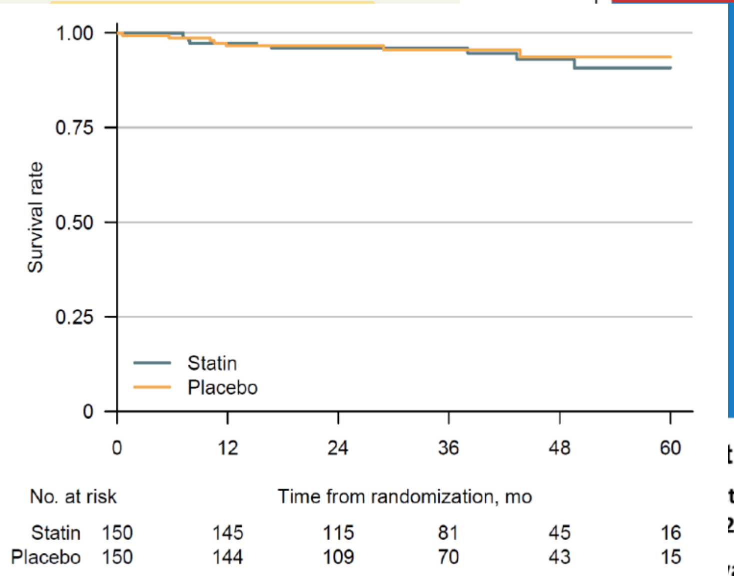
JAMA | Original Investigation

Atorvastatin for Anthracycline-Associated Cardiac Dysfunction
The STOP-CA Randomized Clinical Trial

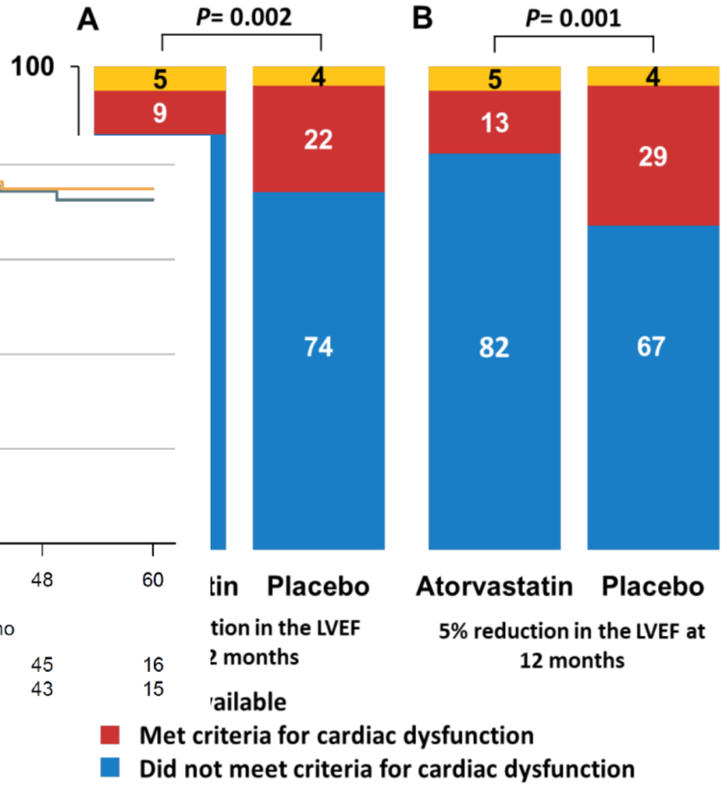
DESIGN, SETTING, AND PARTICIPANTS Double-blind randomized clinical trial conducted at 9 academic medical centers in the US and Canada am were scheduled to receive anthracycline-based che January 25, 2017, and September 10, 2021, with fin

INTERVENTIONS Participants were randomized to r placebo (n = 150) for 12 months.

MAIN OUTCOMES AND MEASURES The primary outc with an absolute decline in left ventricular ejection chemotherapy to a final value of <55% over 12 mon proportion of participants with an absolute decline chemotherapy to a final value of <55% over 12 mon



Absolute Reduction in LVEF From Pretreatment by at least 10% or 5% to < 55%



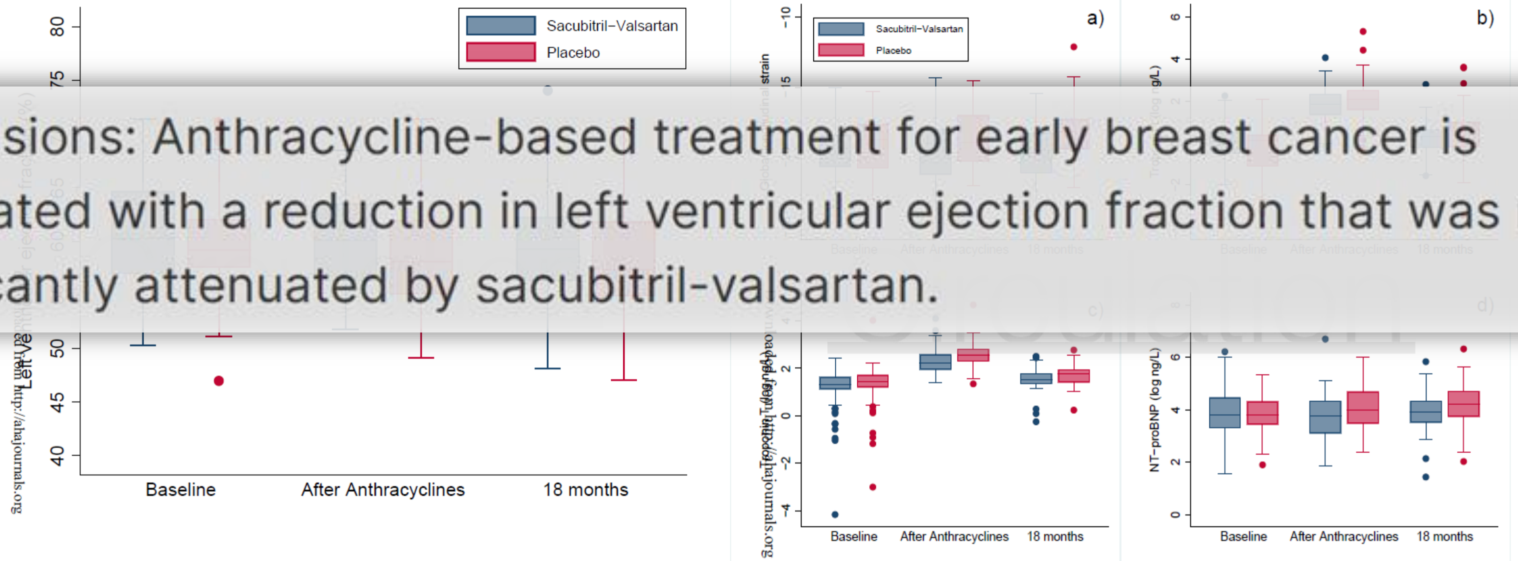
JAMA 2023


FUTURE
PERSPECTIVE

RESEARCH ARTICLE | Originally Published 29 August 2025 | Check for updates

Sacubitril-Valsartan and Prevention of Cardiac Dysfunction During Adjuvant Breast Cancer Therapy: The PRADA II Randomized Clinical Trial

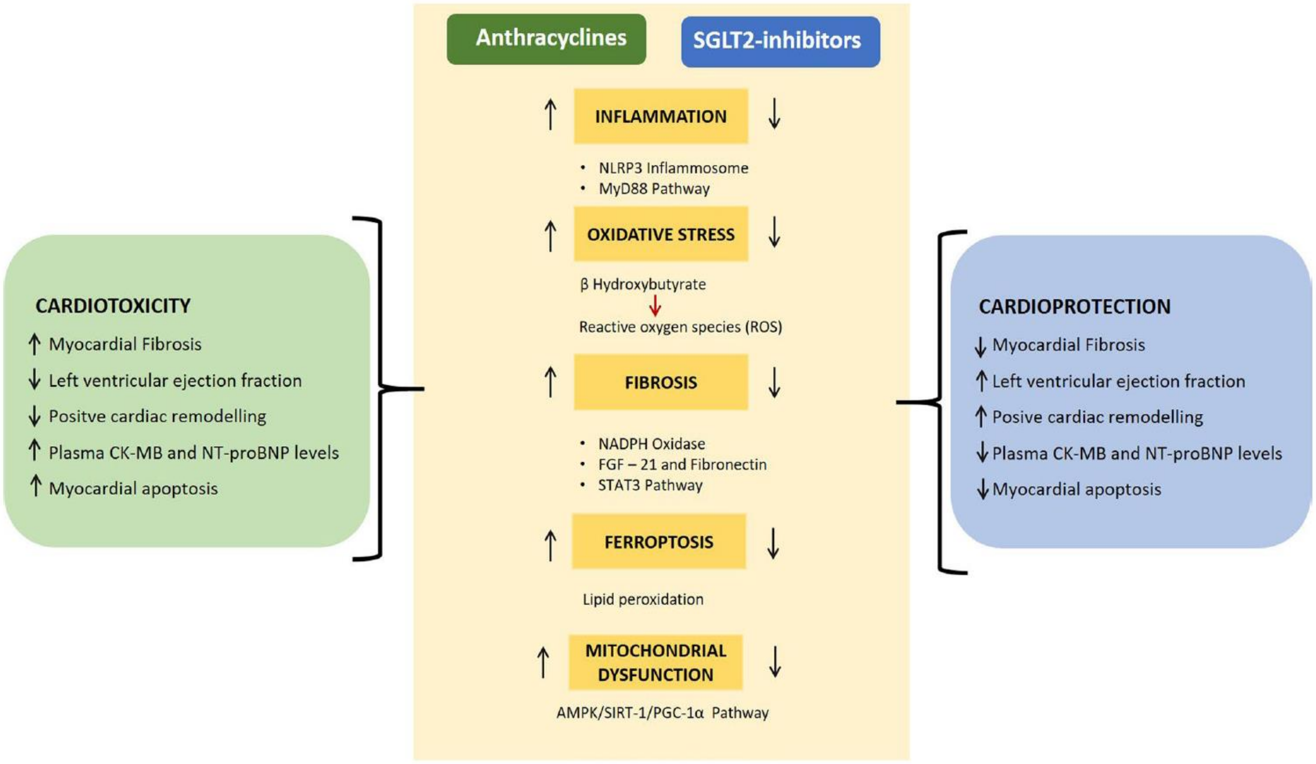
Circulation



Conclusions: Anthracycline-based treatment for early breast cancer is associated with a reduction in left ventricular ejection fraction that was not significantly attenuated by sacubitril-valsartan.

https://doi.org/10.1161/CIRCULATIONAHA.125.076616

SGLT2i PROTECTION AGAINST DOXO-INDUCED CARDIOTOXICITY

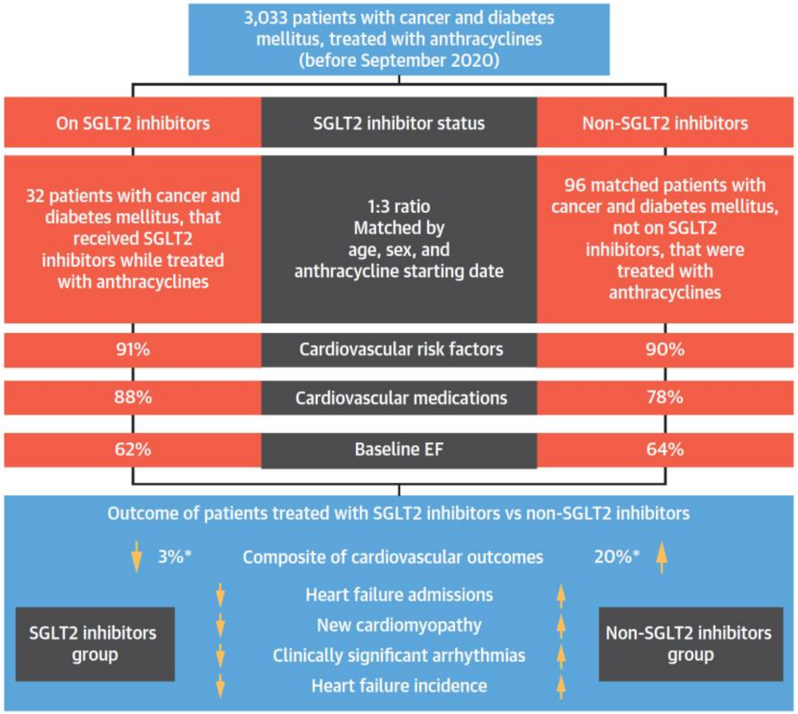


Camilli M. et al – Basic Res Cardiol 2025

Sodium-Glucose Co-Transporter-2 Inhibitors and Cardiac Outcomes Among Patients Treated With Anthracyclines

The lower incidence of cardiac events was principally driven by a reduction in HF hospitalizations and > 10% decline LVEF to < 53% during chemotherapy

CENTRAL ILLUSTRATION Cardiovascular Outcomes of Cancer Patients With Diabetes Mellitus, Treated With Anthracyclines, Divided in Groups by Sodium-Glucose Co-Transporter-2 Inhibitors Status



Gongora CA, et al. J Am Coll Cardiol HF. 2022;10(8):559-567.

Gongora CA et al – JACC HF 2022

Efficacy of Sodium-Glucose Cotransporter 2 Inhibitors in Preventing Heart Failure in Patients Receiving Anthracycline-Based Cancer Therapy: A Systematic Review and Meta-Analysis

Study or Subgroup	log[Risk Ratio]	SE	Weight	Risk Ratio IV, Fixed, 95% CI
Abdel-Qader et al., 2023 [13]	-0.5978	0.4428	37.2%	0.55 [0.23, 1.31]
Fath et al., 2023 [14]	-0.1985	0.3505	59.3%	0.82 [0.41, 1.63]
Gongora et al., 2022 [15]	-1.6298	1.4466	3.5%	0.20 [0.01, 3.34]
Total (95% CI)			**100.0%**	**0.67 [0.40, 1.14]**

Heterogeneity: Chi² = 1.25, df = 2 (P = 0.53); I² = 0%
Test for overall effect: Z = 1.47 (P = 0.14)

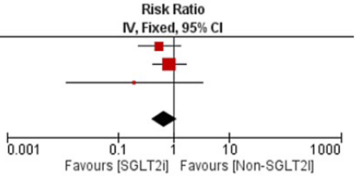


FIGURE 2: Effect of SGLT2i on the incidence of heart failure

Study or Subgroup	log[Risk Ratio]	SE	Weight	Risk Ratio IV, Fixed, 95% CI
Abdel-Qader et al., 2023 [13]	-2.0209	1.4215	16.7%	0.13 [0.01, 2.15]
Gongora et al., 2022 [15]	-1.3863	1.0206	32.4%	0.25 [0.03, 1.85]
Hwang et al., 2023 [16]	0	0.815	50.9%	1.00 [0.20, 4.94]
Total (95% CI)			**100.0%**	**0.46 [0.15, 1.42]**

Heterogeneity: Chi² = 2.03, df = 2 (P = 0.36); I² = 2%
Test for overall effect: Z = 1.35 (P = 0.18)

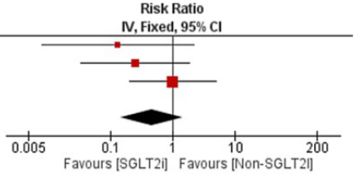


FIGURE 3: Effect of SGLT2i on risk of heart failure hospitalization

Study or Subgroup	log[Risk Ratio]	SE	Weight	Risk Ratio IV, Random, 95% CI
Abdel-Qader et al., 2023 [13]	-0.462	0.289	21.1%	0.63 [0.36, 1.11]
Fath et al., 2023 [14]	-0.3567	0.1168	40.5%	0.70 [0.56, 0.88]
Gongora et al., 2022 [15]	-1.5141	0.5605	8.2%	0.22 [0.07, 0.66]
Hwang et al., 2023 [16]	-0.7765	0.1994	30.2%	0.46 [0.31, 0.68]
Total (95% CI)			**100.0%**	**0.55 [0.39, 0.77]**

Heterogeneity: Tau² = 0.06; Chi² = 6.71, df = 3 (P = 0.08); I² = 55%
Test for overall effect: Z = 3.42 (P = 0.0006)

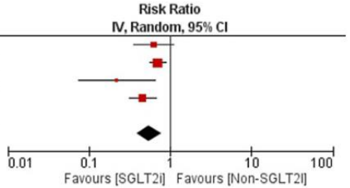
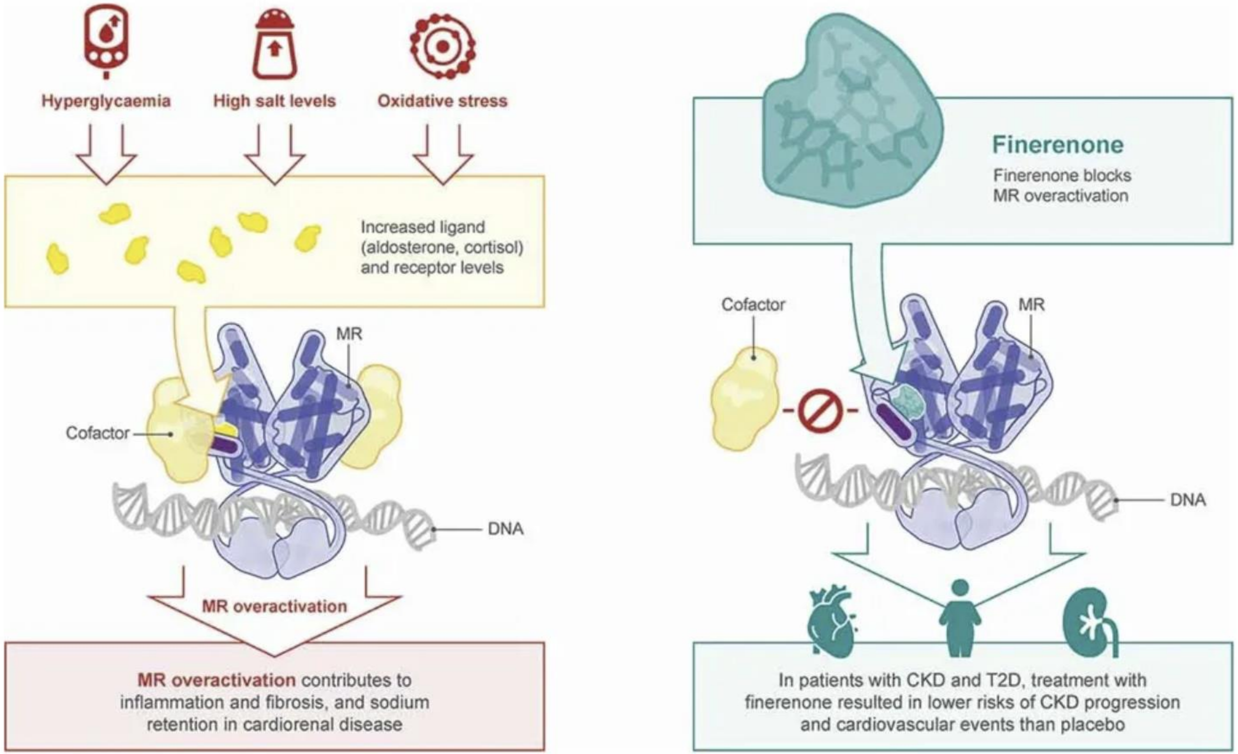


FIGURE 4: Effect of SGLT2i on the risk of mortality

Dimostrata efficacia degli SGLT2i nei pazienti oncologici in trattamento con antracicline

Tabowei G. et al – Springer Nature 2024

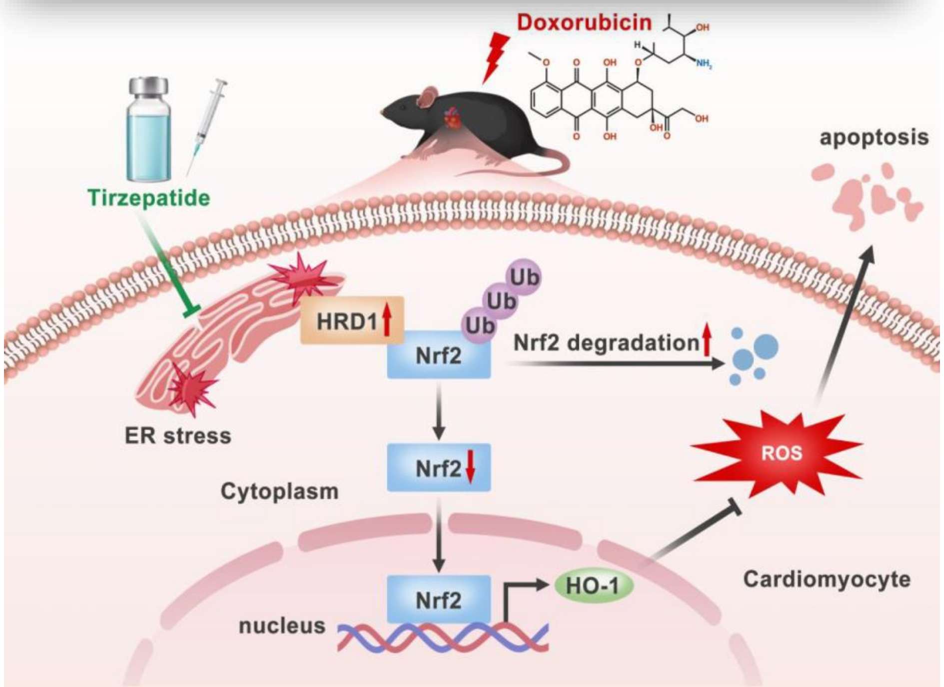
FUTURE PERSPECTIVES: PHISIOPATHOLOGY OF MR DAMAGE



CKD: chronic kidney disease; MR: mineralocorticoid receptor; TD2: type 2 diabetes

Expert Rev Clin Pharmacol. 2022 May;15(5):501-513

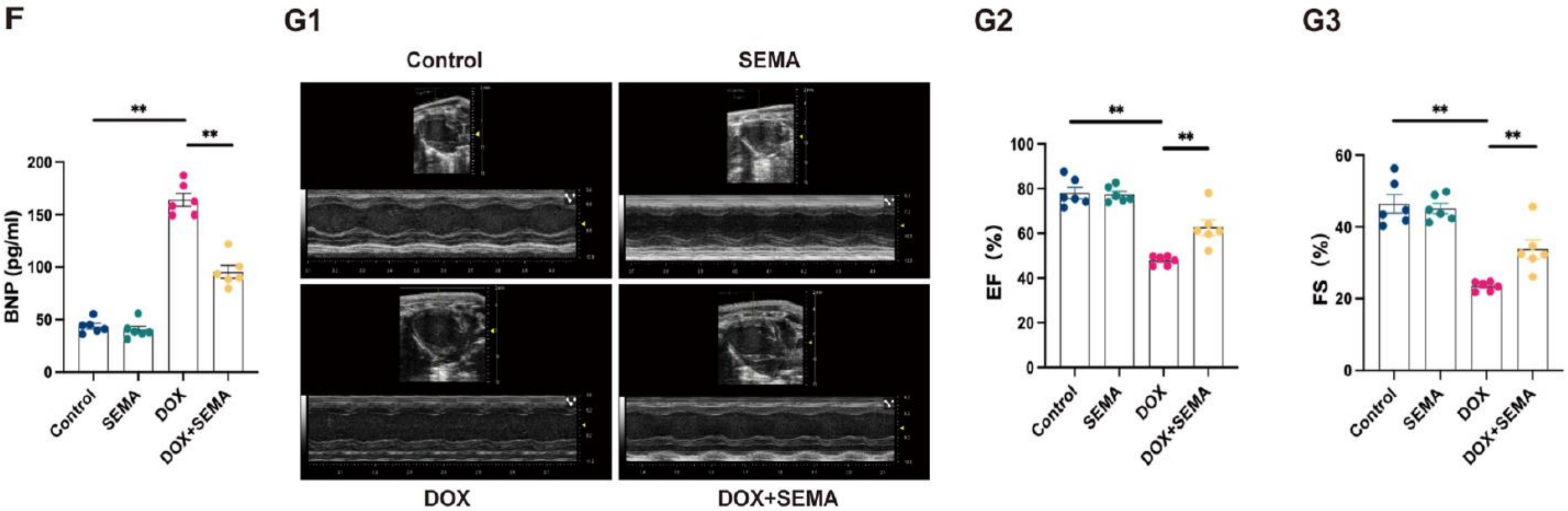
Tirzepatide alleviates doxorubicin-induced cardiotoxicity via inhibiting HRD1-mediated Nrf2 ubiquitination



Our study suggested that Tirzepatide (TZP) attenuated oxidative stress and cardiomyocyte apoptosis by modulating HRD1-mediated Nrf2 expression and activity, thereby protecting against the cardiotoxic effects exerted by Doxorubicin. These results supported that TZP might be a promising therapeutic option for reducing chemotherapy-related cardiotoxicity.

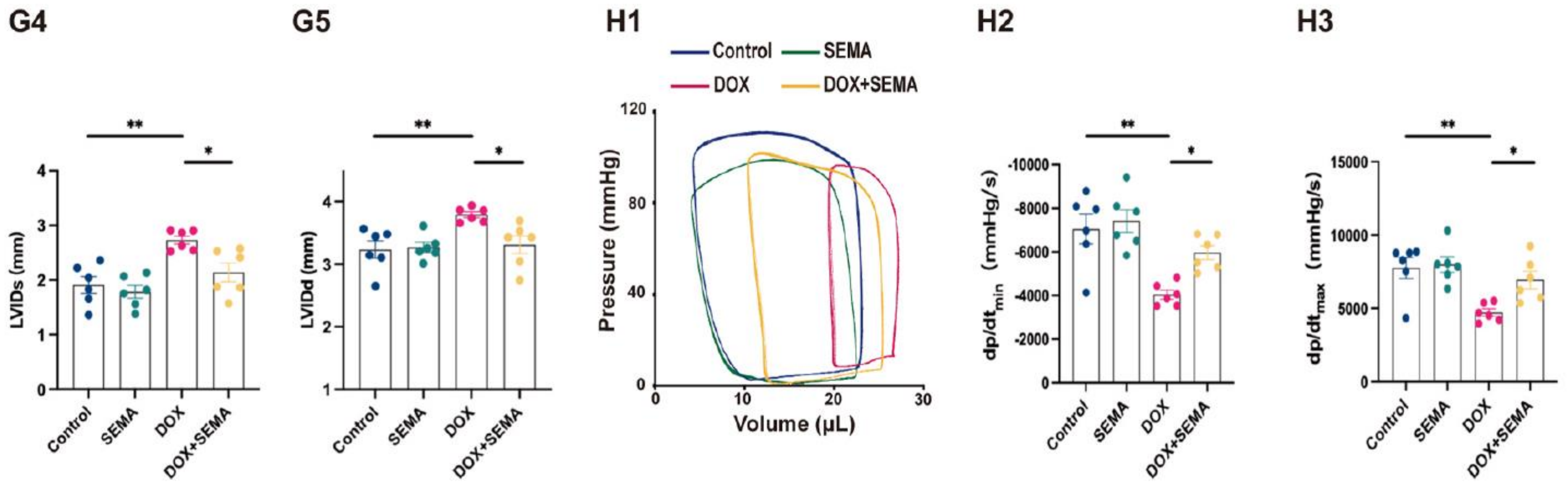
Yang D et al – Cardiovascular Res 2025

Semaglutide attenuates doxorubicin-induced cardiotoxicity by ameliorating BNIP3-Mediated mitochondrial dysfunction



Li X et al – redox Biology 2024

Semaglutide attenuates doxorubicin-induced cardiotoxicity by ameliorating BNIP3-Mediated mitochondrial dysfunction



Li X et al – redox Biology 2024

Healthcare Management in Cardio-Oncology, Clinical Strategies and Future Perspectives: A Narrative Review

Vincenzo Quagliariello [1,*], Massimiliano Berretta [2], Fabrizio Maurea [3], Matteo Barbato [1], Andrea Paccone [1], Martina Iovine [1], Alfredo Mauriello [1], Celeste Fonderico [1], Domenico Gabrielli [4], Andrea Camerini [5], Carmine Riccio [6], Marino Scherillo [7], Stefano Oliva [8], Maria Laura Canale [9] and Nicola Maurea [1]

Future perspectives in cardio-oncology

Healthcare **2025**, *13*, 2599 https://doi.org/10.3390/healthcare13202599

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