«Reinserimento lavorativo del lavoratore cardiopatico: criteri, metodi e discussione casi clinici»

Congresso promosso da SIML, Sezione territoriale lombarda

Giovedì, 15 Giugno 2023
dalle 14 alle 19
Aula Magna Mangiagalli
Policlinico, Via Commenda 10, Milano

Quali accertamenti clinico-funzionali per valutare la riserva funzionale nel lavoratore con pregresso infarto miocardico, coronaropatie croniche, aritmie

Antonella Cherubini

Ambulatorio Riabilitazione del Cardiopatico

SC Patologie Cardiovascolari

Azienda Sanitaria Universitaria Giuliano Isontina, Trieste

UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI SCIENZE CLINICHE E DI COMUNITÀ

Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico

Sistema Socio Sanitario Regione Lombardia

ASUGI Azienda Sanitaria Universitaria Giuliano Isontina

REGIONE AUTONOMA FRIULI VENEZIA GIULIA

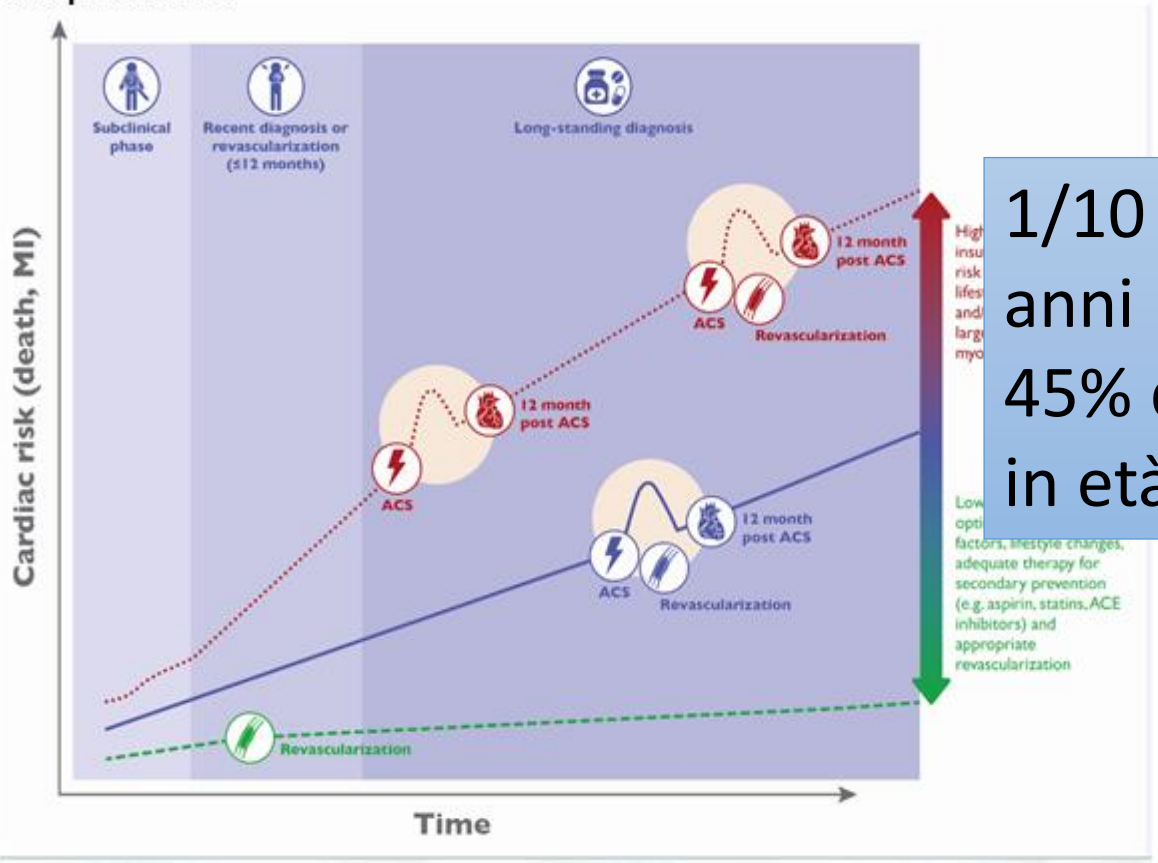
Agenda: valutare la riserva funzionale nel lavoratore con pregresso infarto miocardico, coronaropatie croniche, aritmie

- ✓Cardiopatia ischemica inquadramento epidemiologico
- ✓Riabilitazione cardiologica e rientro al lavoro dopo ricovero
- ✓Stratificazione del paziente:
  - clinica
  - strumentale
- ✓Aritmie

Natural history of chronic coronary syndromes

A dynamic process

ESC European Society of Cardiology



1/10 ha età < 46 anni

45% dei pazienti è in età lavorativa

ESC Guidelines on the diagnosis and management of chronic coronary syndromes (European Heart Journal 2019; 10.1093/eurheartj/ehz425)

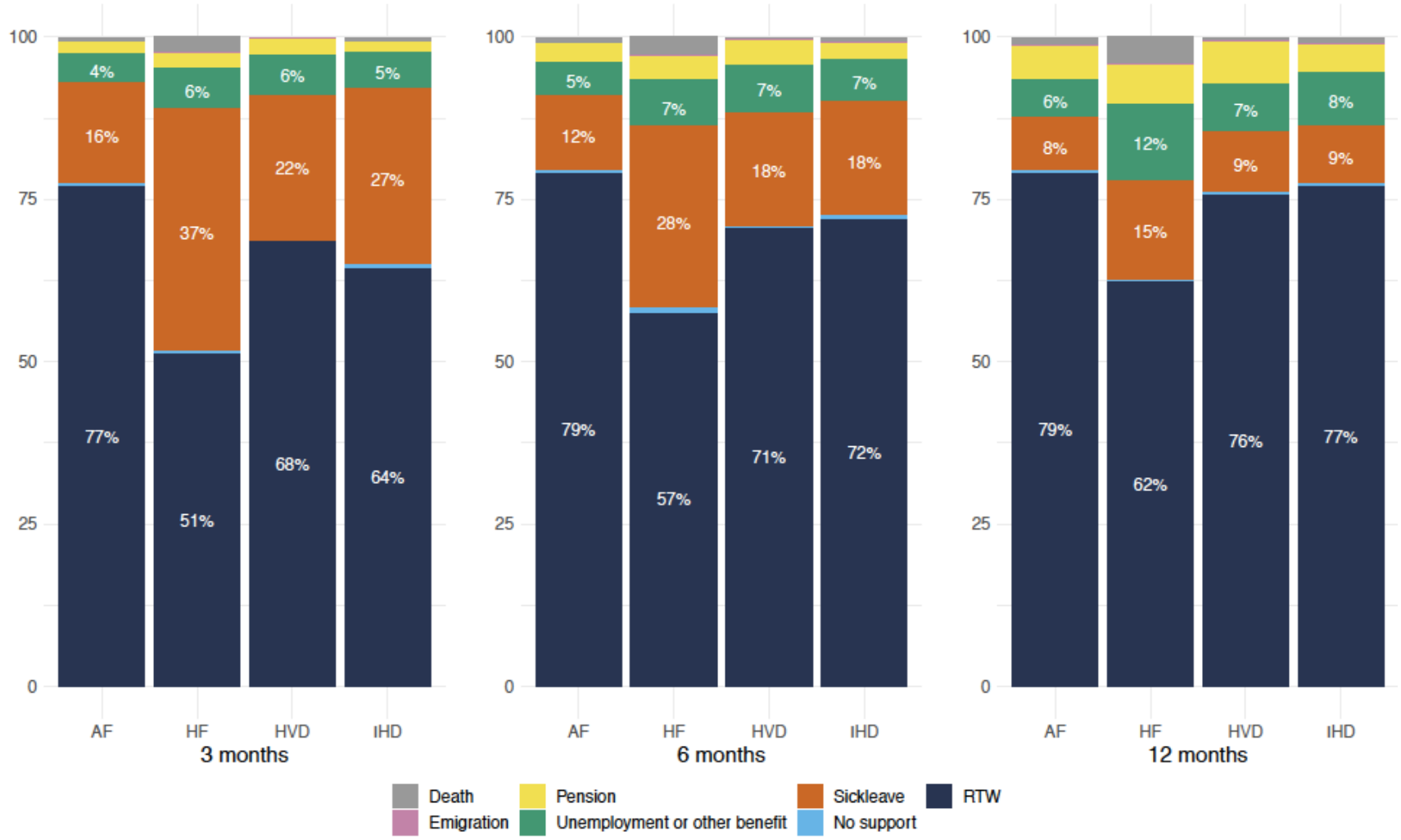
ESC European Society of Cardiology
European Journal of Preventive Cardiology (2023) 30, 182–190
https://doi.org/10.1093/eurjpc/zwac249

FULL RESEARCH PAPER
Cardiac rehabilitation

Diagnostic group differences in return to work and subsequent detachment from employment following cardiovascular disease: a nationwide cohort study

Sidsel Marie Bernt Jørgensen [1,2]*, Thomas Alexander Gerds [1,3], Nina Føns Johnsen[1], Gunnar Gislason[1,4,5], Mohamad El-Chouli[1], Stig Brøndum[1], Thomas Maribo[6,7], and Maria Kristiansen[2]

Status of study participants at 3, 6, and 12 months after diagnosis



Riabilitazione Cardiologica

Intervento multidisciplinare complesso: valutazione cardiologica, prescrizione dell'attività fisica, controllo dei fattori di rischio, educazione e counselling, per migliorare la malattia CV e le condizioni fisiche, mentali e sociali, con lo scopo di preservare o recuperare un'attività migliore nella comunità.

Solo 50% accede alla Riabilitazione,
Il 40% fa percorso riabilitativo,
la metà se consideriamo lo SCC

WHO DEIFINITION,

Nature Reviews cardiology . https://doi.org/10.1038/ s41569-021-00611-7

ESC European Society of Cardiology
European Heart Journal (2023) **44**, 452–469
https://doi.org/10.1093/eurheartj/ehac747

META-ANALYSIS
Ischaemic heart disease

Exercise-based cardiac rehabilitation for coronary heart disease: a meta-analysis

Grace O. Dibben [1]*, James Faulkner[2], Neil Oldridge[3], Karen Rees[4], David R. Thompson [5], Ann-Dorthe Zwisler [6,7,8], and Rod S. Taylor[1,9]

Exercise-based CR is recognized as a key component of comprehensive disease management

This updated Cochrane systematic review and meta-analysis of 85 RCTs in 23,430 patients with CHD (post-MI/PCI/CABG, or stable angina) found that CR was associated with:

1

Better

- Health-related quality of life
- Cost-effectiveness

2

Reduced risk of

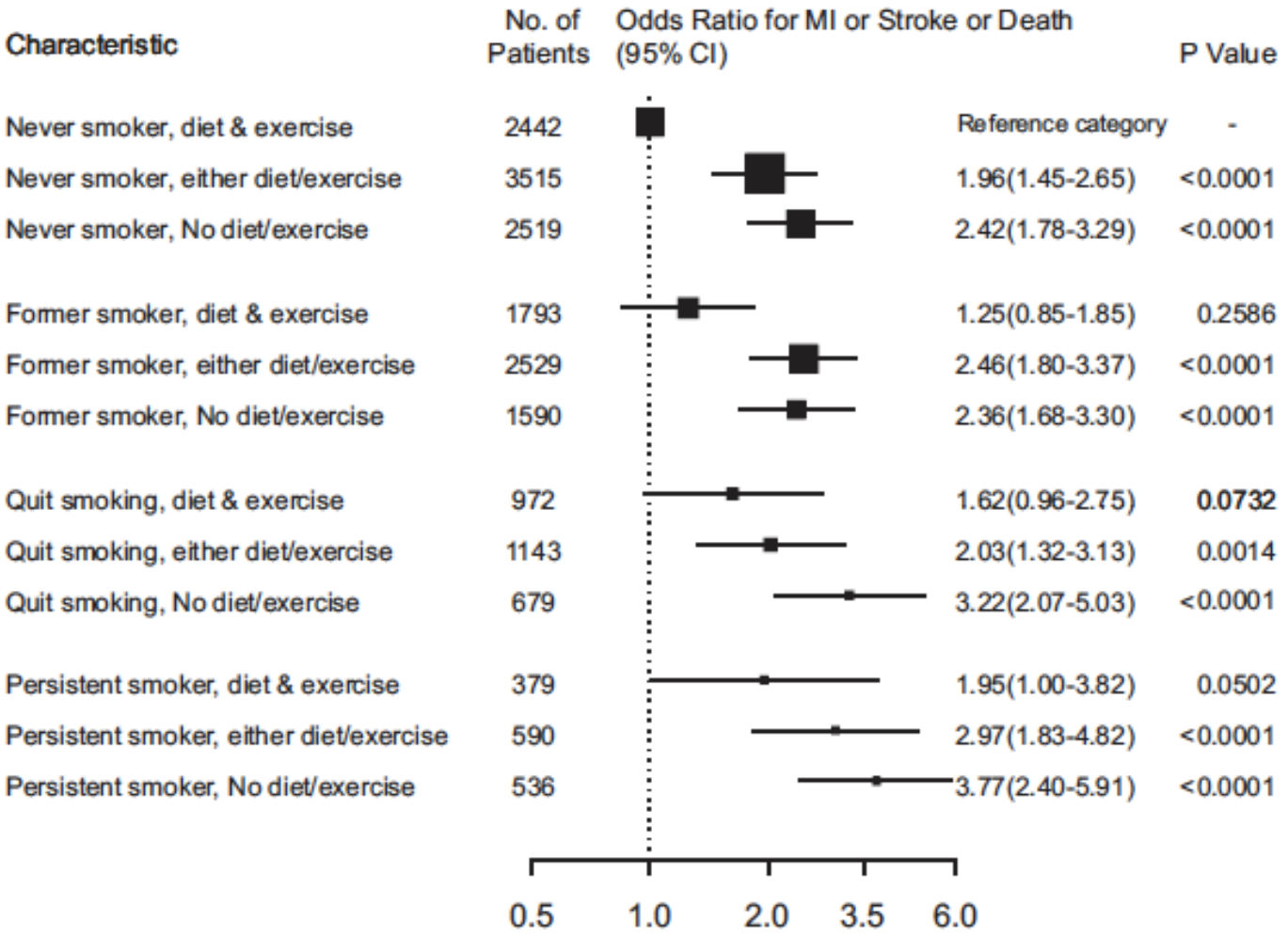
- Cardiovascular mortality
- Myocardial infarction
- Hospitalization

Stratificazione del paziente con cardiopatia ischemica

Fattori clinici	Biomarker	ECG	Funzione ventricolare sinistra	Valutazione funzionale	Valutazione anatomica
età	Troponina	BBS	Ecocardiografia	Test da sforzo	Tc coronarografia
Fattori di rischio CV: IA, DM, iperct, fumo	HS-CRP	Alterazioni del tratto ST	RM cardiaca	Eco stress	Coronarografia + FFR
Gravità angina CCS	NT pro BNP	Onde q	Scintigrafia	SPECT	
Scompenso cardiaco		FA o aritmie ve		CPET	
Eventi CV multipli					
Vasculopatia polidistrettutale					
IRC					

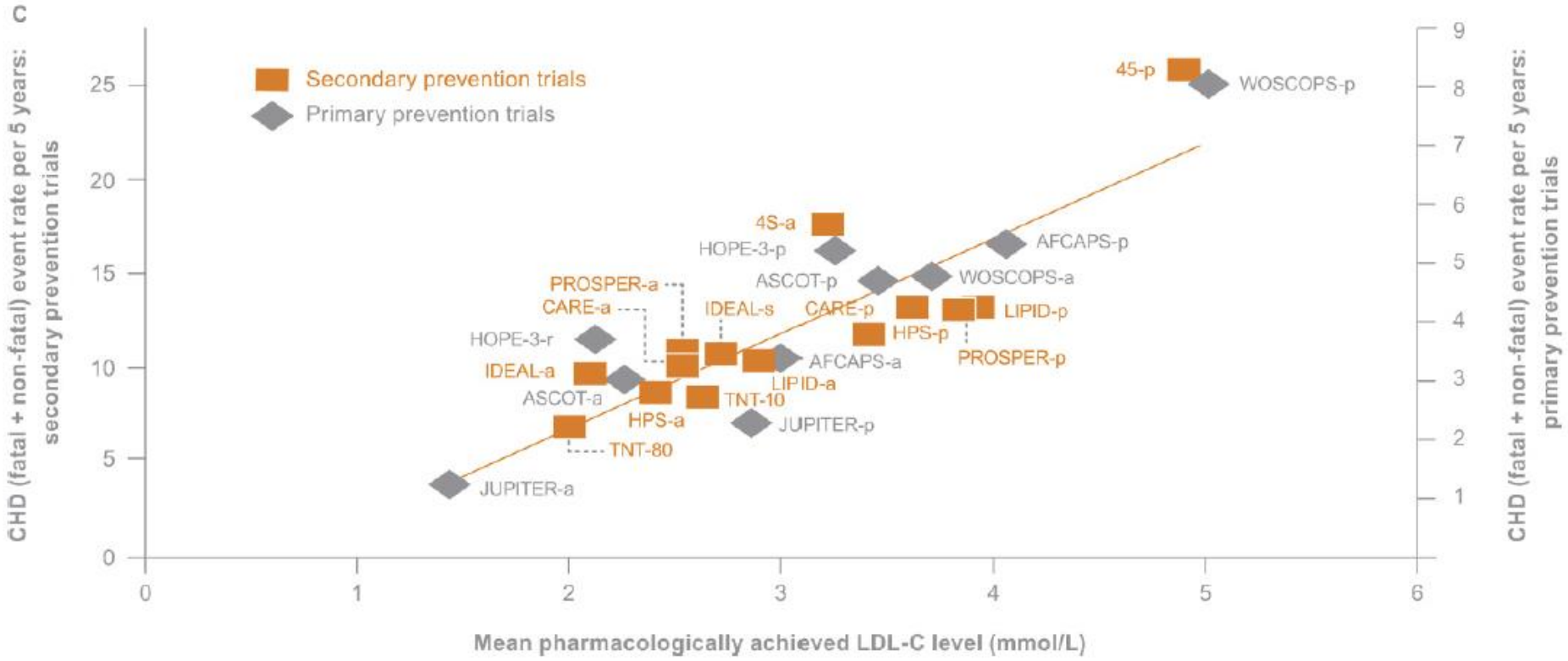
Association of Diet, Exercise, and Smoking Modification With Risk of Early Cardiovascular Events After Acute Coronary Syndromes

Clara K. Chow, MBBS, FRACP, PhD; Sanjit Jolly, MD, MSc, FRCPC;
Purnima Rao-Melacini, MSc; Keith A.A. Fox, BSc (Hons), MB, ChB, FRCP, FESC, FMedSci;
Sonia S. Anand, MD, PhD, FRCPc; Salim Yusuf, DPhil, FRCPC, FRSC



Circulation. 2010;121:750-758.

LDL Cholesterol: Lower is better

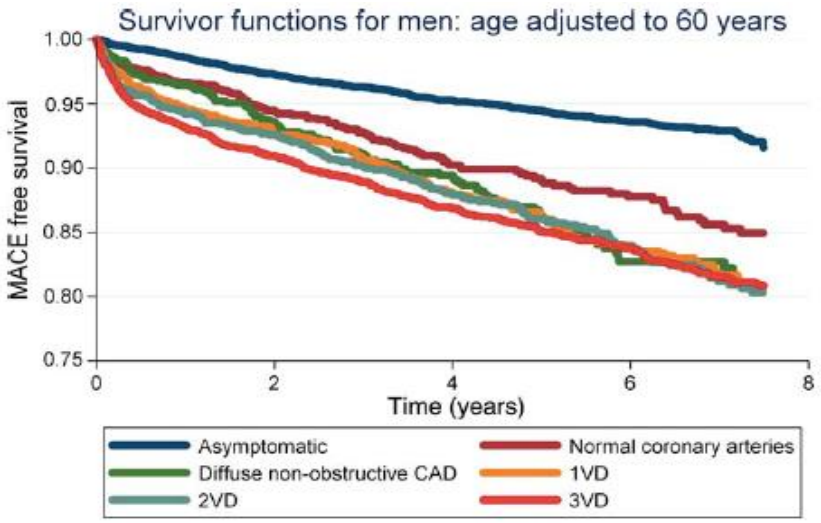


Packard C, et al. Heart 2021;107:1369–1375

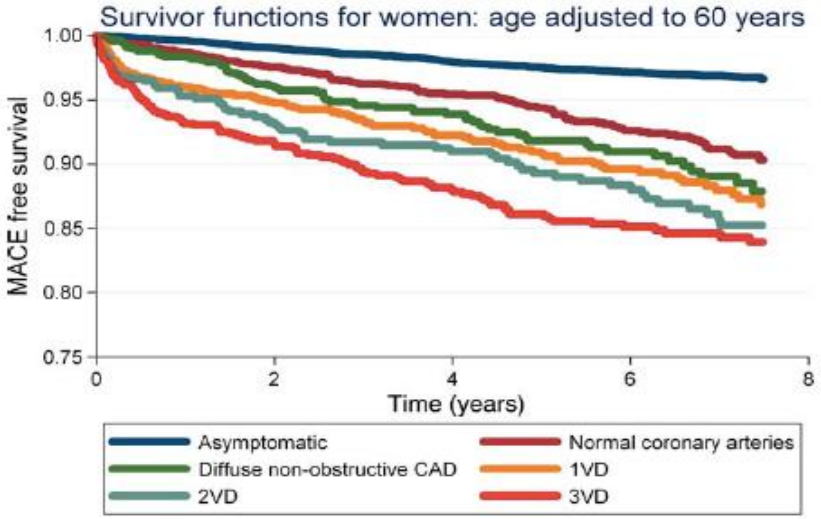
European Heart Journal (2012) **33**, 734–744
doi:10.1093/eurheartj/ehr331

Stable angina pectoris with no obstructive coronary artery disease is associated with increased risks of major adverse cardiovascular events

Lasse Jespersen[1]*, Anders Hvelplund[2,3], Steen Z. Abildstrøm[1], Frants Pedersen[4], Søren Galatius[3], Jan K. Madsen[3], Erik Jørgensen[4], Henning Kelbæk[4], and Eva Prescott[1,5]



Numbers at risk	0	2	4	6
Asymptomatic	2359	2231	2101	1738
Normal CA	1214	854	597	367
Dif. non-obstr. CAD	869	557	362	174
1VD	1475	1072	783	474
2VD	1105	806	583	342
3VD	1783	1312	984	632



Numbers at risk	0	2	4	6
Asymptomatic	3346	3213	3044	2600
Normal CA	2237	1597	1155	721
Dif. non-obstr. CAD	809	527	336	187
1VD	777	567	411	252
2VD	377	274	209	143
3VD	471	333	256	161

Risk Stratification in Patients with Coronary Artery Disease: a Practical Walkthrough in the Landscape of Prognostic Risk Models

Sergio Buccheri,[1,2] Paolo D'Arrigo,[1] Gabriele Franchina[1] and Davide Capodanno[1]

1. CAST, AOU. Policlinico-Vittorio Emanuele, University of Catania, Catania, Italy; 2. Department of Medical Sciences, Cardiology and Uppsala Clinical Research Center, Uppsala University, Uppsala, Sweden

Interventional Cardiology Review 2018;13(3):112–20.

Risk Score	Clinical Setting	Time of Score Use	Predicted Event	Parameters	C-statistic (Derived/ External Validation)	Trials/Studies (Reference)
CADILLAC risk score	ACS	Post-PCI	1-year mortality	Clinical: 2 Echocardiographic: 1 Laboratory: 2 Angiographic: 1 cTherapeutic: 1	0.79/0.78	22,23,24,25
PAMI risk score	ACS	Post-primary PCI	6-month mortality	Clinical: 3 Electrocardiographic: 1	0.78/NR	23,26,27,28
ZWOLLE risk score	STEMI	Post-primary PCI	30-day mortality	Clinical: 3 Angiographic: 3	0.902/0.937	29,30,31,32
GRACE hospital discharge score	All subset of ACS	Pre-discharge	All-cause mortality, from 6 months to 4 years post-discharge	Clinical: 6 Laboratory: 2 Electrocardiographic: 1	0.75/NR	33
Dynamic TIMI risk score	STEMI	Pre-discharge	1-year mortality	Nine admission variables of TIMI risk score plus parameters during the index hospitalisation: Clinical: 5 Electrocardiographic: 1	0.76/0.81	34,35,36
RISK-PCI score	STEMI	Post-primary PCI	30-day MACE and 30-day mortality	Clinical: 2 Laboratory: 3 Electrocardiographic: 3 Echocardiographic: 1 Angiographic: 3	0.83 (MACE-internal validation), 0.87 (mortality-internal validation)/NR	37,38
EPICOR prognostic model	ACS	Pre-discharge	1-year mortality	Clinical: 8 Laboratory: 3 Echocardiographic: 1	0.81/0.78	39
APEX-AMI risk score	STEMI	Post-primary PCI	90-day mortality	Clinical: 4 Electrocardiographic: 2 Laboratory: 1	0.81/NR	40
Residual SYNTAX score (rSS)	ACS	After PCI	1-year all-cause mortality	Same as baseline SYNTAX score	0.63/NR	41
DAPT score	All PCI patients on DAPT	12 months after DAPT	Ischaemia and bleeding between 12 and 30 months after PCI	Clinical: 5 Procedural: 3 plus CHF/LVEF<30%	0.70 (ischaemia), 0.68 (bleeding)/0.64 (for both ischaemia and bleeding)	48
GUSTO score	STEMI	30 days (event-free) after STEMI	1-year mortality	Clinical: 4 ±1 angiographic and heart rate	0.75 and 0.79 (with and without angiographic data)/NR	49

Abbreviations: STEMI, ST-elevation myocardial infarction; NSTEMI, non-ST-elevation myocardial infarction; ACS, acute coronary syndrome; DAPT, dual antiplatelet therapy; MACE, major adverse cardiac event; PCI, percutaneous coronary intervention

Identikit del paziente con cardiopatia ischemica ad alto rischio trombotico

PEGASUS

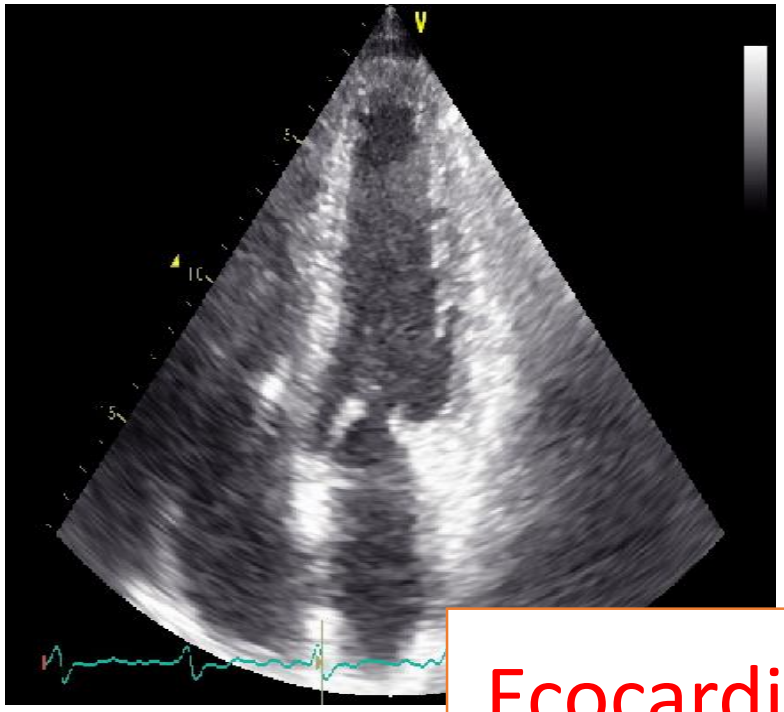
- Post infarto 1-3 anni
- >65 anni
- DM in terapia
- Secondo infarto
- MVD
- GFR < 60 ml/min

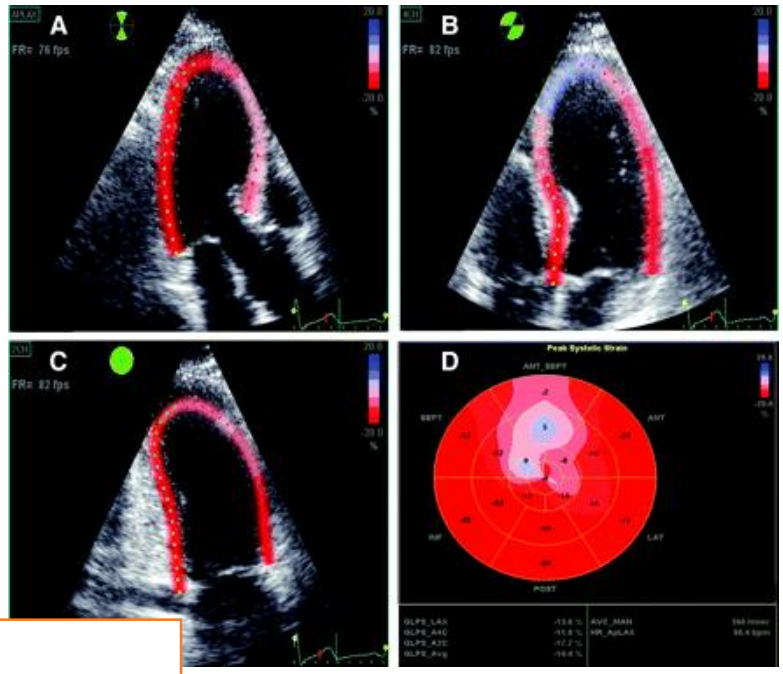
COMPASS

- SCAD o PAD
- Se< 65 anni anche ATS di 2 distretti o almeno uno: fumo attivo, DM; GFR <60 ml/min, HF, ictus ≥ 1 mese

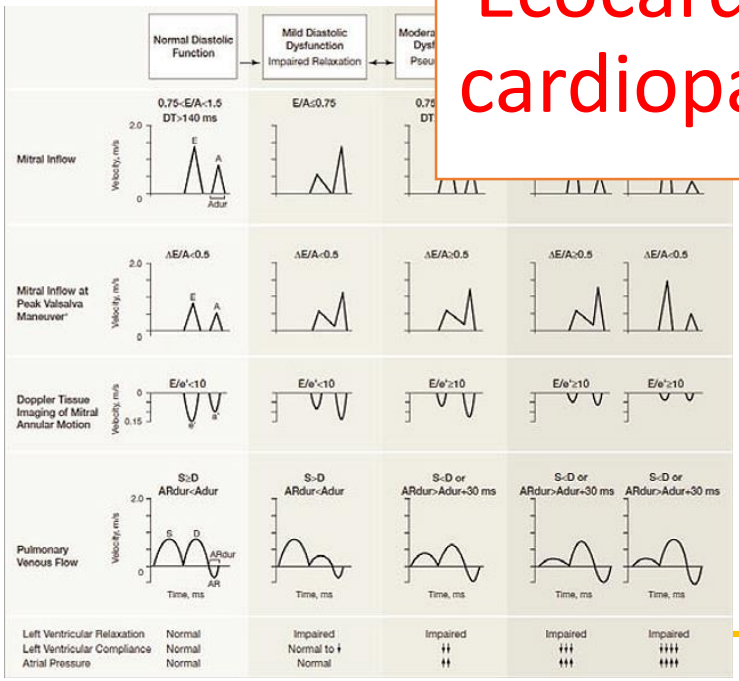
Fattori di rischio clinico e trombotico nel paziente post STEMI

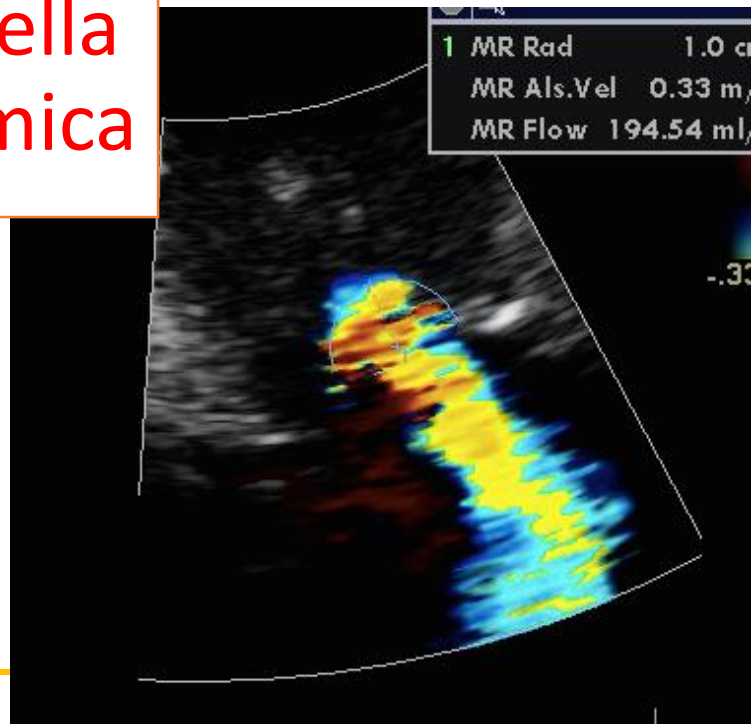
Criteri di basso rischio	Criteri di alto rischio clinico	Criteri di Alto rischio trombotico
Ricovero precoce dall'esordio dei sintomi	FE <40%	Elevato rischio cardiovascolare residuo (GRACE)
Modesto elevazione dei marcatori bioumorali di necrosi	FE 40% - 45% con associato un predittore di rimodellamento - Insufficienza mitralica >1 - Riempimento diastolico restrittivo - Alto score di asinergia e ventricolo non dilatato	Arteriopatia periferica
Funzione ventricolare sinistra normale		Storia di angina o di pregresso IMA
Malattia coronarica monovasale		Malattia multivasale
PCI eseguita con successo		Rivascolarizzazione incompleta
	Importante variazione del BNP	Mancata rivascolarizzazione/riperfusione
	Uso di diuretici dell'ansa durante il ricovero	Diabete mellito
	Aritmie	Insufficienza renale





Ecocardiografia nella cardiopatia ischemica





ESC European Society of Cardiology

European Journal of Heart Failure (2021) **23**, 406–416
doi:10.1002/ejhf.2047

RESEARCH ARTICLE

Ejection fraction and mortality: a nationwide register-based cohort study of 499 153 women and men

Simon Stewart[1]*, David Playford[2], Gregory M. Scalia[3], Philip Currie[4], David S Celermajer[5], David Prior[6], Jim Codde[2], and Geoff Strange[2], on behalf of the NEDA Investigators

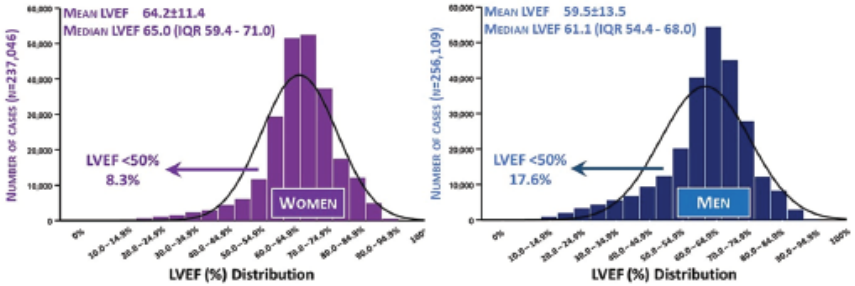
Critical lack of large-scale, real world data on the sex-specific distribution & prognostic impact of LVEF

National Echocardiography Database of Australia

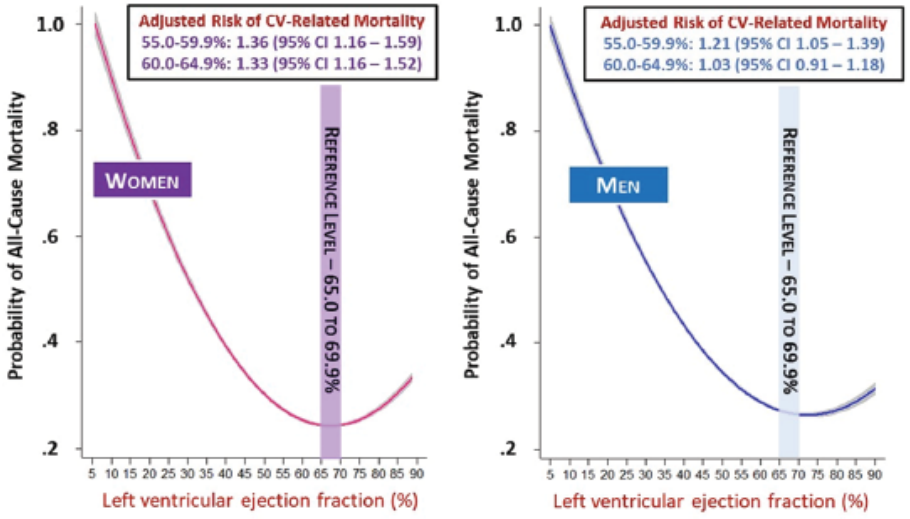
493 155 cases investigated for suspected or established cardiovascular disease with echocardiography linked to mortality outcomes

237 046 women
61.0 (18.3) years

256 109 men
60.6 (17.1) years

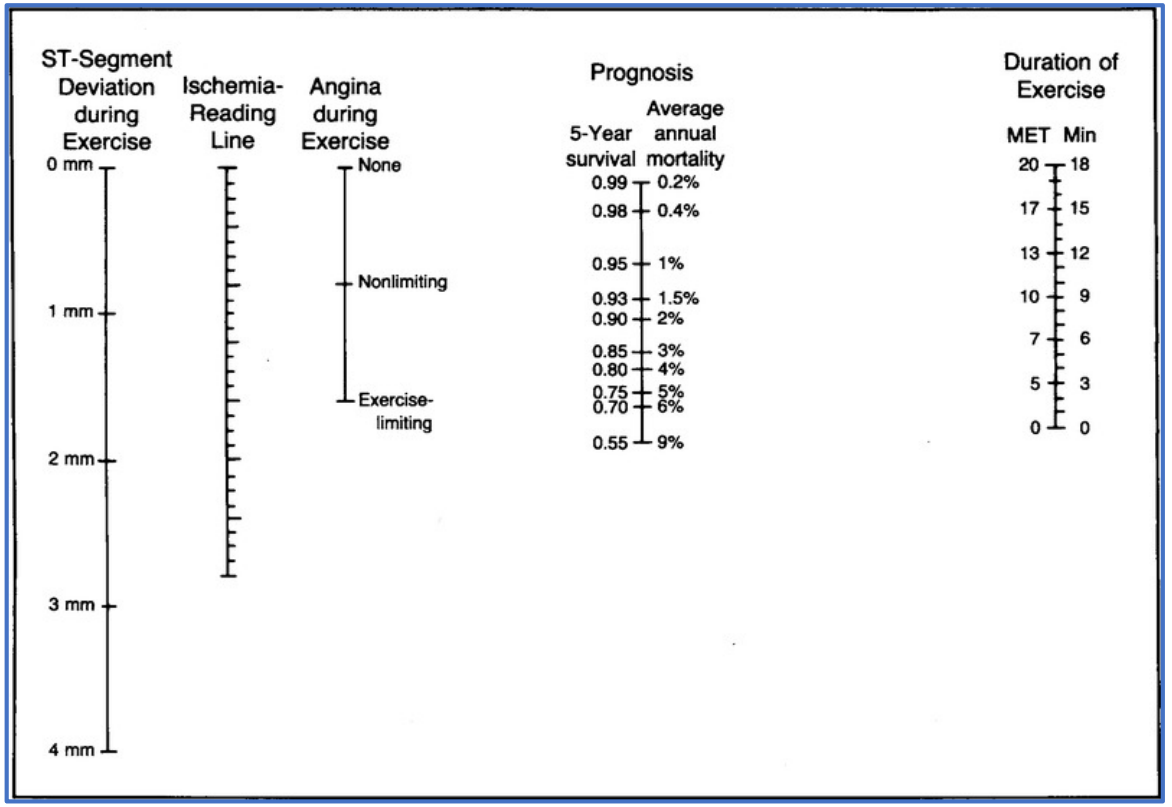


Sex-specific differences in the distribution of LVEF



Sex-specific differences in CV-related mortality at equivalent LVEF

Test da sforzo



$$\text{Duke Treadmill Score} = \text{Exercise Duration (min)} - 5\,(\text{ST Deviation (mm)}) - 4\,(\text{Angina Index})$$

Angina Index

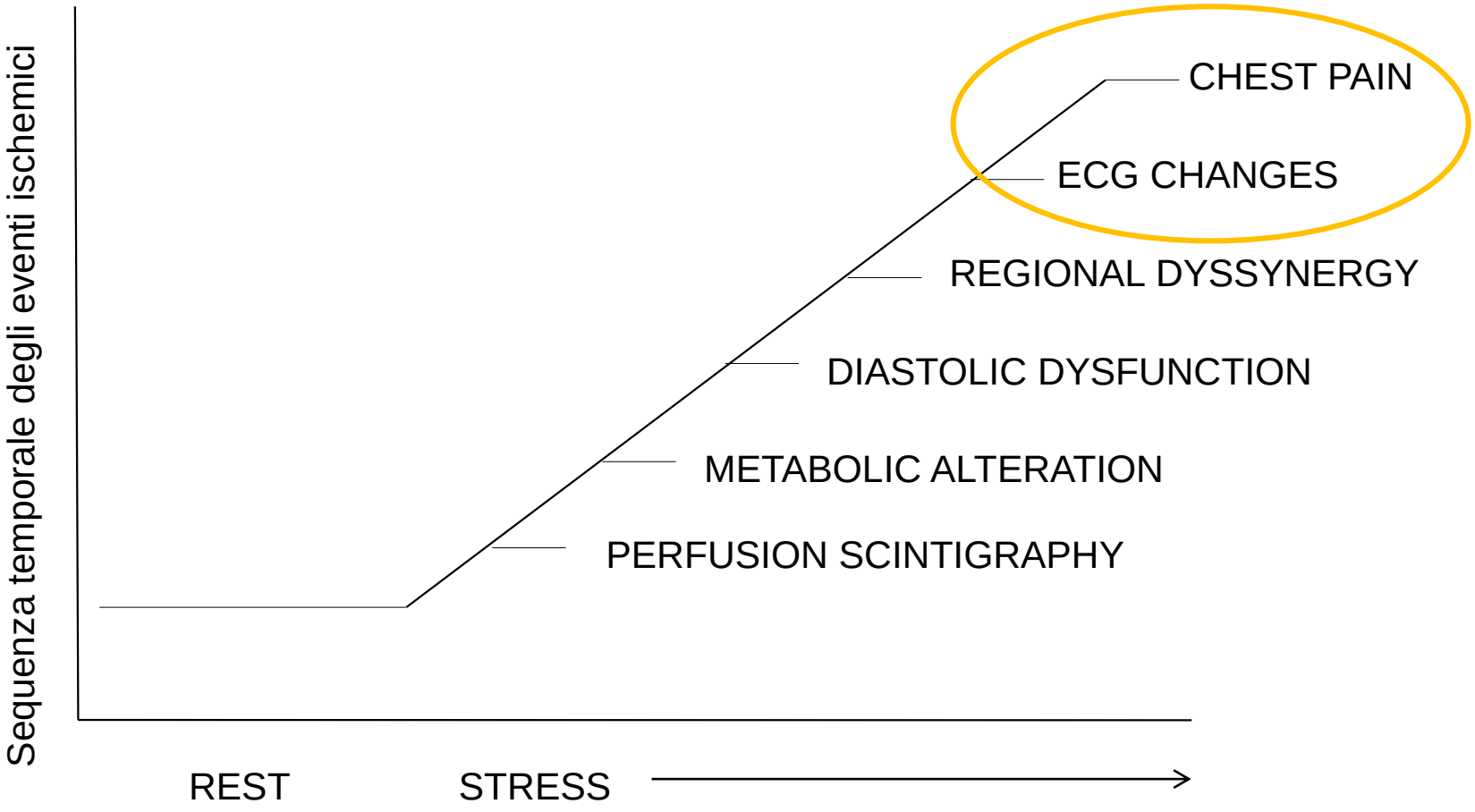
0 – none, 1 – typical angina, 2 – angina causing test cessation

Score	Risk Group	Stenosis ≥75%	Multivessel Disease	1-Year Mortality
≥5	Low	40.1%	23.7%	0.25%
-10 to 4	Intermediate	67.3%	55.0%	1.25%
≤-11	High	99.6%	93.7%	5.25%

N Engl J Med 1991; 325:849-53

JACC Cardiovasc Imaging. 2015 November ; 8(11): 1309–1321

La cascata ischemica



Accuratezza delle tecniche di imaging nella cardiopatia ischemica

Tecniche di imaging	Sensibilità (%)	Specificità (%)
Test da sforzo	68	77
Eco-stress fisico	81	79
Eco-stress farmacologico con dipiridamolo	74	90
Eco-stress globale	80	84
Scintigrafia miocardica da sforzo	86	75
Scintigrafia miocardica con stress farmacologico	88	75
RM-cine	83	86
RM-perfusione	91	79
TC cardiaca	94	92

G Ital Cardiol 2023;24(4 Suppl 2):5S-15S

Pro e contro: ricerca ischemia e anatomia coronarica

	Advantages	Disadvantages
Exercise ECG	Physiological Provides information about patient function Widely available Low cost Extensive evidence base	Patient factors may limit applicability -inability to exercise - uninterpretable ECG (LBBB, LVH, paced rhythm)
Stress Echocardiography	Wide availability Portability Low cost No radiation Provides quantitative assessment and localisation of ischaemia	Image quality may be problematic Operator dependent Subjective assessment
MPI SPECT	Generally available Extensive evidence base Provides quantitative assessment and localisation of ischaemia	Radiation May not detect balanced 3 vessel disease
Stress CMR	Excellent image quality No radiation Potential to assess ischaemia/ viability/ LV function in single scan	Availability of hardware/ expertise Cost Contraindications (eg implanted devices, claustrophobia) Arrhythmias can cause problems Limited quantification of ischaemia
CT coronary angiography	High sensitivity for detecting CAD High negative predictive value of normal scan Hardware generally available	Radiation Assessment may be limited if extensive calcification or previous stents May overestimate intermediate lesions

Patients with angina and/or dyspnoea and suspected coronary artery disease

ESC European Society of Cardiology

Definitions of high event risk for different tests

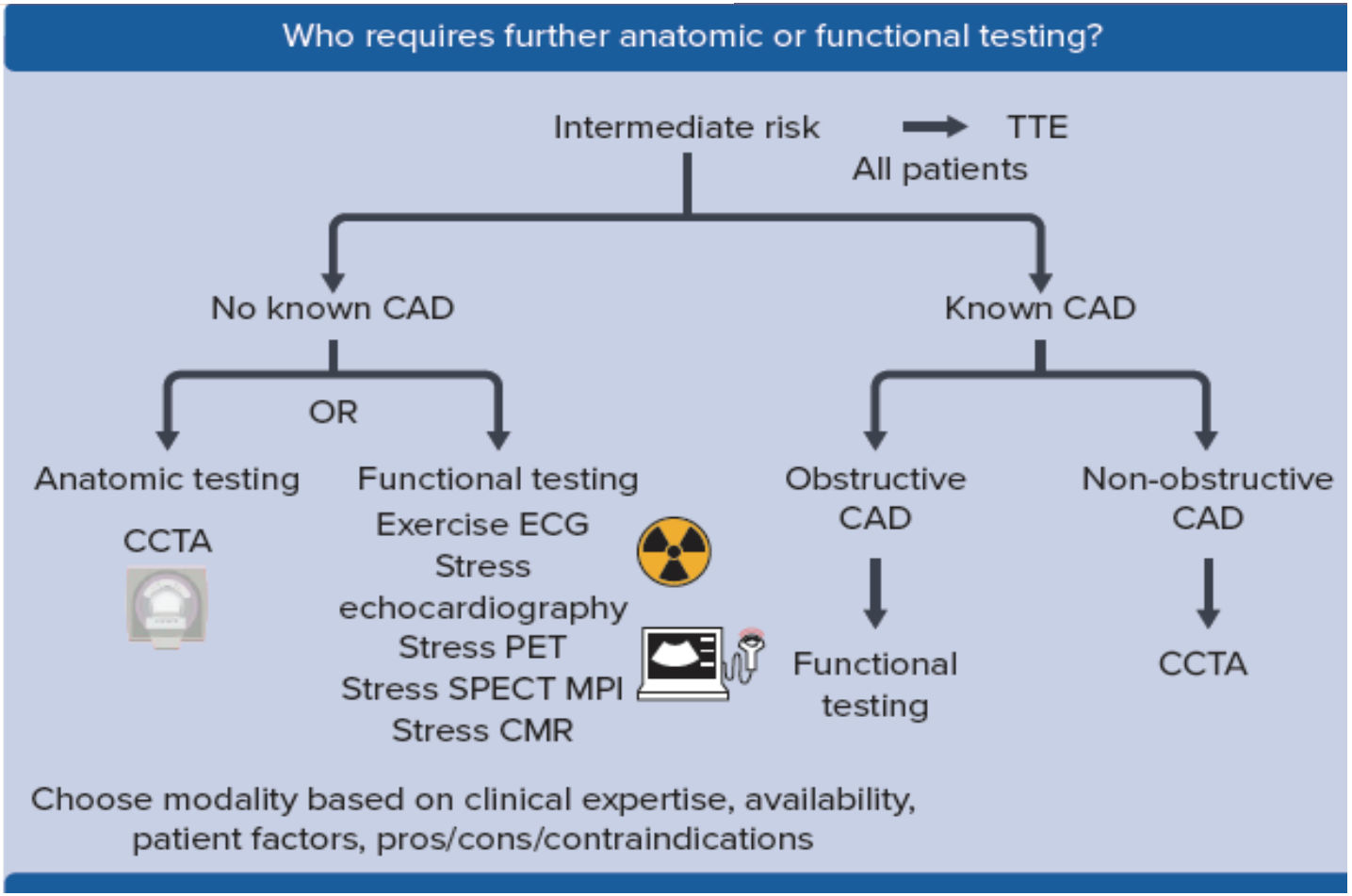
Exercise ECG	Cardiovascular mortality >3% per year according to Duke Treadmill Score.
SPECT or PET perfusion imaging	Area of ischaemia ≥10% of the left ventricle myocardium.
Stress echocardiography	≥3 of 16 segments with stress-induced hypokinesia or akinesia.
CMR	≥2 of 16 segments with stress perfusion defects or ≥3 dobutamine-induced dysfunctional segments.
Coronary CTA or ICA	Three-vessel disease with proximal stenoses, LM disease, or proximal anterior descending disease.
Invasive functional testing	FFR ≤0.8, iwFR ≤0.89.

ESC Guidelines on the diagnosis and management of chronic coronary syndromes (European Heart Journal 2019; 10.1093/eurheartj/ehz425)

Contemporary Risk Stratification of Acute Coronary Syndrome

Gurleen Kaur, MD,[1] Swati Chand, MD,[2] Devesh Rai, MD,[3] Bipul Baibhav, MD,[3] Ron Blankstein, MD,[4] Debabrata Mukherjee, MD, MS,[5] Phillip Levy, MD, MPH,[6] and Martha Gulati, MD, MS[7]

1. Department of Internal Medicine, Brigham and Women's Hospital, Boston, MA; 2. Department of Internal Medicine, Rochester General Hospital, Rochester, NY; 3. Department of Cardiology, Sands-Constellation Heart Institute, Rochester Regional Health, Rochester, NY; 4. Cardiovascular Division, Brigham and Women's Hospital, Boston, MA; 5. Division of Cardiovascular Diseases, Texas Tech University Health Sciences Center at El Paso, El Paso, TX; 6. Department of Emergency Medicine, Wayne State University, Detroit, MI; 7. Department of Cardiology, Barbra Streisand Women's Heart Center, Cedars-Sinai Smidt Heart Institute, Los Angeles, CA



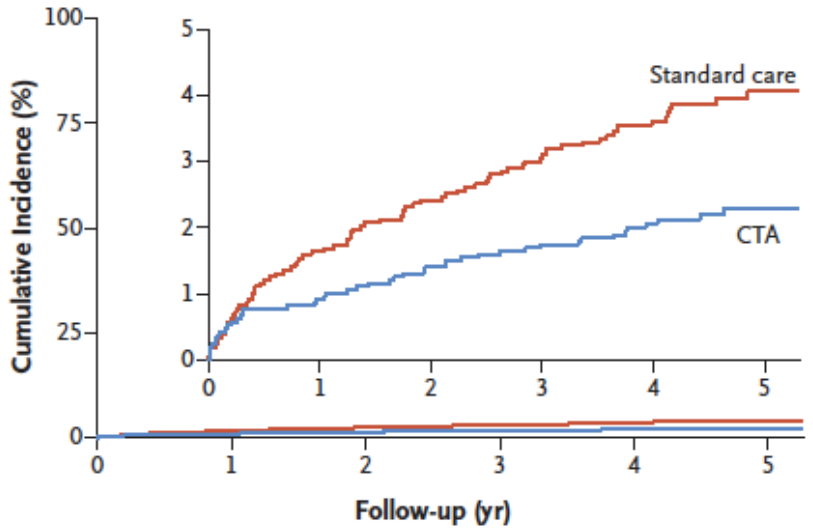
US Cardiology 2022;16:e23. DOI: https://doi.org/10.15420/usc.2022.10

Coronary CT Angiography and 5-Year Risk of Myocardial Infarction

The SCOT-HEART Investigators*

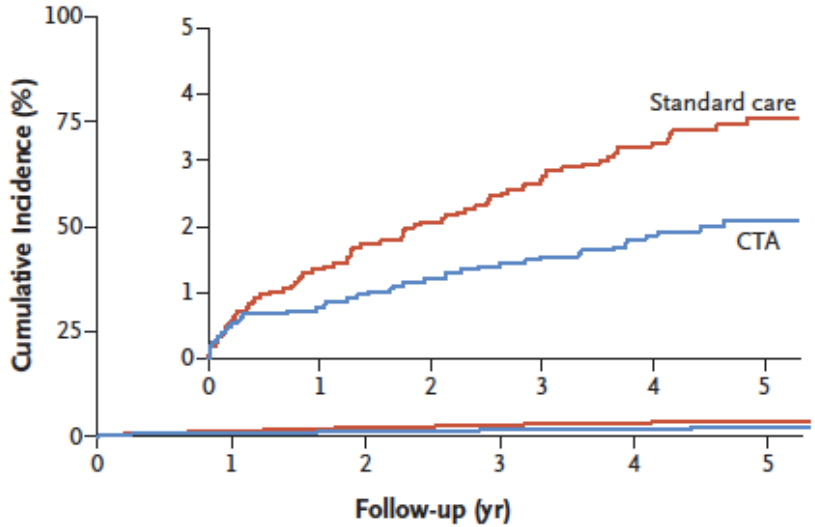
N Engl J Med 2018;379:924-33.

A Death from Coronary Heart Disease or Nonfatal Myocardial Infarction



No. at Risk						
Standard care	2073	2033	2008	1994	1572	856
CTA	2073	2051	2029	2015	1588	872

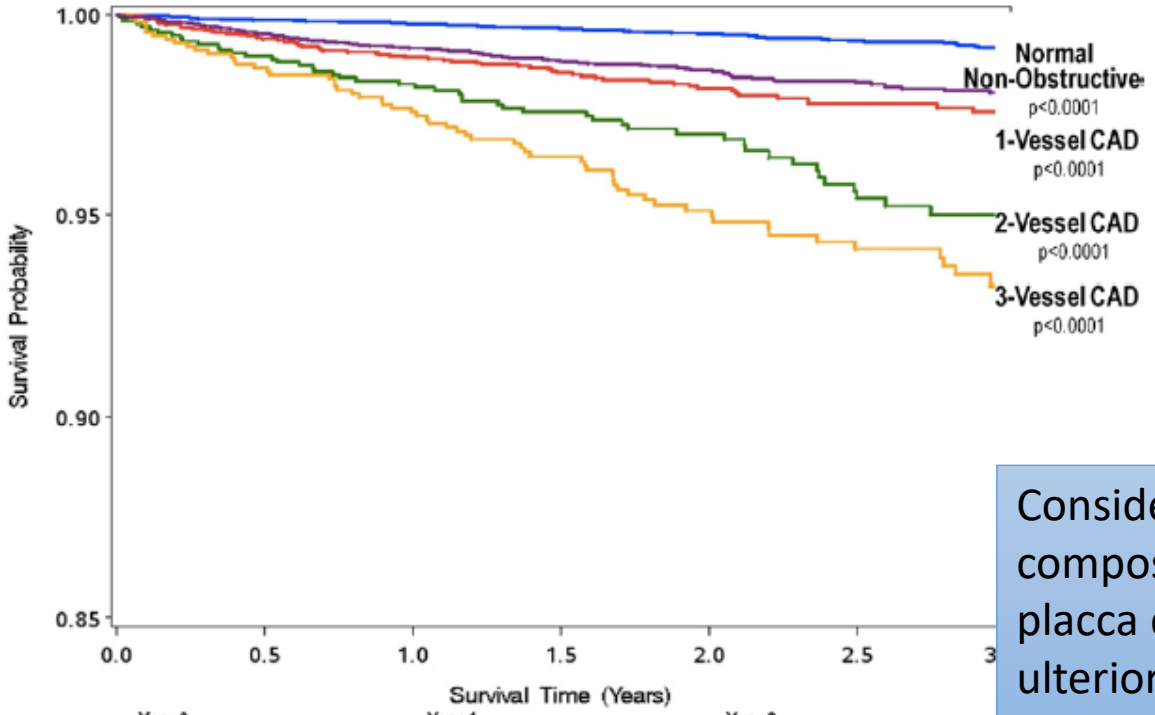
B Nonfatal Myocardial Infarction



No. at Risk						
Standard care	2073	2045	2030	2017	1597	881
CTA	2073	2057	2048	2041	1618	891

Age- and Sex-Related Differences in All-Cause Mortality Risk Based on Coronary Computed Tomography Angiography Findings

Results From the International Multicenter CONFIRM (Coronary CT Angiography Evaluation for Clinical Outcomes: An International Multicenter Registry) of 23,854 Patients Without Known Coronary Artery Disease



At Risk	Year 0	Year 1	Year 2	Year 3
Normal	10146	9357	5800	2907
Non-Obstructive	8114	7437	4081	1930
1-Vessel	3118	2873	1747	782
2-Vessel	1346	1228	742	324
3-Vessel/Left Main	1130	1034	664	324

Considerare la composizione della placca determina ulteriore differenza

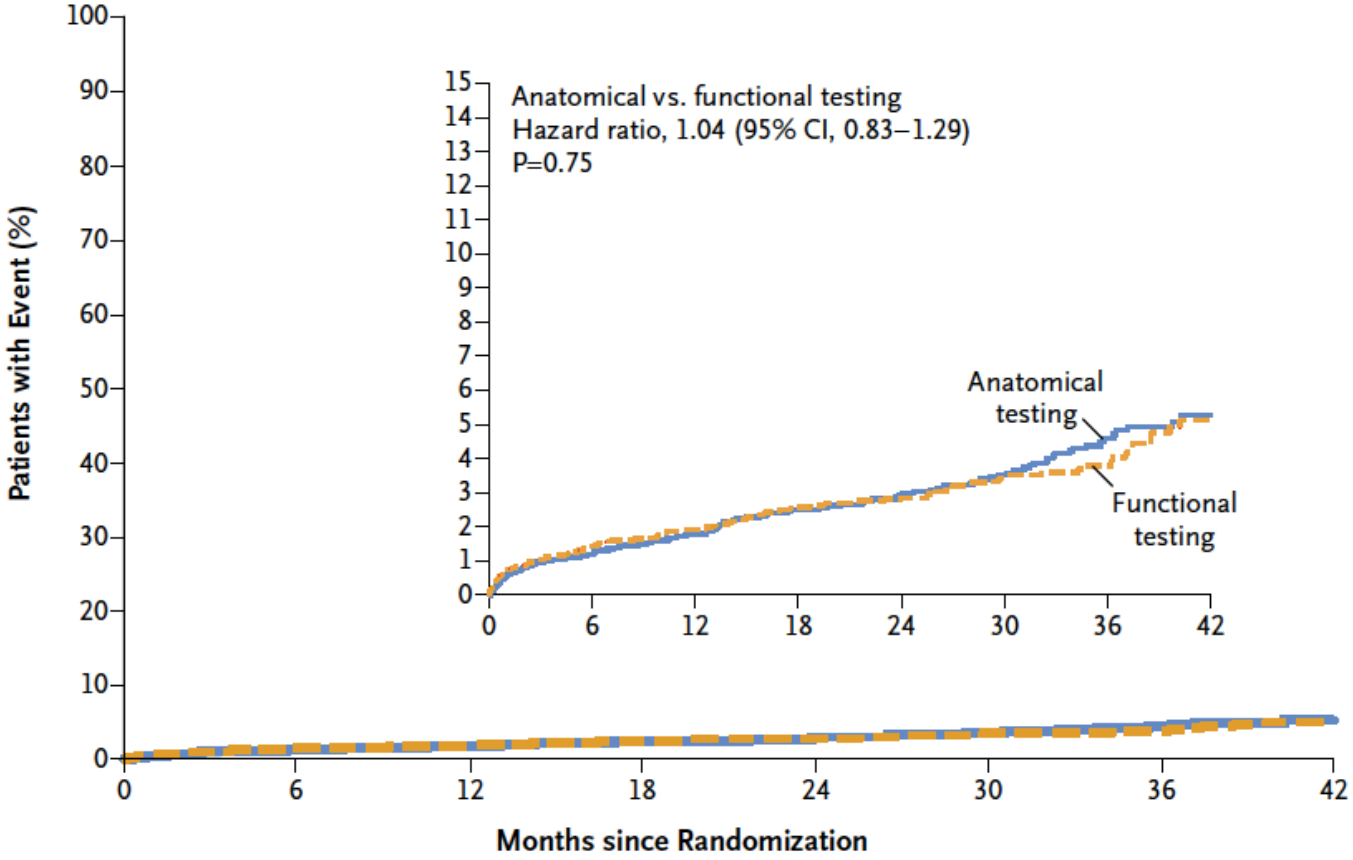
J Am Coll Cardiol 2011;58:849–60

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 2, 2015 VOL. 372 NO. 14

Outcomes of Anatomical versus Functional Testing for Coronary Artery Disease

Pamela S. Douglas, M.D., Udo Hoffmann, M.D., M.P.H., Manesh R. Patel, M.D., Daniel B. Mark, M.D., M.P.H., Hussein R. Al-Khalidi, Ph.D., Brendan Cavanaugh, M.D., Jason Cole, M.D., Rowena J. Dolor, M.D., Christopher B. Fordyce, M.D., Megan Huang, Ph.D., Muhammad Akram Khan, M.D., Andrzej S. Kosinski, Ph.D., Mitchell W. Krucoff, M.D., Vinay Malhotra, M.D., Michael H. Picard, M.D., James E. Udelson, M.D., Eric J. Velazquez, M.D., Eric Yow, M.S., Lawton S. Cooper, M.D., M.P.H., and Kerry L. Lee, Ph.D., for the PROMISE Investigators*



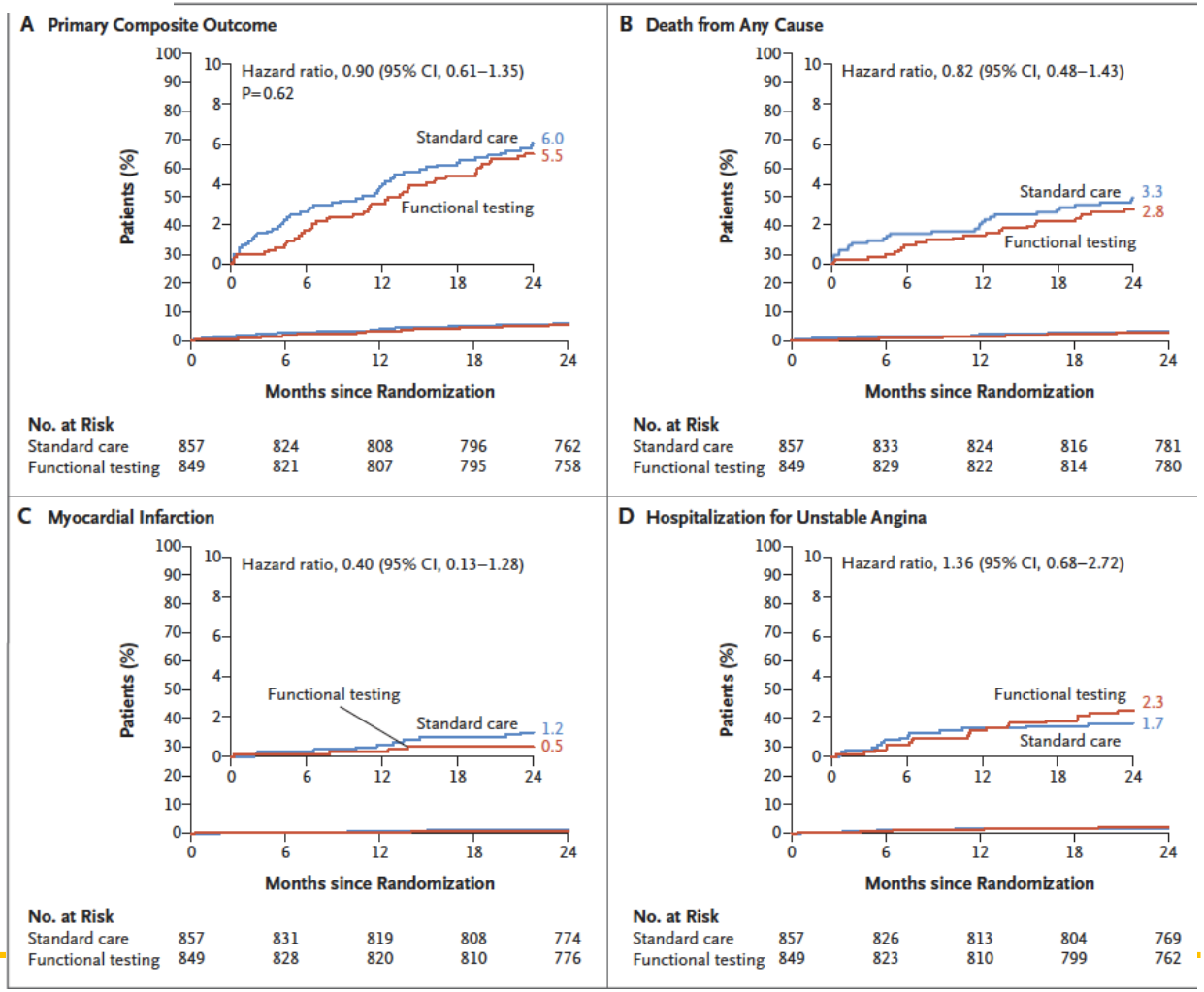
No. at Risk								
Anatomical testing	4996	4703	4362	3551	2652	1705	902	269
Functional testing	5007	4536	4115	3331	2388	1518	832	258

ORIGINAL ARTICLE

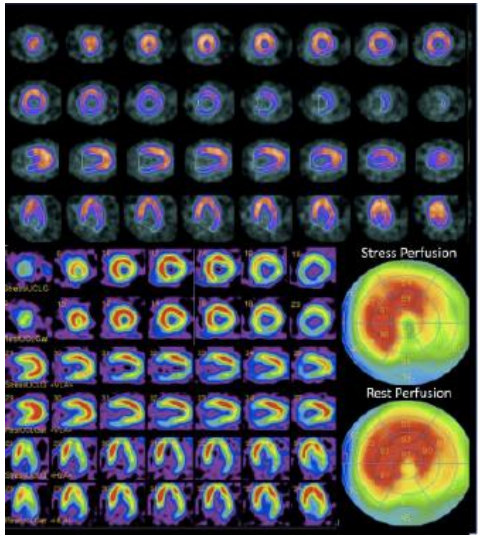
Routine Functional Testing or Standard Care in High-Risk Patients after PCI

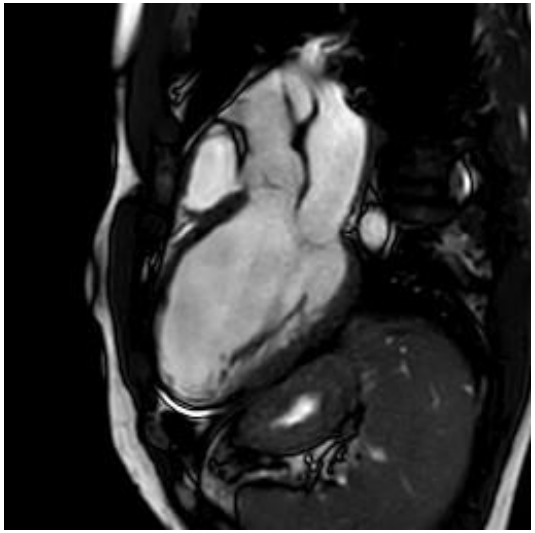
Duk-Woo Park, M.D., Do-Yoon Kang, M.D., Jung-Min Ahn, M.D., Sung-Cheol Yun, Ph.D., Yong-Hoon Yoon, M.D., Seung-Ho Hur, M.D., Cheol Hyun Lee, M.D., Won-Jang Kim, M.D., Se Hun Kang, M.D., Chul Soo Park, M.D., Bong-Ki Lee, M.D., Jung-Won Suh, M.D., Jung Han Yoon, M.D., Jae Woong Choi, M.D., Kee-Sik Kim, M.D., Si Wan Choi, M.D., Su Nam Lee, M.D., and Seung-Jung Park, M.D., for the POST-PCI Investigators*

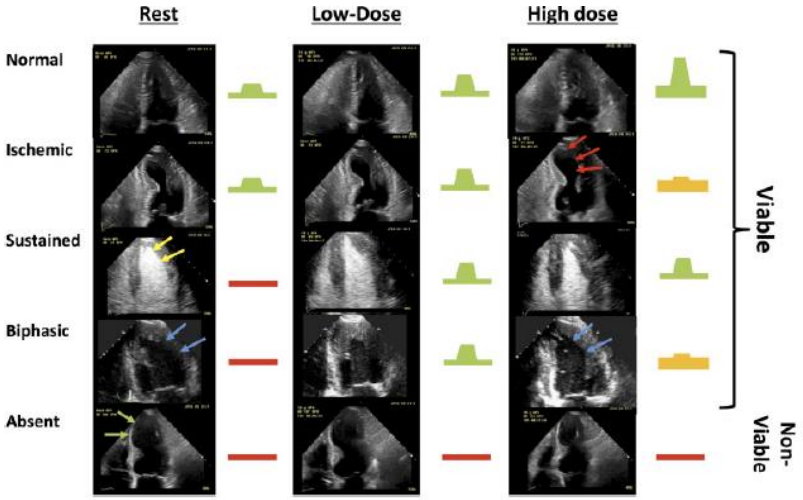
N Engl J Med 2022;387:905-15.

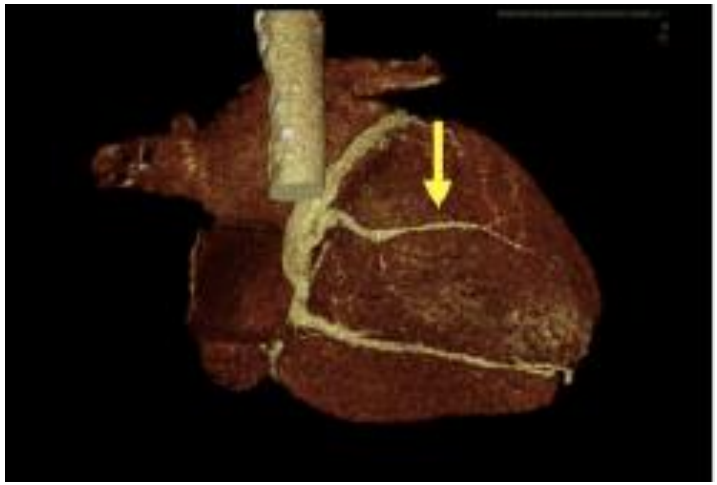


Integrazione studio funzionale e anatomico









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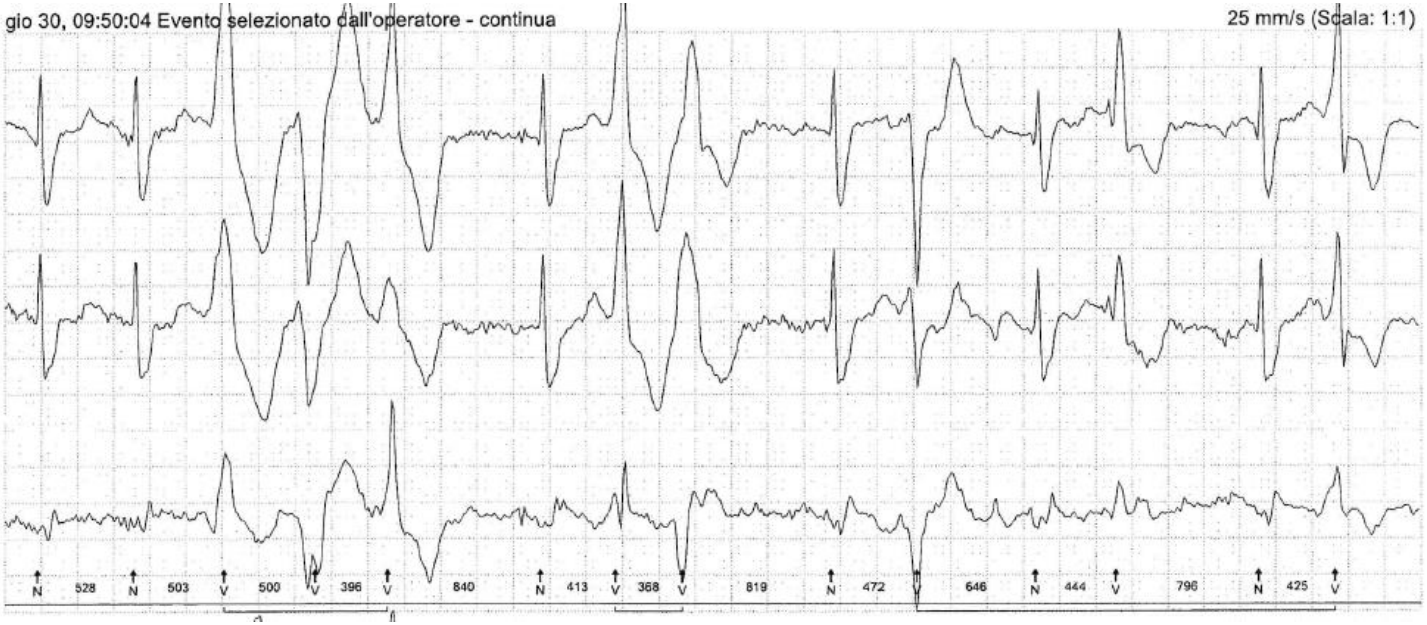
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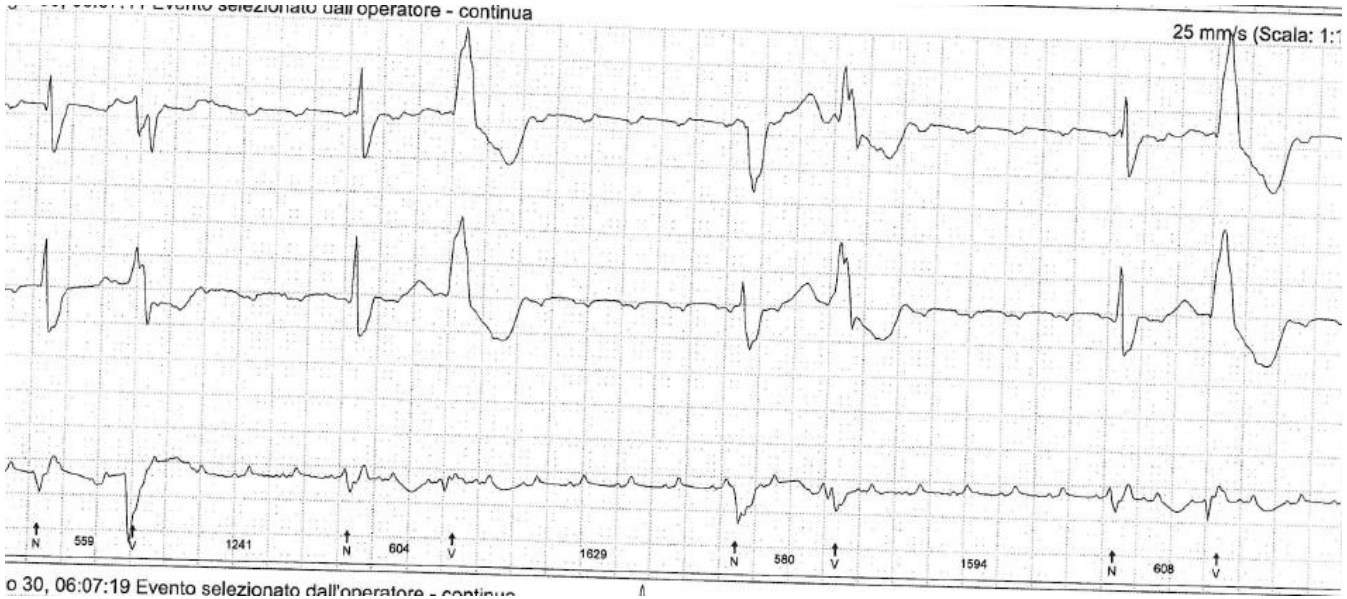
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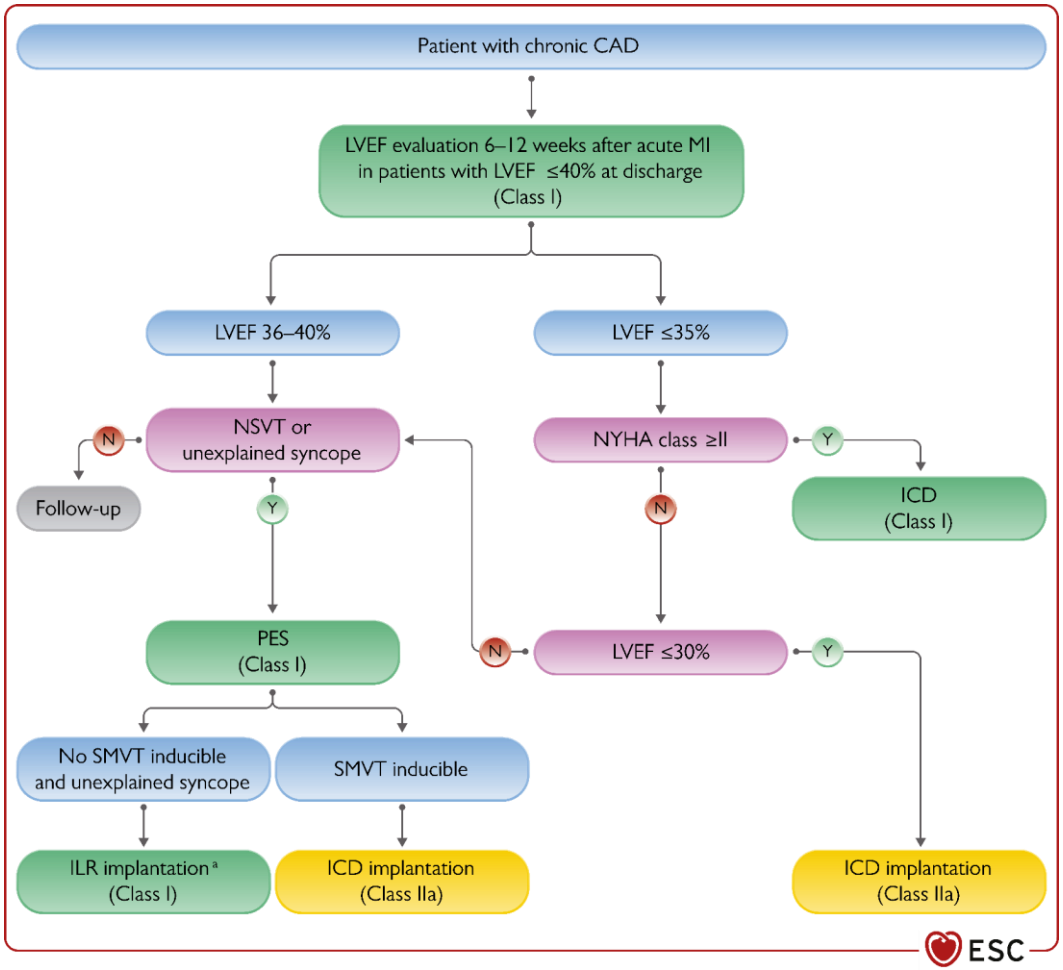
o 30, 06:07:19 Evento selezionato dall'operatore - continua

Rischio aritmico nella cardiopatia ischemica

Figure 15

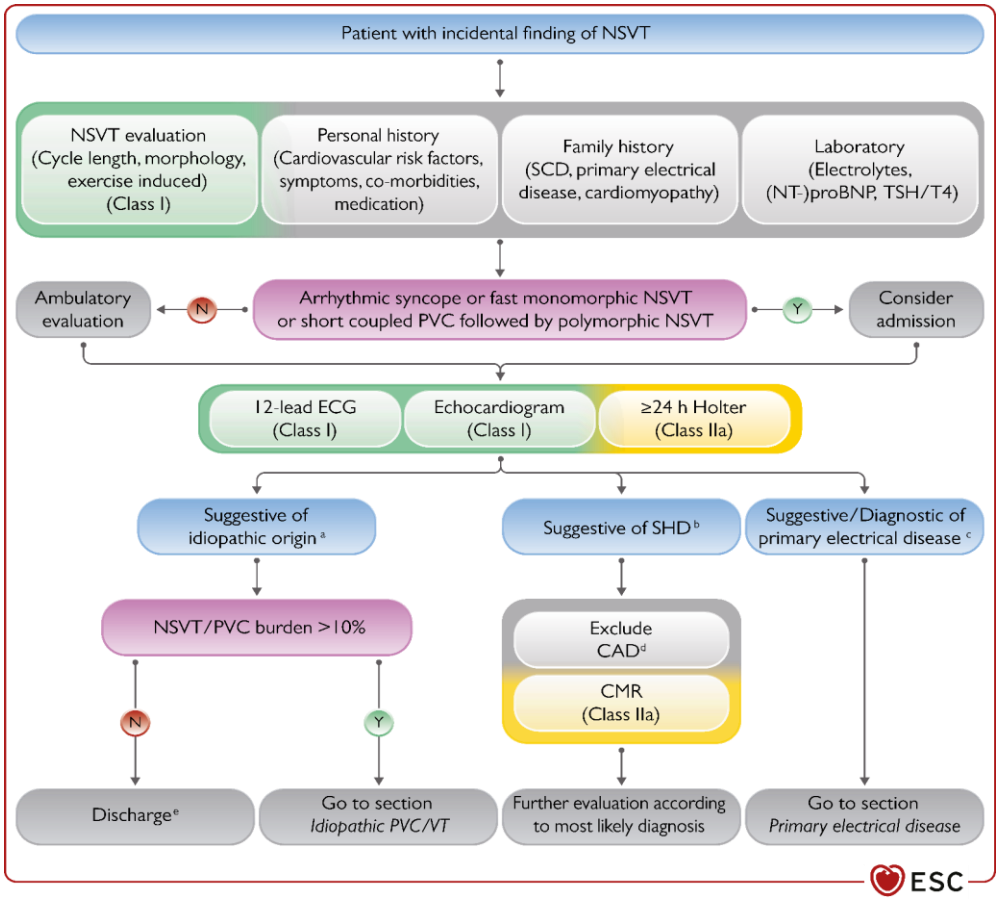
Algorithm for risk stratification and primary prevention of SCD in patients with chronic CAD and reduced EF



2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death (European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

Figure 2

Algorithm for the evaluation of patients presenting with an incidental finding of NSVT



2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death
(European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

Arrhythmic risk stratification in non-ischaemic dilated cardiomyopathy beyond ejection fraction

Antonio Cannatà ,[1,2] Giulia De Angelis,[1] Andrea Boscutti,[1] Camilla Normand,[3,4] Jessica Artico,[1] Piero Gentile,[1] Massimo Zecchin,[1] Stephane Heymans,[5,6,7] Marco Merlo ,[1] Gianfranco Sinagra[1]

Heart 2020;0:1–9. doi:10.1136/heartjnl-2019-315942

		LVRR Prediction	Arrhythmic Risk
Baseline	Clinical	Long duration of disease Poor tolerance to betablockers	Family history of SCD
	ECG	LBBB Long QRS	Low voltage QRS Fragmented QRS
	Holter-ECG		NSVT Frequent couplets/PVCs
	Echocardiography	Very dilated LV	LVEF≤35%
	CMR	LGE	LGE T1-mapping
	Genetic testing	Cytoskeletal Z-disk variants TTN variants	LMNA, FLNC, PLN RBM20, SCN5A, Desmosomal
Short term (3-9 months)	Re-evaluation (clinical + ECG + echo + Holter)	Persistence of: - Functional MR - RV dysfunction	Re-assess LGE if reversible causes of DCM (i.e. inflammatory)
Mid term (1-2 years)	Re-evaluation (clinical + ECG + echo + Holter)	Usually LVRR is complete after 2 years	NYHA III-IV High LVEDVi
Long term	Regular follow-up (clinical + ECG + echo + Holter)	Exclude removable factors if worsening of LVEF or new onset ventricular arrhythmias	LVEF≤35% NSVT/couplets/PVCs High LVEDVi, LAA

Take home message: valutazione del paziente cardiopatico

- Deriva dall'integrazione di fattori clinici + funzionali + anatomici
- La frazione d'eiezione è la maggiore determinante della prognosi
- La valutazione funzionale con imaging integra i dati anatomici, preferita nel rischio intermedio-alto
- La valutazione anatomica stratifica il paziente e determina il follow-up
- Non c'è necessità di test di induzione annuali, ma vanno modulati in base alla clinica e all'attività del paziente