

MALATTIA CORONARICA NELL'ATLETA

Ecostress nell'atleta con ponte miocardico e nella cardiopatia ischemica: cosa ci aggiunge?

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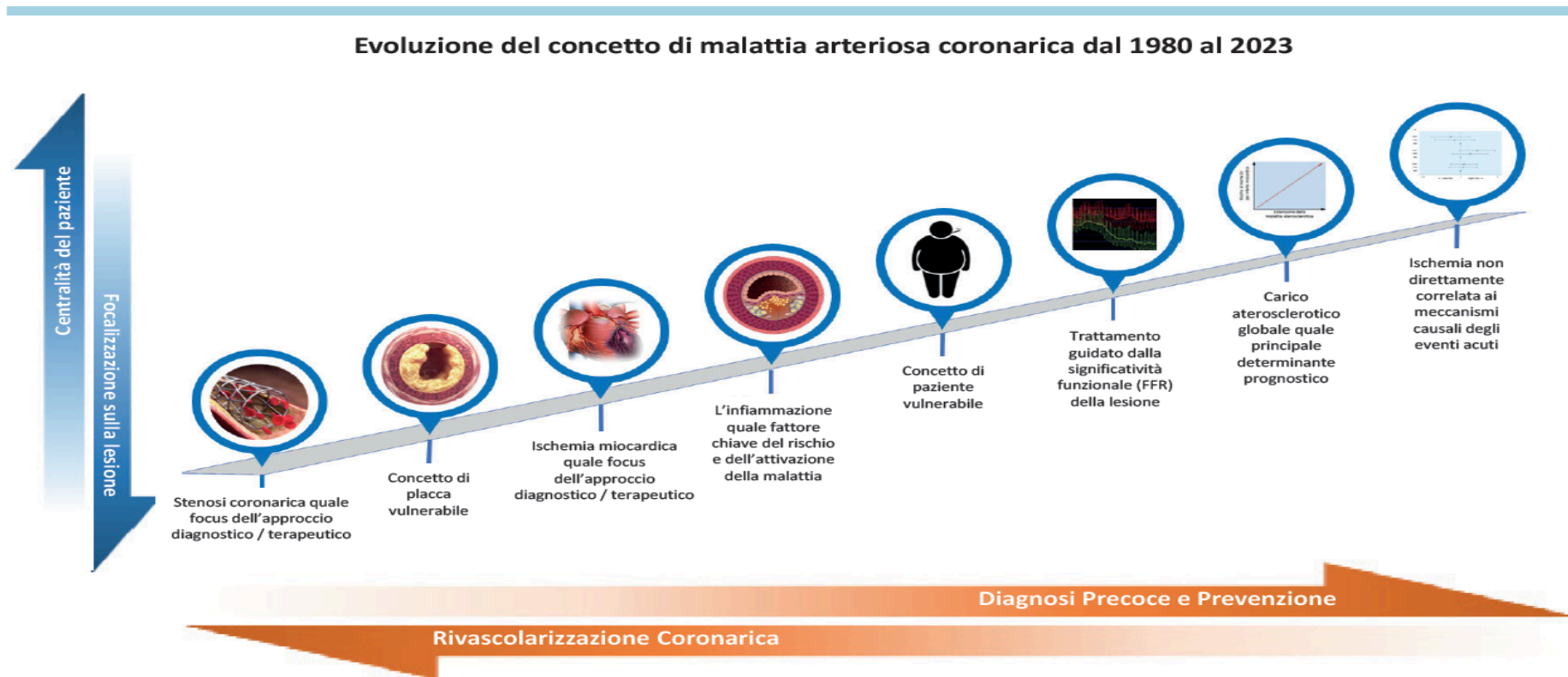
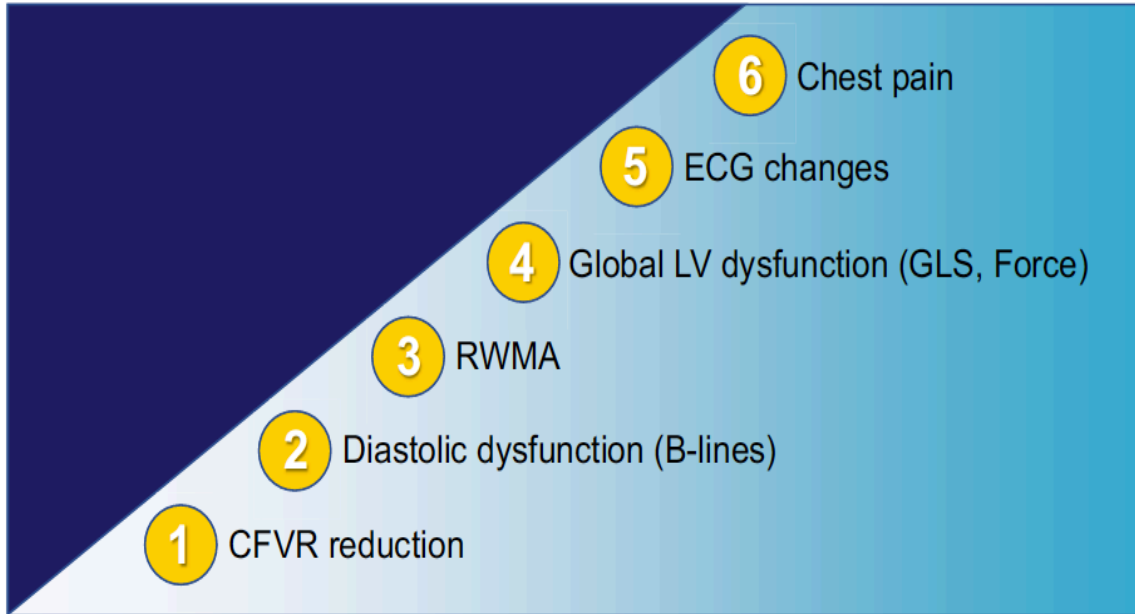
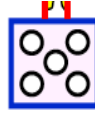


Figura 3. Evoluzione nel tempo delle principali acquisizioni fisiopatologiche nella cardiopatia ischemica e conseguenti paradigmi. Il principale cambiamento si è osservato nel passaggio da una visione centrata sulla relazione ischemia/stenosi ad una visione comprensiva della condizione clinica identificando nel carico aterosclerotico il maggiore determinante prognostico.
FFR, riserva frazionale di flusso.



Cascata ischemica

Ischemic cascade in epicardial Coronary Artery Disease



ESC
European Society
of Cardiology

European Heart Journal - Cardiovascular Imaging (2024) 25, e65–e90
<https://doi.org/10.1093/ehjci/jead250>

EACVI DOCUMENT

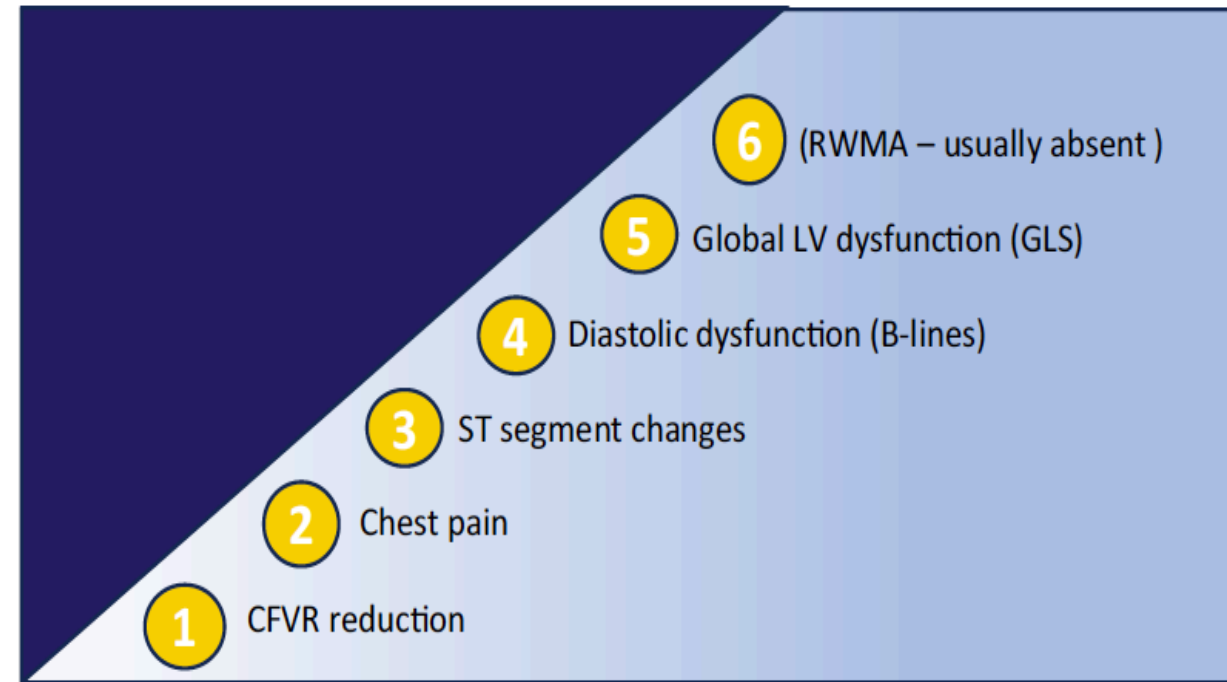
The clinical use of stress echocardiography in chronic coronary syndromes and beyond coronary artery disease: a clinical consensus statement from the European Association of Cardiovascular Imaging of the ESC

Eugenio Picano^{1*}, Luc Pierard², Jesus Peteiro³, Ana Djordjevic-Dikic⁴, Leyla Elif Sade⁵, Lauro Cortigiani⁶, Caroline M. Van De Heyning⁷, Jelena Celutkienė⁸, Nicola Gaibazzi⁹, Quirino Ciampi¹⁰, Roxy Senior^{11,12,13}, Aleksandar N. Neskovic¹⁴, and Michael Henein¹⁵

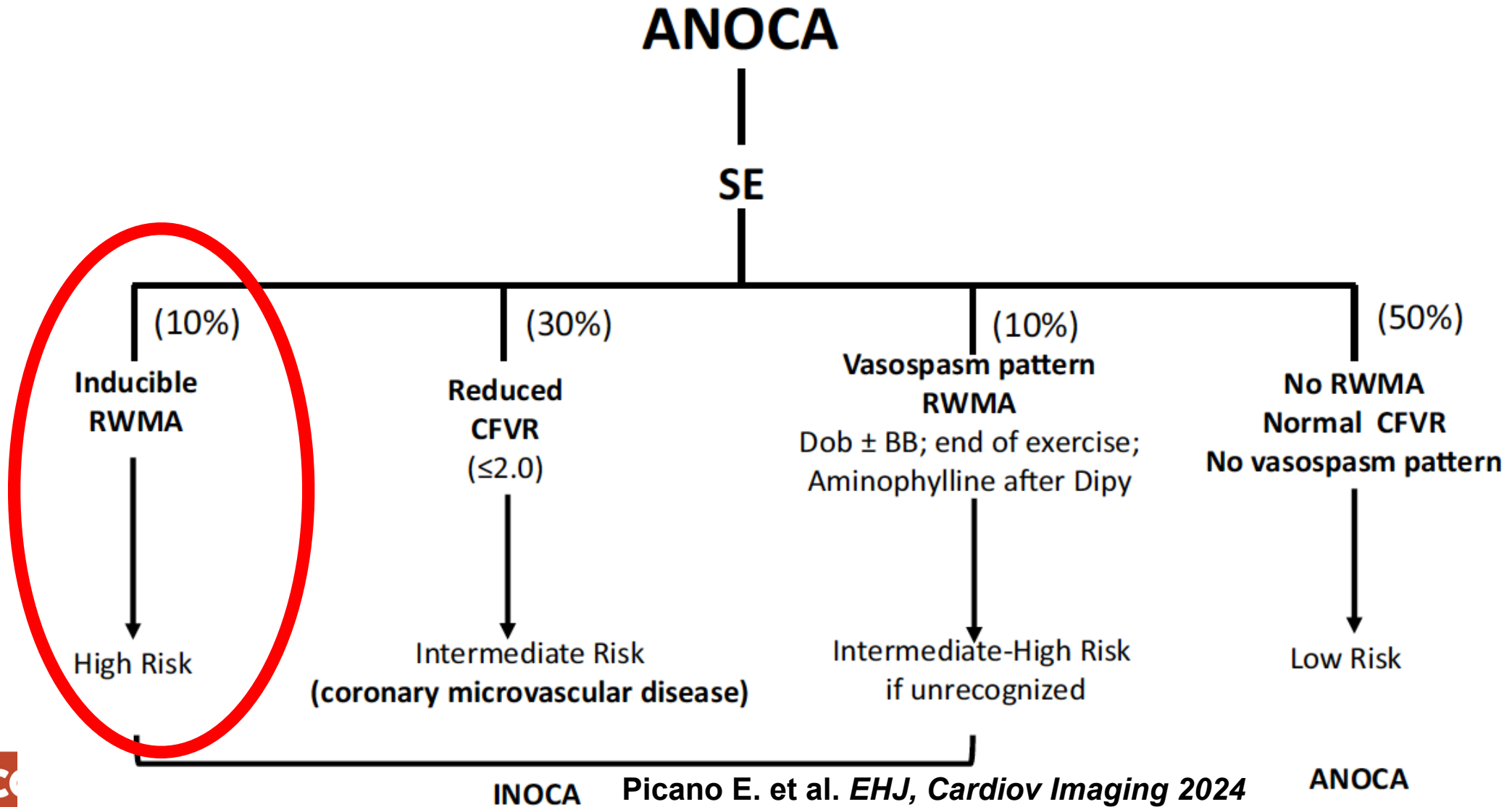
Ischemic cascade in coronary microvascular disease



Temporal sequence of ischemic events



Multiplicity of phenotypes



Stressors

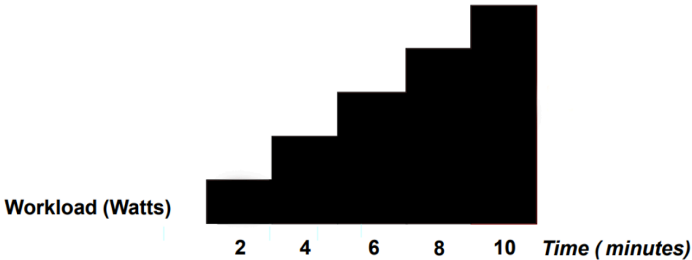
Bicycle



Treadmill

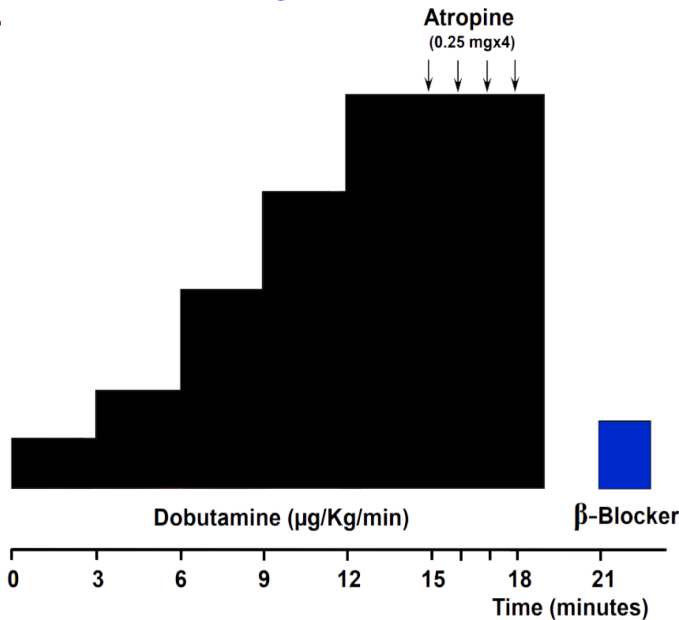


Supine

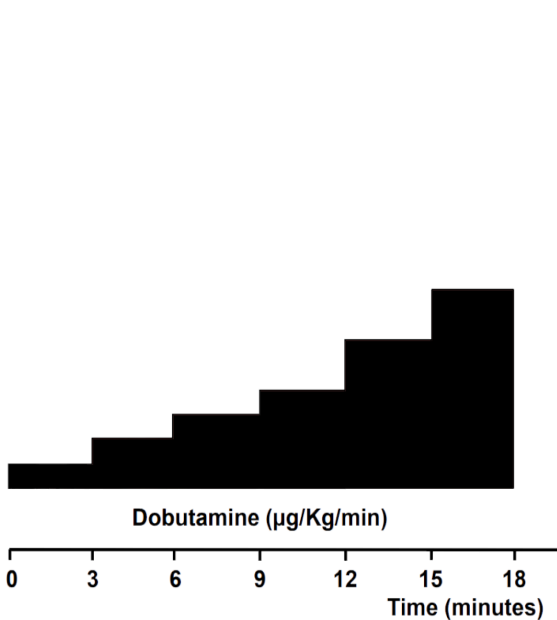


Dobutamine stress-echo protocols

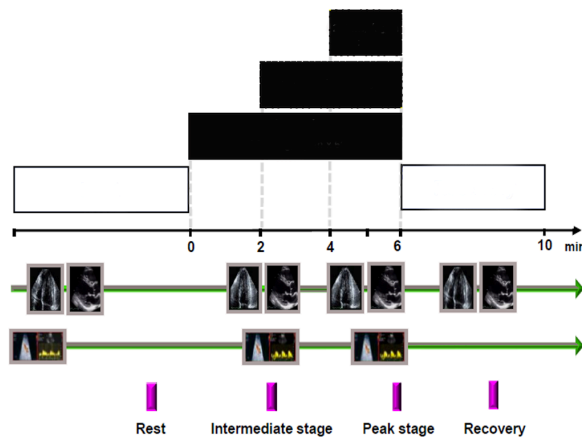
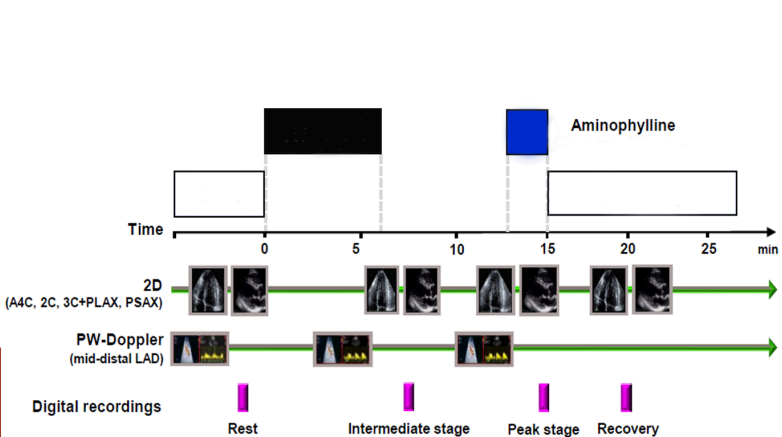
High-dose



Low-dose



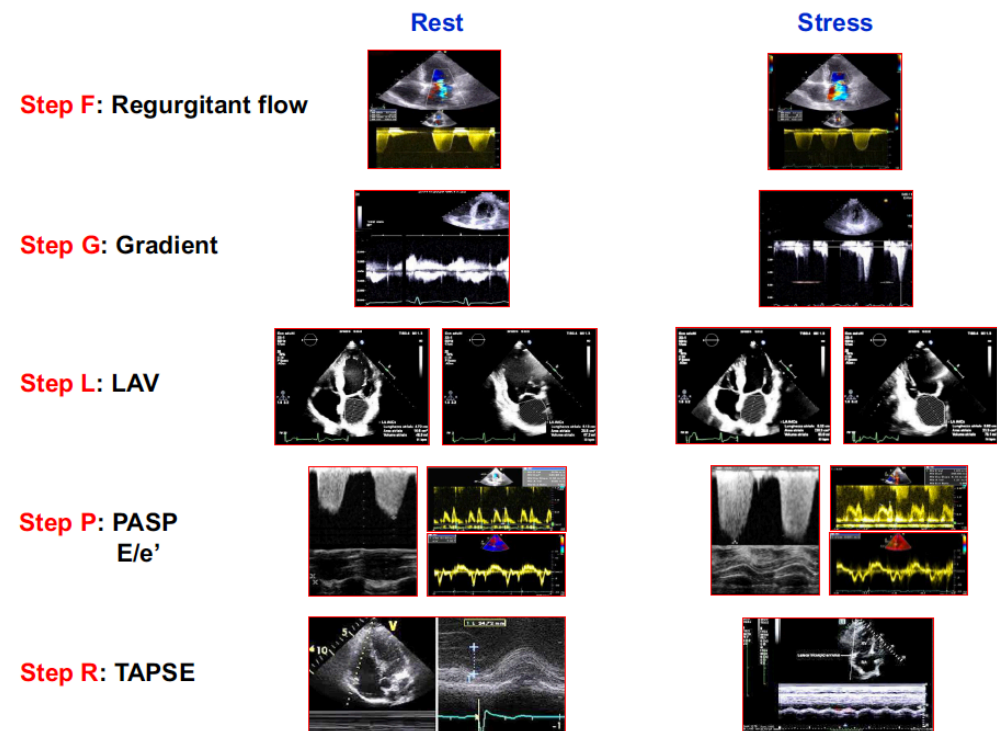
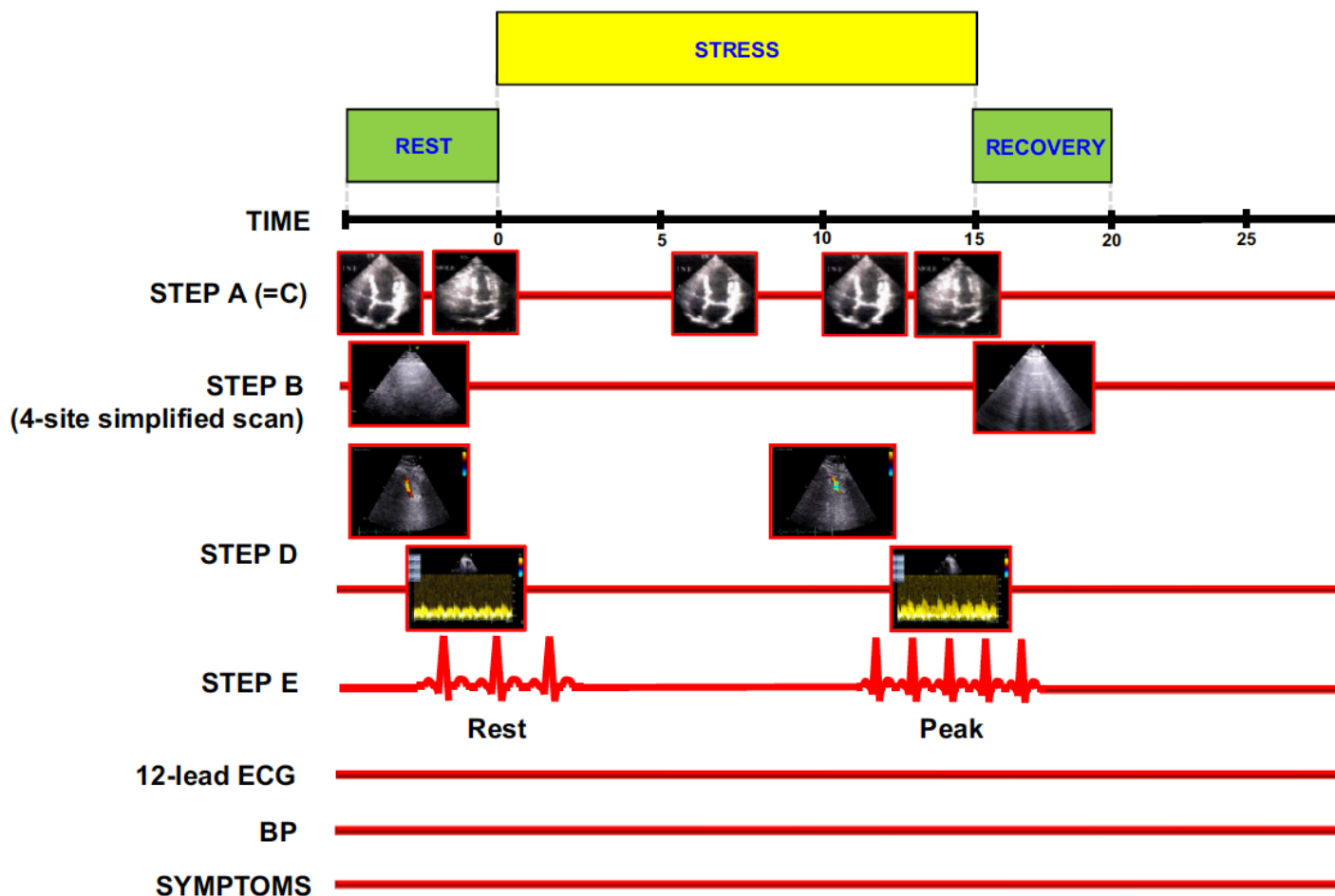
Dipyridamole and Adenosine stress-echo protocol



Picano E. et al. *EHJ, Cardio Imaging* 2024

ABCDE Protocol

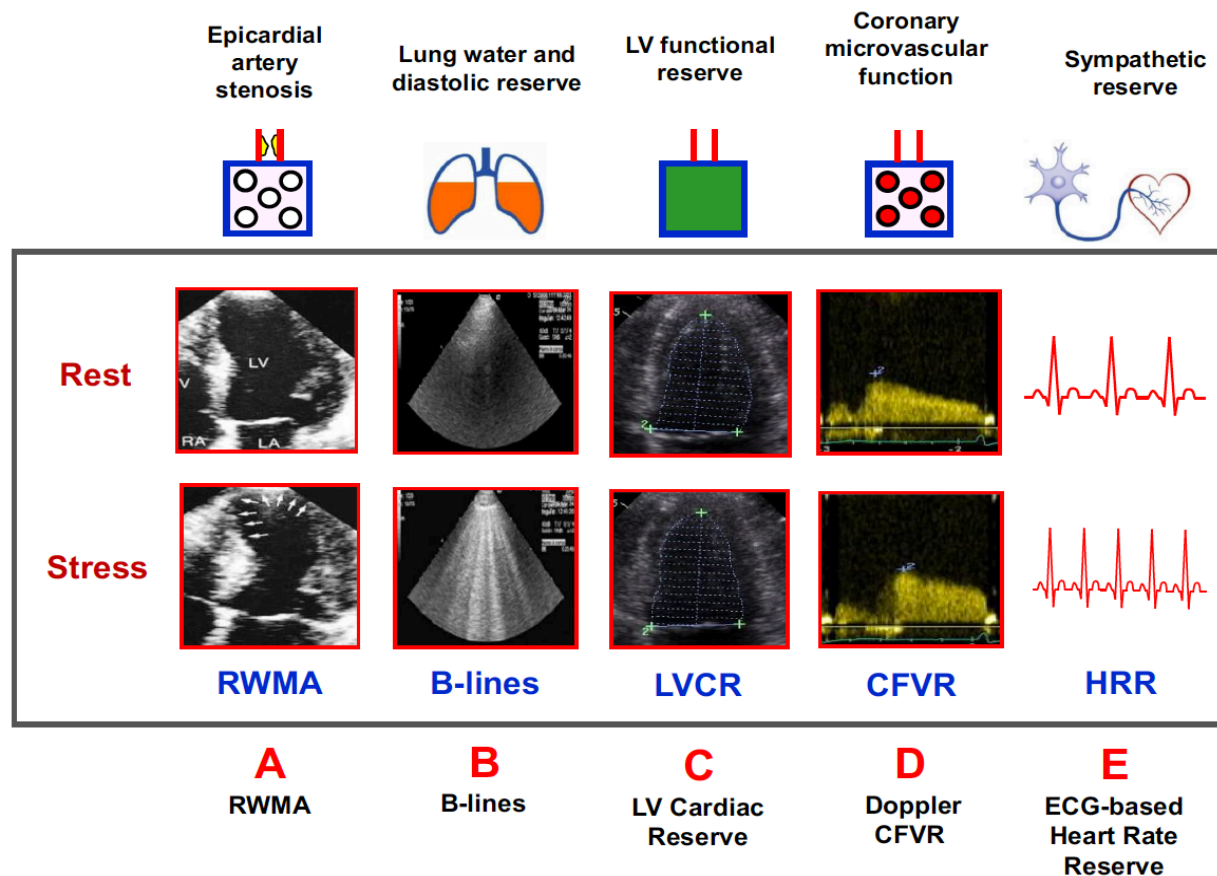
ABCDE SE General Protocol



Picano E. et al. *EHJ, Cardio Imaging* 2024



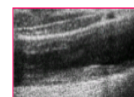
ABCDE Protocol



From reductionistic
stenocentric view
(SE based on RWMA only)

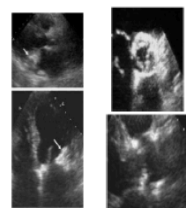
To comprehensive patient
vulnerability
(ABCDE-FGLPR SE)

Pre-obstructive atherosclerosis



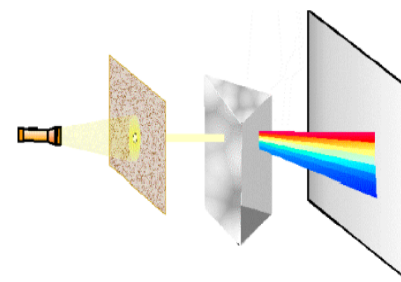
Carotid
imaging

TTE



Cardiac calcification

SE based
on RWMA



Coronary artery stenosis (Step A)

Alveolar-capillary barrier (Step B)

Myocardial reserve (Step C)

Coronary microcirculation (Step D)

Cardiac autonomic dysfunction (Step E)

Mitral regurgitation (Step F)

LV dynamic obstruction (Step G)

Left atrium (Step L)

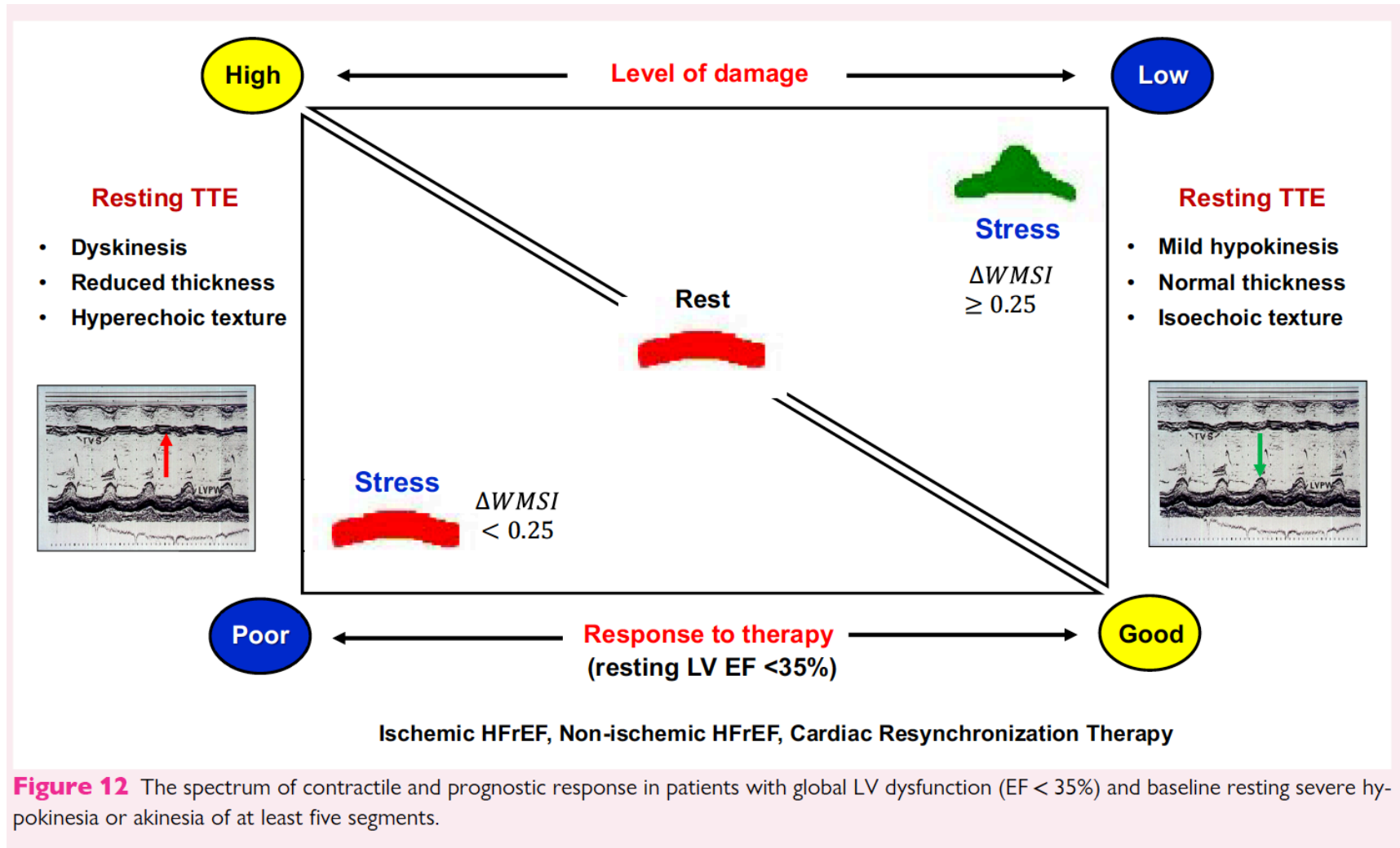
Pulmonary hemodynamics (Step P)

Right ventricular function (Step R)

Picano E. et al. *EHJ, Cardiovascular Imaging* 2024



Myocardial viability and contractile reserve



Picano E. et al. *EHJ, Cardio Imaging* 2024



Intramyocardial bridge

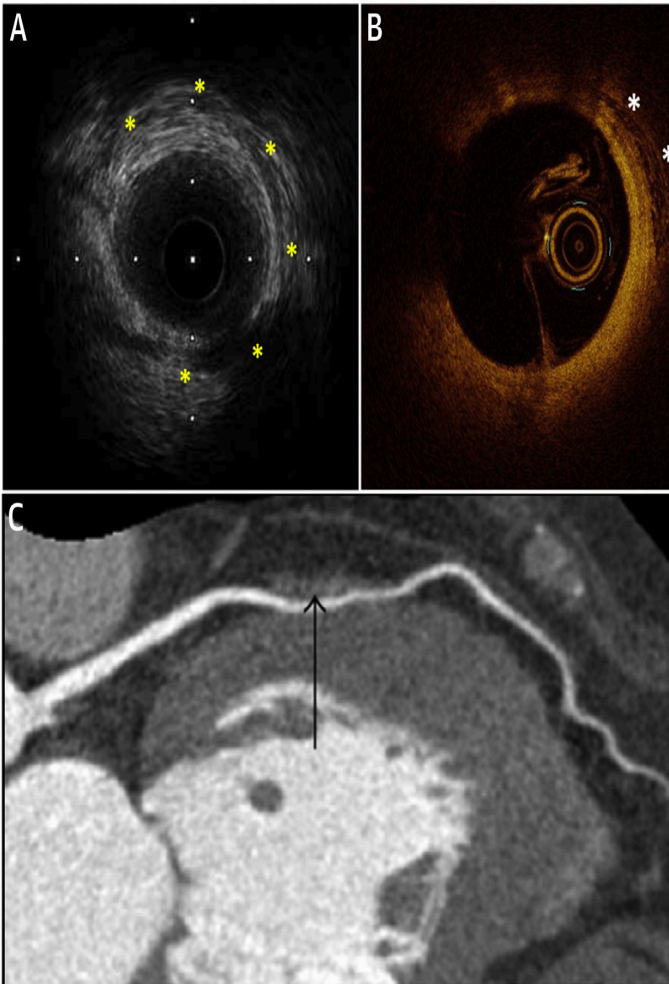
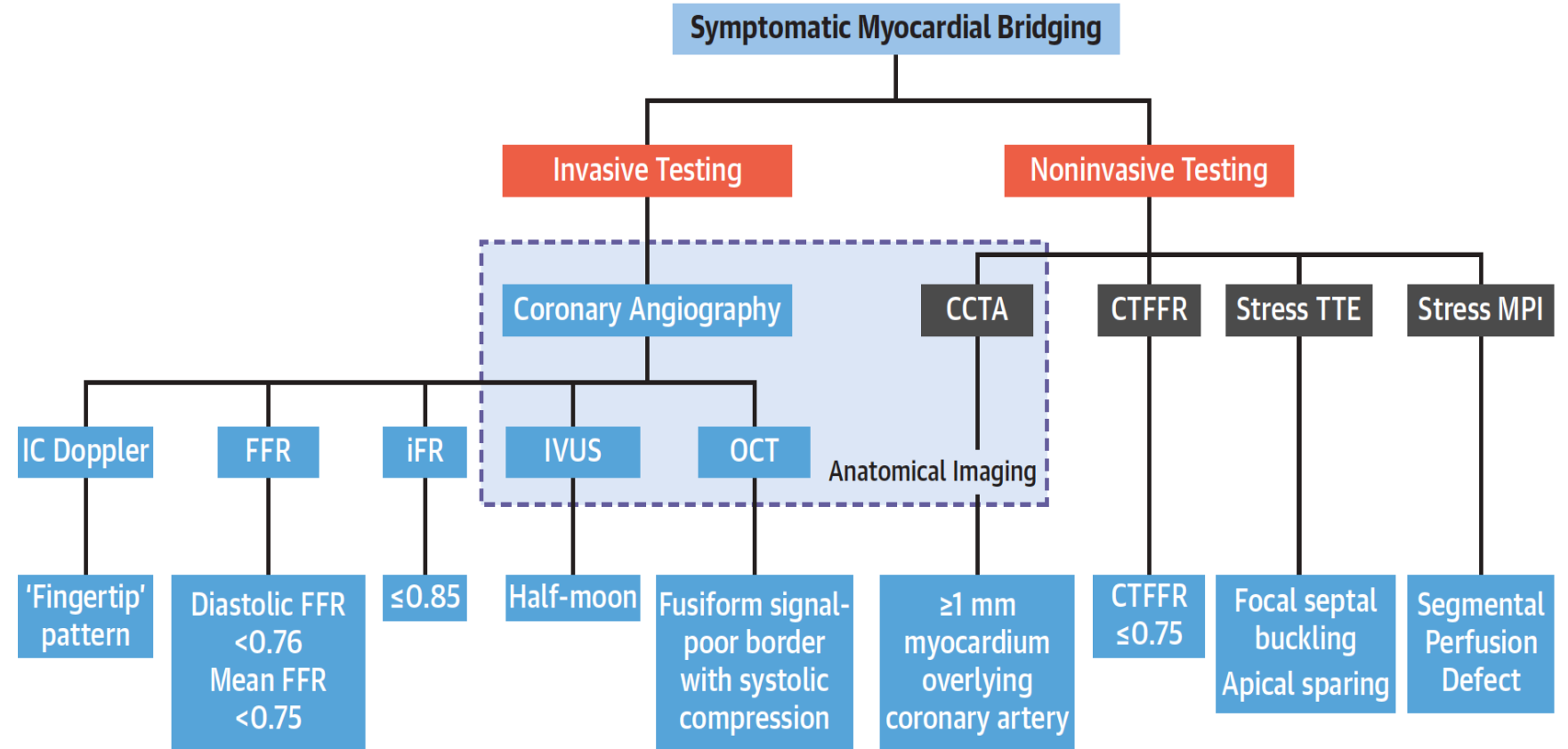


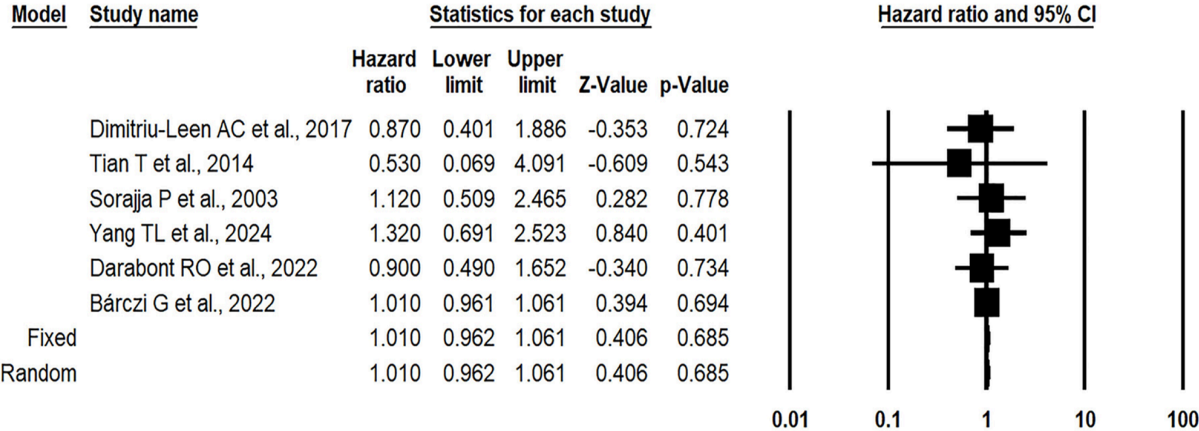
FIGURE 1 Invasive and Noninvasive Imaging Modalities of MB



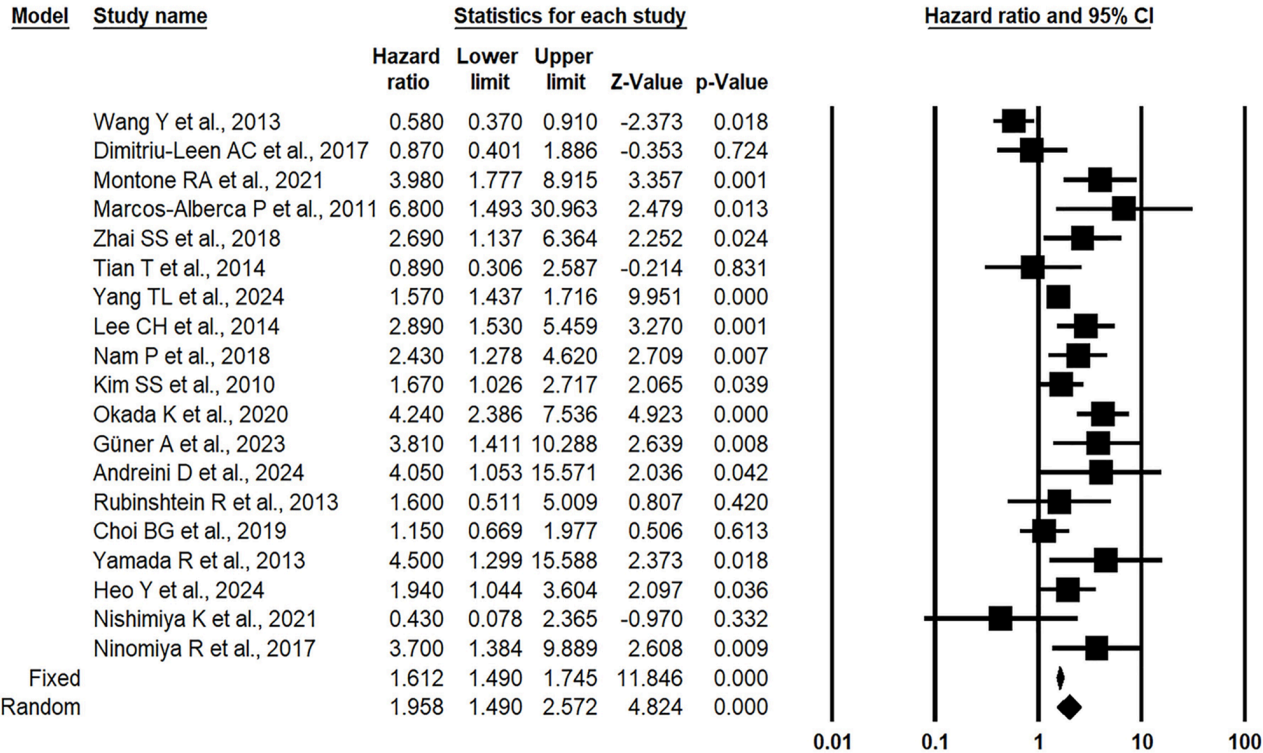
Sternheim, et al., Myocardial bridge review, J Am Coll Cardiol. 2021



All Cause Death



MACE

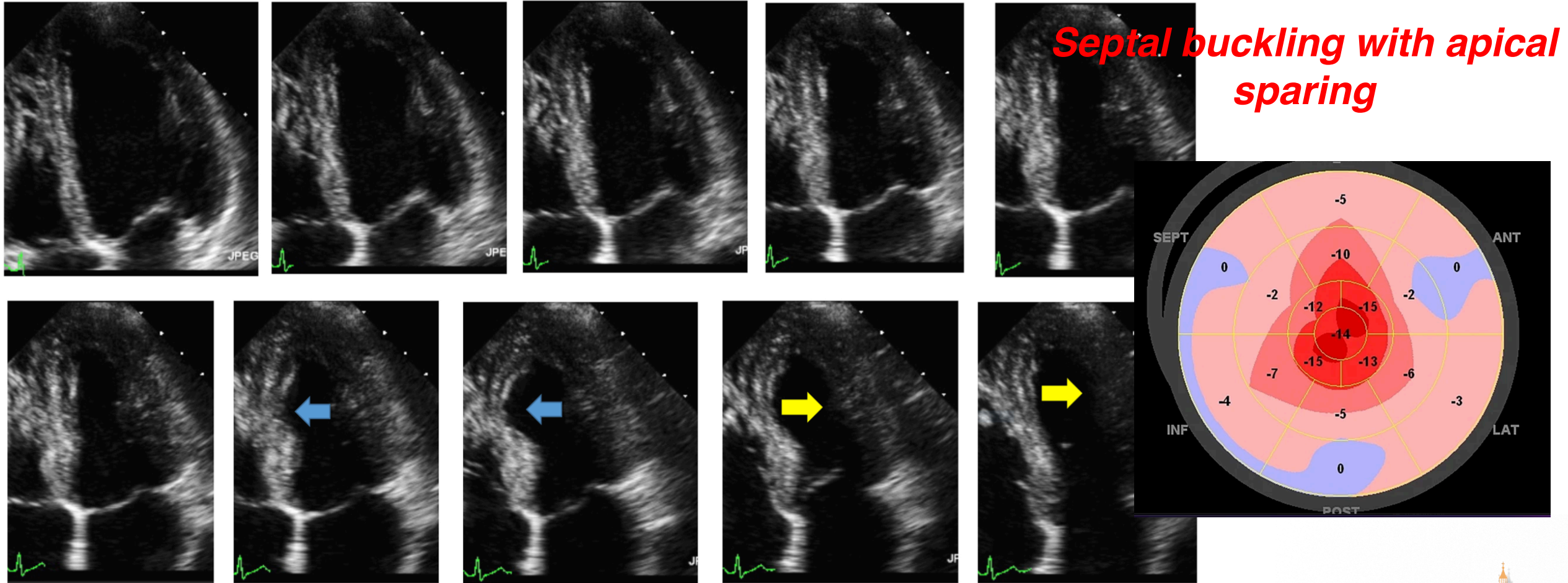


Salam Alam Y, et al. *Int J Cardiov Img*, 2026



Echo - Intramyocardial bridge

A



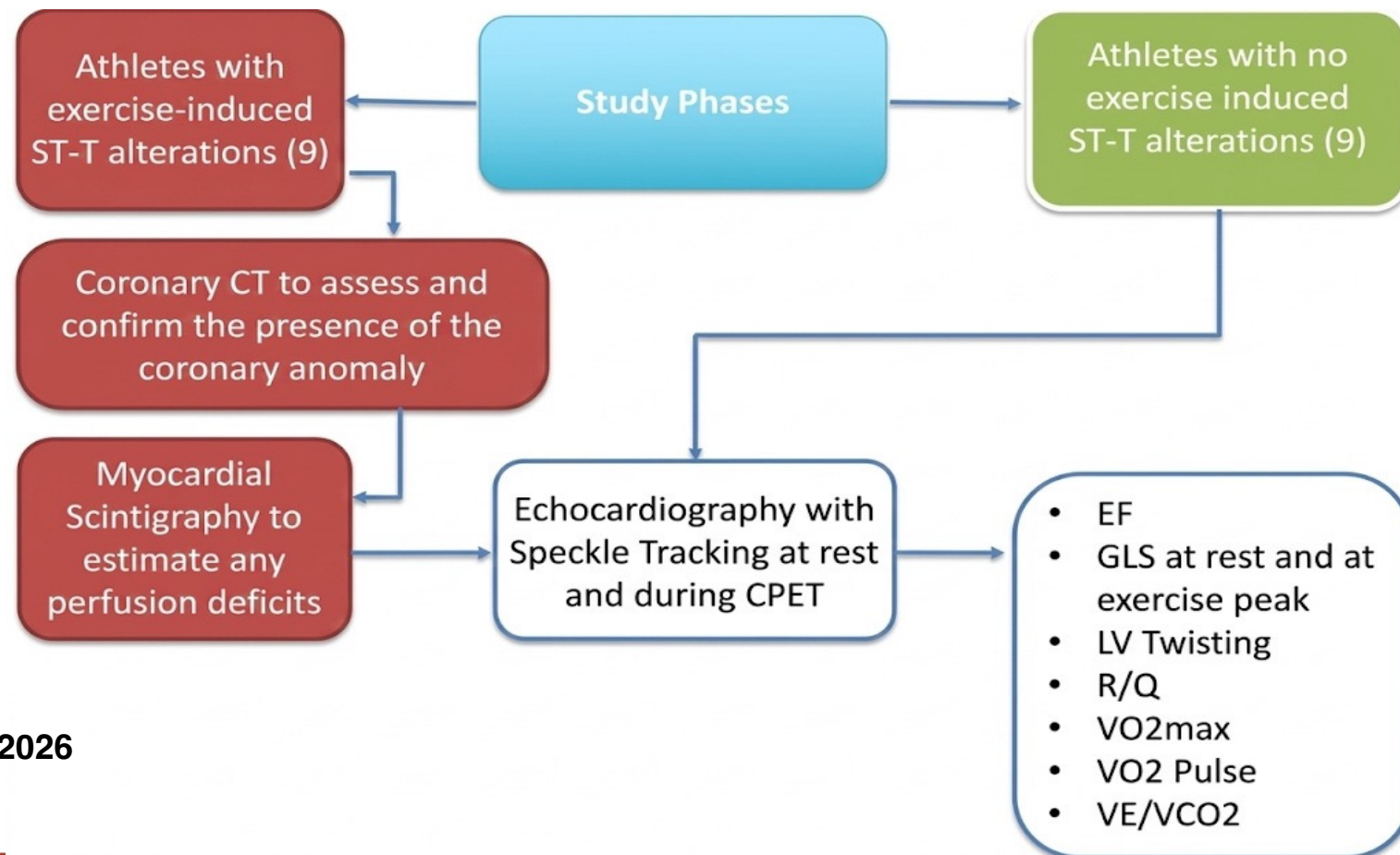
Pargaonkar V. et al., Int J Cardiol. 2020



Article

Intramyocardial Bridge in Sports Medicine: Proposal of a Possible Follow-Up Strategy in Asymptomatic Athletes

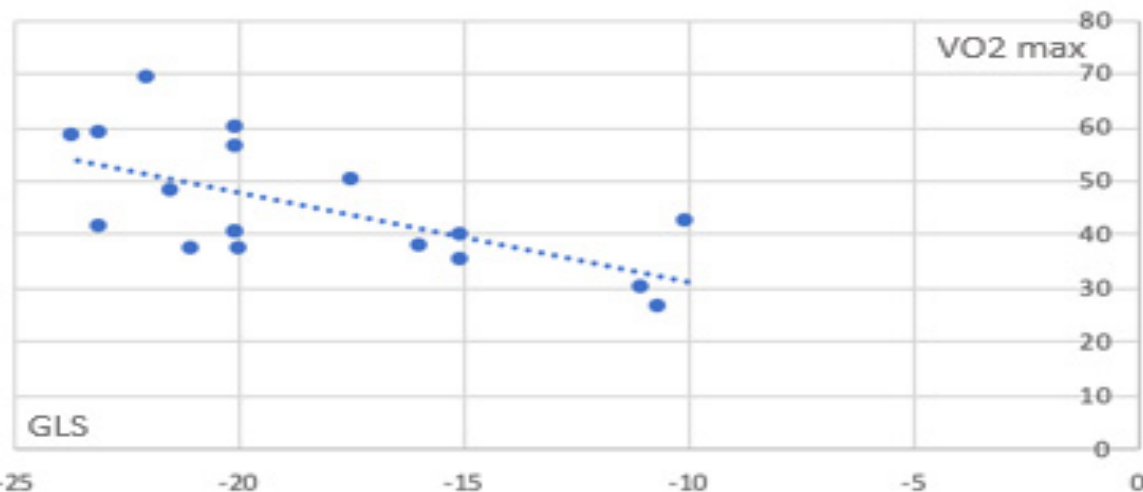
Roberto Palazzo ¹, Melissa Orlandi ¹, Federico Fu ¹, Vittorio Bini ² and Laura Stefani ^{1,*}



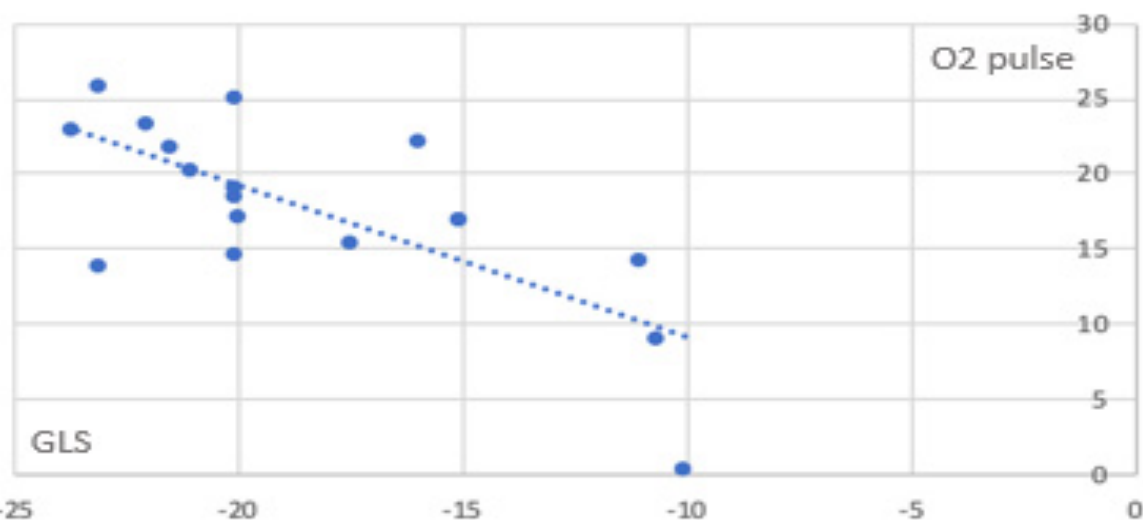
Palazzo R. et al. *J Func Morp and Kines*, 2026

Intramyocardial bridge in athletes

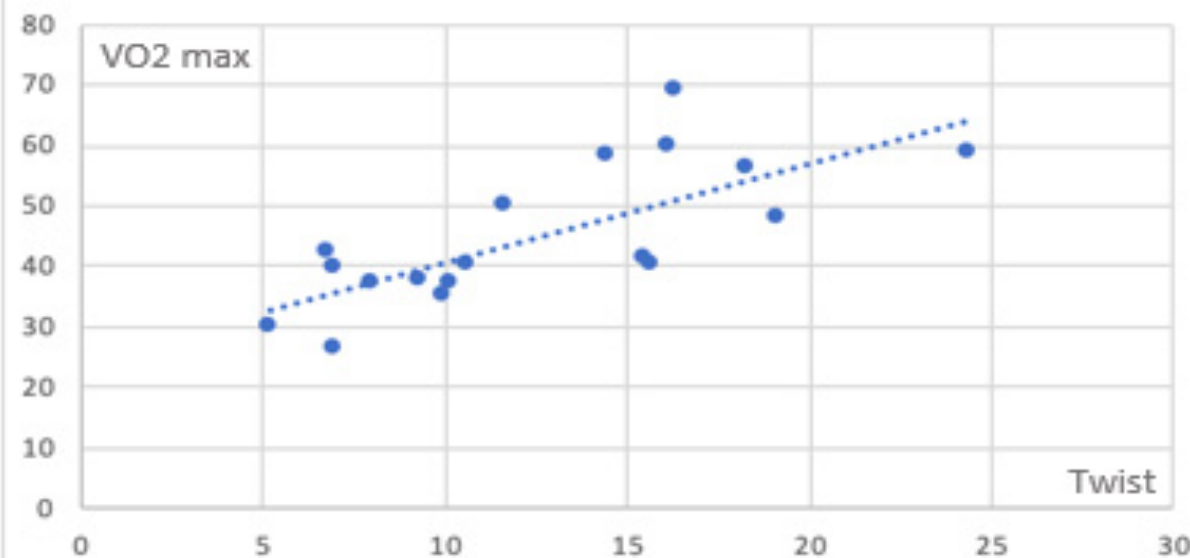
Correlation between GLS and VO2 max



Correlation between O2 pulse and GLS



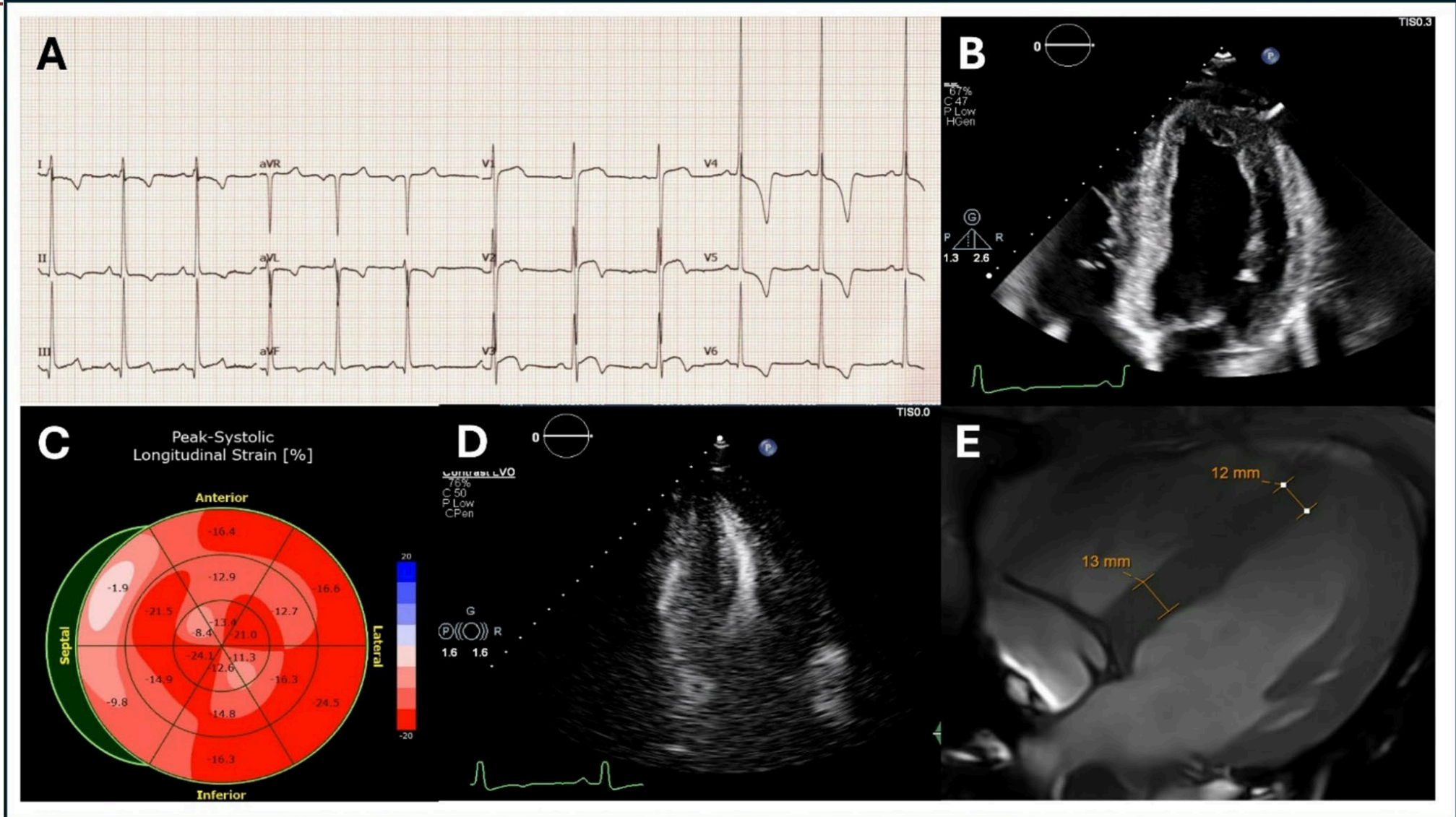
Correlation between VO2 max and Twist



Palazzo R. et al. *J Func Morp and Kines*, 2026



Echocardiography in athletes



Fritzlen J. et al., Current Cardiol Rep, 2026



ESE in athletes

Palermi S. et al. *J Clin Med*, 2023

First-line screening tool

Personal and family history
Physical examination
12-lead resting ECG

Suspected structural
CV disease or
heart rhythm
disorder

Second-line CV evaluation

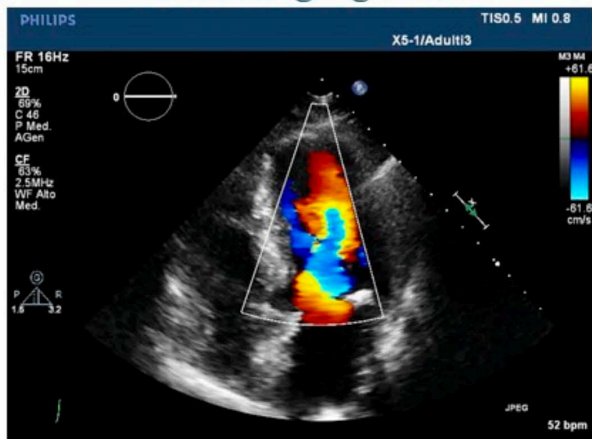
Echocardiography
24-hour ECG monitoring
EST/CPET

Abnormal, uncertain
and/or controversial
findings
at first- and second-
line investigations

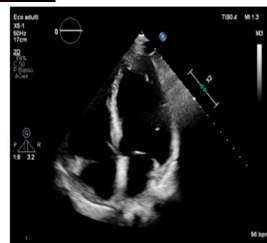
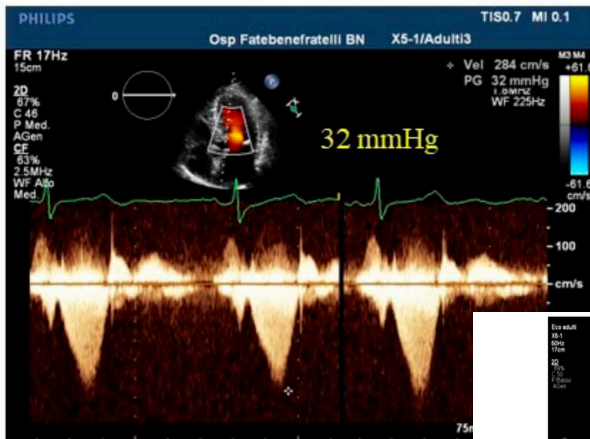
Third-line CV evaluation

ESE
CMR
CCT
Scintigraphy- SPECT/PET
Genetic testing

Mitral regurgitation



LVOTG

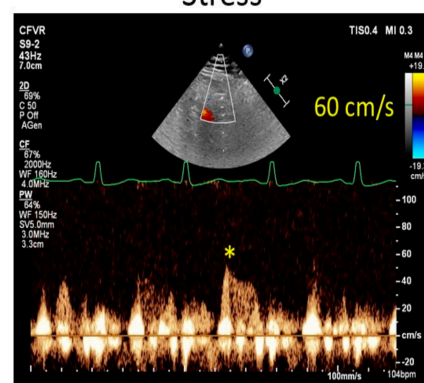
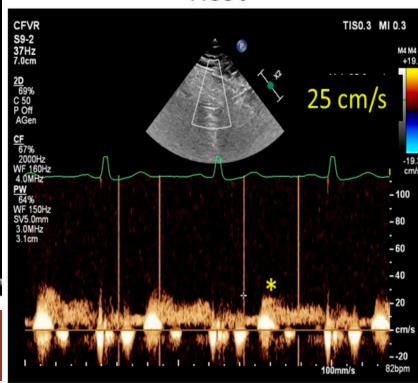


Rest

CFVR: 2.48



Stress



[2]. ECG: electrocardiogram



ESE in athletes

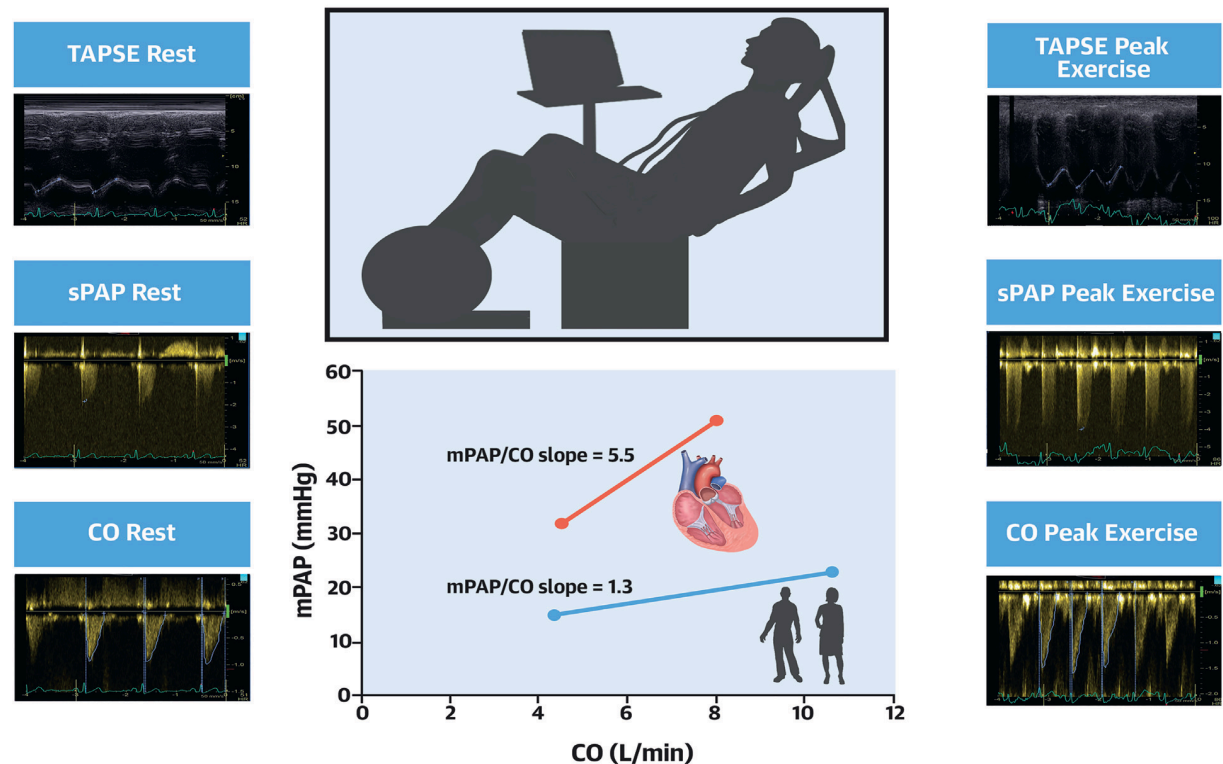
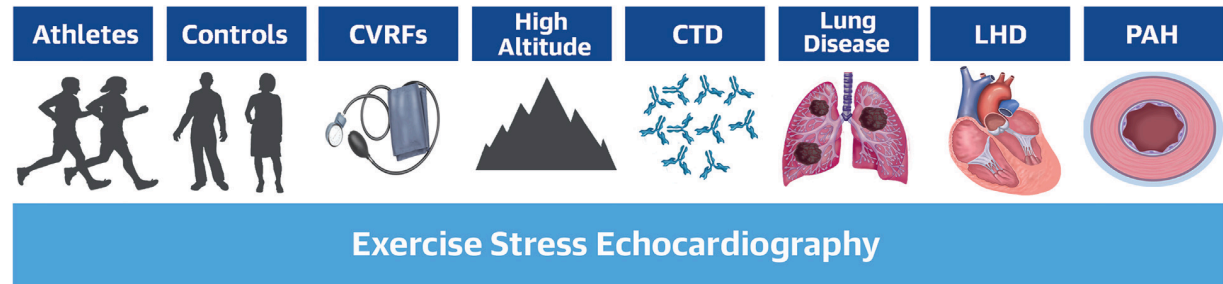
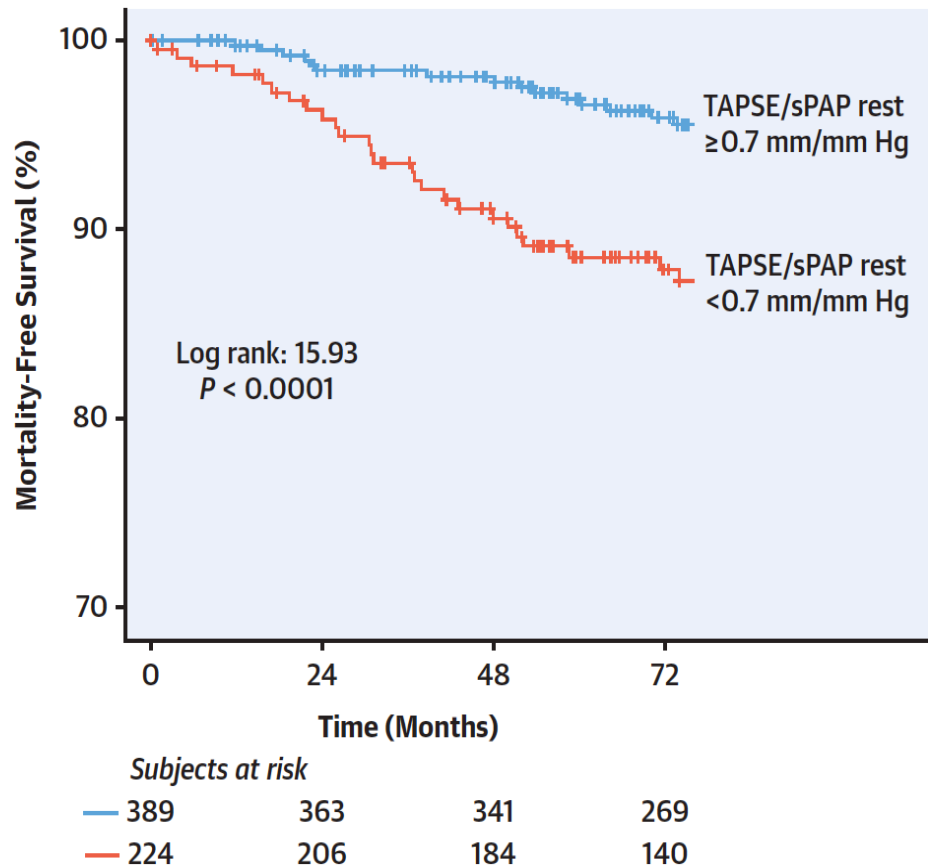


FIGURE 2 Survival Analysis According to TAPSE/sPAP



Gargani L, et al. *J Am Coll Cardiol* 2023;82(21):1973–1985



- ESE in INOCA: 10% pz high risk
- ESE in CAD: multiplicity of phenotypes
- ESE in CAD: ABCDE protocol; risk stratification;
- ESE in MB is first line imaging exam to evaluate inducible myocardial ischemia; GLS and twist study;
- ESE in MB athletes: annual follow-up and sport evaluation





*Thank You
For Your
Attention*

