

PHYSIO DAY

JOURNÉES DE PHYSIOLOGIE
EN CARDIOLOGIE INTERVENTIONNELLE

INOQUOI ?

Pr Gilles Barone-Rochette

Interventional cardiology and cardiac imaging

Pôle Thorax et vaisseaux- CHU de Grenoble

Inserm 1039

5 & 6 AVRIL 2024

HÔTEL SHERATON · NICE



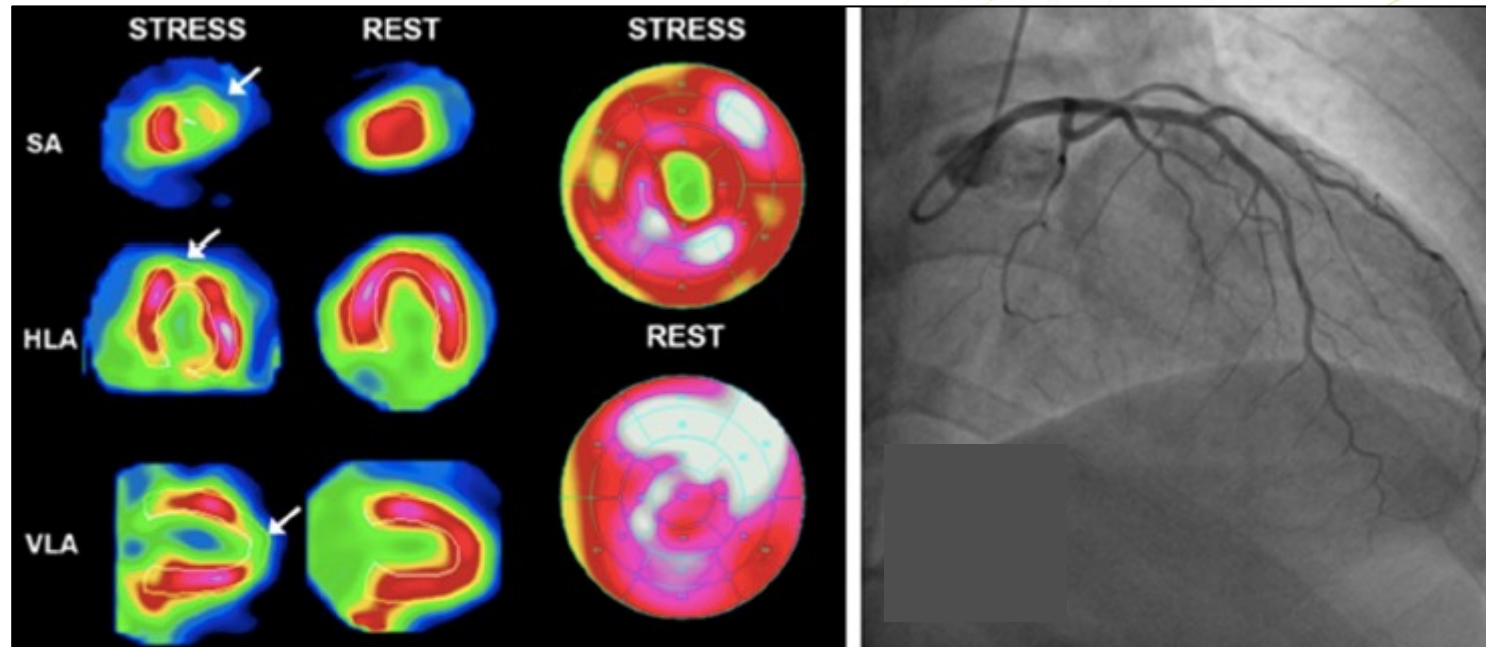
Disclosure

- Consulting: Abbott Vascular, Bayer, Novonordisk, General electric, Medis imaging
- Honoraria: Bayer, AMGEN, Sanofi, AstraZeneca, Novonordisk, Novartis, Pfizer, Boehringer Ingelheim
- Grants: MDS, Pfizer, Bayer, Abbott vascular



INOCA: Ischemia with Non Obstructive Coronary Artery disease

ANOCA: angina with no obstructive coronary artery disease





Questions

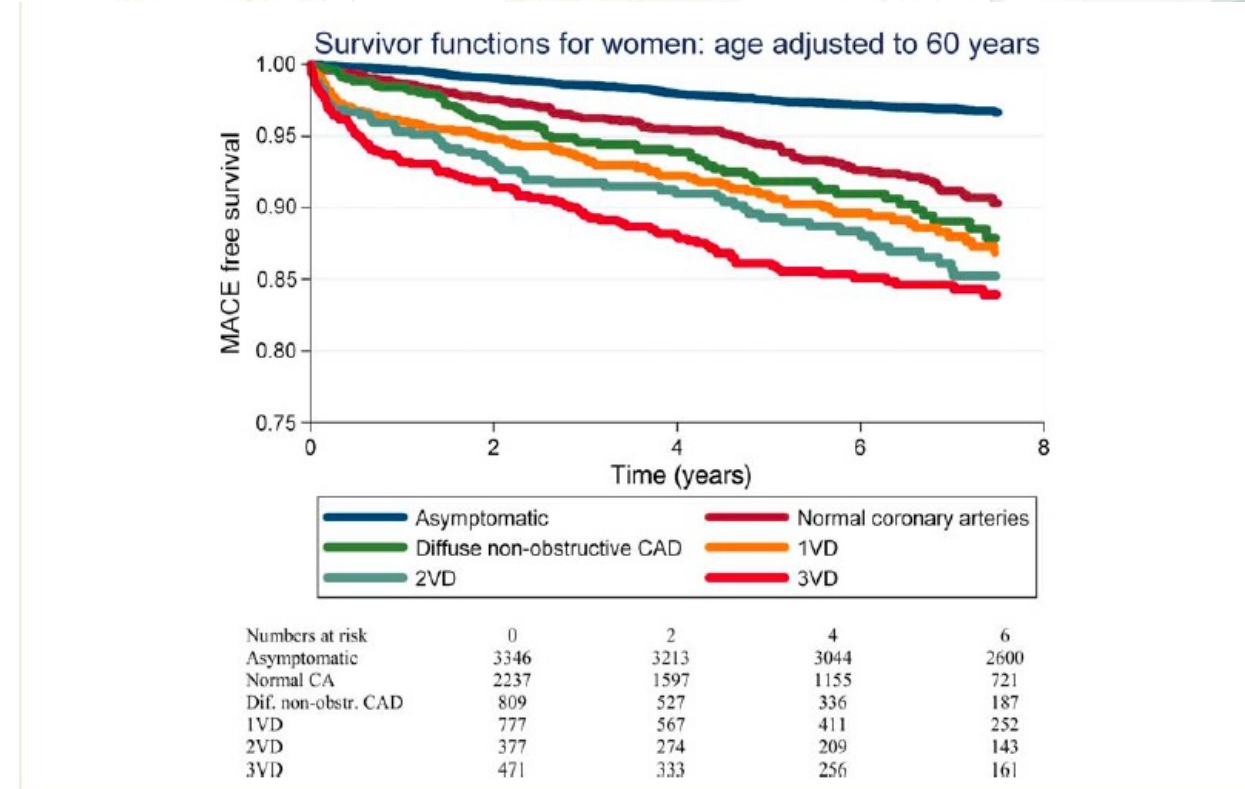
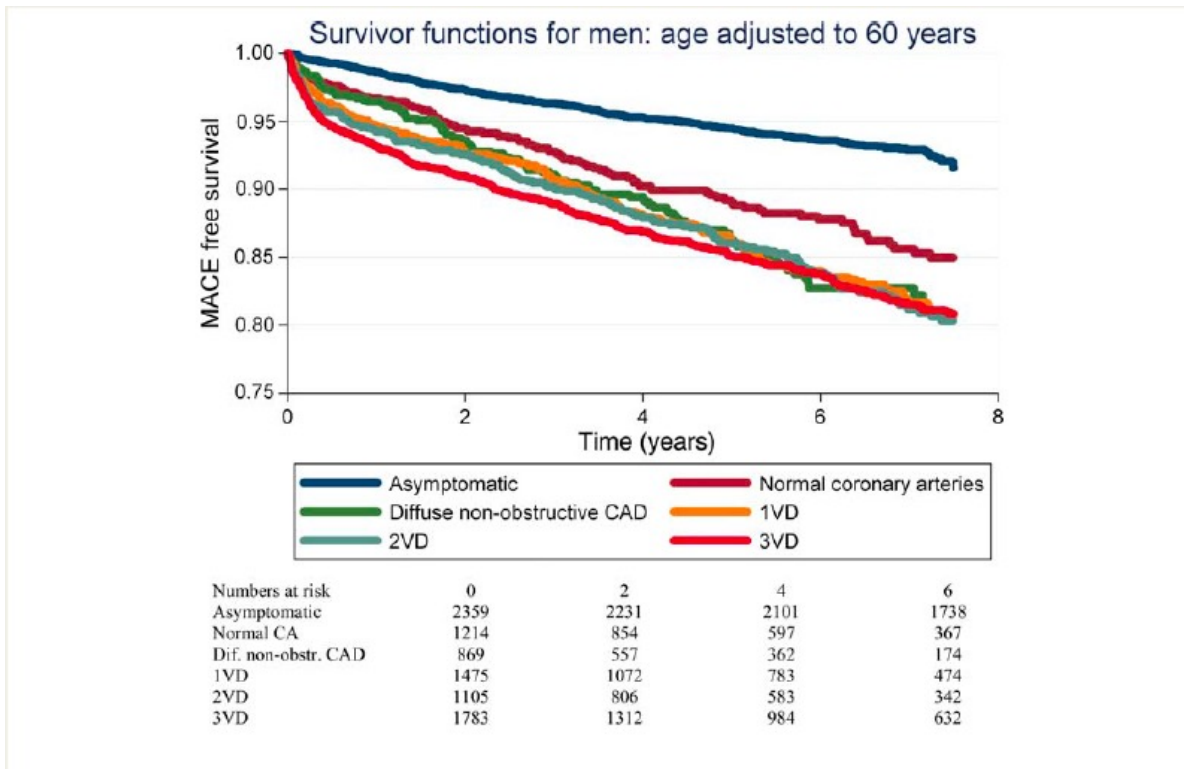
- Is it serious?
- How common is it?
- Assessment and treatment





Pronostic

11 223 patients referred for coronary angiography with stable angina pectoris as indication and 5705 participants from the Copenhagen City Heart Study for comparison

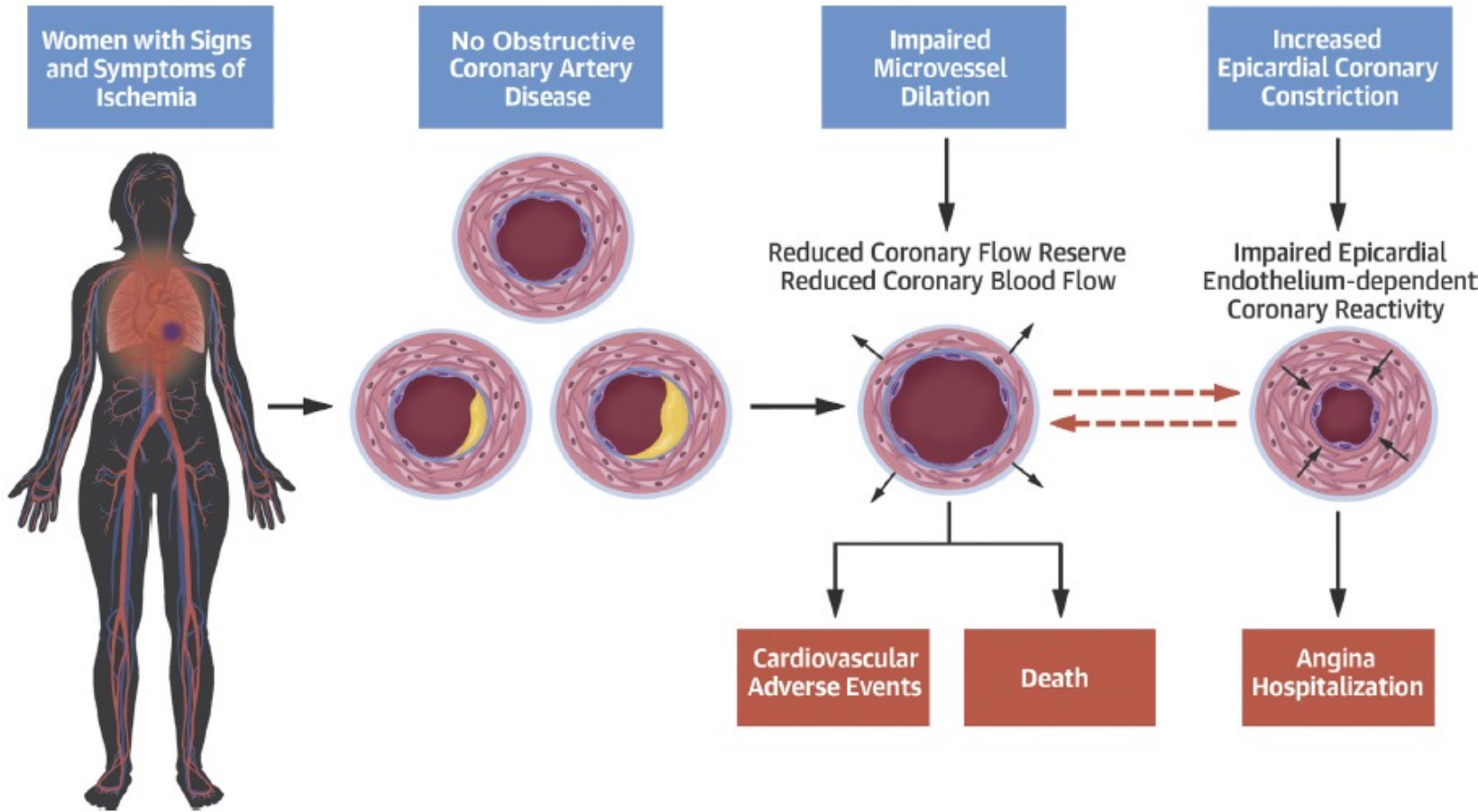


Jespersen et al. European Heart Journal (2012) 33, 734–744.

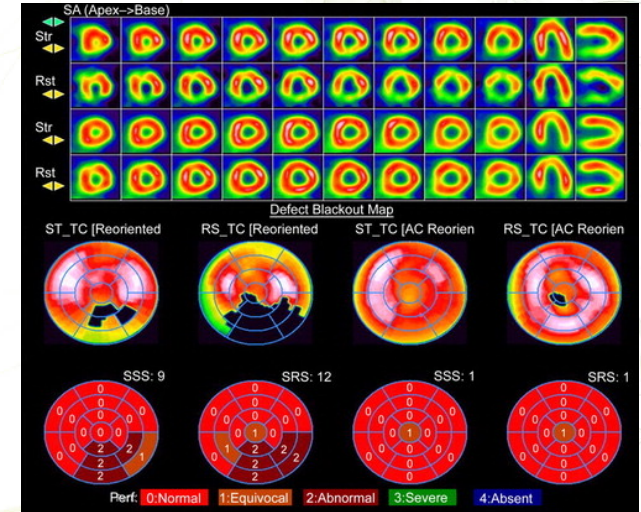
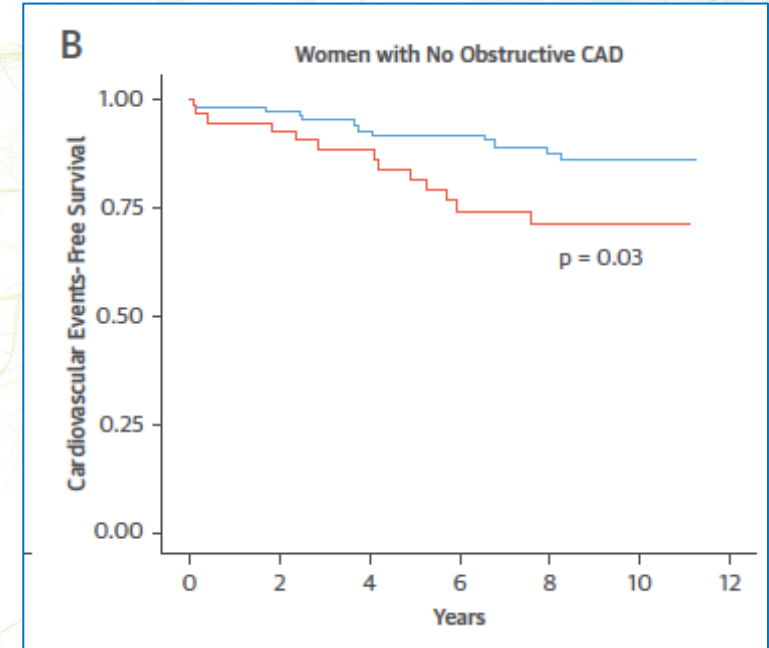


Pronostic

CENTRAL ILLUSTRATION Women With Signs and Symptoms of Ischemia With No Obstructive Coronary Artery Disease and the Potential Role of Coronary Reactivity Testing

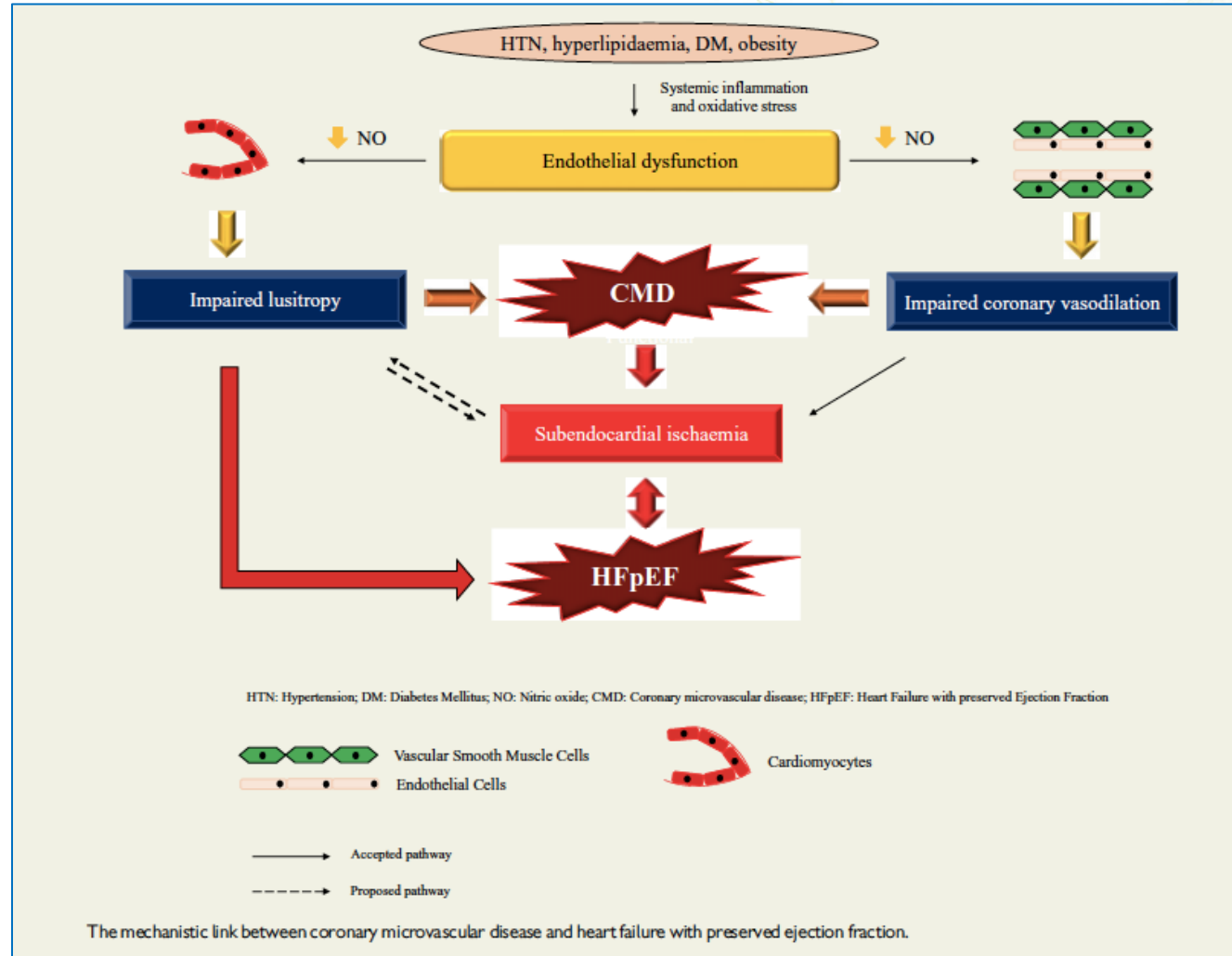


AlBadri, A. et al. J Am Coll Cardiol. 2019;73(6):684-93.





Pronostic



Sinha et al. European Heart Journal (2021) 42, 4431–4441



Two compartment model

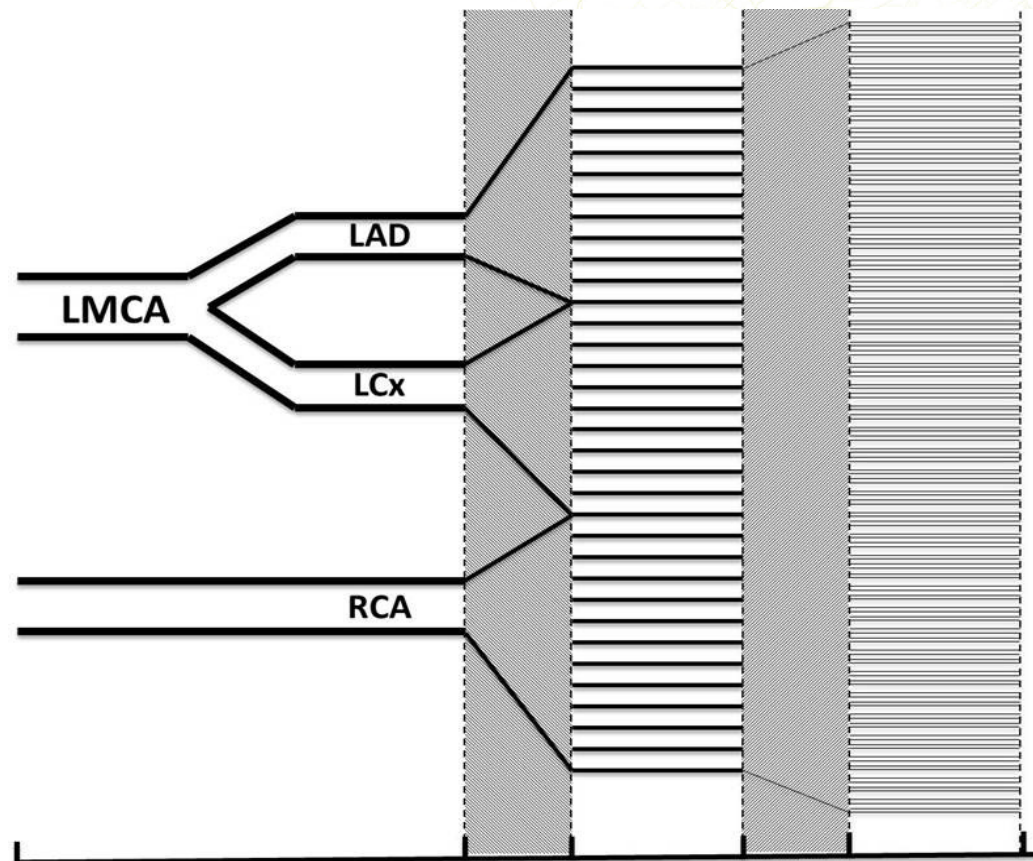
Epicardial Artery

Microvasculature

Conductive vessels

Prearteriolar vessels

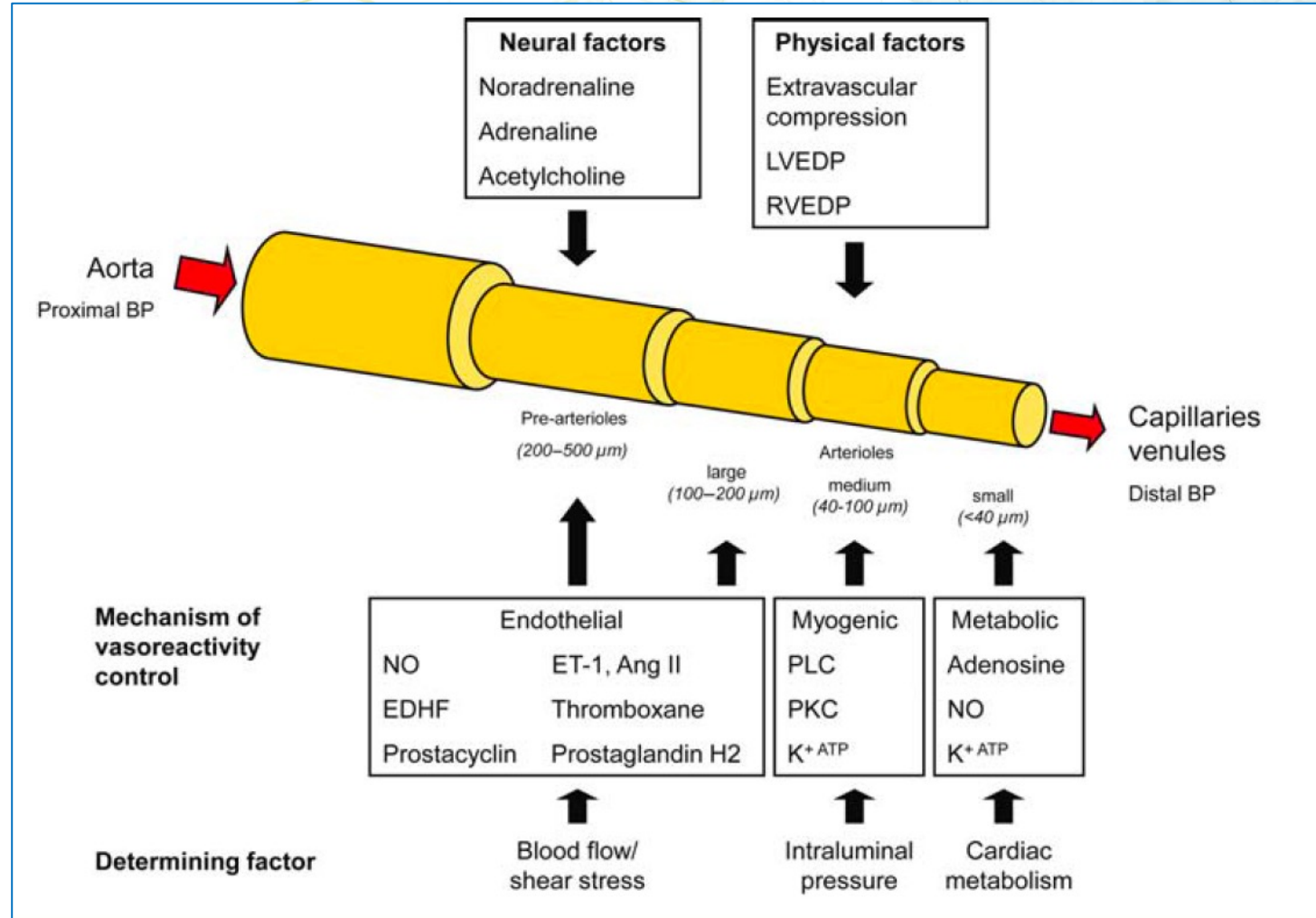
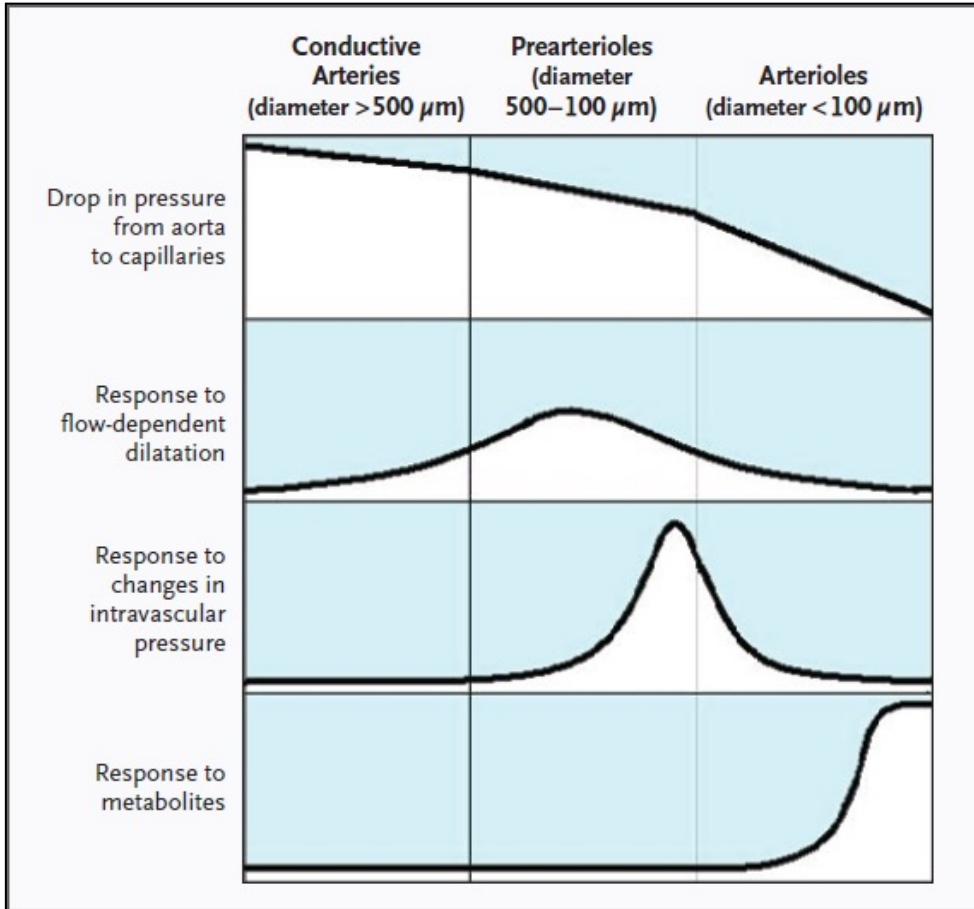
Arteriolar vessels



Maitre-Ballesteros L, ..., Barone-Rochette G. Rev. Cardiovasc. Med. 2022; 23(5): 158



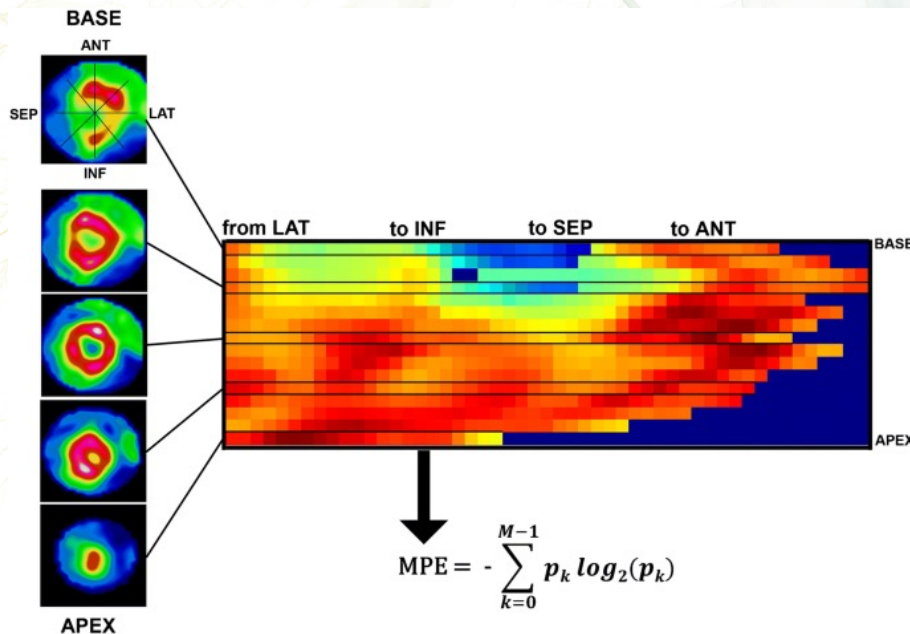
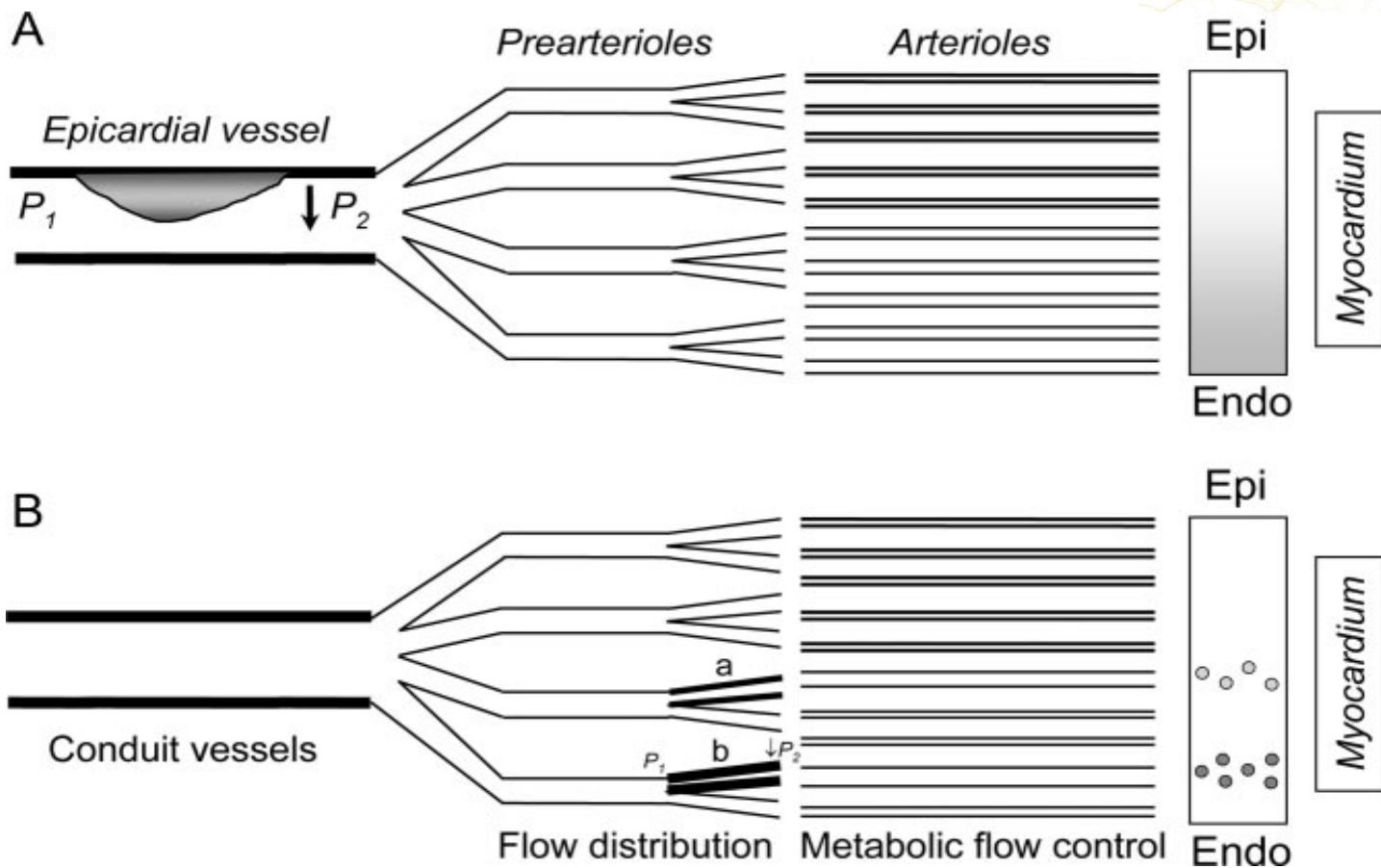
Functional aspects of the coronary microcirculation



Herrmann et al. European Heart Journal (2012) 33, 2771–2781



Microvascular Dysfunction



Djaileb L,..., Barone-Rochette G. EJMIMI. 2021 Jun;48(6):1813-1821.

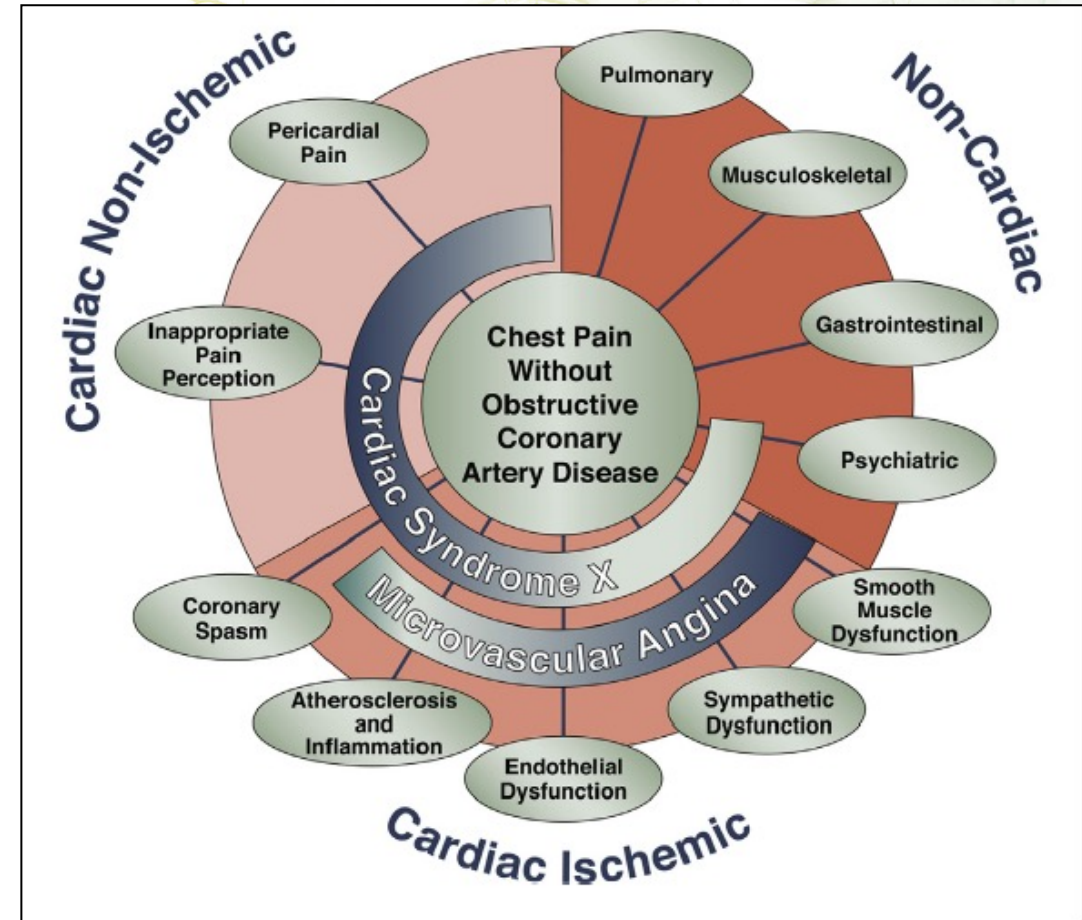
Lanza et al. Circulation. 2010;121:2317-2325



Frequency

At least **10% to 40%** of patients presenting with angina have no significant CAD on invasive coronary angiography.

As many as **50% to 70%** of these patients with chest pain without obstructive CAD are believed to have coronary microvascular dysfunction

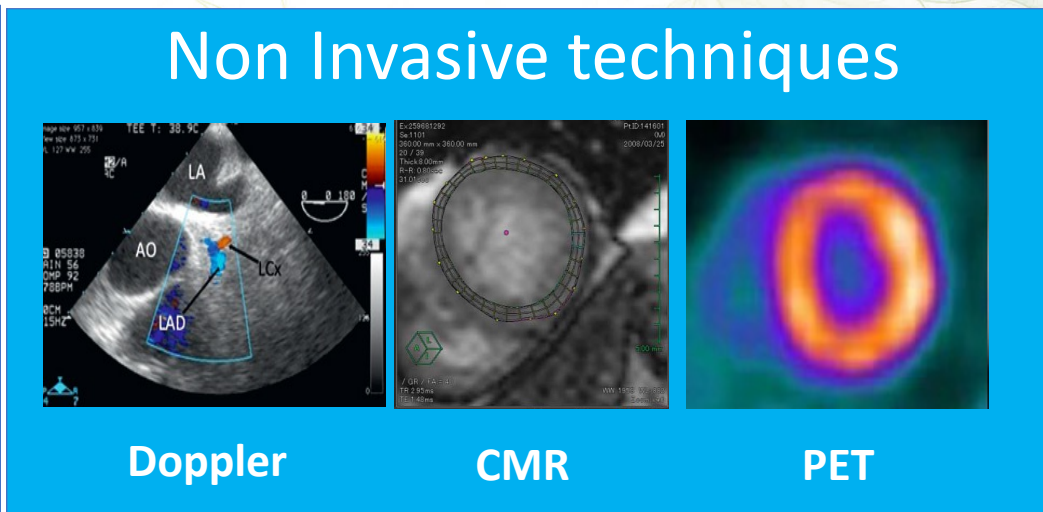
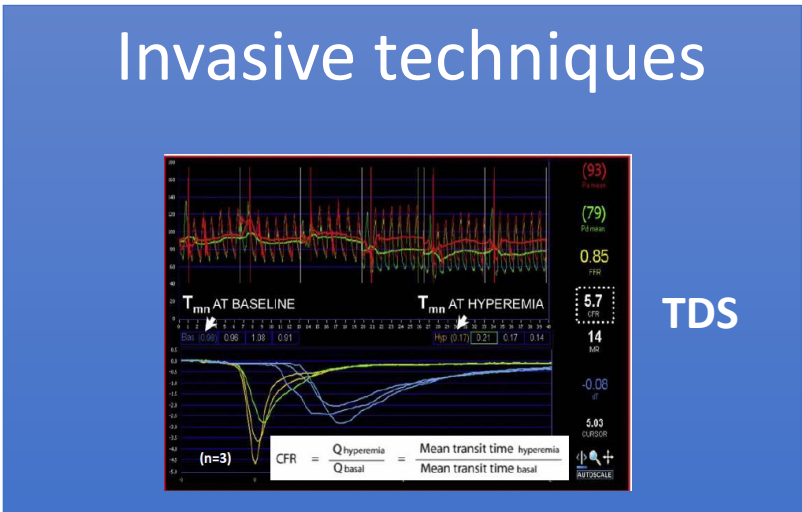


Marinescu et al. J Am Coll Cardiol Img 2015;8:210–20

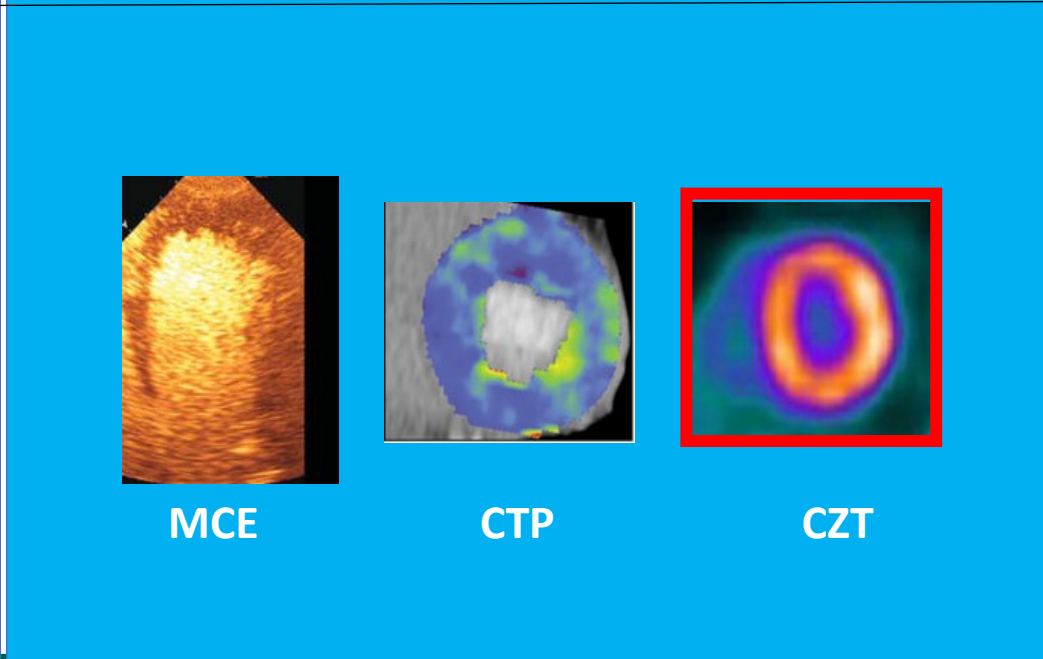
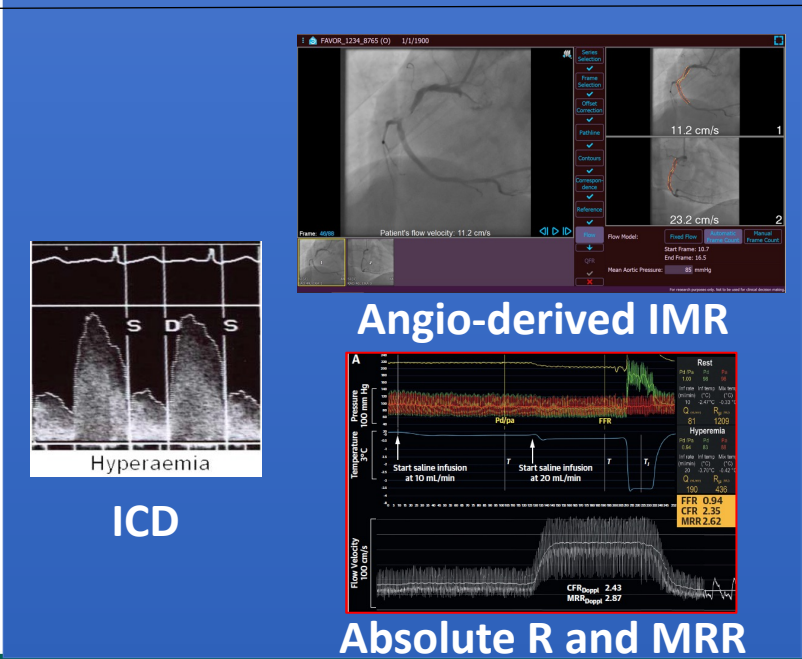


Modalities to assess coronary microvascular function

Clinical application



Research





Recommendations ESC 2019

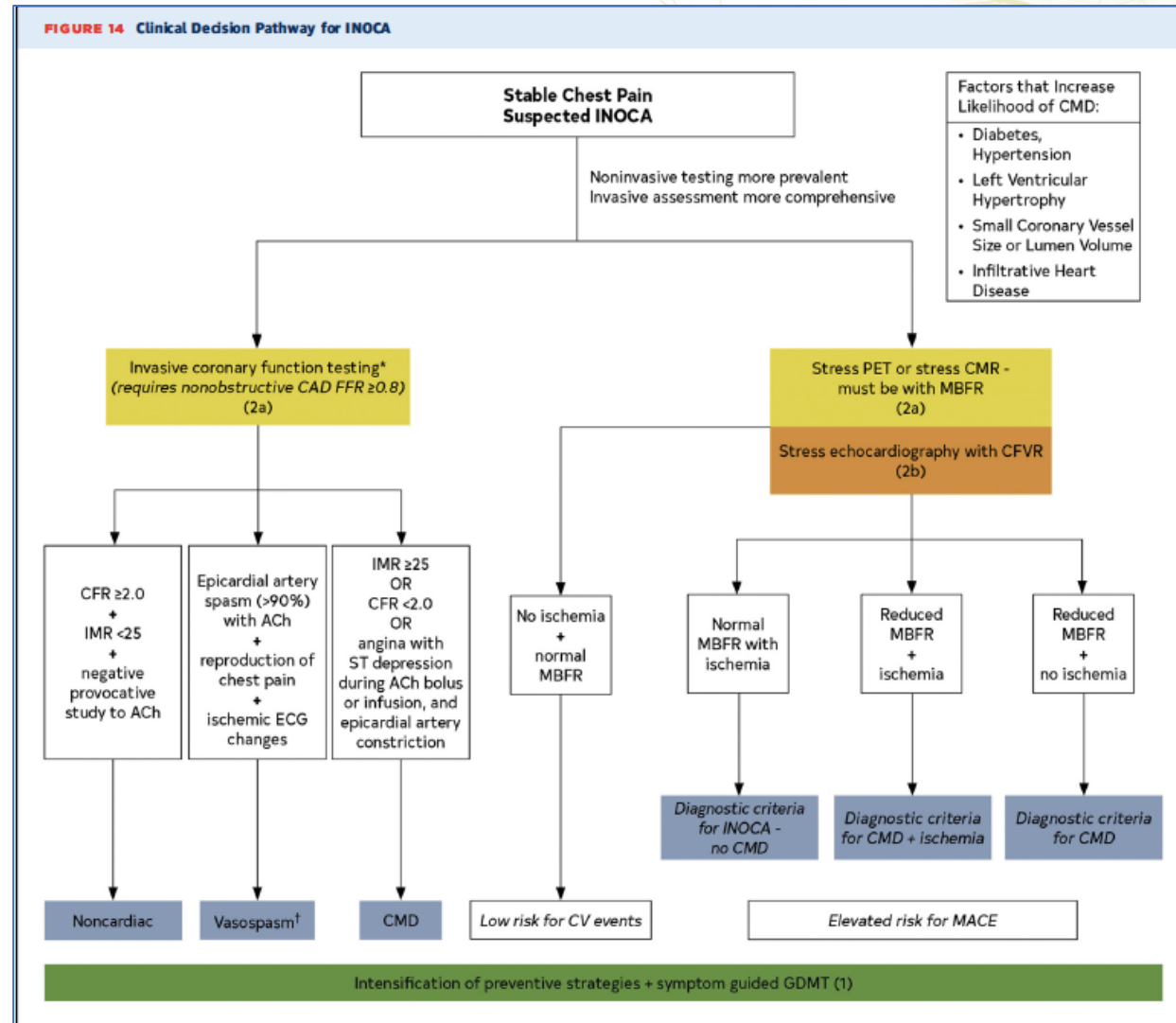
Investigations in patients with suspected coronary microvascular angina

Recommendations	Class ^a	Level ^b
Guidewire-based CFR and/or microcirculatory resistance measurements should be considered in patients with persistent symptoms, but coronary arteries that are either angiographically normal or have moderate stenoses with preserved iwFR/FFR. ^{412,413}	IIa	B
Intracoronary acetylcholine with ECG monitoring may be considered during angiography, if coronary arteries are either angiographically normal or have moderate stenoses with preserved iwFR/FFR, to assess microvascular vasospasm. ^{412,438–440}	IIb	B
Transthoracic Doppler of the LAD, CMR, and PET may be considered for non-invasive assessment of CFR. ^{430–432,441}	IIb	B

© ESC 2019



Recommendations AHA 2021

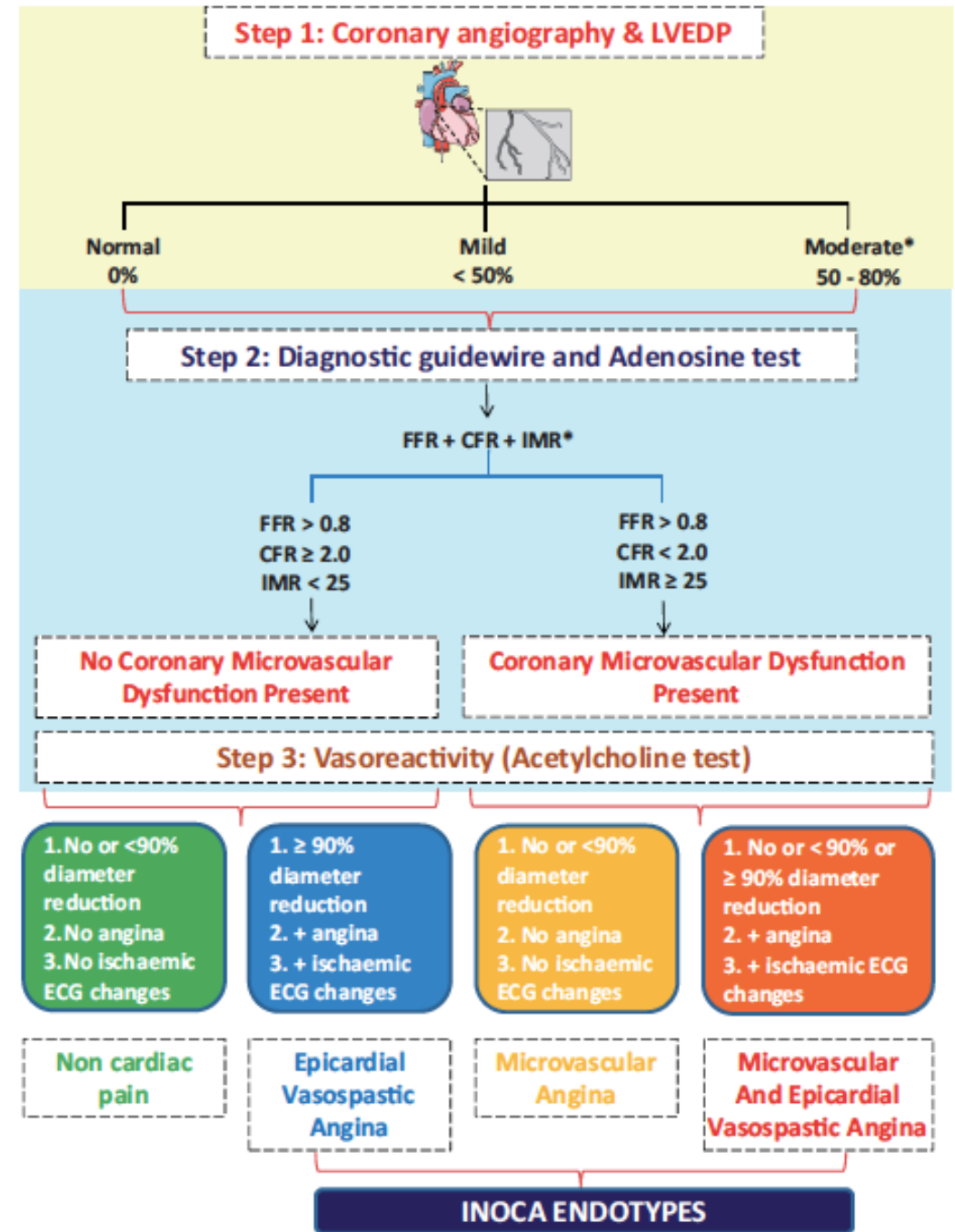


An EAPCI Expert Consensus Document on Ischaemia with Non-Obstructive Coronary Arteries in Collaboration with European Society of Cardiology Working Group on Coronary Pathophysiology & Microcirculation Endorsed by Coronary Vasomotor Disorders International Study Group

Non-invasive functional techniques are options to detect ischaemia in INOCA.

ETT, TTDE, MCE, SPECT MRI, PET

Currently, no technique allows a direct anatomical visualization of the coronary microcirculation *in vivo* in humans. Therefore, its assessment relies on the measurement of parameters which reflect its functional status, such as myocardial blood flow and CFR.





ANOCA/ INOCA

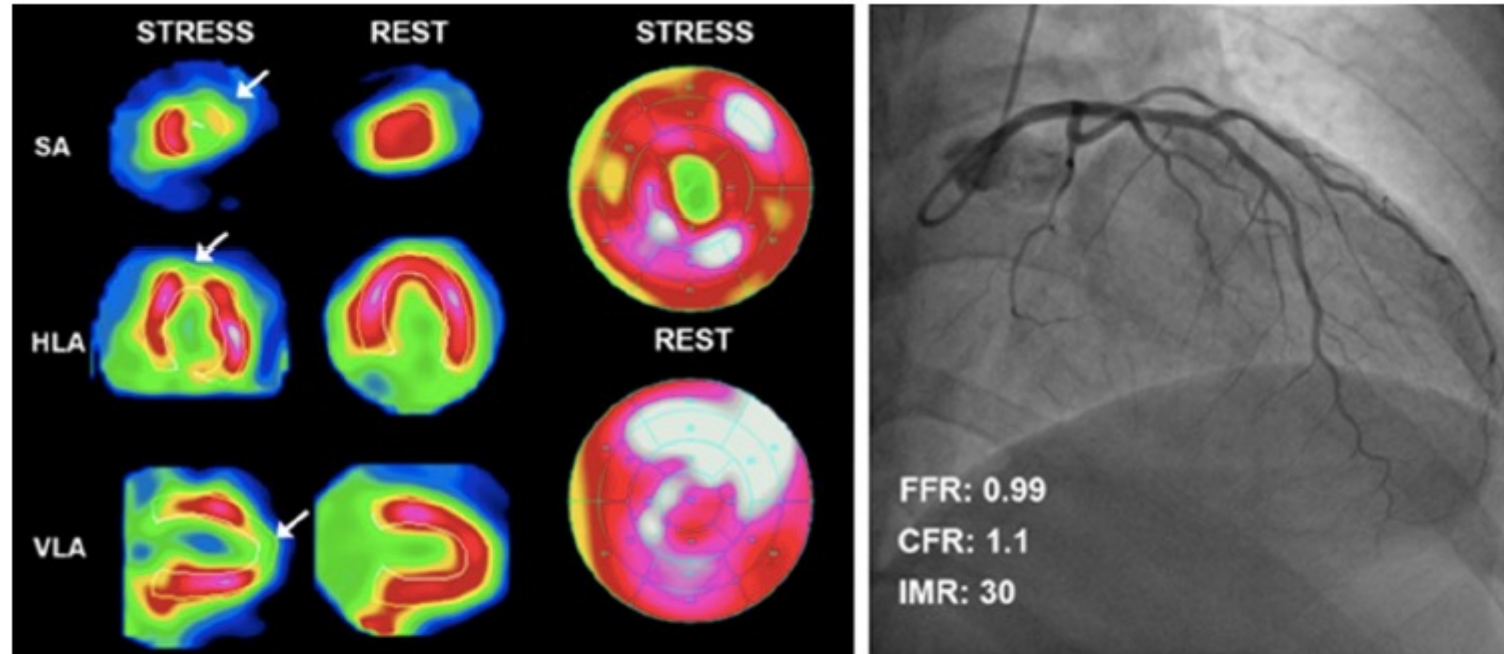


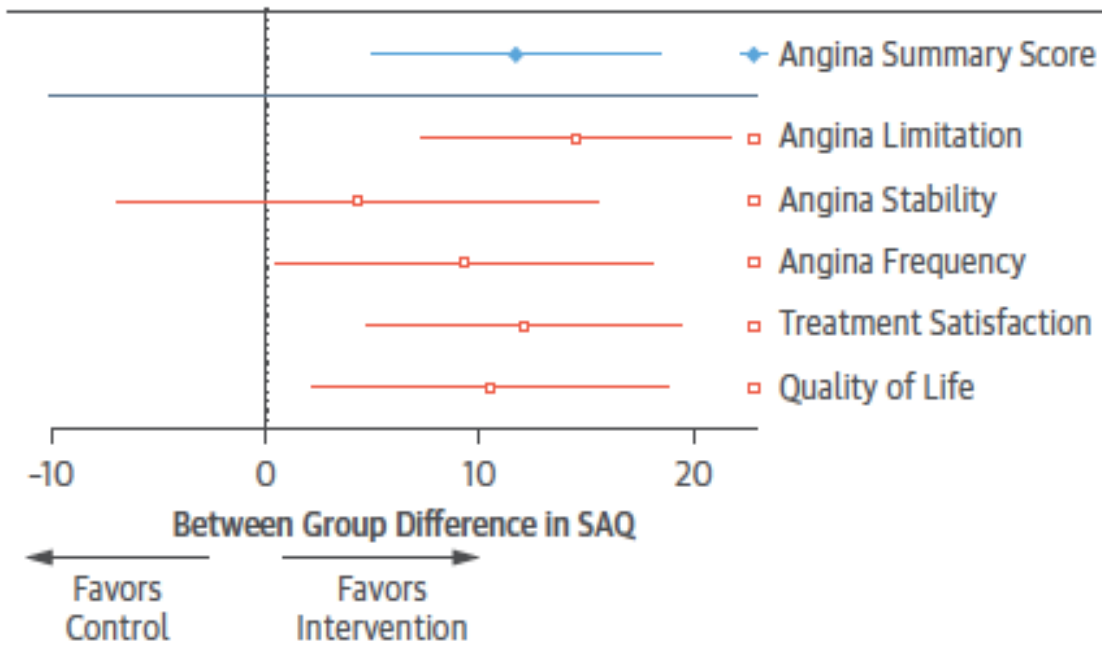
Figure 1. LEFT, short axis (SA), horizontal long axis (HLA) and vertical long axis (VLA) views and bull's eye from SPECT MPI indicated severe apical hypoperfusion (arrows) (summed stress score [SSS], 7; summed rest score [SRS], 0). Coronary angiography (CA) of the left anterior descending artery revealed the absence of obstructive CAD, a normal FFR value (0.99; normal FFR values, > 0.8), an elevated IMR (30, normal IMR values, < 23), and the alteration of coronary flow reserve (CFR) (1.1; normal CFR values, > 2).

Loic Djaileb, ..., Gilles Barone-Rochette et al. J Nucl Cardiol 2017



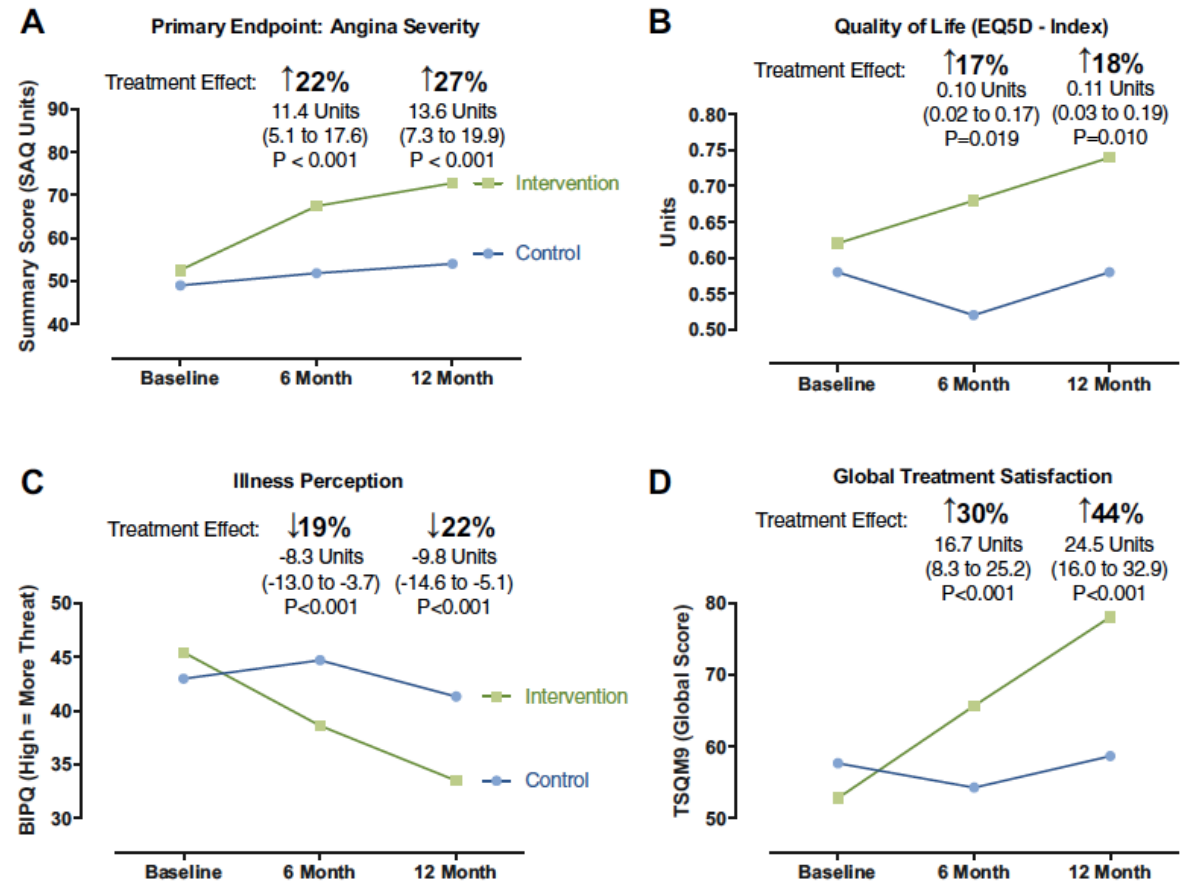
ANOCA/ INOCA

FIGURE 3 Primary Efficacy Outcome: Treatment Difference in the 6-Month SAQ Summary Score



Ford et al. J Am Coll Cardiol 2018;72:2841–55

FIGURE 2 Primary Efficacy Endpoint: Quality of Life Mean Scores at Baseline and at 6 and 12 Months



Ford et al. J Am Coll Cardiol Intv 2020;13:33–45



Conclusion

- INOCA and ANOCA are frequent in cath lab
- Microcirculation dysfunction must be explored in ANOCA and INOCA patients to improve their symptoms and quality of life.
- Possible impact on MACE : science is in progress

