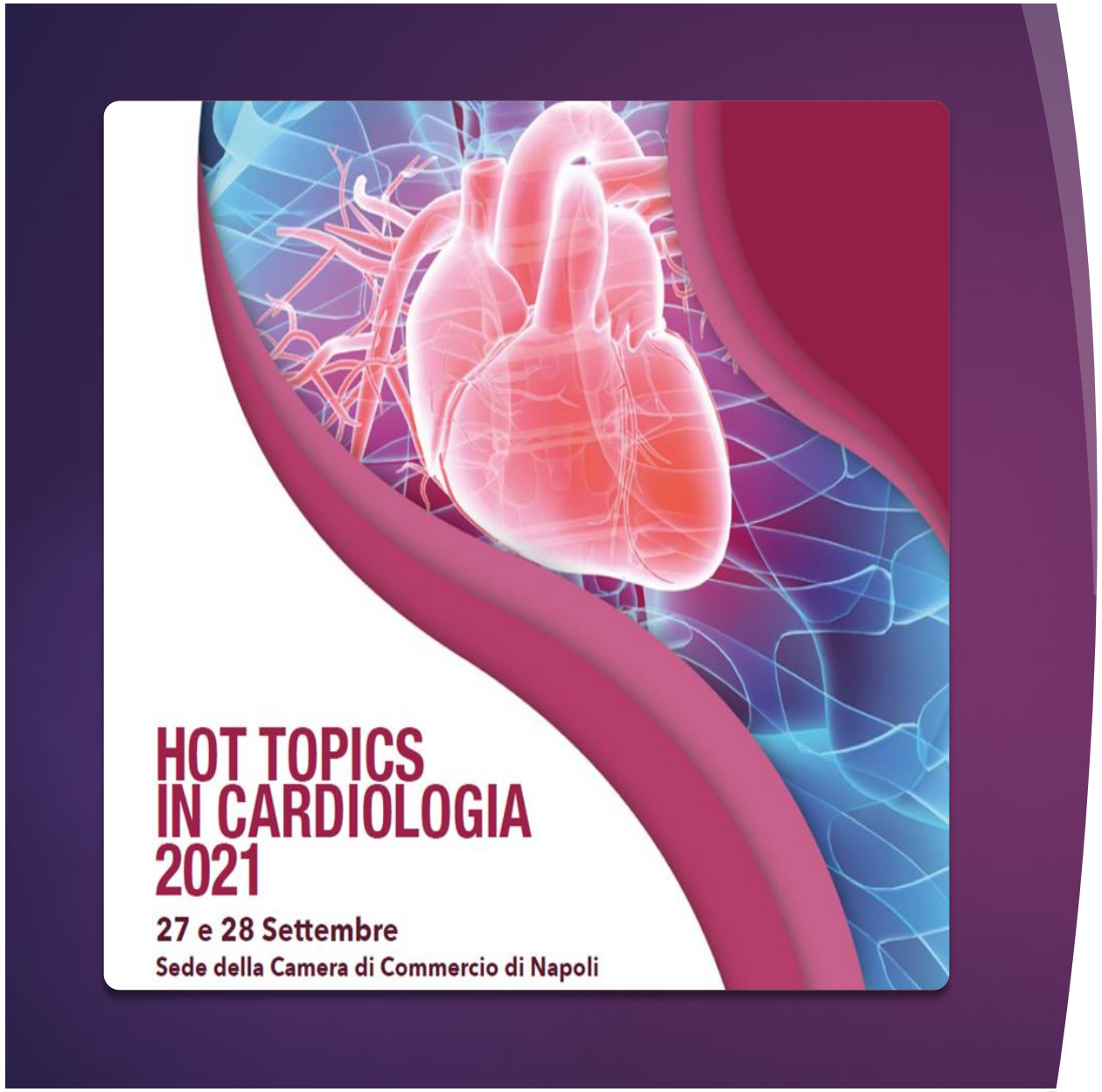

Ecostress con Dobutamina: predittività del risultato della PCI in CAD Stabile

Rossella Gottilla
Cardiologia con Utic ed Emodinamica
AORN A Cardarelli

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 12, 2007 VOL. 356 NO. 15

Optimal Medical Therapy with or without PCI for Stable Coronary Disease

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ABSTRACT

BACKGROUND

In patients with stable coronary artery disease, it remains unclear whether an initial management strategy of percutaneous coronary intervention (PCI) with intensive pharmacologic therapy and lifestyle intervention (optimal medical therapy) is superior to optimal medical therapy alone in reducing the risk of cardiovascular events.

METHODS

We conducted a randomized trial involving 2287 patients who had objective evidence of myocardial ischemia and significant coronary artery disease at 50 U.S. and Canadian centers. Between 1999 and 2004, we assigned 1149 patients to undergo PCI with optimal medical therapy (PCI group) and 1138 to receive optimal medical therapy alone (medical-therapy group). The primary outcome was death from any cause and nonfatal myocardial infarction during a follow-up period of 2.5 to 7.0 years (median, 4.6).

RESULTS

There were 211 primary events in the PCI group and 202 events in the medical-therapy group. The 4.6-year cumulative primary-event rates were 19.0% in the PCI group and 18.5% in the medical-therapy group (hazard ratio for the PCI group, 1.05; 95% confidence interval [CI], 0.87 to 1.27; P=0.62). There were no significant differences between the PCI group and the medical-therapy group in the composite of death, myocardial infarction, and stroke (20.0% vs. 19.5%; hazard ratio, 1.05; 95% CI, 0.87 to 1.27; P=0.62); hospitalization for acute coronary syndrome (12.4% vs. 11.8%; hazard ratio, 1.07; 95% CI, 0.84 to 1.37; P=0.56); or myocardial infarction (13.2% vs. 12.3%; hazard ratio, 1.13; 95% CI, 0.89 to 1.43; P=0.33).

CONCLUSIONS

As an initial management strategy in patients with stable coronary artery disease, PCI did not reduce the risk of death, myocardial infarction, or other major cardiovascular events when added to optimal medical therapy. (ClinicalTrials.gov number, NCT00007657.)

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*Members of the Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE) trial are listed in the Appendix and in the Supplementary Appendix, available with the full text of this article at www.nejm.org.

This article (10.1056/NEJMoa070829) was published at www.nejm.org on March 26, 2007.

N Engl J Med 2007;356:1503-16.

COURAGE

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 13, 2012 VOL. 367 NO. 11

Fractional Flow Reserve–Guided PCI versus Medical Therapy in Stable Coronary Disease

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ABSTRACT

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Fractional Flow Reserve–Guided PCI for Stable Coronary Artery Disease

Bernard De Bruyne, M.D., Ph.D., William F. Fearon, M.D., Nico H.J. Pijls, M.D., Ph.D., Emanuele Barbato, M.D., Ph.D., Pim Tonino, M.D., Ph.D., Zsolt Piroth, M.D., Nikola Jagic, M.D., Sven Mobius-Winckler, M.D., Gilles Rioufol, M.D., Ph.D., Nils Witt, M.D., Ph.D., Petr Kala, M.D., Philip MacCarthy, M.D., Thomas Engström, M.D., Keith Oldroyd, M.D., Kreton Mavromatis, M.D., Ganesh Manoharan, M.D., Peter Verlee, M.D., Ole Frobert, M.D., Nick Curzen, B.M., Ph.D., Jane B. Johnson, R.N., B.S.N., Andreas Limacher, Ph.D., Eveline Nüesch, Ph.D., and Peter Jüni, M.D., for the FAME 2 Trial Investigators*

ABSTRACT

CONCLUSIONS

In patients with stable coronary artery disease, FFR-guided PCI, as compared with medical therapy alone, improved the outcome. Patients without ischemia had a favorable outcome with medical therapy alone. (Funded by St. Jude Medical; FAME 2 ClinicalTrials.gov number, NCT01132495.)

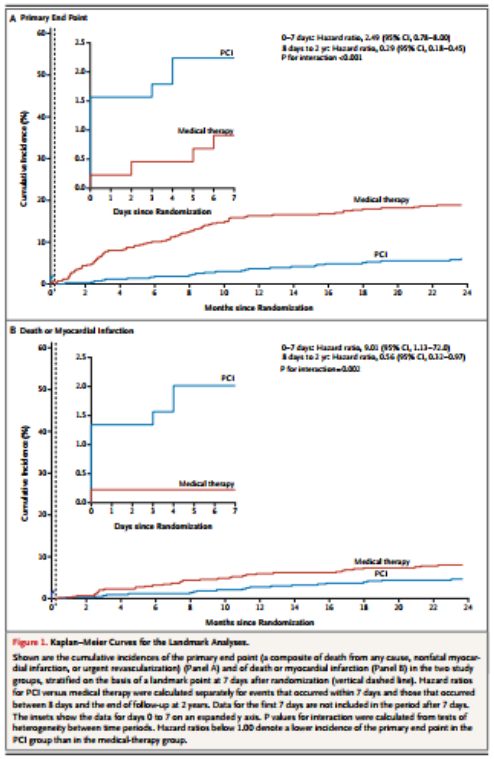
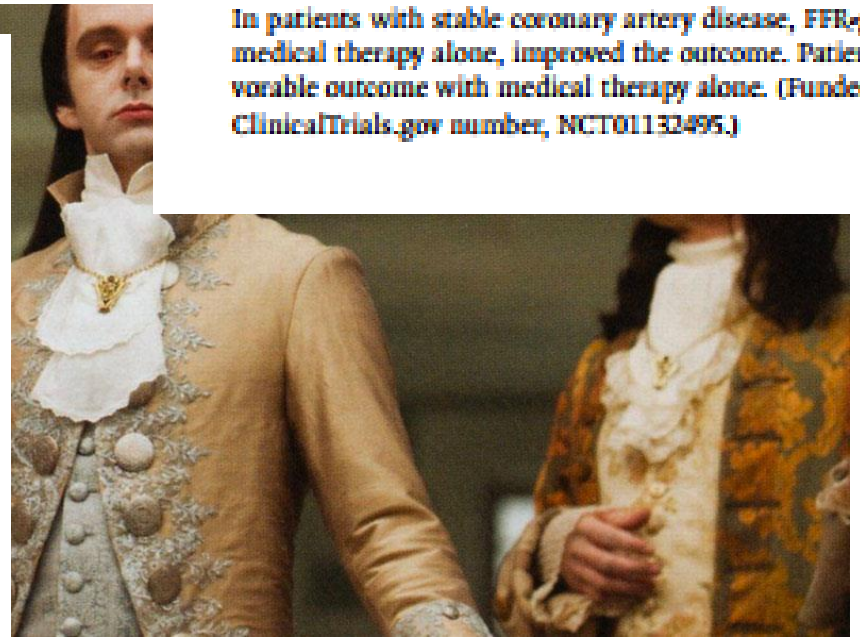


Figure 1. Kaplan–Meier Curves for the Landmark Analyses.

Shown are the cumulative incidences of the primary end point (a composite of death from any cause, nonfatal myocardial infarction, or urgent revascularization) (Panel A) and of death or myocardial infarction (Panel B) in the two study groups, stratified on the basis of a landmark point at 7 days after randomization (vertical dashed line). Hazard ratios for PCI versus medical therapy were calculated separately for events that occurred within 7 days and those that occurred between 8 days and the end of follow-up at 2 years. Data for the first 7 days are not included in the period after 7 days. The insets show the data for days 0 to 7 on an expanded y axis. P values for interaction were calculated from tests of heterogeneity between time periods. Hazard ratios below 1.00 denote a lower incidence of the primary end point in the PCI group than in the medical-therapy group.



Ecostress Dobutamina in CAD cronica

- Prima della PTCA
- per stabilire il significato emodinamico di una stenosi
- il miocardio ibernato cosi da pianificare l'eventuale intervento.
- Buon valore predittivo pos (93%) e neg (80%) per il miglioramento dell'ischemia precocemente post PTCA.
- Riduzione dell'ischemia e recupero del miocardio ibernato.

Kao H-L Am J Cardiol 1995;76:652-656

Davila-Roman VG Am J Cardiol 1995;76:245-249

Potere diagnostico per restenosi post PTCA

- Nel 95% dei pz avviene nei primi 6 mesi post PTCA
- Sensibilità 74% (CI 69-79%).
- Specificità 87% (CI 84-89%).
- Predittivo positivo (83%)
- Predittivo negativo (97%)

Scherhag A International Journal Cardiol 98.2005 191-197

Restenosi Post PTCA

- ECG da sforzo sensibilità 54% specificità 70%
- VPpos 64% VPN 61%
- Scintigrafia sensibilità 75-80%, specificità 79%
- VP pos 80% VPN 85%

ESC European Society of Cardiology

European Heart Journal (2020) 41, 407–477
doi:10.1093/eurheartj/ehz425

ESC GUIDELINES

2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes

The Task Force for the diagnosis and management of chronic coronary syndromes of the European Society of Cardiology (ESC)

Authors/Task Force Members: Juhani Knuuti* (Finland) (Chairperson), William Wijns* (Ireland) (Chairperson), Antti Saraste (Finland), Davide Capodanno (Italy), Emanuele Barbato (Italy), Christian Funck-Brentano (France), Eva Prescott (Denmark), Robert F. Storey (United Kingdom), Christi Deaton (United Kingdom), Thomas Cuisset (France), Stefan Agewall (Norway), Kenneth Dickstein (Norway), Thor Edvardsen (Norway), Javier Escaned (Spain), Bernard J. Gersh (United States of America), Pavel Svitil (Czech Republic), Martine Gilard (France), David Hasdai (Israel), Robert Hatala (Slovak Republic), Felix Mahfoud (Germany), Josep Masip (Spain), Claudio Muneretto (Italy), Marco Valgimigli (Switzerland), Stephan Achenbach (Germany), and Jeroen J. Bax (Netherlands)

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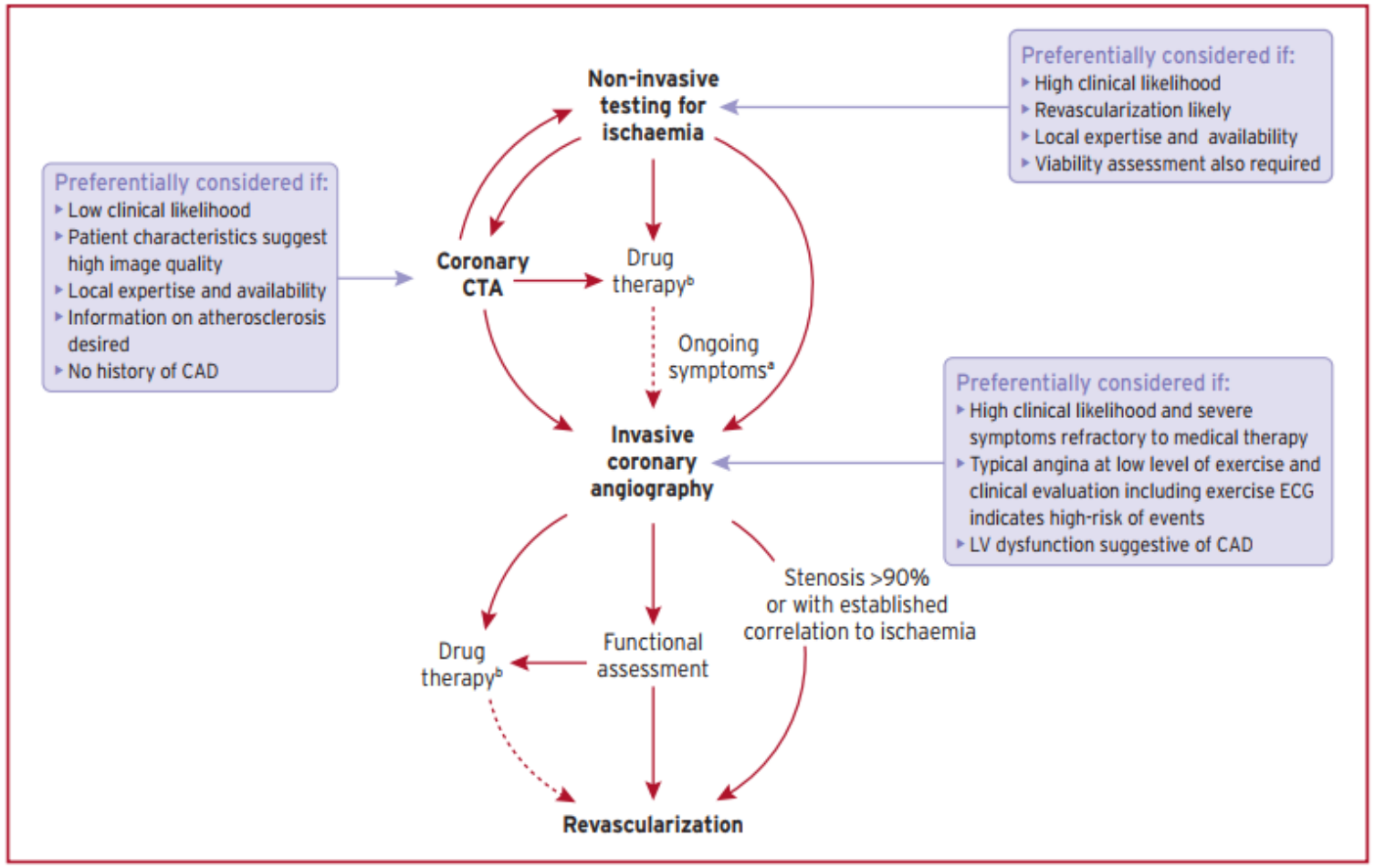
Linee guida ESC 2019 CAD Cronica



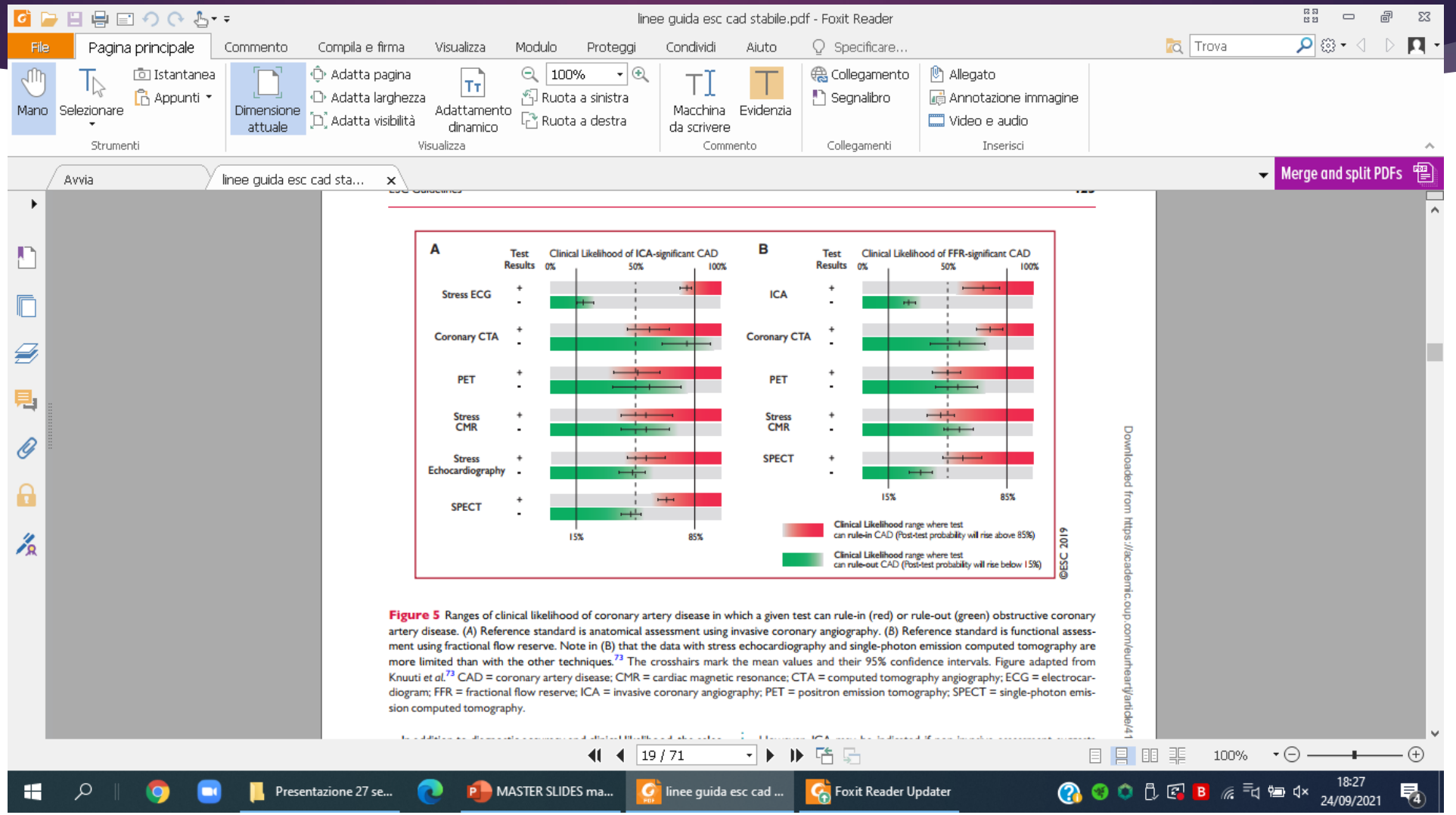


Figure 5 Ranges of clinical likelihood of coronary artery disease in which a given test can rule-in (red) or rule-out (green) obstructive coronary artery disease. (*A*) Reference standard is anatomical assessment using invasive coronary angiography. (*B*) Reference standard is functional assessment using fractional flow reserve. Note in (B) that the data with stress echocardiography and single-photon emission computed tomography are more limited than with the other techniques.[73] The crosshairs mark the mean values and their 95% confidence intervals. Figure adapted from Knuuti *et al.*[73] CAD = coronary artery disease; CMR = cardiac magnetic resonance; CTA = computed tomography angiography; ECG = electrocardiogram; FFR = fractional flow reserve; ICA = invasive coronary angiography; PET = positron emission tomography; SPECT = single-photon emission computed tomography.

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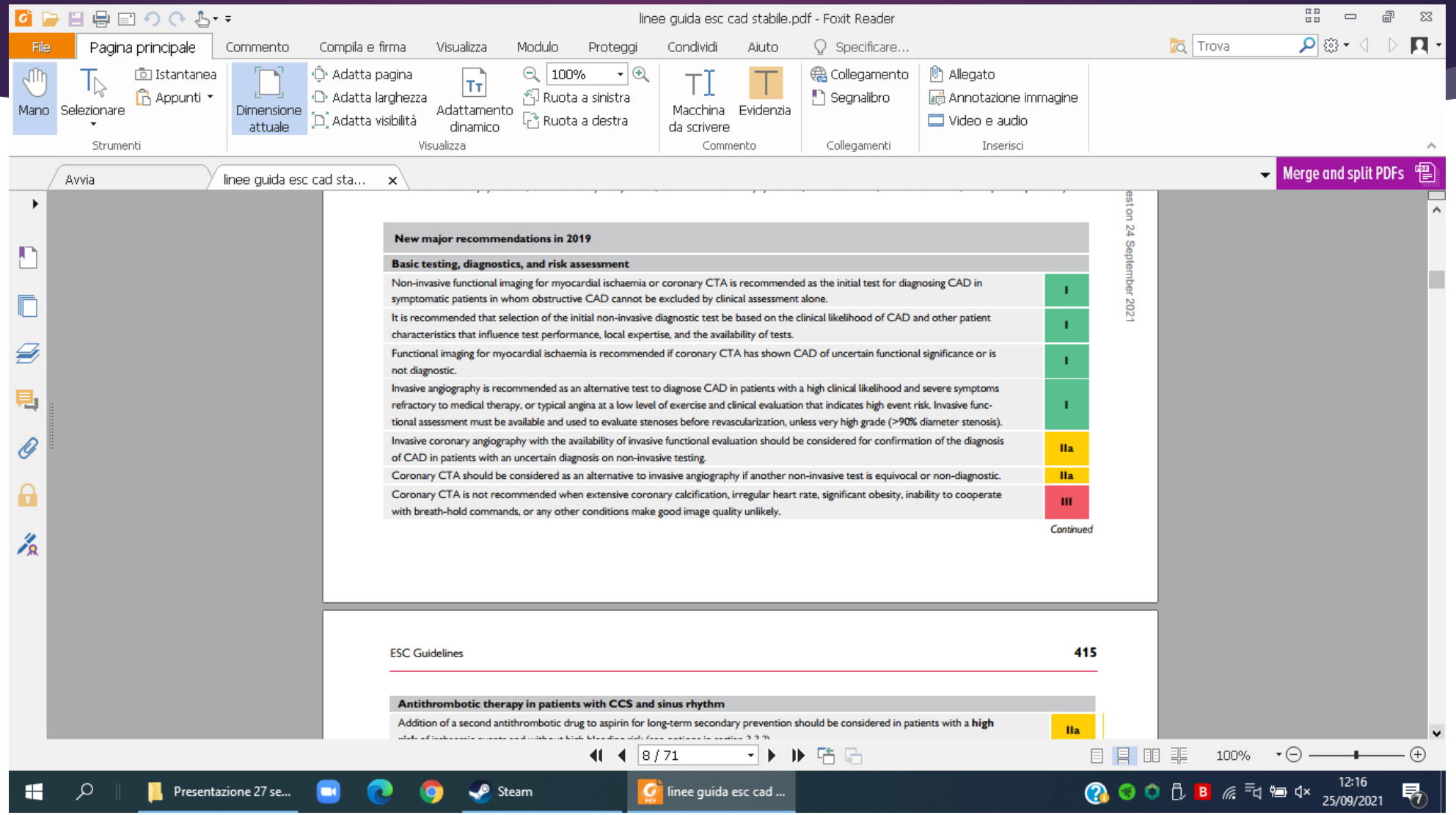

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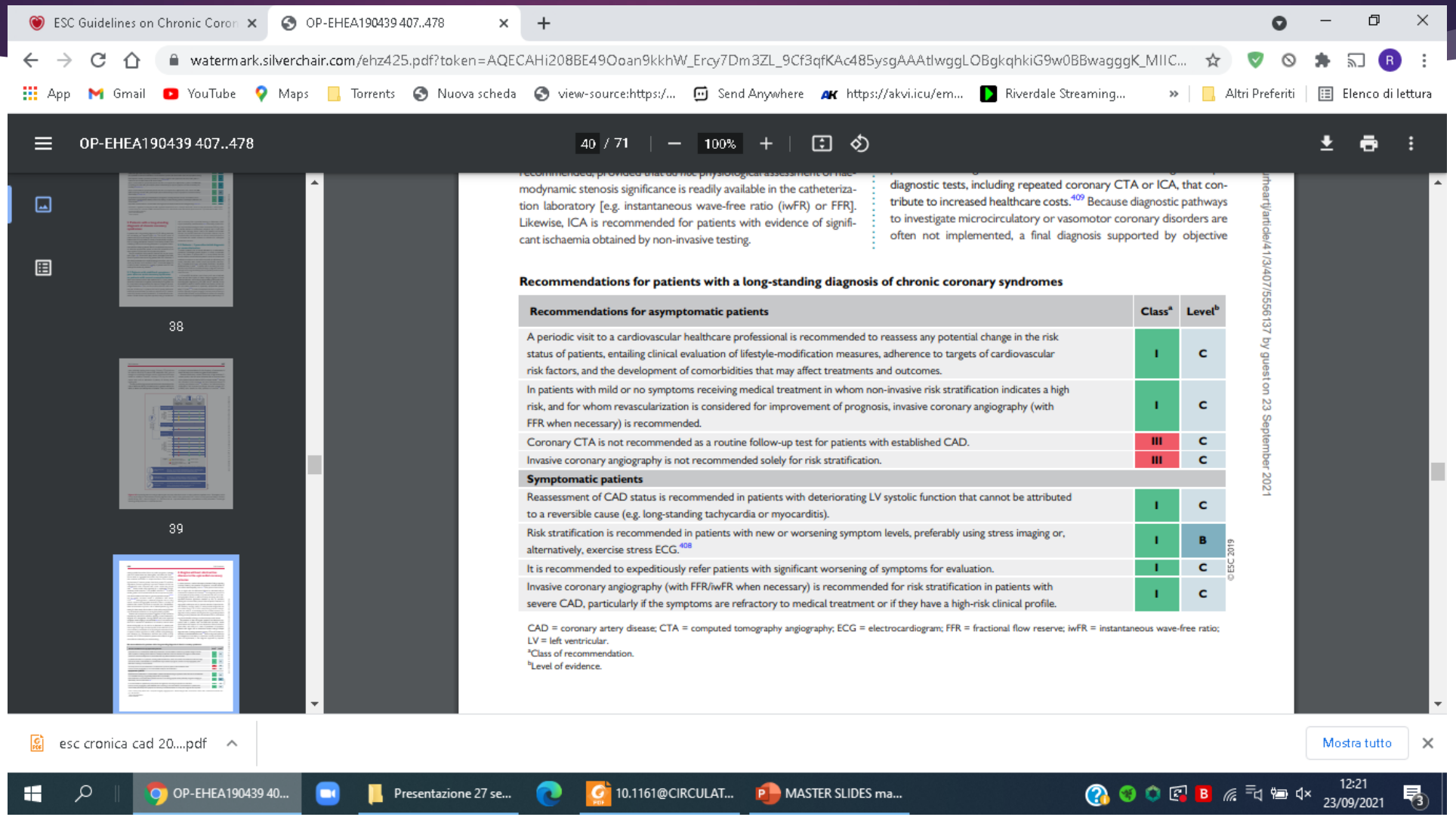

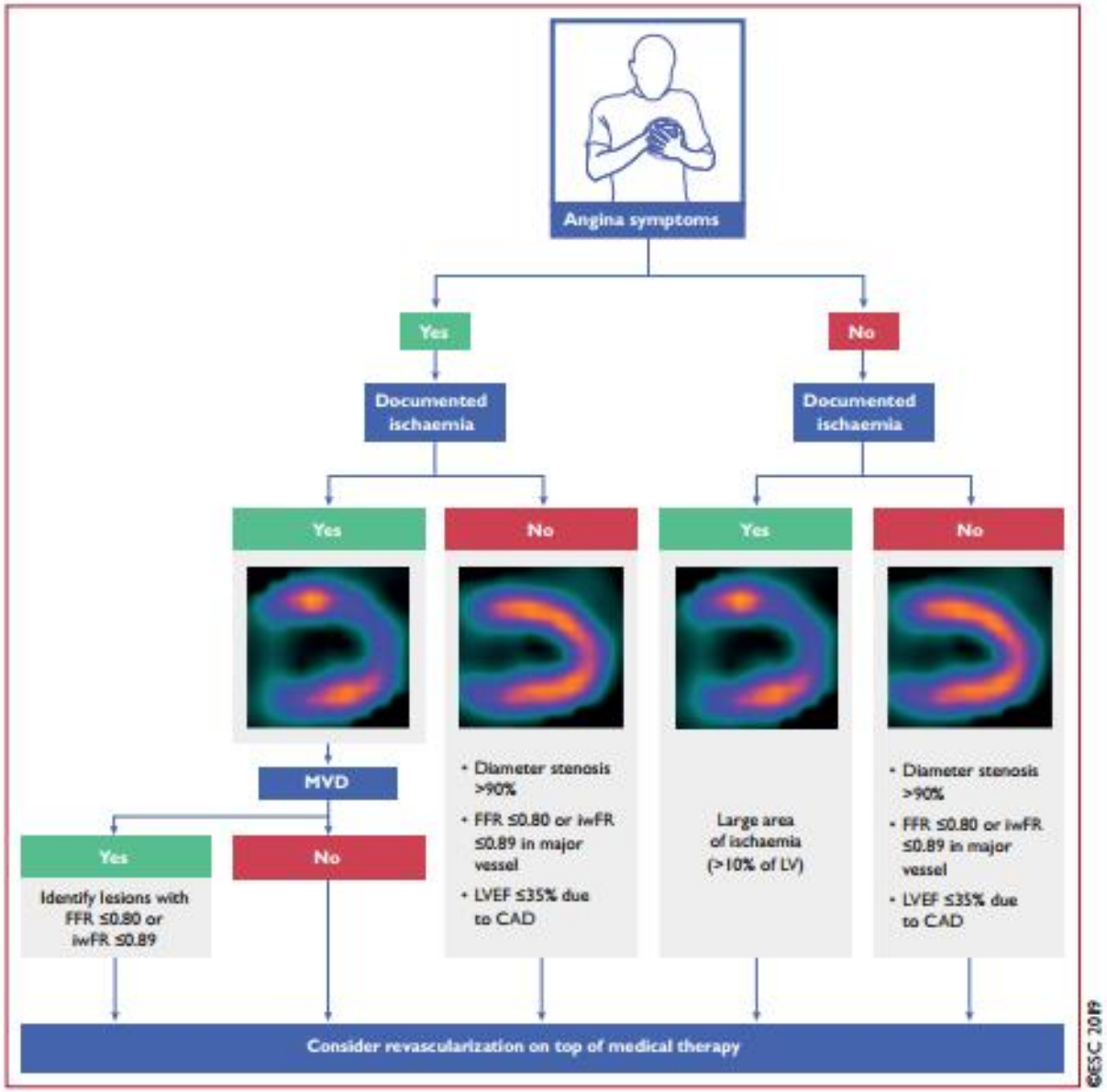
Angina symptoms
Yes
No
Documented ischaemia
Documented ischaemia
Yes
No
Yes
No
MVD
• Diameter stenosis >90%
• FFR ≤0.80 or iwFR ≤0.89 in major vessel
• LVEF ≤35% due to CAD
Large area of ischaemia (>10% of LV)
• Diameter stenosis >90%
• FFR ≤0.80 or iwFR ≤0.89 in major vessel
• LVEF ≤35% due to CAD
Yes
No
Identify lesions with FFR ≤0.80 or iwFR ≤0.89
Consider revascularization on top of medical therapy
©ESC 2019

[a]cardiologist, internist, general practitioner, or cardiovascular nurse

 Echocardiography at rest	Early (e.g. 1-3 months) after revascularization to set as a reference and/or periodically (e.g. at 1 year if previously abnormal and/or every 3-5 years) to evaluate LV function, valvular status and haemodynamic status.
 Stress test for inducible ischaemia	As necessary, to investigate changes in symptoms level, and/or early (e.g. 1-3 months) after revascularization to set as a reference and/or periodically (e.g. every 3-5 years) to reassess ischaemia.
 Invasive coronary angiography	As necessary, for patients at high risk based on noninvasive ischaemia testing, or severe angina symptoms (e.g. CCS class 3-4). Not recommended solely for risk stratification.

Ecostress

- Fisico
- Dipiridamolo/adenosina
- Dobutamina


No, non sono stressato, sto solo attraversando un periodo difficile.
BESTI.IT

GUIDELINES AND STANDARDS

Guidelines for Performance, Interpretation, and Application of Stress Echocardiography in Ischemic Heart Disease: From the American Society of Echocardiography

Patricia A. Pellikka, MD, FASE, Chair, Adelaide Arruda-Olson, MD, PhD, FASE, Farooq A. Chaudhry, MD, FASE,* Ming Hui Chen, MD, MMSc, FASE, Jane E. Marshall, RDCS, FASE, Thomas R. Porter, MD, FASE, and Stephen G. Sawada, MD, *Rochester, Minnesota; New York, New York; Boston, Massachusetts; Omaha, Nebraska; Indianapolis, Indiana*

Journal of the American Society of Echocardiography January 2020

Table 12 Recommendations for stress echocardiography in patients with symptoms or suspected stable coronary artery disease

Recommendations for non-invasive testing for IHD	Class of recommendation	Level of evidence
In patients with suspected stable CAD, intermediate pretest probability and preserved ejection fraction, stress imaging, such as stress echocardiography, is preferred as the initial test option.	I	B
In patients without typical angina, an imaging stress test, such as stress echocardiography, is recommended as the initial test for diagnosing stable CAD if the pretest probability is high or if LVEF is reduced.	I	B
In patients with suspected CAD and with resting ECG abnormalities, which prevent accurate interpretation of ECG changes during stress, an imaging stress test, such as stress echocardiography, is recommended.	I	B
In patients with LBBB and symptoms consistent with IHD, stress echocardiography (either ESE or DSE) is preferred over SPECT imaging because of its greater specificity and because of its versatility for detecting other cardiac conditions associated with LBBB	I	B
Stress echocardiography is the preferred test for women with an indication for an noninvasive imaging test for known or suspected CAD because of its safety (absence of radiation to the breasts), and greater specificity (absence of breast attenuation artifact)	I	B
ESE is the preferred imaging stress test for children with suspected IHD because of the absence of radiation to developing tissues and absence of need for an intravenous line, and the provision of the prognostically important assessment of exercise capacity	I	B
A pharmacologic stress test, such as DSE, is recommended for patients with the above indications for a stress imaging test who are unable to exercise.	I	B
Stress echocardiography is the preferred test in patients with exertional dyspnea of uncertain etiology. In these patients, in addition to assessment of regional wall motion, tricuspid regurgitation velocity and diastolic function should be assessed at rest and with stress	I	B
An imaging stress test, such as stress echocardiography, should be considered in patients with prior coronary artery revascularization (PCI or CABG) and new cardiac symptoms.	IIa	B
An imaging stress test, such as stress echocardiography, should be considered to assess the functional severity of intermediate lesions on coronary arteriography.	IIa	B

regurgitation velocity and diastolic function should be assessed at rest and with stress		
An imaging stress test, such as stress echocardiography, should be considered in patients with prior coronary artery revascularization (PCI or CABG) and new cardiac symptoms.	IIa	B
An imaging stress test, such as stress echocardiography, should be considered to assess the functional severity of intermediate lesions on coronary arteriography.	IIa	B

Recommendations for risk stratification using ischemia testing	Class of recommendation	Level of evidence
A stress imaging test such as stress echocardiography for risk stratification is recommended in patients with an inconclusive exercise ECG	I	B
A stress imaging test, such as stress echocardiography, is recommended for risk stratification in patients with known stable CAD and a deterioration in symptoms if the site and extent of ischemia would influence clinical decision making	I	B
In asymptomatic adults with diabetes, peripheral vascular disease, or a strong family history of CAD, or when previous risk assessment testing suggests high risk of CAD, such as a coronary artery calcium score of ≥400, a stress imaging test, such as stress echocardiography, may be considered for advanced cardiovascular risk assessment.[208]	IIb	B

Recommendation for re-assessment in patients with stable CAD	Class of recommendation	Level of evidence
An exercise ECG or stress imaging test such as stress echocardiography is recommended in the presence of recurrent or new symptoms once instability has been ruled out.	I	C
In symptomatic patients with revascularized stable CAD, a stress imaging test, such as stress echocardiography, is indicated rather than stress ECG.	I	C
Reassessment of prognosis using a stress test, such as stress echocardiography, may be considered in asymptomatic patients after the expiration of the period for which the previous test was felt to be valid	IIb	B
Recommendations for stress echocardiography in the context of non-cardiac surgery		

Recommendations for non-invasive stress testing of IHD	Class of recommendation	Level of evidence
A pharmacologic stress imaging test such as DSE is recommended before high-risk surgery in patients with more than two clinical risk factors and poor functional capacity (<4 METs).	I	B
A pharmacologic stress imaging test such as DSE may be considered before high- or intermediate-risk surgery in patients with suspected cardiac symptoms and poor functional capacity (<4 METs).	I	B

Percutaneous coronary intervention in stable angina (ORBITA): a double-blind, randomised controlled trial

Rasha Al-Lamee, David Thompson, Hakim-Moulay Dehbi, Sayan Sen, Kare Tang, John Davies, Thomas Keeble, Michael Mielewczik, Raffi Kaprielian, Iqbal S Malik, Sukhjinder S Nijjer, Ricardo Petraco, Christopher Cook, Yousif Ahmad, James Howard, Christopher Baker, Andrew Sharp, Robert Gerber, Suneel Talwar, Ravi Assomull, Jamil Mayet, Roland Wensel, David Collier, Matthew Shun-Shin, Simon A Thom, Justin E Davies, Darrel P Francis, on behalf of the ORBITA investigators*

Summary

Background Symptomatic relief is the primary goal of percutaneous coronary intervention (PCI) in stable angina and is commonly observed clinically. However, there is no evidence from blinded, placebo-controlled randomised trials to show its efficacy.

Methods ORBITA is a blinded, multicentre randomised trial of PCI versus a placebo procedure for angina relief that was done at five study sites in the UK. We enrolled patients with severe (≥70%) single-vessel stenoses. After enrolment, patients received 6 weeks of medication optimisation. Patients then had pre-randomisation assessments with

Interpretation In patients with medically treated angina and severe coronary stenosis, PCI did not increase exercise time by more than the effect of a placebo procedure. The efficacy of invasive procedures can be assessed with a placebo control, as is standard for pharmacotherapy.

Findings ORBITA enrolled 230 patients with ischaemic symptoms. After the medication optimisation phase and between Jan 6, 2014, and Aug 11, 2017, 200 patients underwent randomisation, with 105 patients assigned PCI and 95 assigned the placebo procedure. Lesions had mean area stenosis of 84·4% (SD 10·2), fractional flow reserve of 0·69 (0·16), and instantaneous wave-free ratio of 0·76 (0·22). There was no significant difference in the primary endpoint of exercise time increment between groups (PCI minus placebo 16·6 s, 95% CI −8·9 to 42·0, p=0·200). There were no deaths. Serious adverse events included four pressure-wire related complications in the placebo group, which required PCI, and five major bleeding events, including two in the PCI group and three in the placebo group.

Interpretation In patients with medically treated angina and severe coronary stenosis, PCI did not increase exercise time by more than the effect of a placebo procedure. The efficacy of invasive procedures can be assessed with a placebo control, as is standard for pharmacotherapy.

Funding NIHR Imperial Biomedical Research Centre, Foundation for Circulatory Health, Imperial College Healthcare Charity, Philips Volcano, NIHR Barts Biomedical Research Centre.

Lancet 2018; 391: 31–40

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This online publication has been corrected. The corrected version first appeared at thelancet.com

R Petraco MRCP, C Cook MRCP, Y Ahmad MRCP, J Howard MRCP, Prof J Mayet FRCP, R Wensel MRCP, M Shun-Shin MRCP, Prof S A Thom FRCP, J E Davies MRCP, Prof D P Francis FRCP†); Imperial College Healthcare NHS Trust, London, UK (R Al-Lamee, D Thompson, S Sen, R Kaprielian FRCP, I S Malik FRCP, S S Nijjer MRCP, R Petraco, C Cook, Y Ahmad, J Howard, C Baker FRCP, R Assomull MRCP, Prof J Mayet, M Shun-Shin, Prof S Thom, J E Davies, Prof D P Francis FRCP†); Cancer

Circulation

ORIGINAL RESEARCH ARTICLE

Dobutamine Stress Echocardiography Ischemia as a Predictor of the Placebo-Controlled Efficacy of Percutaneous Coronary Intervention in Stable Coronary Artery Disease

The Stress Echocardiography–Stratified Analysis of ORBITA

Circulation. 2019;140:00–00. DOI: 10.1161/CIRCULATIONAHA.119.042918

ORBITA trial

(Objective Randomised Blinded Investigation With Optimal

Medical Therapy of Angioplasty in Stable Angina).

- 183 pazienti
- Randomizzato Doppio cieco
- Pz con angina stabile
- Lesione coronarica singola severa
- PCI contro terapia medica
- Il grado di ischemia all'ecostress predice l'efficacia della PTCA sulla frequenza di angina del paziente.

- Non vi è relazione significativa tra la frequenza di angina e la PTCA
- Il miglioramento sintomatico non è relazionato ai parametri invasivi.

Orbita

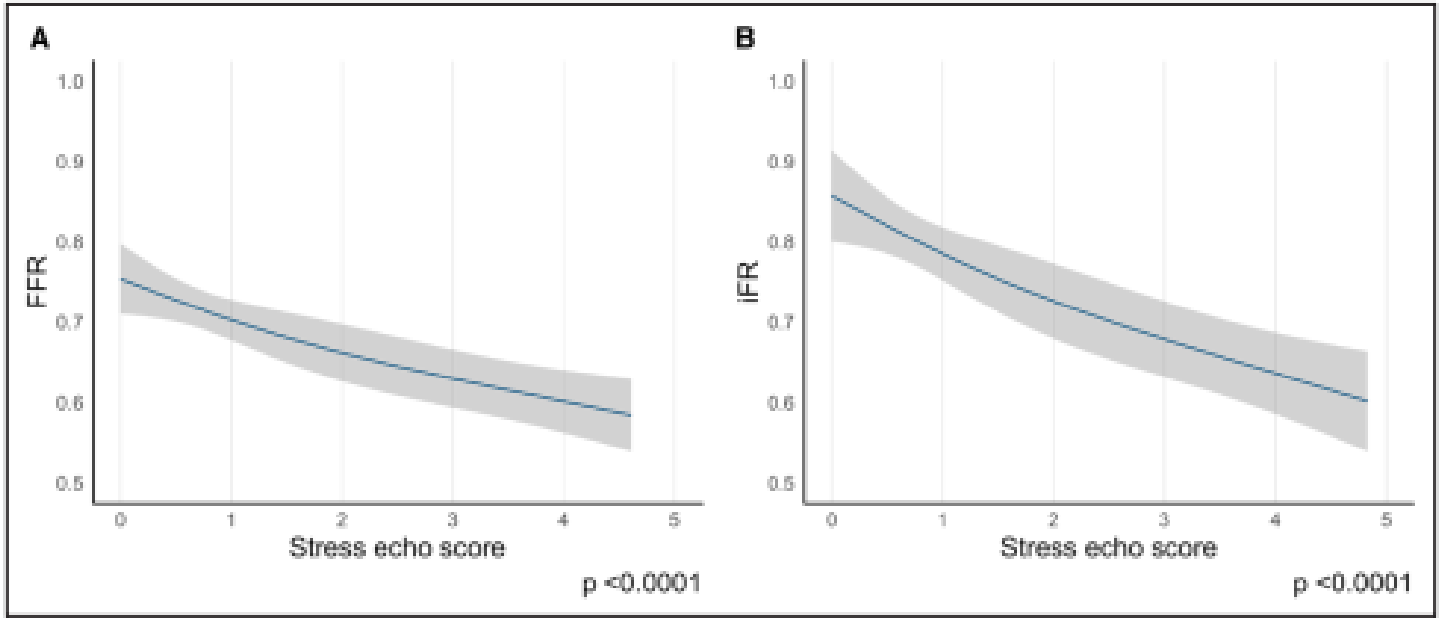
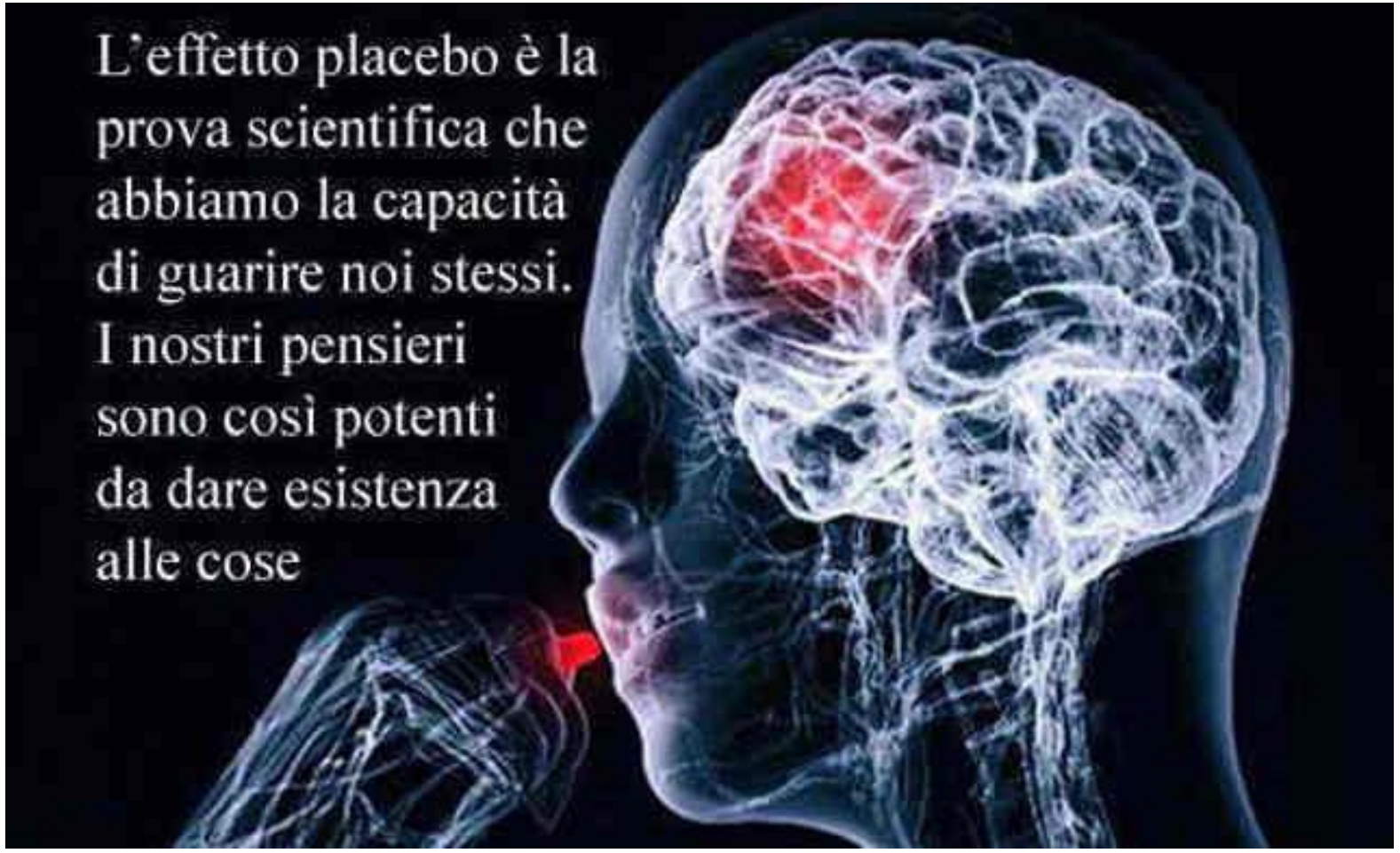


Figure 1. Relationship between prerandomization stress echocardiography score and prerandomization FFR and iFR.
A, Relationship between prerandomization stress echocardiography score and prerandomization FFR. B, Relationship between prerandomization stress echocardiography score and prerandomization iFR. echo indicates echocardiography; FFR, fractional flow reserve; and iFR, instantaneous wave-free ratio.

Tuttavia non vi è relazione significativa tra parametri invasivi e sintomi o tempo di esercizio


L'effetto placebo è la
prova scientifica che
abbiamo la capacità
di guarire noi stessi.
I nostri pensieri
sono così potenti
da dare esistenza
alle cose


Effetto placebo:
la mente supera
la medicina.

Grado di ischemia-frequenza di angina

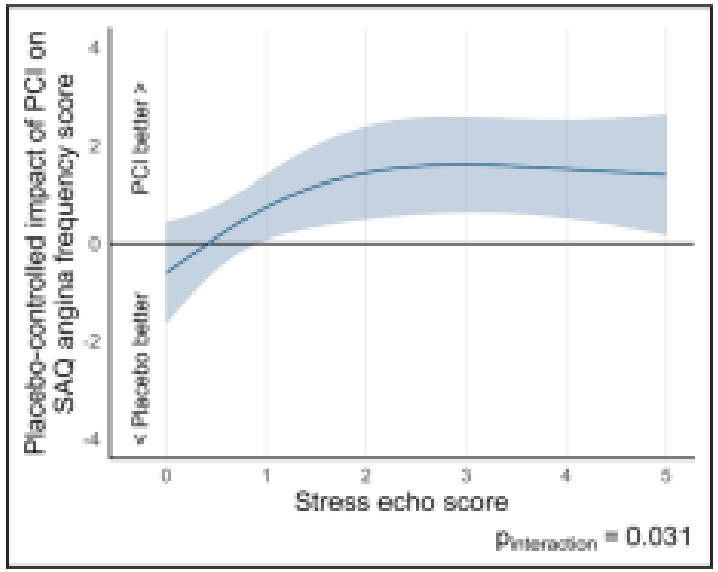


Figure 2. Relationship of treatment difference in Seattle Angina Questionnaire (SAQ) angina frequency score at follow-up to prerandomization stress echocardiography score by randomization arm.
There is a significant interaction between stress echocardiography score and Seattle Angina Frequency score with a progressive tendency for larger effects on angina frequency score with higher stress echocardiography score ($P_{interaction}$=0.031). echo indicates echocardiography; and PCI, percutaneous coronary intervention.

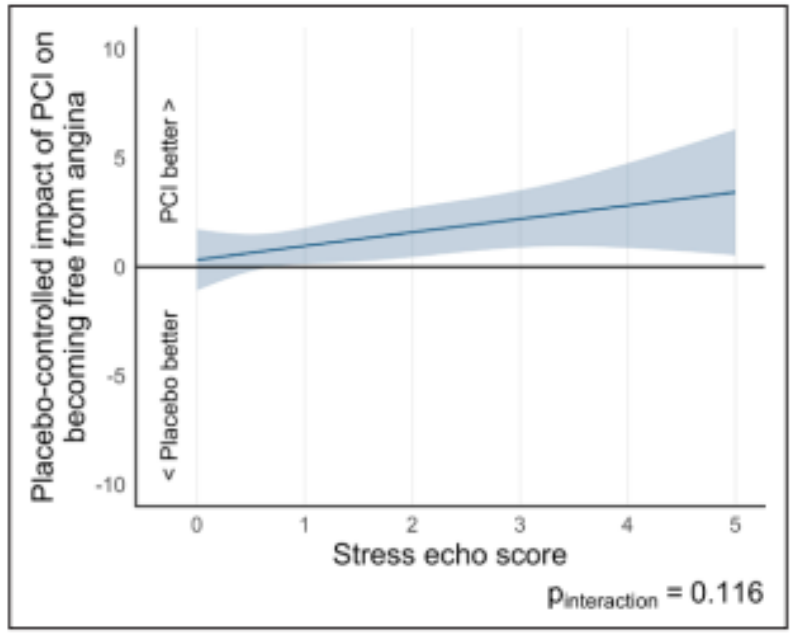


Figure 3. Relationship of treatment difference in freedom from angina and prerandomization stress echocardiography by randomization arm.
There is no discernible dependence on prerandomization stress echocardiography score. echo indicates echocardiography; and PCI, percutaneous coronary intervention.

Orbita

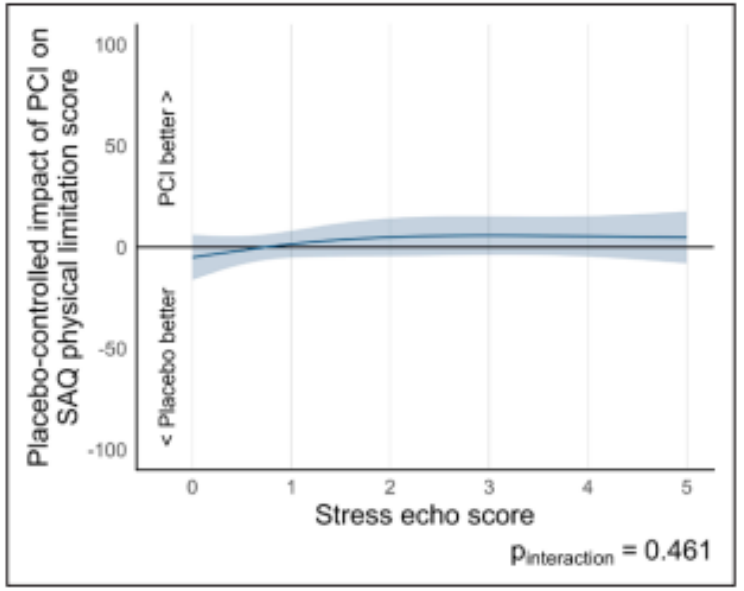


Figure 4. Relationship of treatment difference in Seattle Angina Questionnaire (SAQ) physical limitation score and prerandomization stress echocardiography by randomization arm.
There is no discernible dependence on prerandomization stress echocardiography score. echo indicates echocardiography; and PCI, percutaneous coronary intervention.

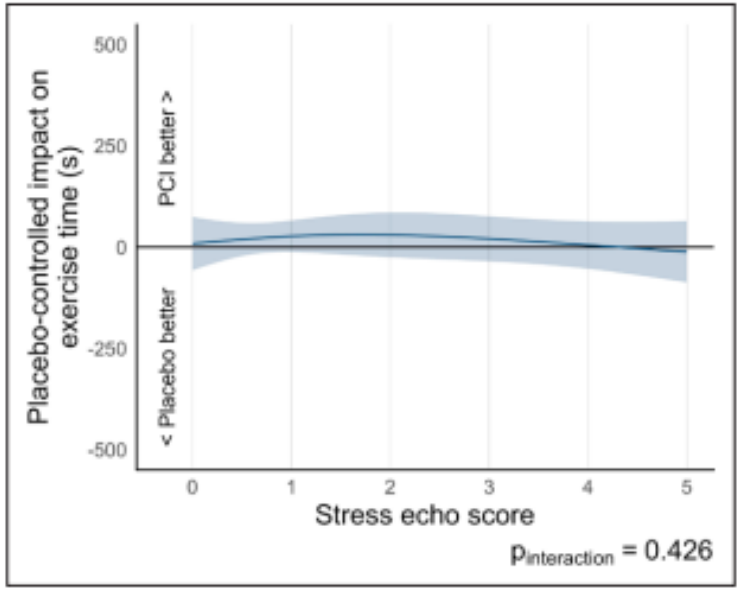
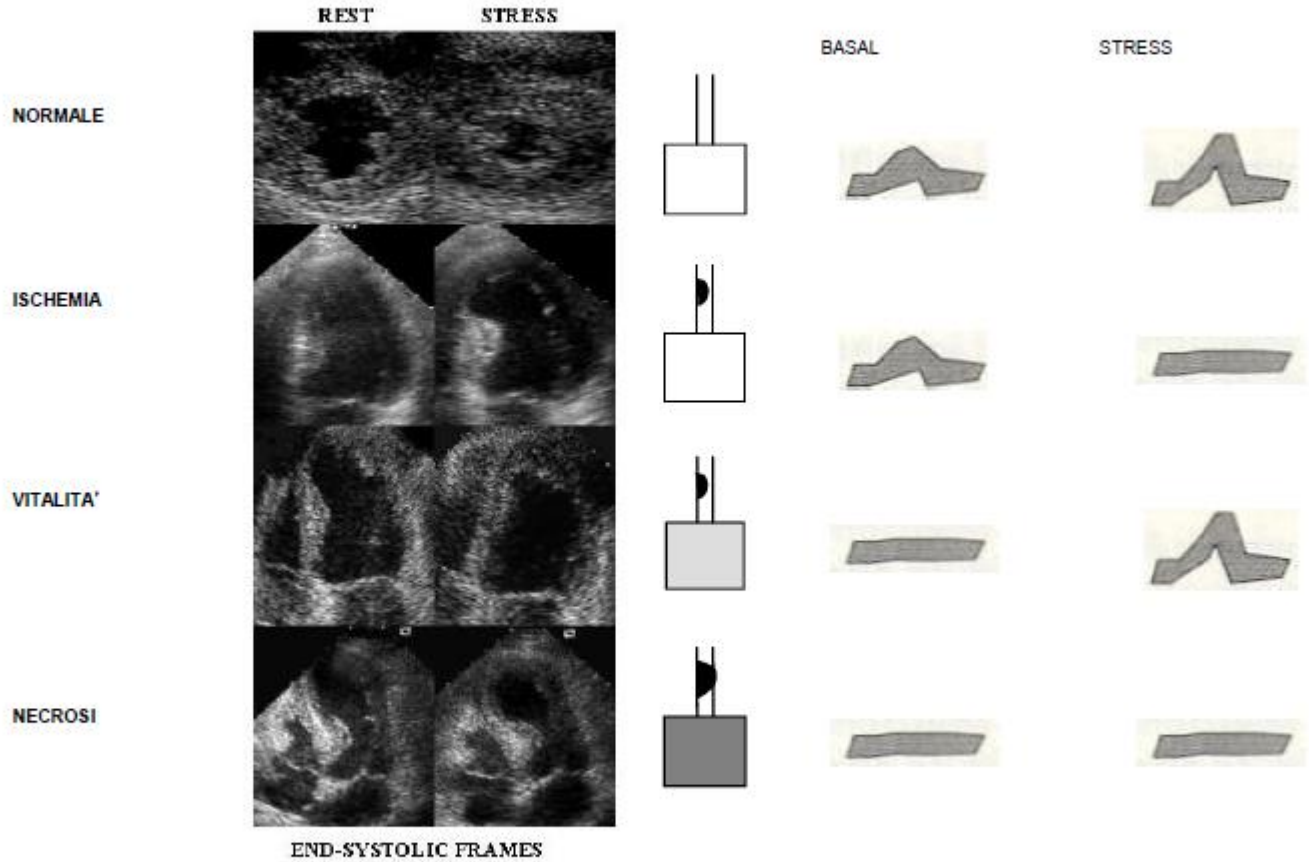


Figure 5. Relationship of treatment difference in exercise time and prerandomization stress echocardiography by randomization arm.
There is no discernible dependence on prerandomization stress echocardiography score. echo indicates echocardiography; and PCI, percutaneous coronary intervention.

LA DIAGNOSI


REST
STRESS
BASAL
STRESS
NORMALE
ISCHEMIA
VITALITA'
NECROSI
END-SYSTOLIC FRAMES

Evidenziare/escludere anomalie della cinetica

ESCURSIONE

. normale: normocinesia→1
. ridotta: ipocinesia→**2**
. assente: acinesia →**3**
. espansione sistolica: discinesia→**4**
. espansione fissa: aneurisma→**5**

SPESSORE

. diminuito spessore diastolico
. ridotto/assente ispessimento sistolico
. assottigliamento sistolico

ECOGENICITA'

. Aumentata

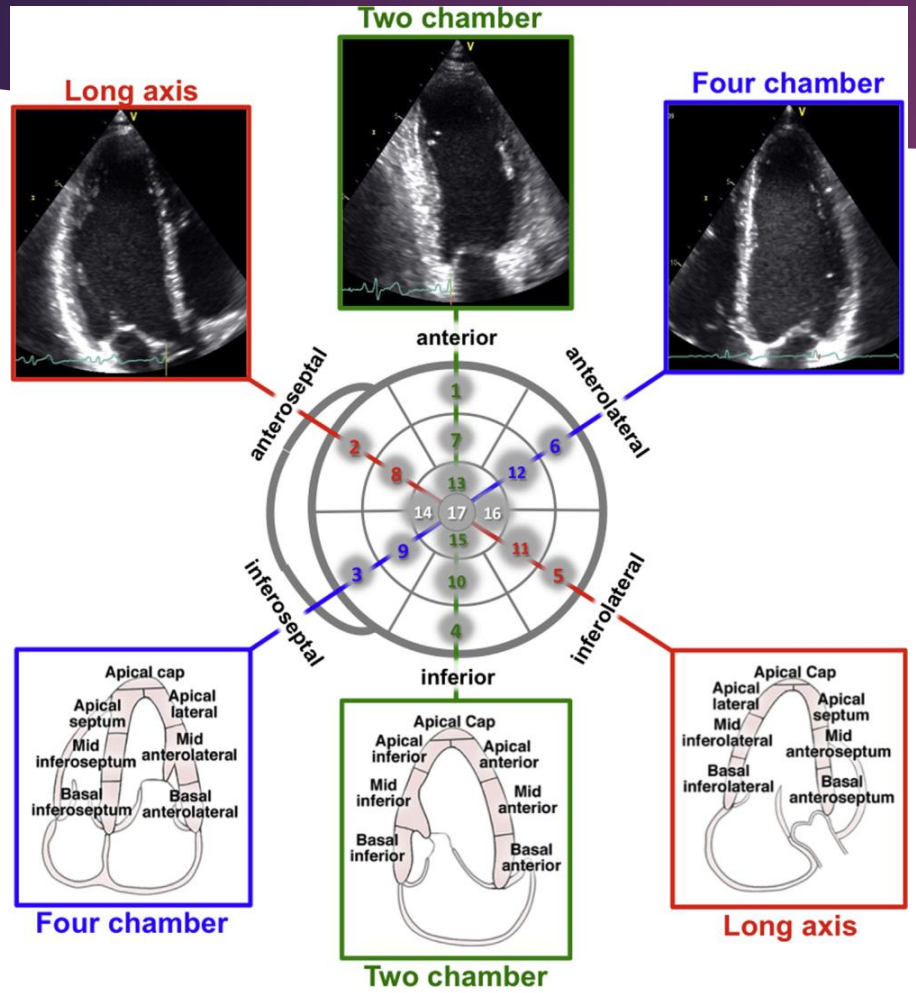
Ecostress con dobutamina

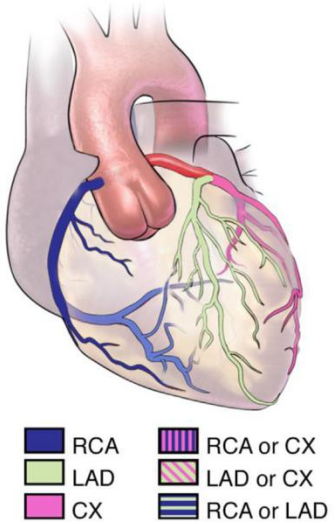
- Sicuro
- Senza radiazioni ionizzanti
- Disponibile
- Basso costo
- Risultato immediato
- Accuratezza paragonabile a ecostress fisico e tomoscintigrafia miocardica
- Operatore dipendente
- Limitato da finestra acustica subottimale

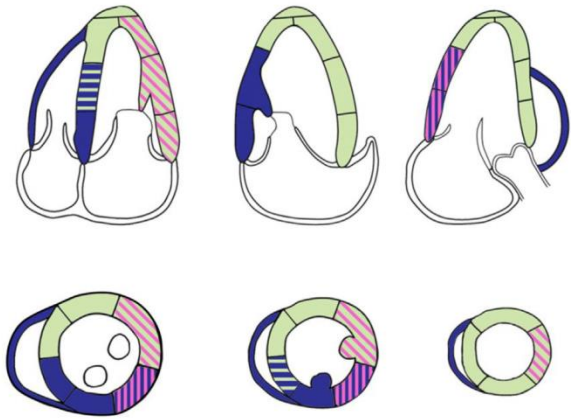
Dobutamina sconsigliata

- Severa Ipertensione non controllata
- Aneurismi cerebrali noti
- Importanti aneurismi addominali

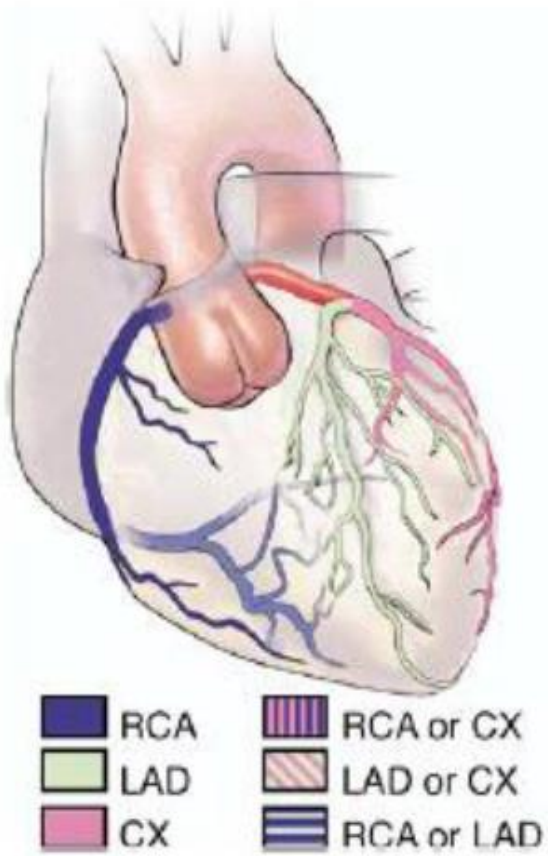
Segmenti e territori di distribuzione coronarica

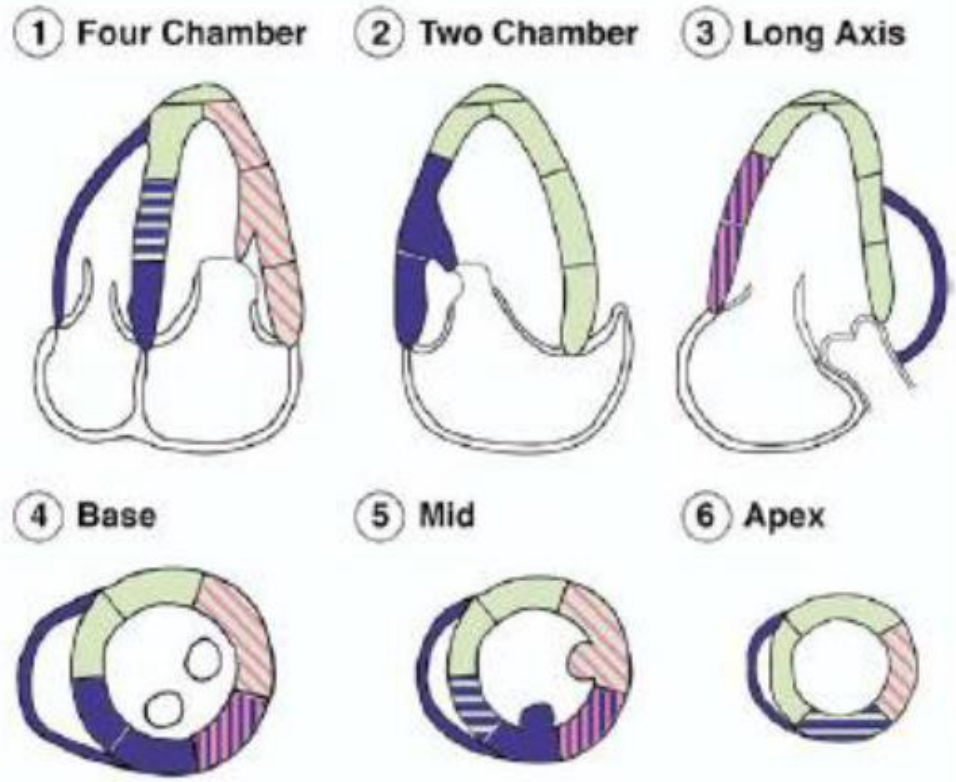




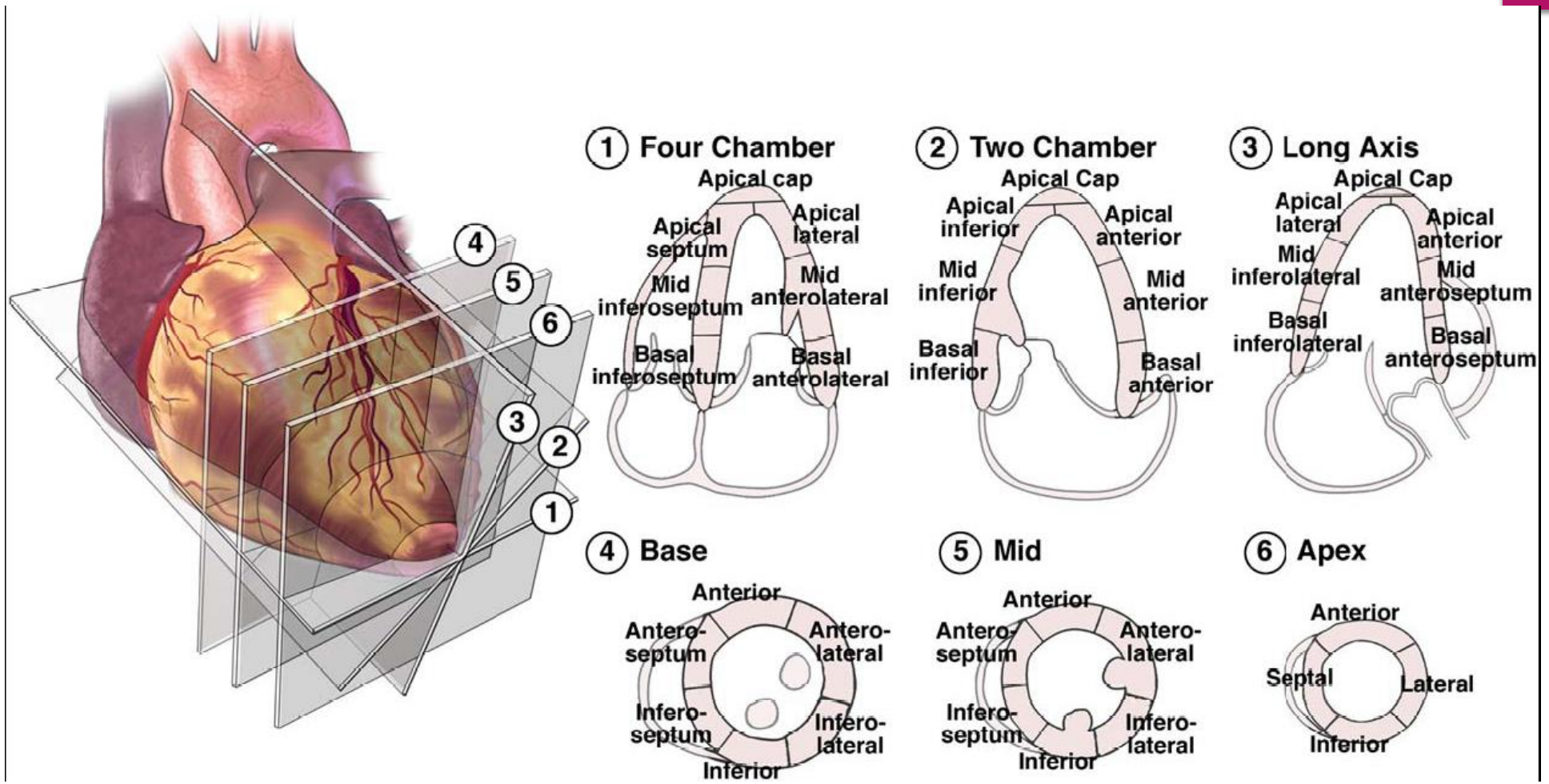


www.escardio.org ASE-EAE 2006: modello a 17 segmenti (16 utilizzati per lo studio della cinetica)

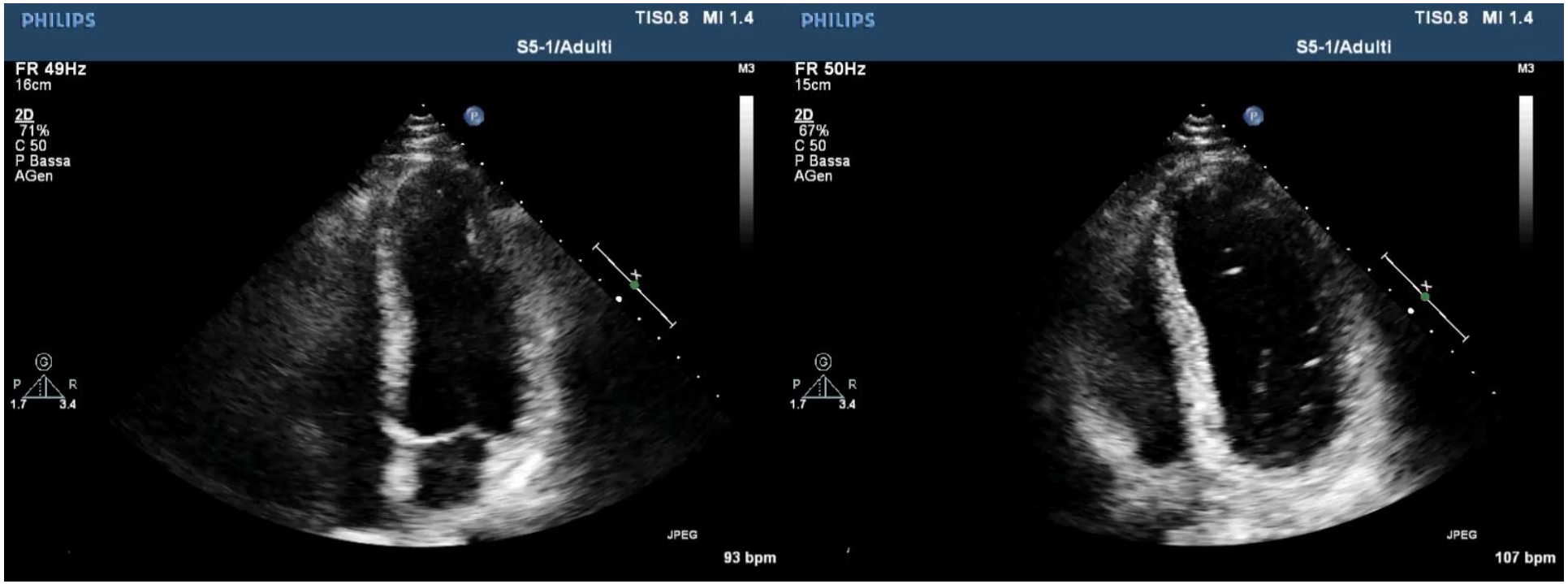




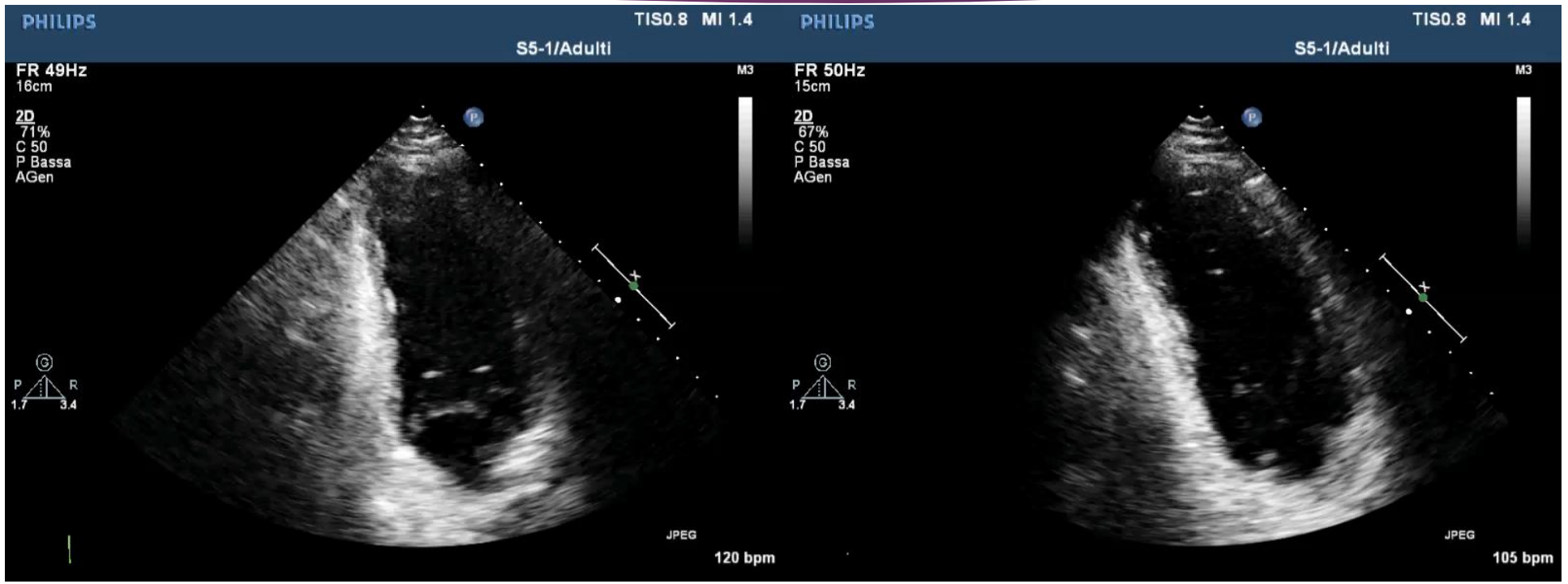
ANALISI DELLA CINESI SEGMENTARIA-17 SEGMENTI



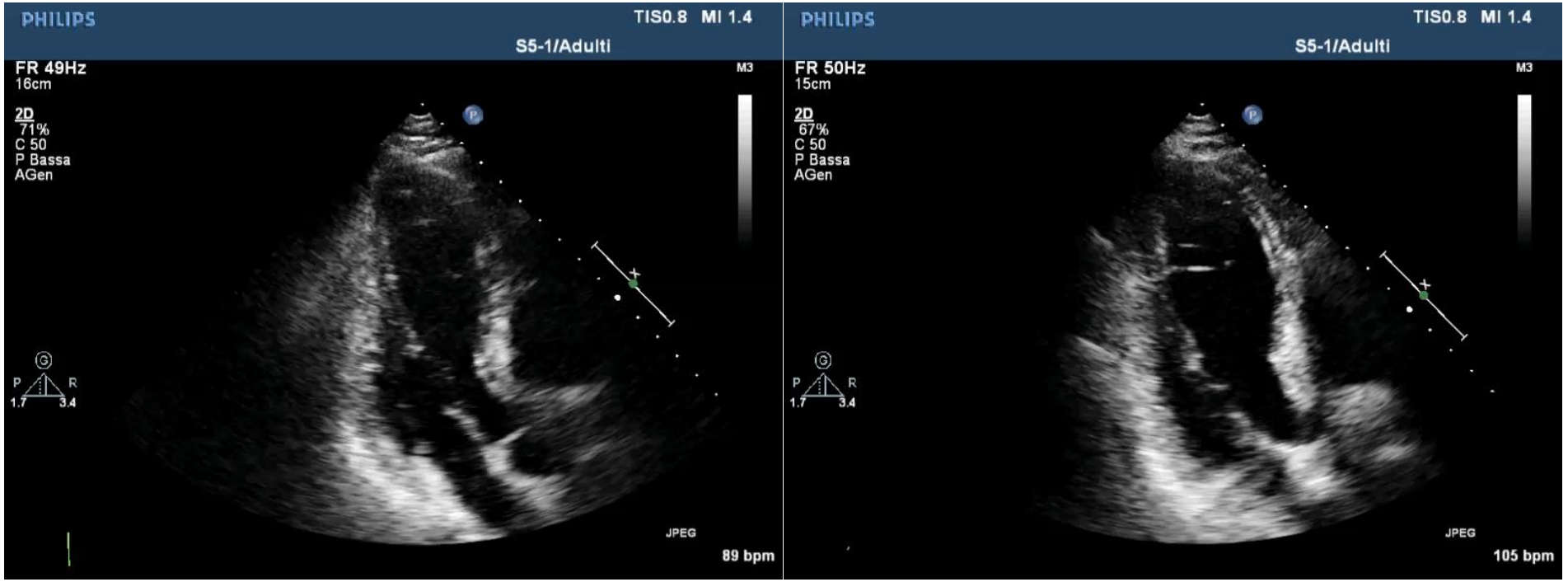
Ecostress


PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 49Hz
16cm
2D
71%
C 50
P Bassa
AGen
M3
P R
1.7 3.4
JPEG
93 bpm
PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 50Hz
15cm
2D
67%
C 50
P Bassa
AGen
M3
P R
1.7 3.4
JPEG
107 bpm

Ecostress


PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 49Hz
16cm
2D
71%
C 50
P Bassa
AGen
M3
P
R
1.7
3.4
JPEG
120 bpm
PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 50Hz
15cm
2D
67%
C 50
P Bassa
AGen
M3
P
R
1.7
3.4
JPEG
105 bpm

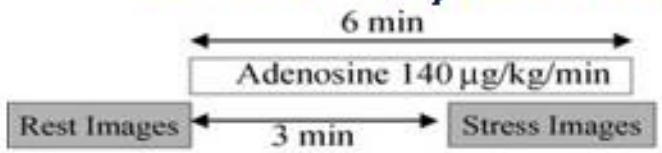
Ecostress


PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 49Hz
16cm
M3
2D
71%
C 50
P Bassa
AGen
P
R
1.7
3.4
JPEG
89 bpm
PHILIPS
TIS0.8 MI 1.4
S5-1/Adulti
FR 50Hz
15cm
M3
2D
67%
C 50
P Bassa
AGen
P
R
1.7
3.4
JPEG
105 bpm

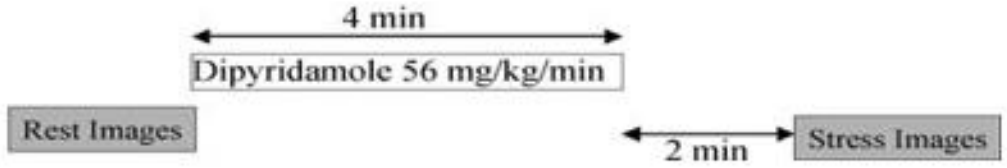
Ecostress in CAD

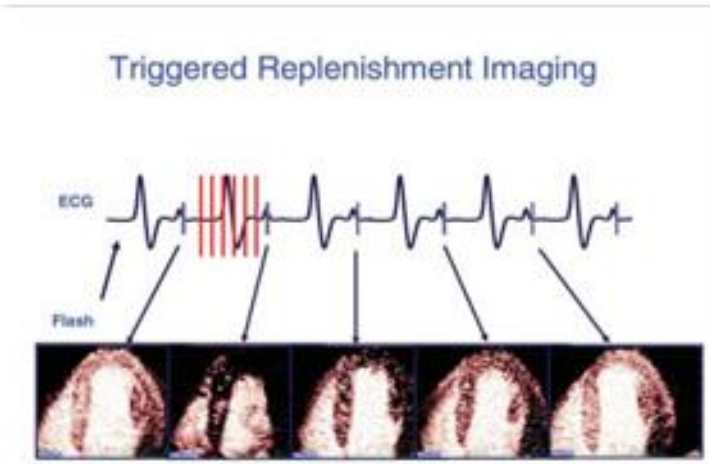
- Diagnosi di CAD
- Indicazione a PTCA
- Nel follow up
- Valutazione restenosi

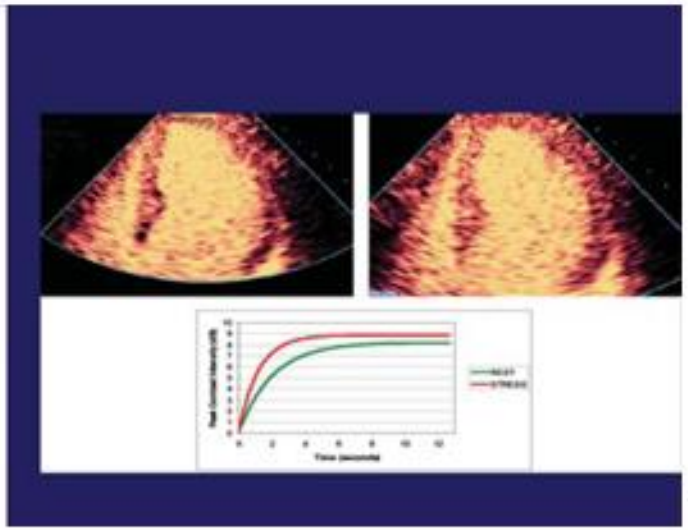
Stress myocardial contrast echocardiography



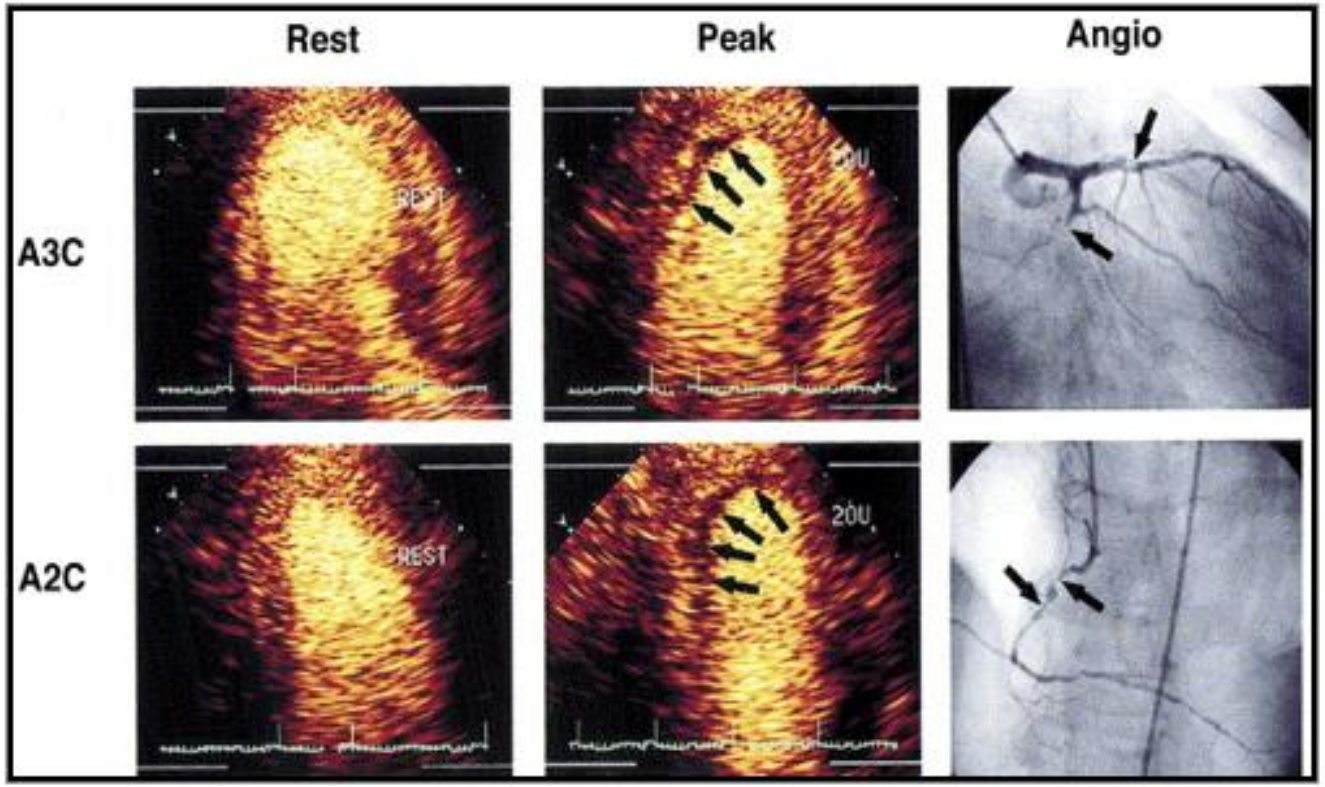
EAE recommantion for contrast echo,
Eur J Echo 2009







Reversible perfusion defect during dobutamine



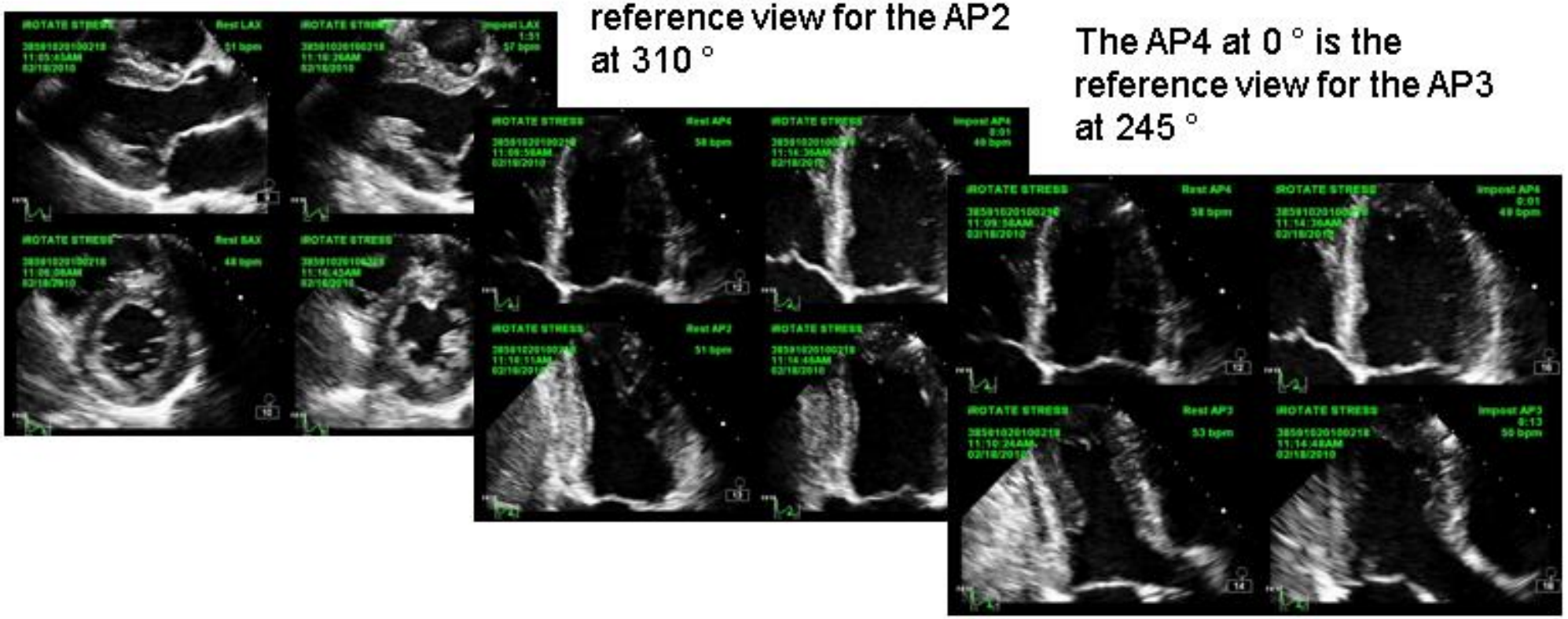
Dijkmans et al JACC 2006

iROTATE STRESS

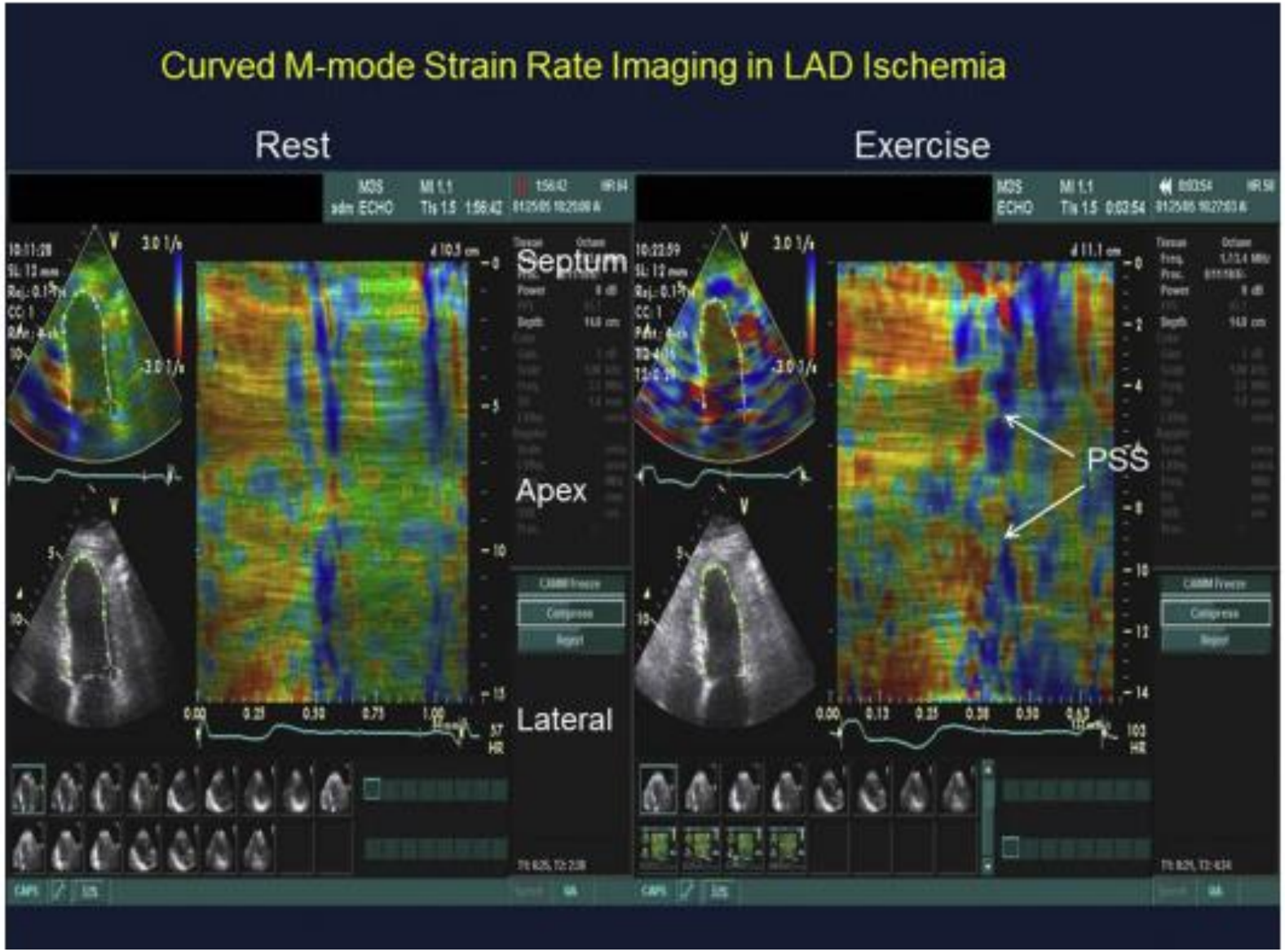
The LAX at 0 ° is the reference view for the SAX at 90 °

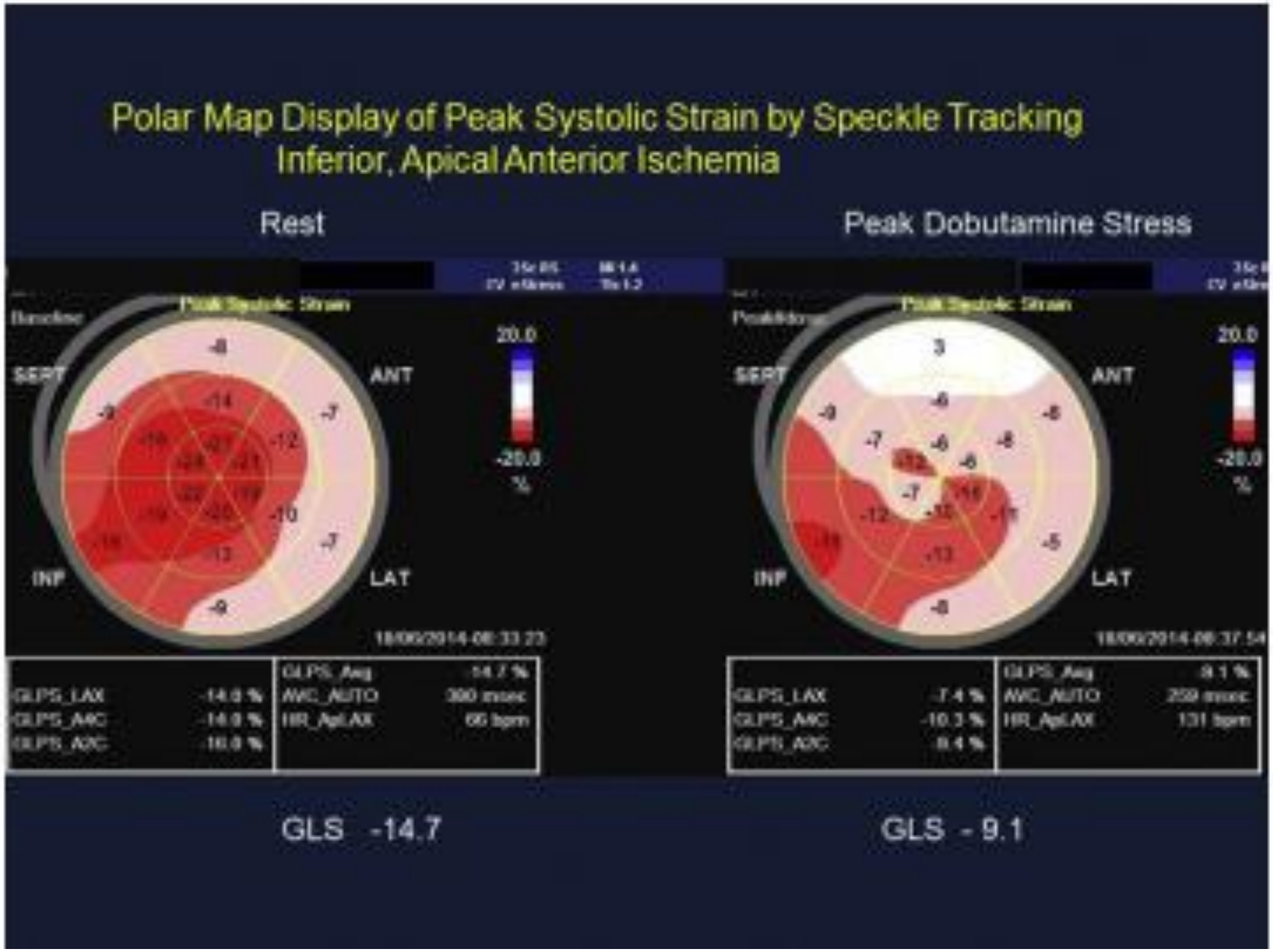
The AP4 at 0 ° is the reference view for the AP2 at 310 °

The AP4 at 0 ° is the reference view for the AP3 at 245 °



Curved M-mode Strain Rate Imaging in LAD Ischemia




Polar Map Display of Peak Systolic Strain by Speckle Tracking
Inferior, Apical Anterior Ischemia
Rest
Peak Dobutamine Stress
SEPT
ANT
INP
LAT
20.0
-20.0
GLS -14.7
GLS - 9.1


The End