



CAD progression and/or CAD regression: anche nell'atleta?

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The Lancet Commissions



The *Lancet* Commission on rethinking coronary artery disease: moving from ischaemia to atheroma

Sarah Zaman, Jason H Wasfy, Vikas Kapil, Boback Ziaieian, William A Parsonage, Sira Sriswasdi, Timothy J A Chico, Davide Capodanno, Róisín Colleran, Nadia R Sutton, Lei Song, Nicole Karam, Reecha Sofat, Chiara Fraccaro, Daniel Chamié, Mirvat Alasnag, Takayuki Warisawa, Nieves Gonzalo, Walid Jomaa, Shamir R Mehta, Elizabeth E S Cook, Johan Sundström, Stephen J Nicholls, Leslee J Shaw, Manesh R Patel, Rasha K Al-Lamee

www.thelancet.com Vol 405 April 12, 2025



STATE-OF-THE-ART REVIEW

Vulnerable or High-Risk Plaque

A JACC: Cardiovascular Imaging Position Statement



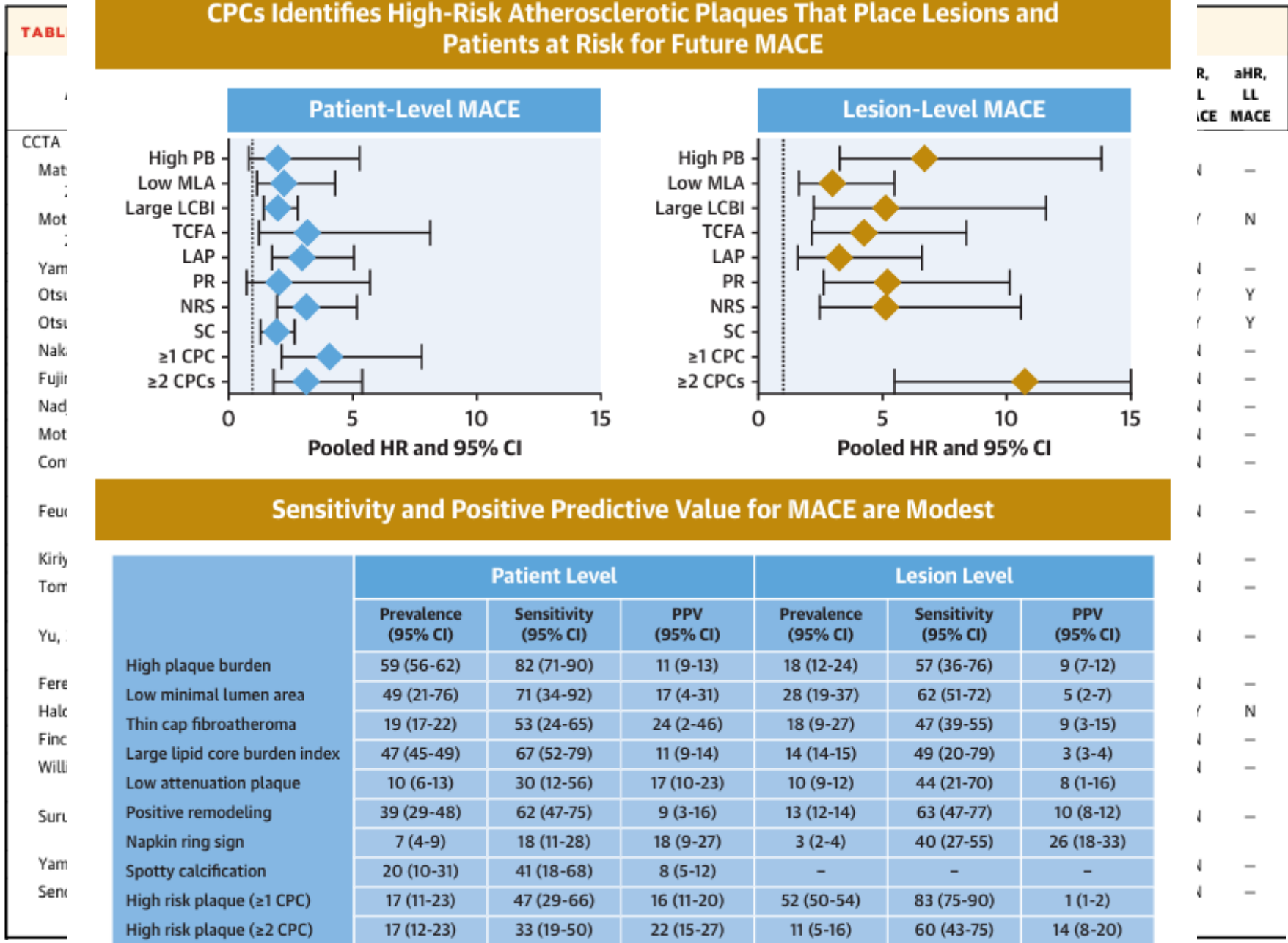
Rocco Vergallo, MD, PhD,^{a,b} Seung-Jung Park, MD, PhD,^c Gregg W. Stone, MD,^d David Erlinge, MD, PhD,^e
 Italo Porto, MD, PhD,^{a,b} Ron Waksman, MD,^f Gary S. Mintz, MD,^g Fabrizio D'Ascenzo, MD, PhD,^h Sara Seitun, MD,^a
 Luca Saba, MD,ⁱ Rozemarijn Vliegenthart, MD, PhD,^j Fernando Alfonso, MD,^k Armin Arbab-Zadeh, MD, PhD, MPH,^l
 Peter Libby, MD,^m Marcelo F. Di Carli, MD,^m James E. Muller, MD,^m Gerald Maurer, MD,ⁿ Robert J. Gropler, MD,^o
 Y.S. Chandrashekar, MD,^p Eugene Braunwald, MD,^m Valentin Fuster, MD, PhD,^d Ik-Kyung Jang, MD, PhD^q

CTA has emerged as the diagnostic modality with the greatest potential to non-invasively identify high-risk plaques, potentially enabling screening

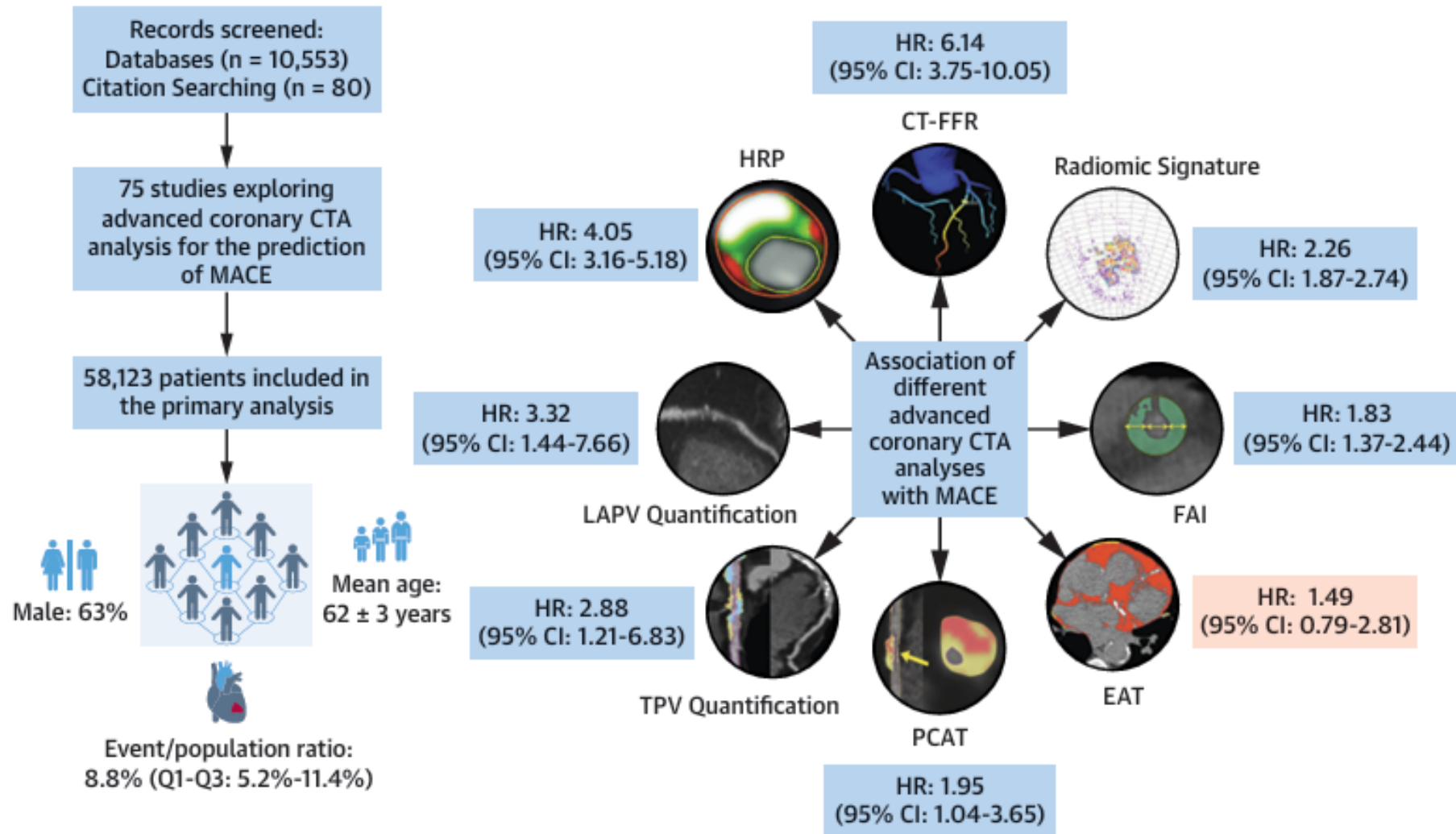
Therapies leading to coronary atherosclerosis plaque regression: a scientific statement of the European Association of Preventive Cardiology, the European Association of Cardiovascular Imaging of the ESC, the ESC Working Group on Atherosclerosis and Vascular Biology, and the ESC Working Group on Cardiovascular Pharmacotherapy Part 1: Atherosclerosis Pathophysiology and Imaging Evaluation

Edoardo Conte^{1*}, Francesco Perone², Bernard Cosyns^{3,4}, Marc R. Dweck⁵,
 Erwan Donal⁶, Isabel Goncalves⁷, Borja Ibanez⁸, Juan Carlos Kaski⁹,
 Pal Maurovich-Horvat¹⁰, Yoshinobu Onuma¹¹, Elena Ostro^{12,13},
 Marcio Sommer Bittencourt¹⁴, Patrick Washington Serruys¹⁵, and Daniele Andreini¹⁶

Invasive methods are characterized by higher spatial resolution and reproducibility while cardiac CT appears as the most promising non-invasive tool for atherosclerosis serial imaging



CENTRAL ILLUSTRATION Associations of Different Advanced Coronary CTA-Based Analyses With MACE



Bianchini E, et al. JACC Cardiovasc Imaging. 2025;18(11):1220-1231.

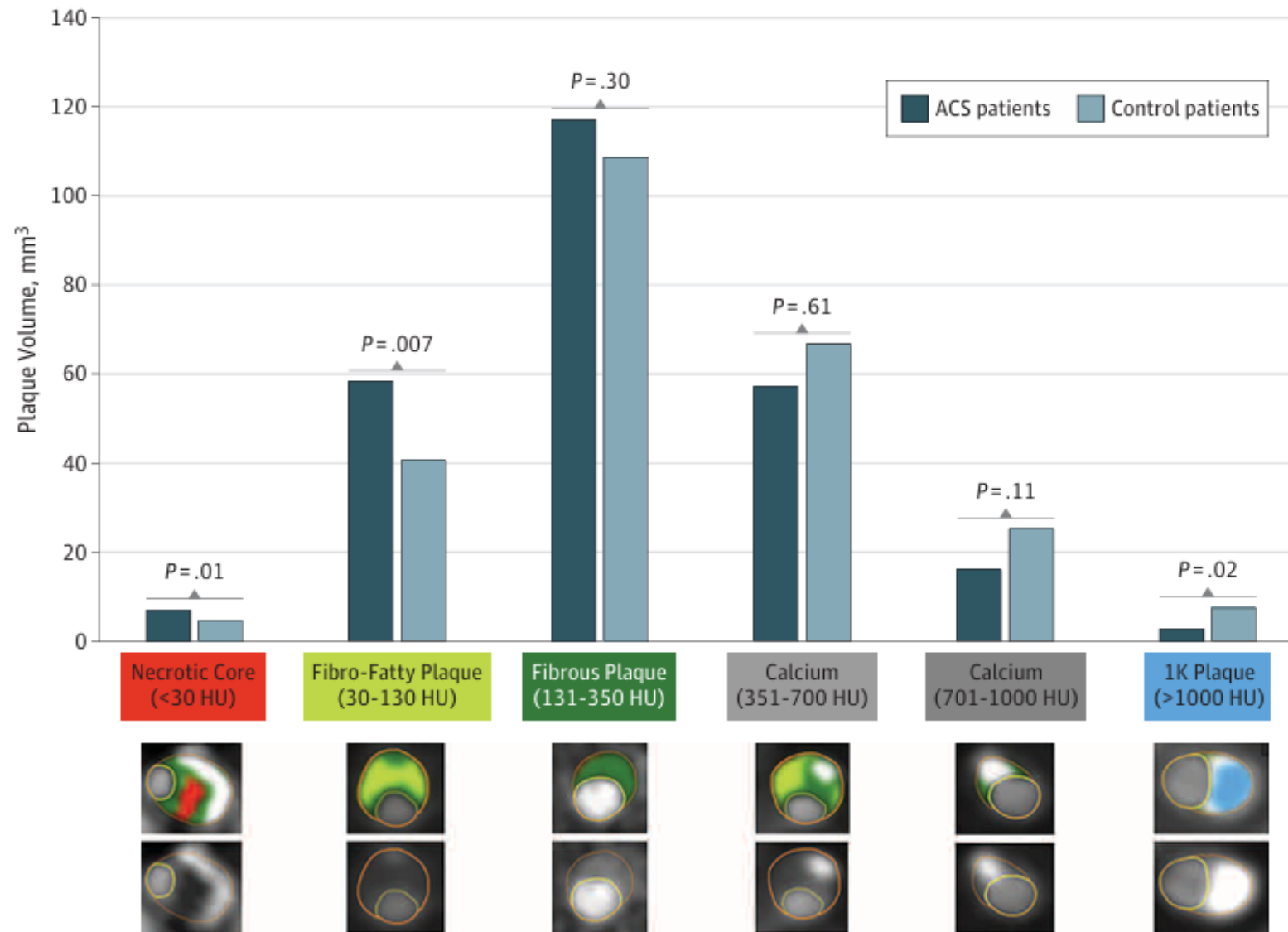
JAMA Cardiol

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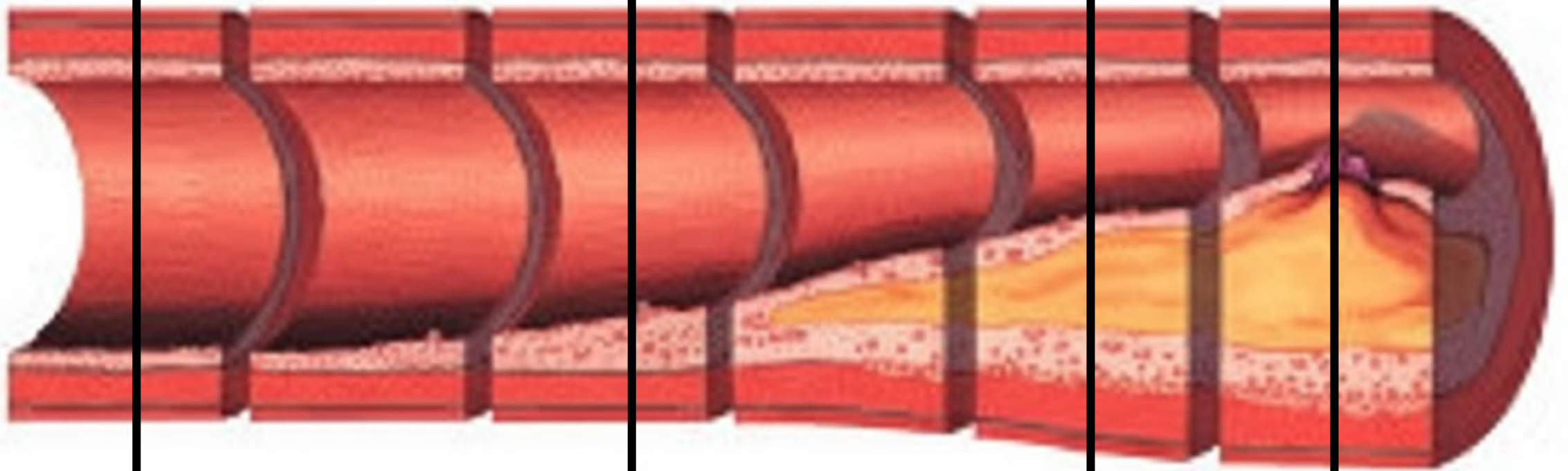
With Risk

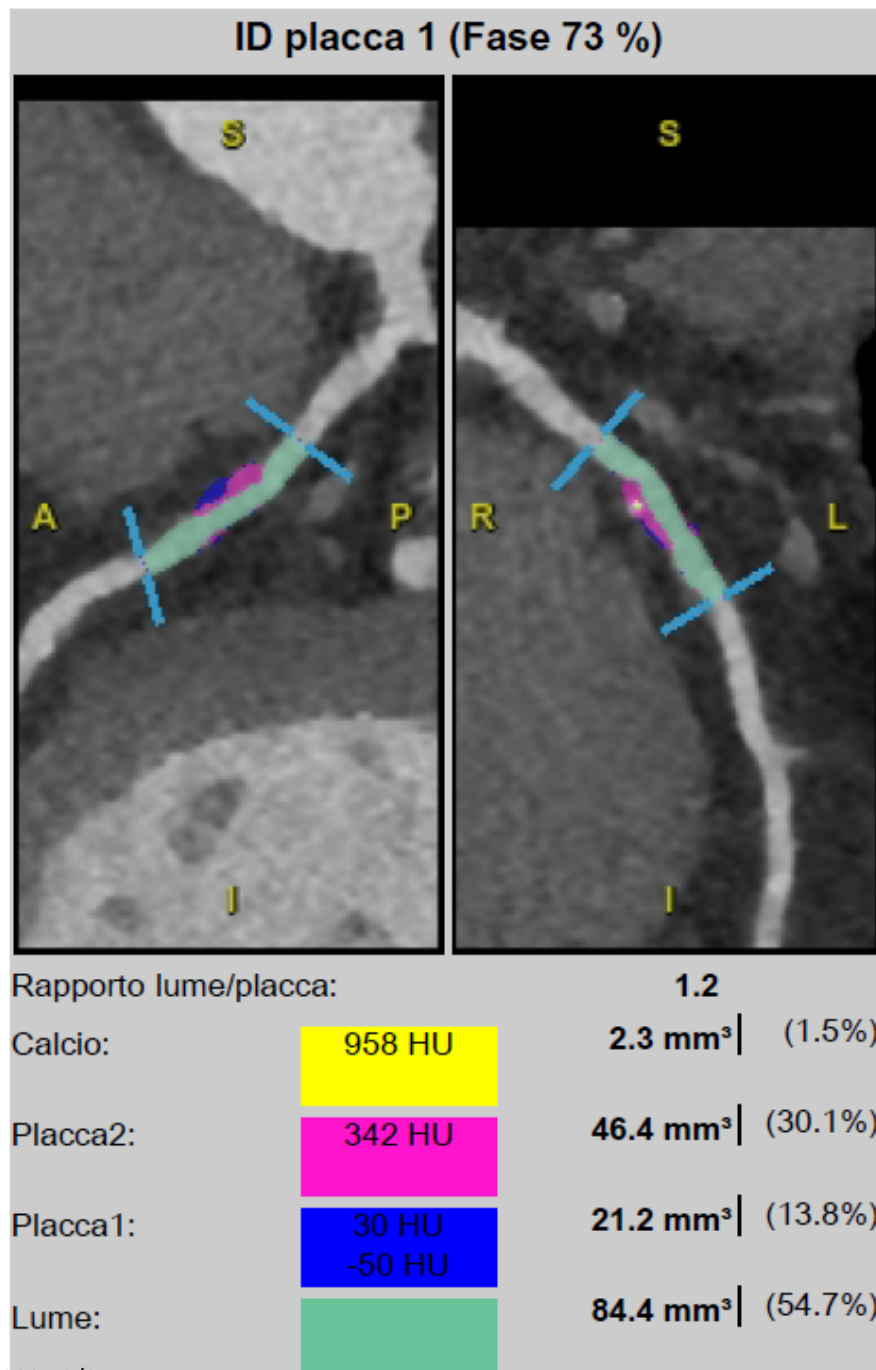
Alexander R. van R
Omar Al Hussein Al
Filippo Cademartiri
Gudrun Feuchtner,
Pedro de Araújo Go
Harald G. Weirich, M
Ran Heo, MD; Ji Hy
Hyung-Bok Park, M
Hyuk-Jae Chang, M

Figure 1. Whole-Heart Plaque Volume by Composition for Patients With Acute Coronary Syndrome (ACS) and Control Individuals



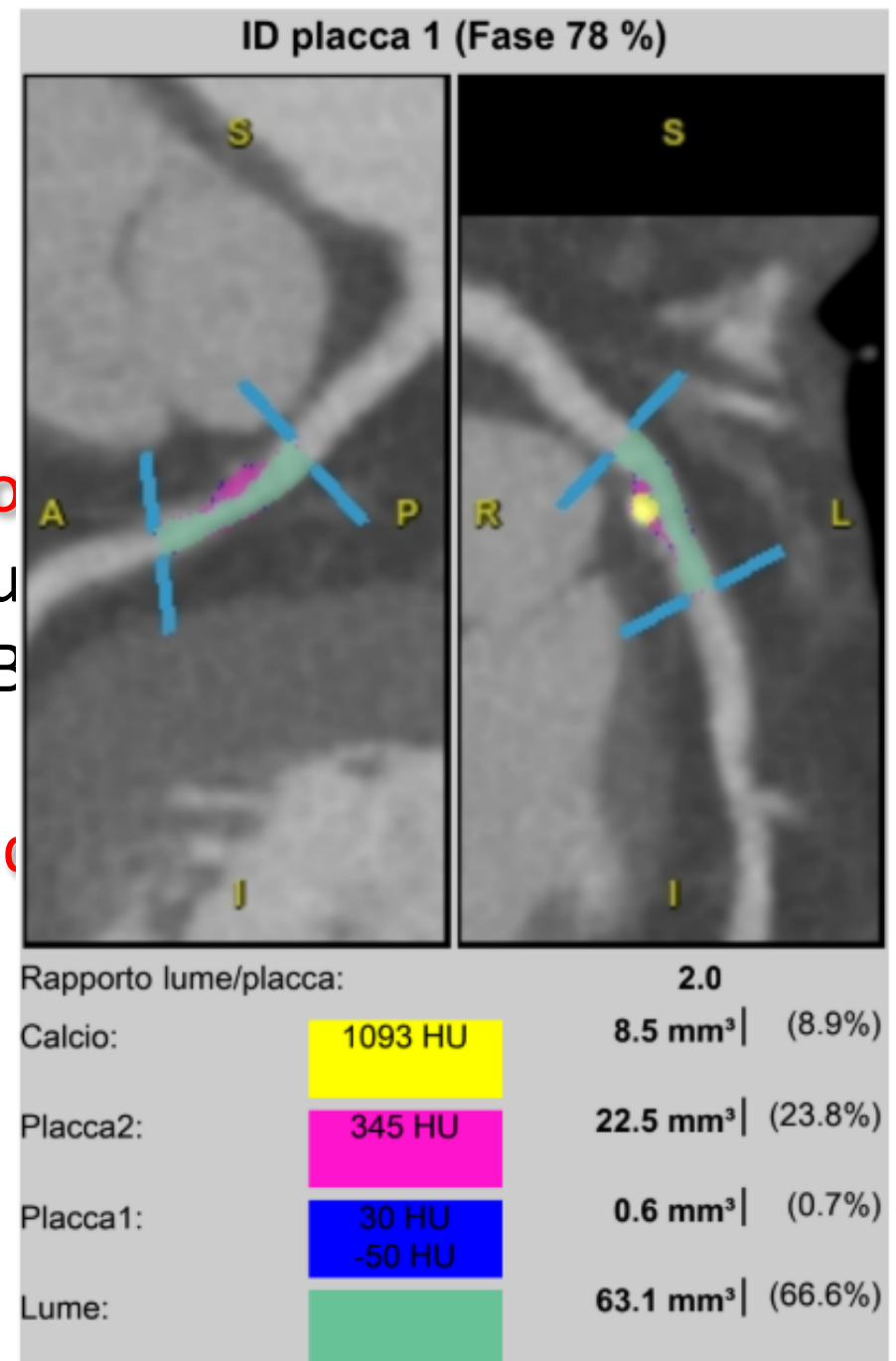
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ques, MD, PhD;
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lan, MD;
; PhD;
man, MD;





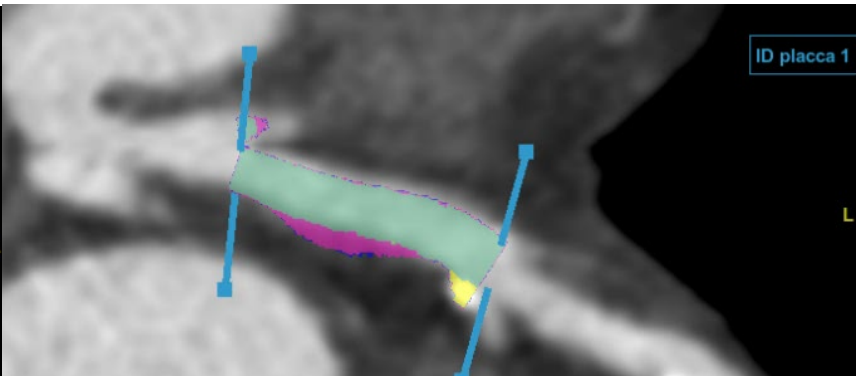
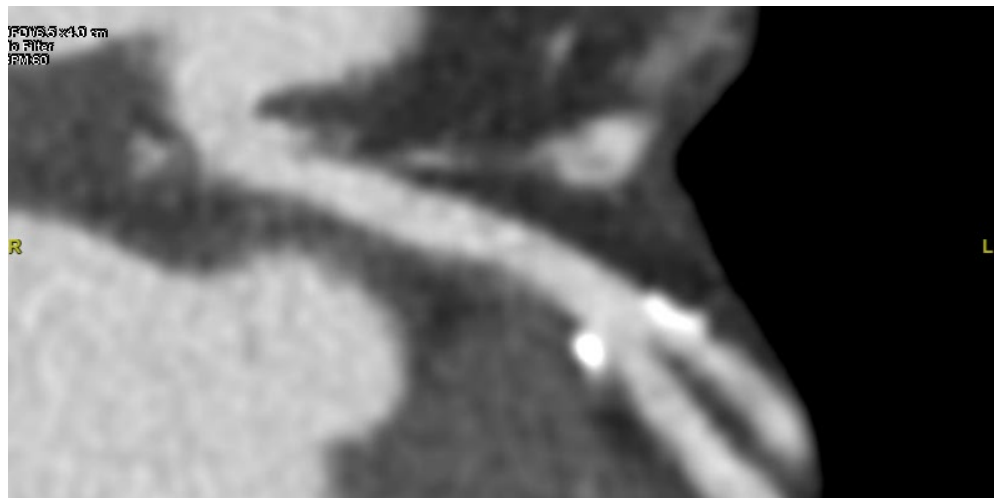
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- **LDL c**



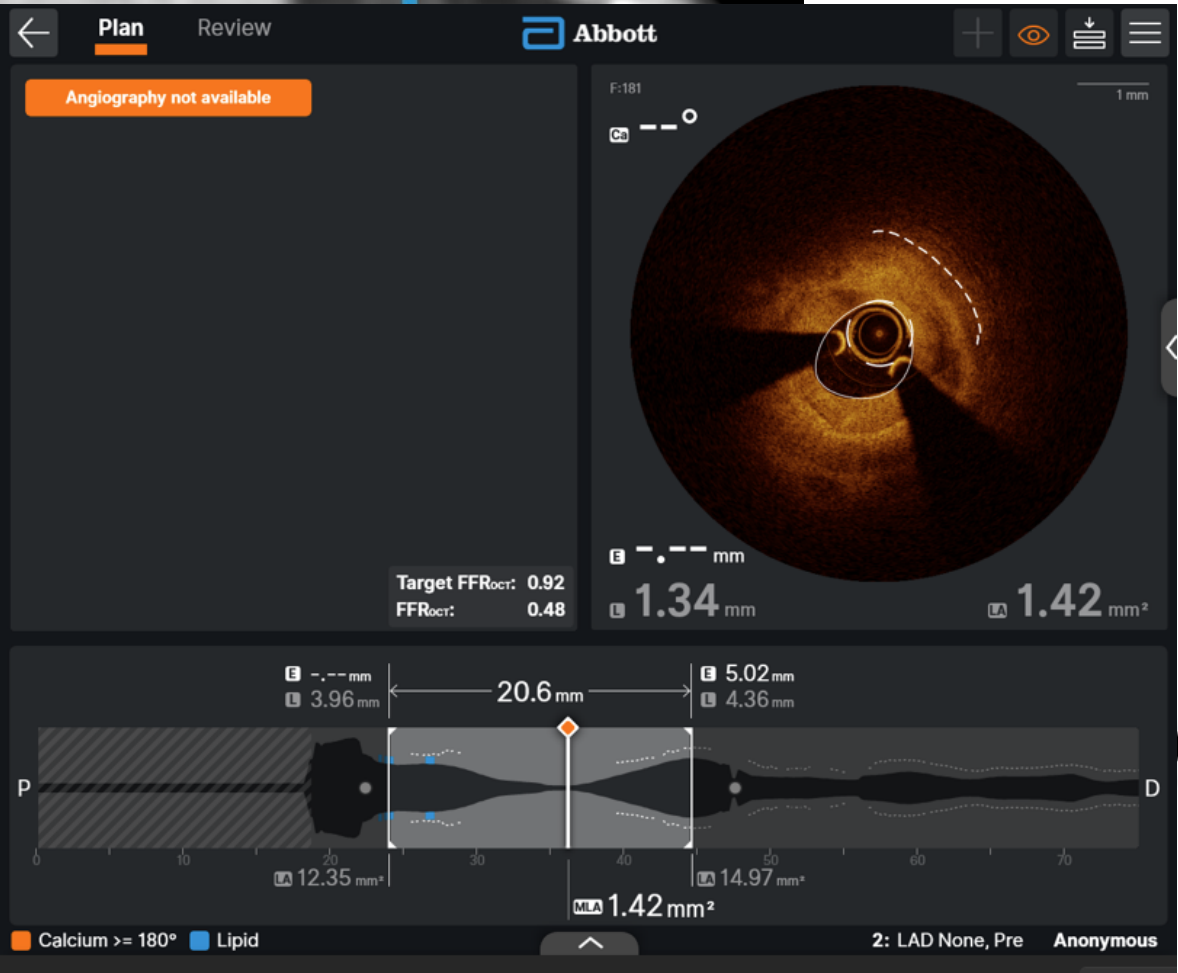
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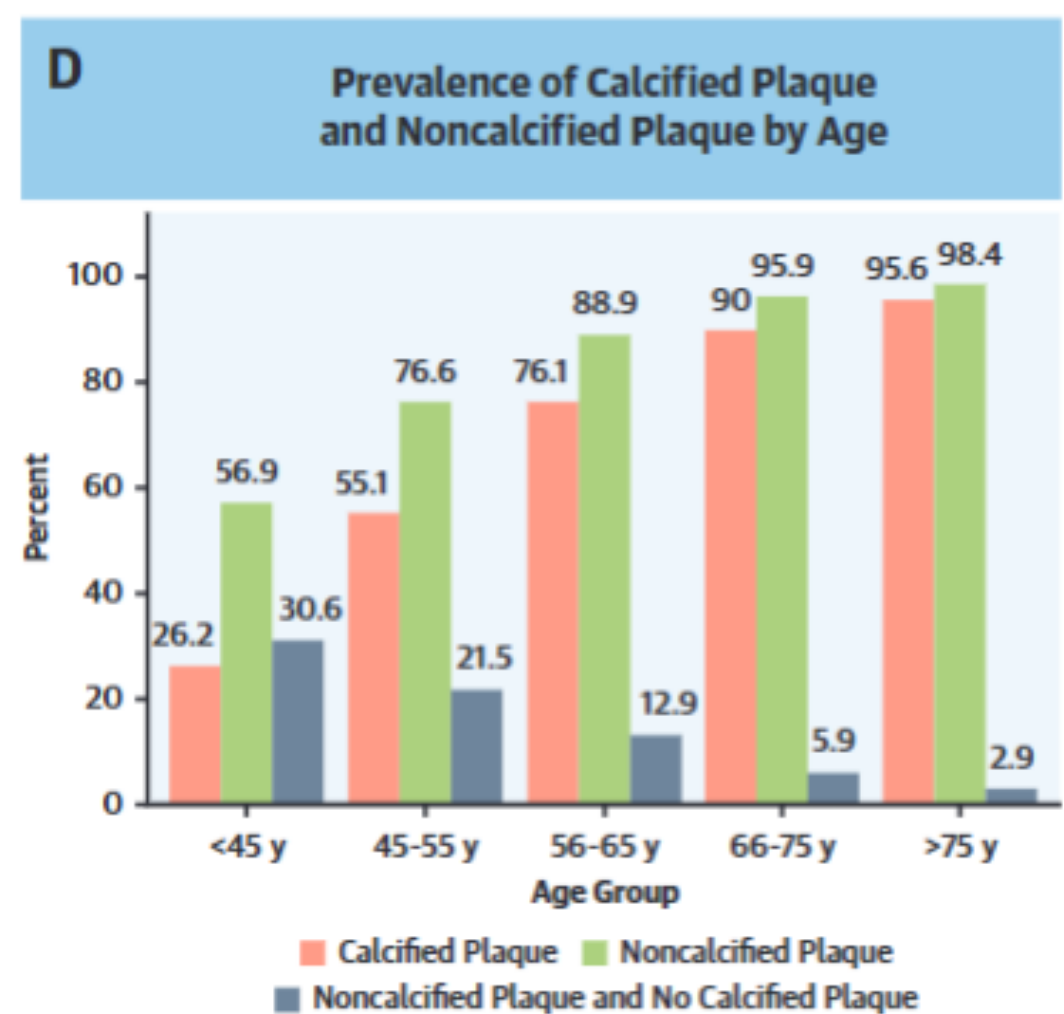
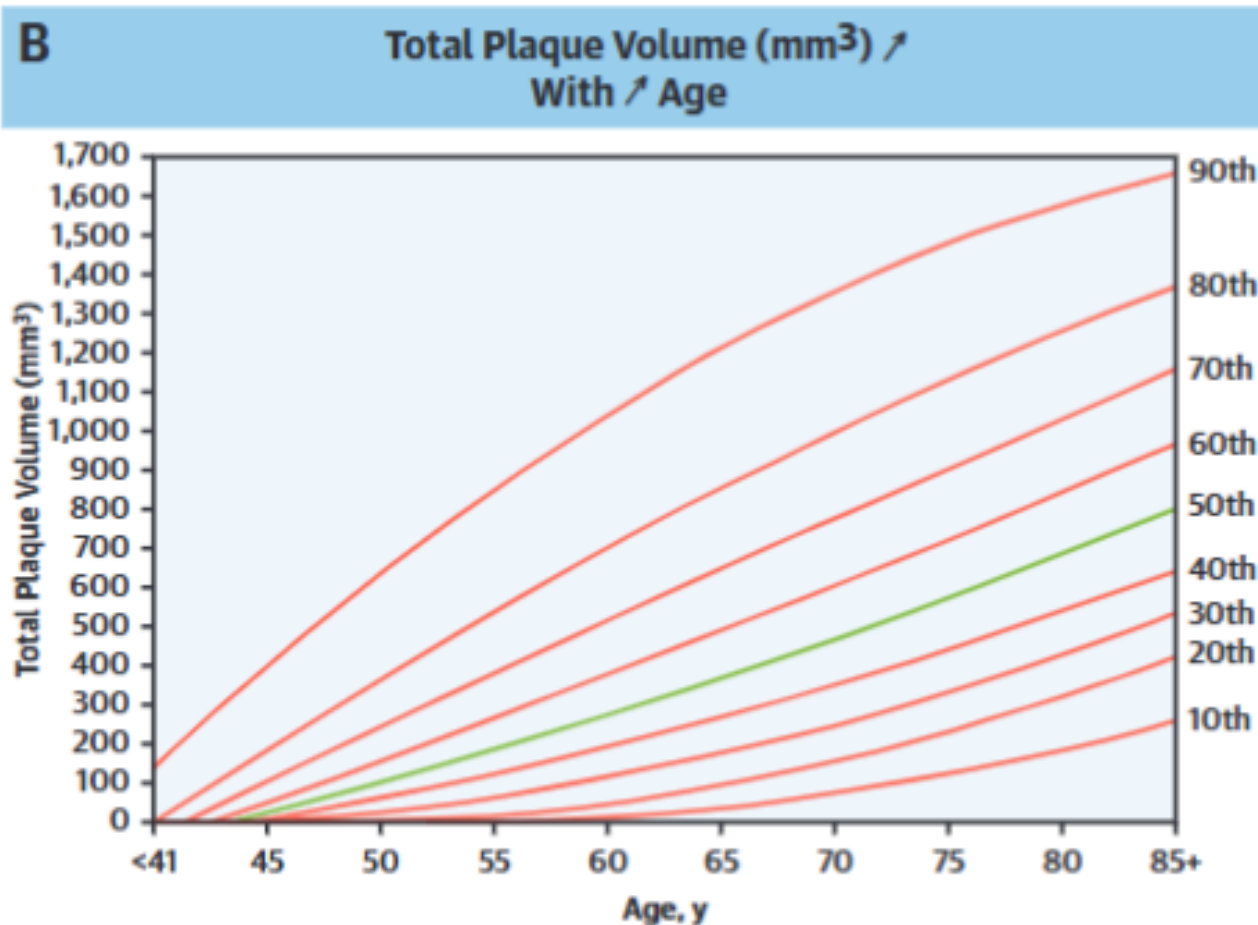
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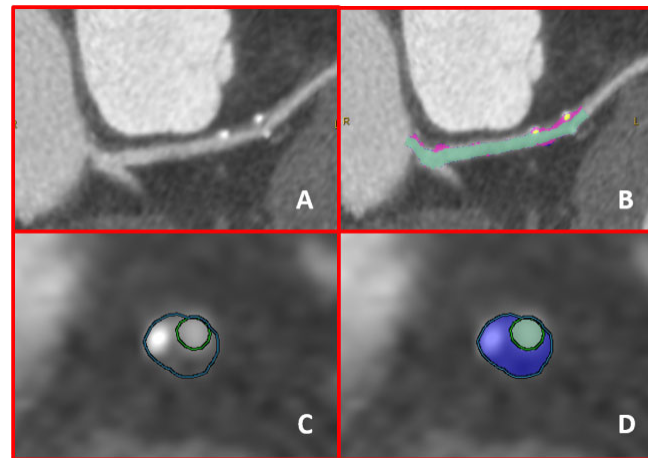
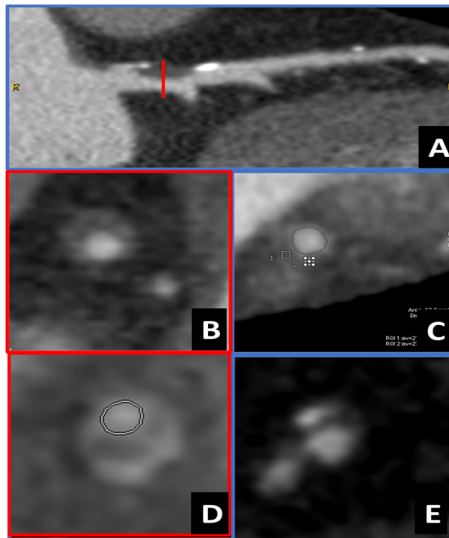
ORIGINAL RESEARCH



Age- and sex-related features of atherosclerosis from coronary computed tomography angiography in patients prior to acute coronary syndrome: results from the ICONIC study

Edoardo Conte¹, Aeshita Dwivedi², Saima Mushtaq¹, Gianluca Pontone¹, Fay Y. Lin², Emma J. Hollenberg², Sang-Eun Lee^{3,4}, Jeroen Bax⁵, Filippo Cademartiri⁶,

Within the ICONIC study, in which 234 patients with subsequent acute coronary syndrome (ACS) were propensity matched 1:1 with 234 non-event controls, our current sub-analysis included only the ACS cases.



The study population of patients with ACS after CCTA was then divided into different subgroups according to:

- sex (male vs female)
- age (>65 y/o defined as older)

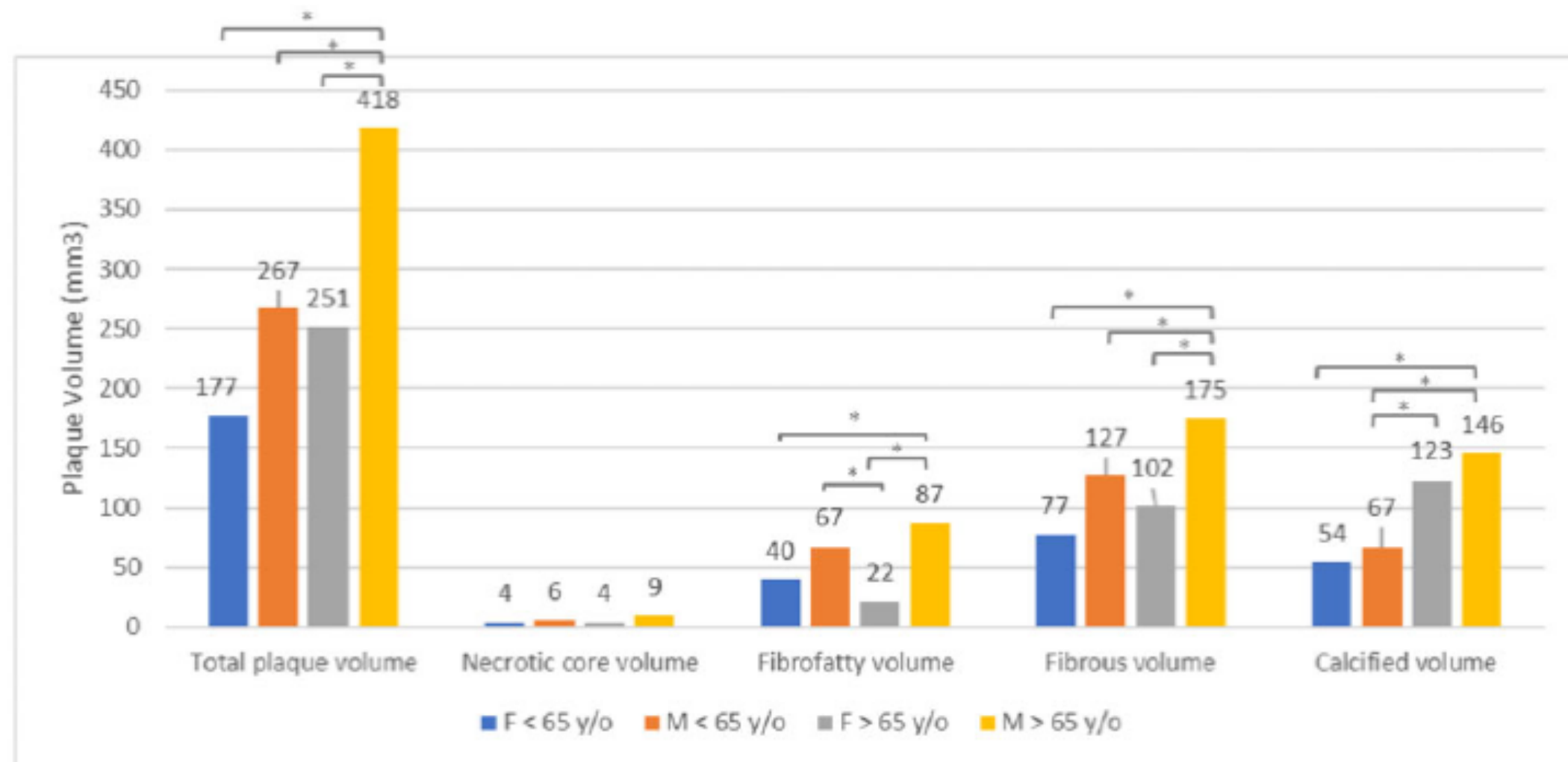
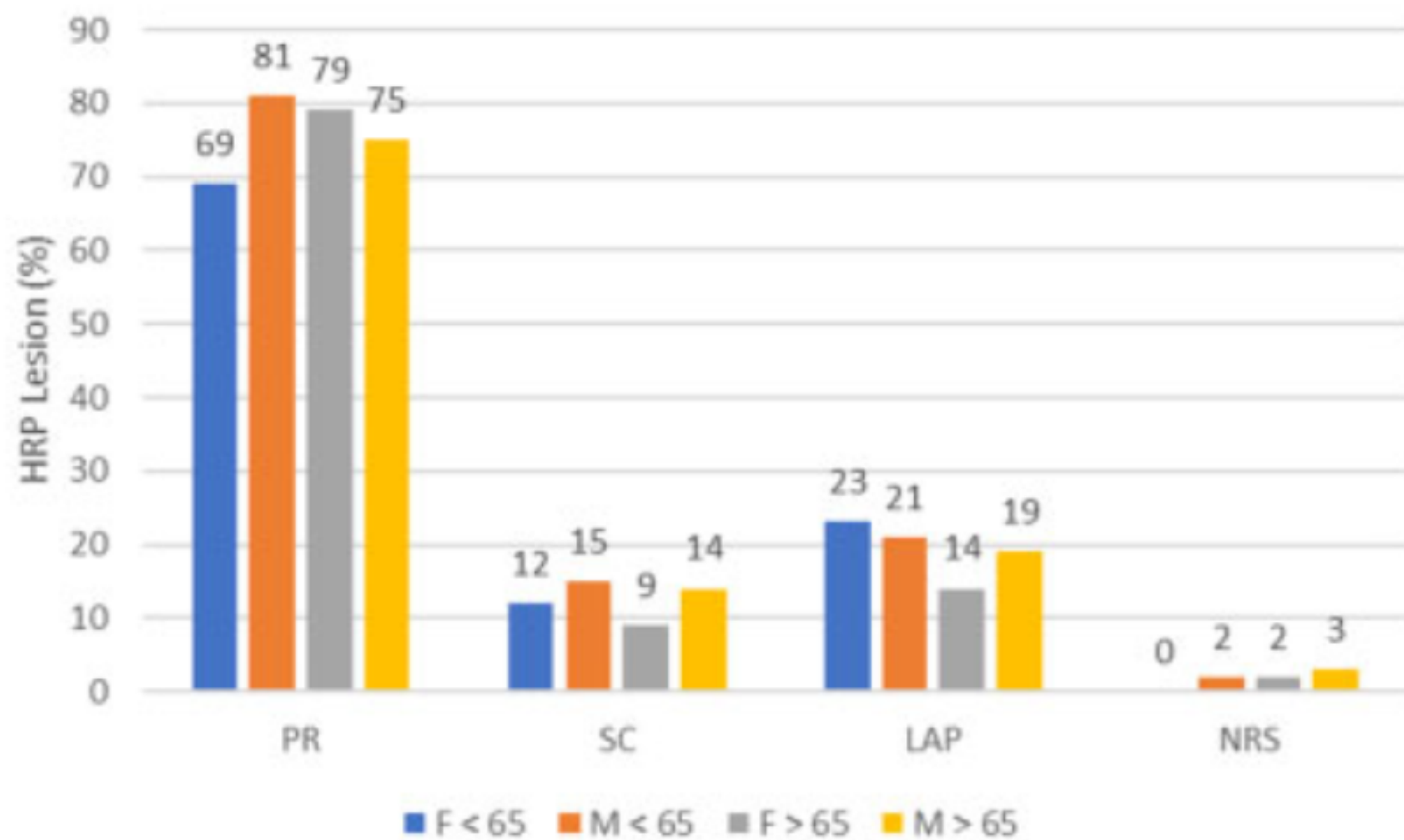


Figure 1 Total plaque volume and plaque subtypes volume quantification according to age and sex. All differences evidenced with 'a' have $P < 0.005$ as outlined in Table 5. F, female; M, male.





Therapies leading to coronary atherosclerosis plaque regression: a scientific statement of the European Association of Preventive Cardiology, the European Association of Cardiovascular Imaging of the ESC, the ESC Working Group on Atherosclerosis and Vascular Biology, and the ESC Working Group on Cardiovascular Pharmacotherapy

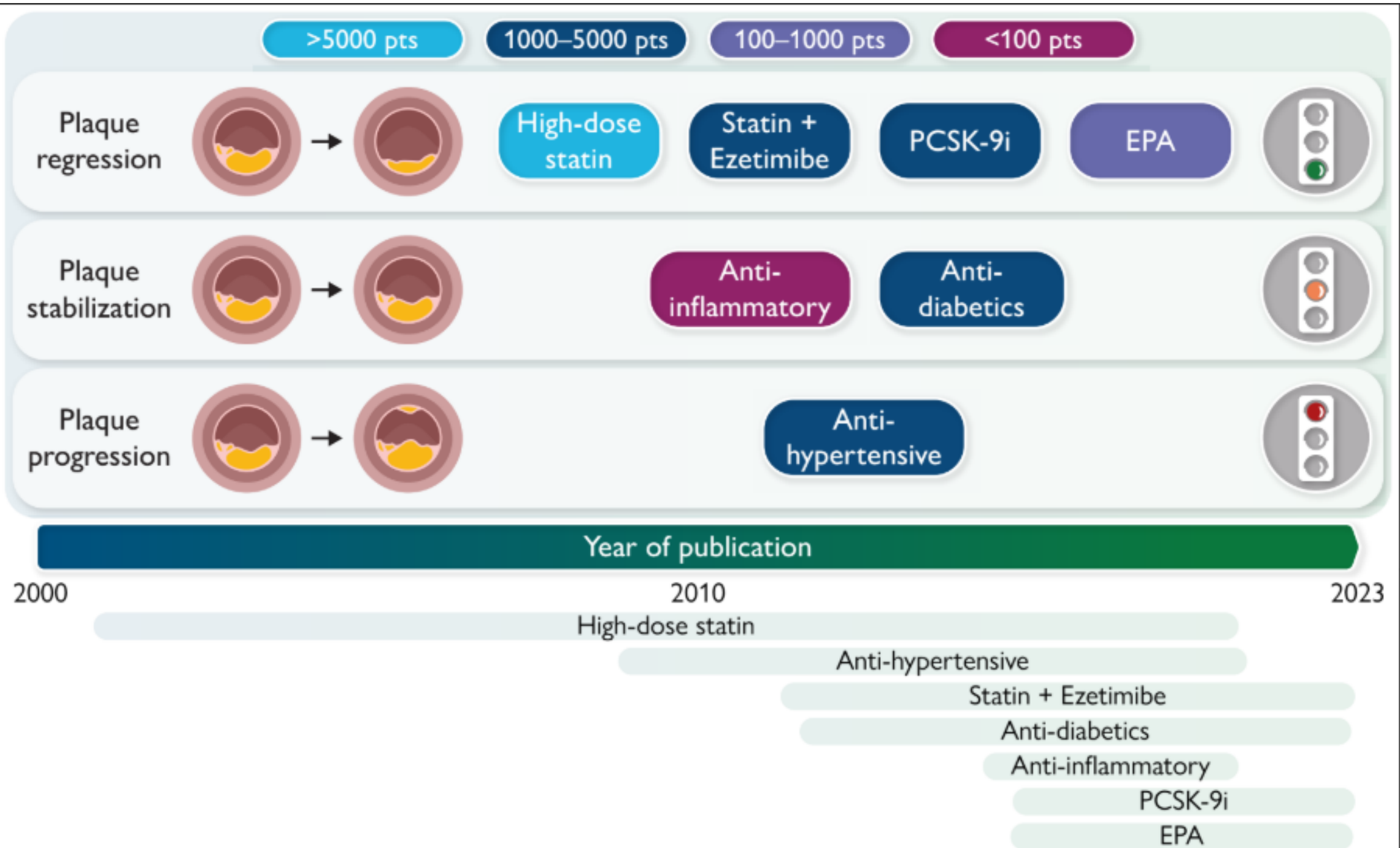
Part 2—drugs' specific effect on atherosclerosis

AQ2

Edoardo Conte ^{1*}, Francesco Perone ², Bernard Cosyns^{3,4}, Marc R. Dweck⁵, Erwan Donal ⁶, Isabel Goncalves ⁷, Borja Ibanez ⁸, Juan Carlos Kaski⁹, Pal Maurovich-Horvat¹⁰, Yoshinobu Onuma^{11,12}, Elena Osto ^{13,14}, Marcio Sommer Bittencourt¹⁵, Patrick Washington Serruys¹⁶, and

AQ3

Daniele Andreini¹⁷



COMITATO ORGANIZZATIVO CARDIOLOGICO
PER L'IDONEITÀ ALLO SPORT AGONISTICO
FMSI - SIC SPORT - ANCE - ANMCO - SIC

Protocolli cardiologici per il giudizio di idoneità allo sport agonistico (COCIS) 2023

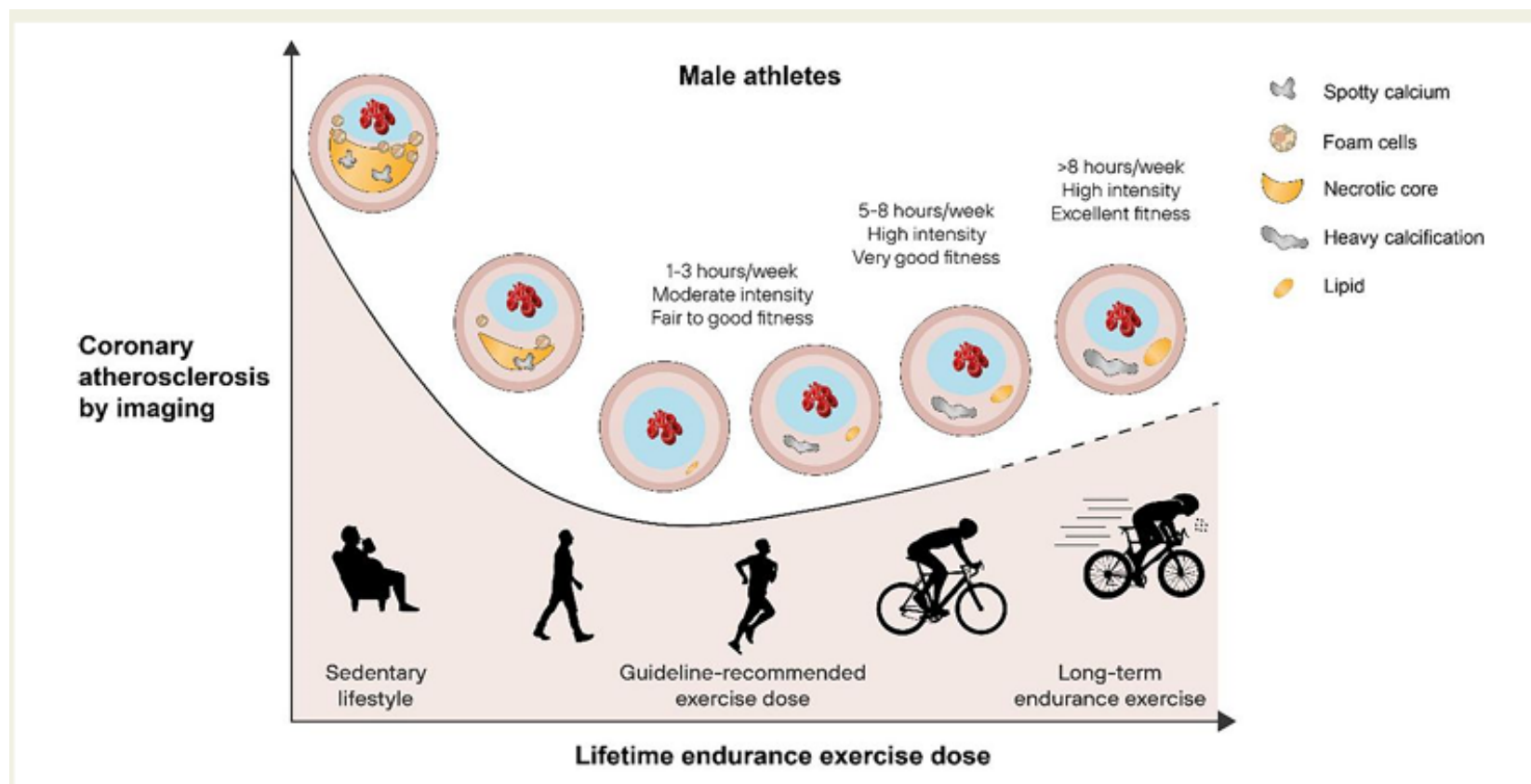


Casa Editrice Scientifica Internazionale

	Classe	LDE
Non devono essere considerati idonei allo sport agonistico i soggetti con aterosclerosi coronarica e una o più delle seguenti caratteristiche: a) presenza di placca con almeno due caratteristiche a rischio elevato (densità fibrolipidica, micro-calcificazioni, o rimodellamento positivo) determinante una stenosi > 30% su arteria interventricolare anteriore o tronco comune; b) stenosi >50% su qualunque ramo coronarico; c) pregresso test provocativo (ad esempio ecocardiogramma da stress, scintigrafia) di inequivoco significato ischemico.	III	C
I soggetti con aterosclerosi coronarica e presenza di stenosi 30-50% su uno o più vasi coronarici, in assenza di placche che mostrino almeno due delle caratteristiche a rischio elevato di cui sopra (densità fibrolipidica, micro-calcificazioni, rimodellamento positivo) possono essere considerati idonei agli sport appartenenti al gruppo A.	II	C
I soggetti con Coro-TC negativa per presenza di ateromasia, o con presenza di placche aterosclerotiche con stenosi <30% possono essere considerati idonei a tutti gli sport.	I	C

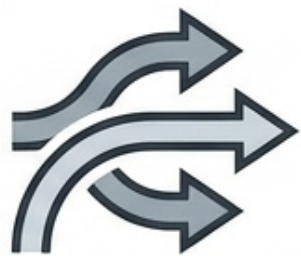
Coronary atherosclerosis in athletes: emerging concepts and preventive strategies

Guido Claessen ^{1,2,3,*†}, Thijs M.H. Eijssvogels ^{4,†}, Christine M. Albert⁵, Aaron L. Baggish⁶, Benjamin D. Levine^{7,8}, Eloi Marijon^{9,10}, Erin D. Michos¹¹, and Andre La Gerche ^{12,13,14}



Five Mechanisms of Exercise-Induced Pathophysiology

Development of athlete subclinical CAD requires a multi-hit equation occurring over years of habitual training.



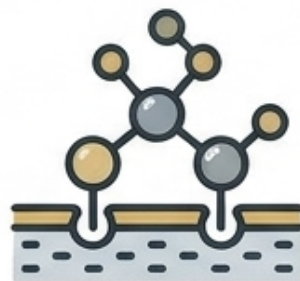
Biomechanical Force

Hemodynamics
& Shear Stress



Biochemical Response

Inflammatory
Markers



Endocrine Response

Parathyroid
Hormone



Dietary Modulators

Caloric Input &
Lipid Metabolism



Genetic Modulators

Polygenic Risk
Factors



176

Controls



191

Late-onset
endurance
athletes

191

Lifelong
endurance
athletes

Absence of cardiovascular disease and of established risk factors for coronary artery disease

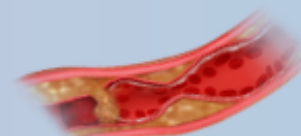
No current or past history of smoking, no body mass index $>27.2 \text{ kg/m}^2$

Sampled at random for inclusion to minimize the risk of selection bias

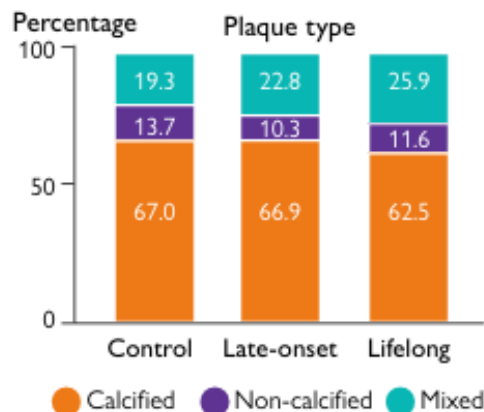
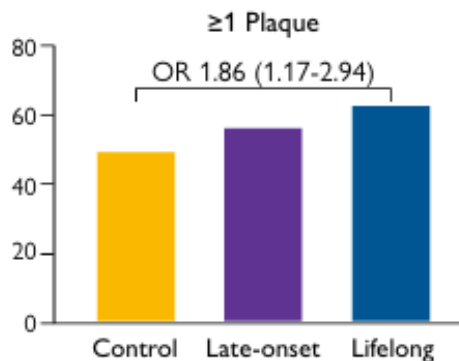


Primary endpoint

Prevalence of any coronary plaques (calcified, mixed, non-calcified) by computed tomography



Plaque burden and plaque composition by endurance exercise group

Odds of having coronary plaque in **lifelong endurance athletes** compared to **controls**

≥1 mixed plaque

1.78

≥1 coronary plaque

1.86

≥1 non-calcified plaque

1.95

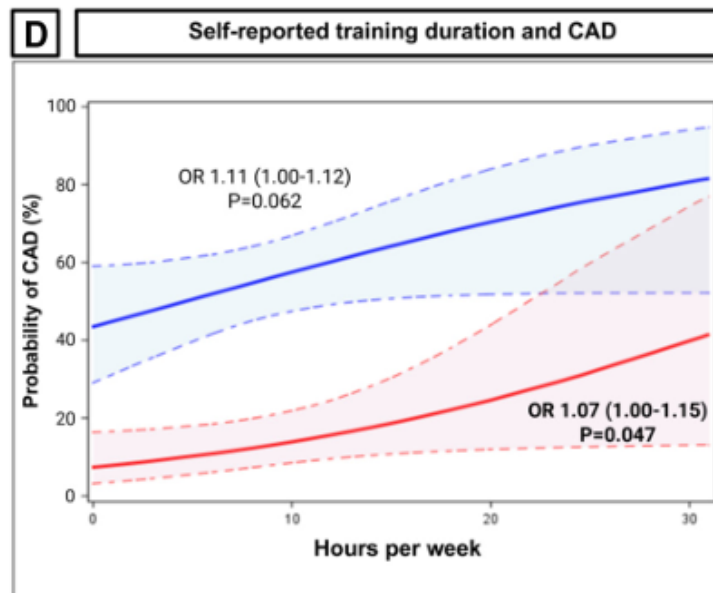
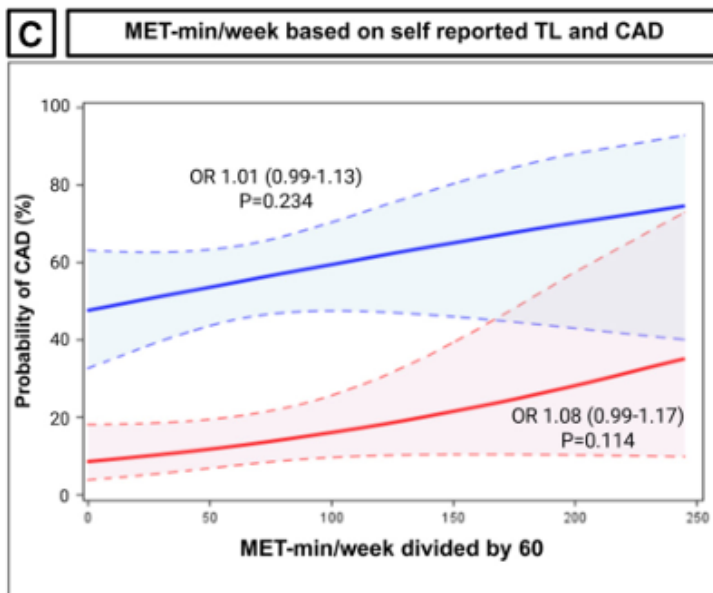
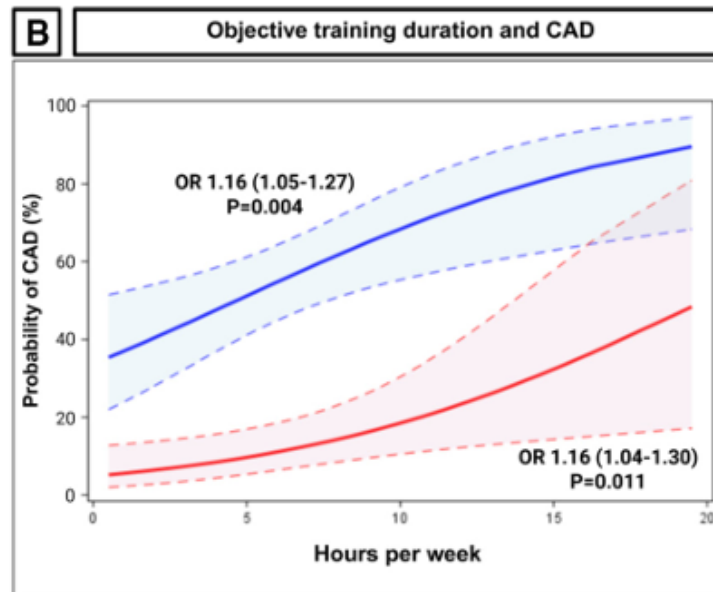
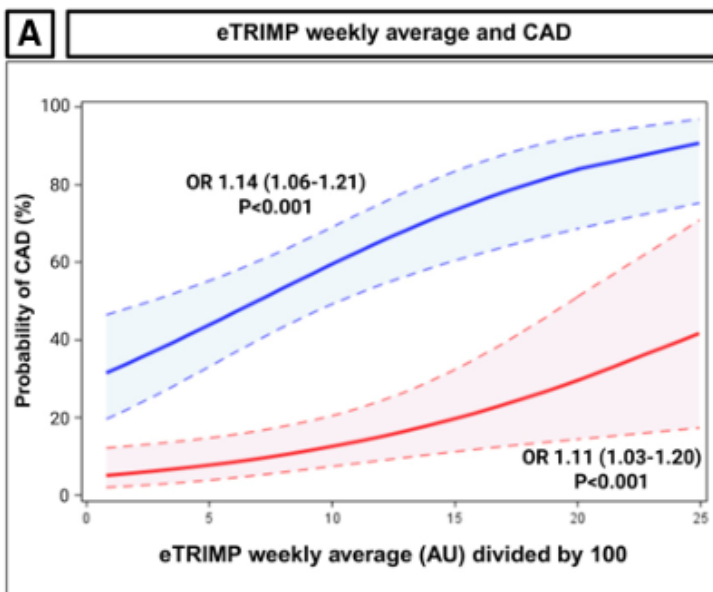
≥1 proximal plaque

1.96

≥1 proximal non-calcified plaque

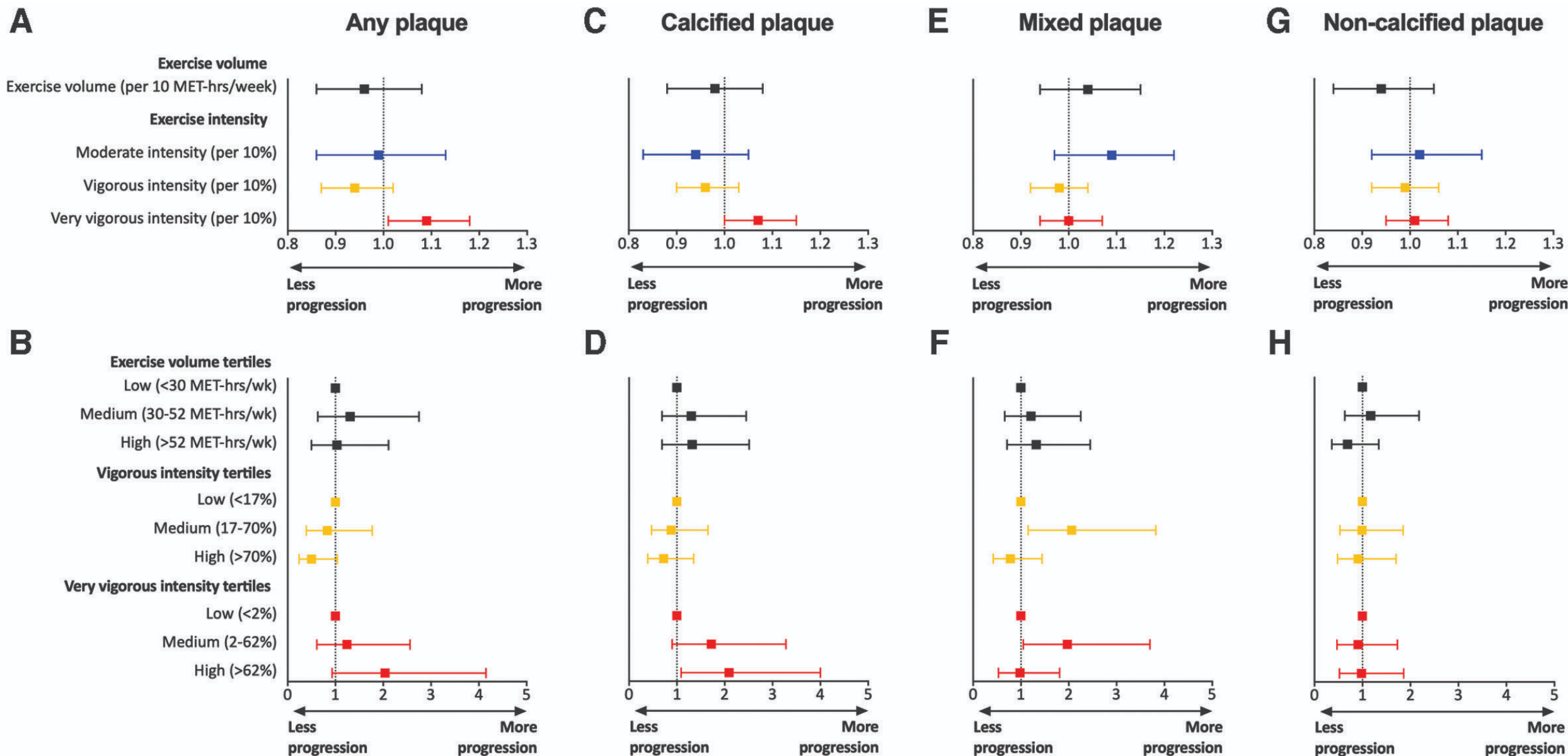
2.80

Odds ratios were adjusted for other risk factors

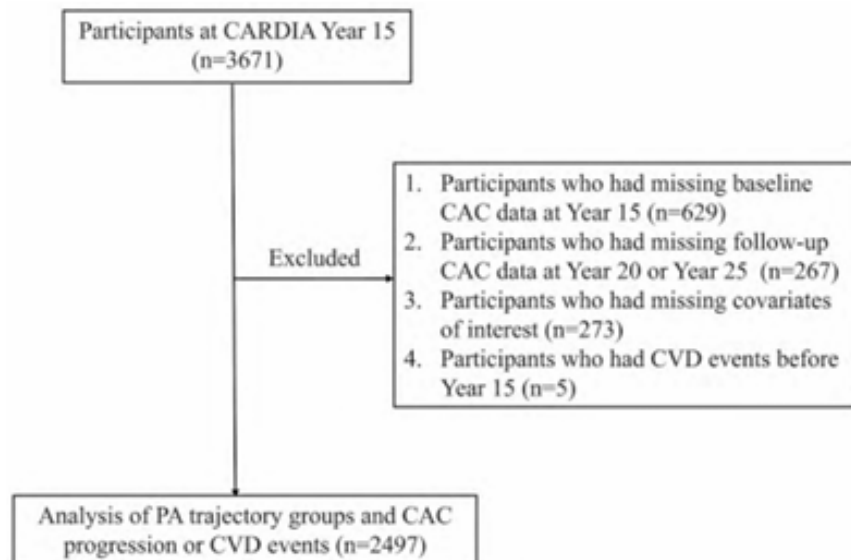


≥1 plaque

CAC > 100



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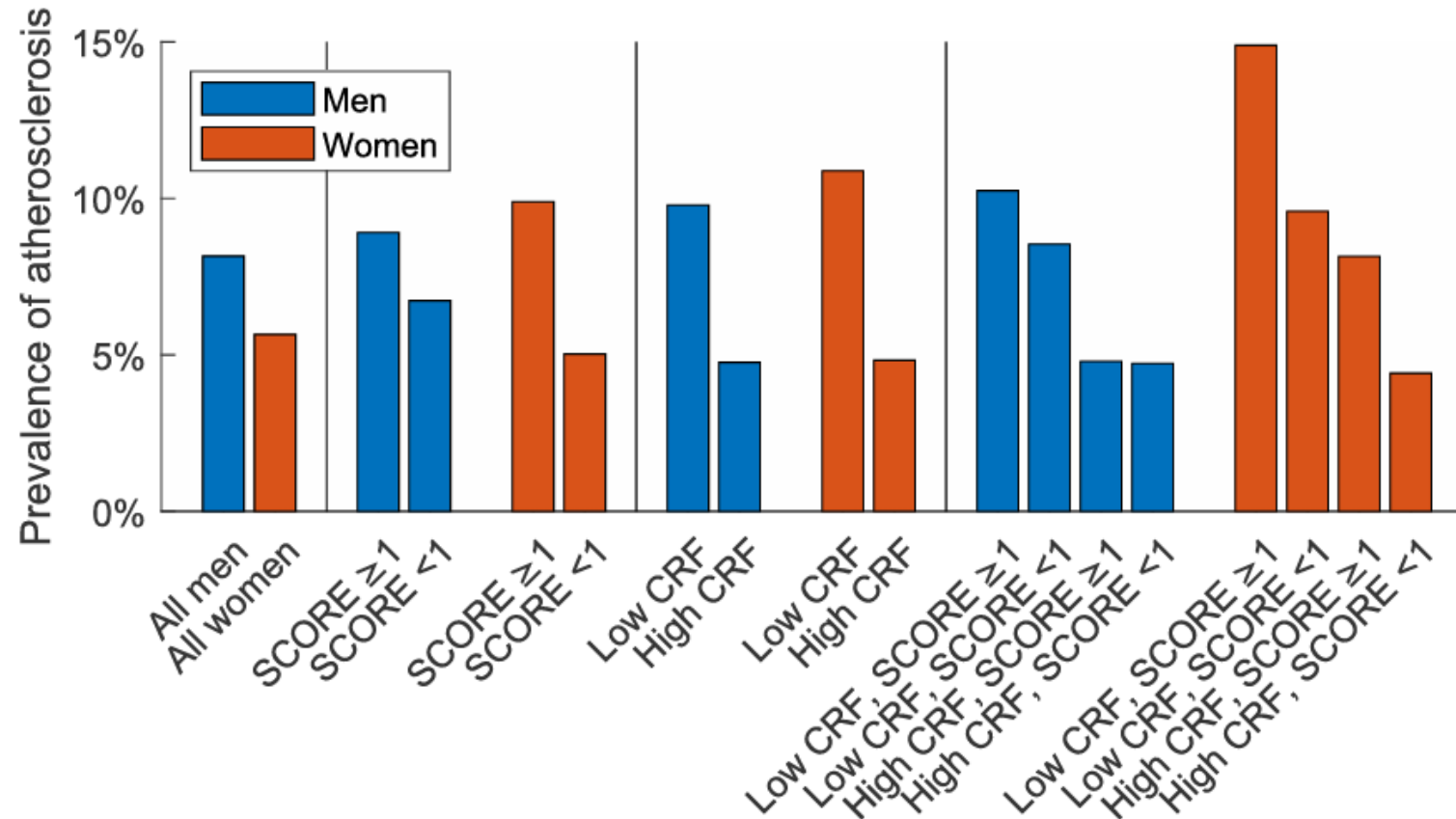
Subgroups	Events/no. at risk	Groups*		HR (95% CI)	P value	Interaction P value
Sex						
Male	420/1120	Moderate PA trajectory group		0.95 (0.76-1.19)	0.658	0.366
		High PA trajectory group		1.13 (0.85-1.49)	0.411	
Female	220/1377	Moderate PA trajectory group		0.81 (0.58-1.13)	0.208	0.309
		High PA trajectory group		1.43 (0.72-2.86)	0.309	
Race						
White	382/1418	Moderate PA trajectory group		0.74 (0.54-1.03)	0.072	0.726
		High PA trajectory group		0.82 (0.60-1.13)	0.228	
Black	258/1079	Moderate PA trajectory group		1.00 (0.75-1.34)	0.978	0.003
		High PA trajectory group		1.84 (1.23-2.75)	0.003	
BMI-kg/m2						
<30	384/1695	Moderate PA trajectory group		1.02 (0.81-1.28)	0.857	0.020
		High PA trajectory group		1.48 (1.10-2.01)	0.010	
≥30	256/802	Moderate PA trajectory group		1.09 (0.82-1.44)	0.567	0.274
		High PA trajectory group		1.30 (0.82-2.06)	0.274	
Hypertension						
Yes	144/375	Moderate PA trajectory group		1.05 (0.70-1.57)	0.801	0.572
		High PA trajectory group		1.86 (1.02-3.39)	0.042	
No	496/2122	Moderate PA trajectory group		1.02 (0.84-1.25)	0.826	0.075
		High PA trajectory group		1.30 (0.97-1.73)	0.075	
Diabetes						
Yes	46/126	Moderate PA trajectory group		1.20 (0.56-2.57)	0.643	0.749
		High PA trajectory group		0.88 (0.18-4.24)	0.874	
No	594/2371	Moderate PA trajectory group		1.07 (0.89-1.29)	0.445	0.002
		High PA trajectory group		1.51 (1.17-1.95)	0.002	
Baseline CAC						
Yes	136/230	Moderate PA trajectory group		0.81 (0.54-1.21)	0.299	0.003
		High PA trajectory group		0.77 (0.44-1.37)	0.373	
No	504/2267	Moderate PA trajectory group		1.13 (0.92-1.37)	0.245	<0.001
		High PA trajectory group		1.67 (1.26-2.21)	<0.001	

0.5 1 2.5



Lower cardiorespiratory fitness is associated with coronary artery atherosclerosis in individuals with a zero CAC score – cross-sectional results

Atherosclerosis



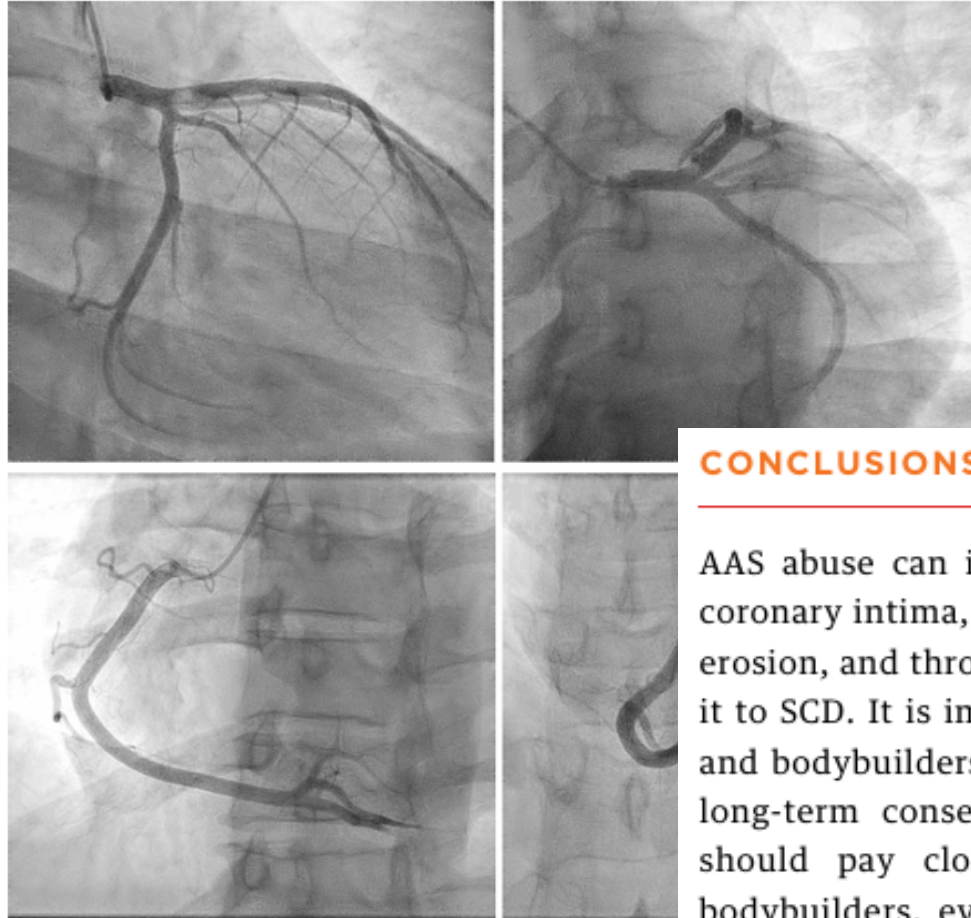
CORONARY, PERIPHERAL, AND STRUCTURAL INTERVENTIONS

CLINICAL CASE

Impact of AAS on Coronary Insights From Op

Ahmed Hegazi Abdelsamie,

FIGURE 2 Coronary Angiography Showing Proximal LAD Occlusion and Normal Other Coronary Vessels



CONCLUSIONS

AAS abuse can induce pathological changes in the coronary intima, such as intimal hyperplasia, plaque erosion, and thrombus formation, potentially linking it to SCD. It is imperative to educate young athletes and bodybuilders about the serious health risks and long-term consequences of AAS abuse. Clinicians should pay close attention to complaints from bodybuilders, even if they appear healthy. Further investigations are necessary to fully understand the impact of AAS abuse on health and to have screening protocols or guideline for AAS users.

Take Home Message

- TC cardiaca è la **metodica non invasiva** per la caratterizzazione della progressione/regressione **dell'ateromasia coronarica**
- La valutazione deve tenere conto del fattore **tempo**
- Attività **sportiva ad alta intensità e protratta nel tempo** può essere associata a **maggior prevalenza e progressione dell'aterosclerosi** anche non calcifica
- E' possibile ottenere **stabilizzazione/regressione** dell'ateromasia se **identificata nelle fasi precoci**.
- Attenzione all'utilizzo di «**performance-enhancing drugs**»



Grazie
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