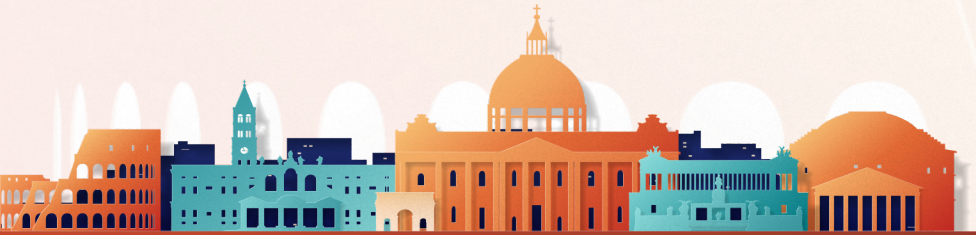
PLACE 2026
PLATFORM OF LABORATORIES FOR ADVANCES IN CARDIAC EXPERIENCE

CONGRESSO
ROMA, 25 - 27 Giugno 2026

MALATTIA CORONARICA NELL'ATLETA

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



Fusco Armando MD, PhD

Diagnostica per immagini e Radiologia Interventistica, Policlinico Casilino, Roma

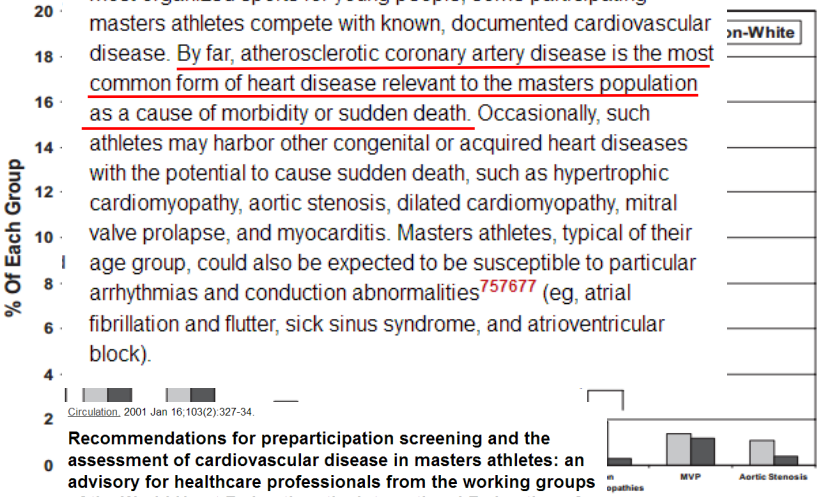
Cause soggetti < 35 anni:

Dati Autoptici del *Minneapolis Heart Institute Foundation* registry su un periodo di 27 anni (19[illegible] imp[illegible] card[illegible]

Cardiovascular Risks of Masters Sports

Causes of Sudden Death or Morbidity

Masters sports programs primarily comprise apparently normal and healthy individuals from the general population. However, unlike most organized sports for young people, some participating masters athletes compete with known, documented cardiovascular disease. By far, atherosclerotic coronary artery disease is the most common form of heart disease relevant to the masters population as a cause of morbidity or sudden death. Occasionally, such athletes may harbor other congenital or acquired heart diseases with the potential to cause sudden death, such as hypertrophic cardiomyopathy, aortic stenosis, dilated cardiomyopathy, mitral valve prolapse, and myocarditis. Masters athletes, typical of their age group, could also be expected to be susceptible to particular arrhythmias and conduction abnormalities[757677] (eg, atrial fibrillation and flutter, sick sinus syndrome, and atrioventricular block).



Circulation. 2001 Jan 16;103(2):327-34.

Recommendations for preparticipation screening and the assessment of cardiovascular disease in masters athletes: an advisory for healthcare professionals from the working groups of the World Heart Federation, the International Federation of Sports Medicine, and the American Heart Association Committee on Exercise, Cardiac Rehabilitation, and Prevention.

Maron BJ, Araújo CG, Thompson PD, Fletcher GF, de Luna AB, Fleg JL, Pelliccia A, Balady GJ, Furlanello F, Van Camp SP, Elosua R, Chaitman BR, Bazzarre TL; World Heart Federation; International Federation of Sports Medicine; American Heart Association Committee on Exercise, Cardiac Rehabilitation, and Prevention.

Sudden Deaths in Young Competitive Athletes: Analysis of 1866 Deaths in the United States, 1980–2006

Barry J. Maron, Joseph J. Doerer, Tammy S. Haas, David M. Tierney and Frederick O. Mueller

Dati ottenuti dal lavoro di *Corrado et. al* raccolti in 17 anni ([illegible]te impro[illegible]usi dall' *Europ*

Variable	Age Group			
	12–17 yr	18–34 yr	35–45 yr	All
Competitive				
No. of athletes	4	9	3	16
Percent of athletes who survived	50.0	44.4	33.3	43.8
Diagnosis				
Ischemic*	0	0	3	3
Primary arrhythmic	0	6	0	6
Structural†	2	3	0	5
Commotio cordis	2	0	0	2
Noncompetitive				
No. of athletes	9	18	31	58
Percent of athletes who survived	66.7	50.0	35.5	44.8
Diagnosis				
Ischemic*	0	5	21	26
Primary arrhythmic	4	5	0	9
Unknown	2	2	0	4
Structural‡	3	6	8	17
Other§	0	0	2	2

Table 2 Cause[illegible] [illegible]gion of Italy from 1979 to 1996

	) *n* (%)	Total (*n* = 269) *n*(%)
Arrhythmogenic		29 (10.8)
Atherosclerotic		45 (16.7)
Anomalous origi		7 (2.6)
Conduction syst		24 (8.9)
Mitral valve pro		26 (9.7)
HCM		17 (6.3)
Myocarditis		22 (8.2)
Myocardial bridg		7 (2.6)
Pulmonary thror		4 (1.5)
Dissecting aortic		12 (4.5)
Dilated cardiom		10 (3.7)
Other		66 (24.5)

*P = 0.008 for t
**P < 0.001 for
Modified from C

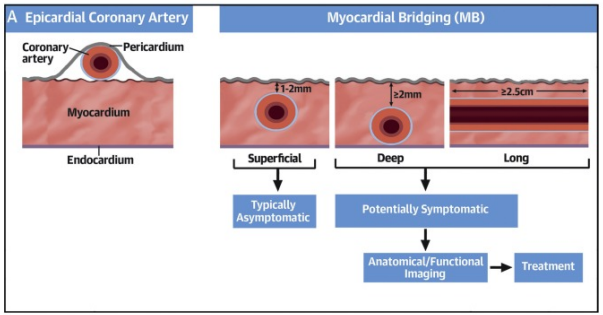
Cardiovas[illegible] competiti[illegible] death: proposal for a common European protocol

Consensus Statement of the Study Group of Sport Cardiology of the Working Group of Cardiac Rehabilitation and Exercise Physiology and the Working Group of Myocardial and Pericardial Diseases of the European Society of Cardiology

Cause di morte cardiaca improvvise in agonisti e non agonisti

STRESS CMR and MYOCARDIAL BRIDGE

CENTRAL ILLUSTRATION: Anatomic Properties of Myocardial Bridging and Overview of Treatment Modalities



B — Treatment Modalities

	Medical Therapy	Percutaneous Coronary Intervention	Coronary Artery Bypass Surgery	Surgical Myotomy
Treatment Goal	• Decrease HR • RF modification	• Reinforce the intramural coronary artery	• Bypass the compressed arterial segment	• Remove the overlying MB
Clinical Issues	• First line treatment • Trial nitrate cessation • Avoid pure vasodilators	• High radial strength, second generation DES recommended • Intravascular imaging critical to avoid over or under expansion • Avoid bioresorbable stents	• Suitable for long or very deep MB • Saphenous grafts may be preferred to arterial grafts due to potentially lower rates of graft failure	• Consider as first line surgical treatment at experienced myotomy centers • Technically challenging

Sternheim, D. et al. J Am Coll Cardiol. 2021;78(22):2196-2212.

DEFINIZIONE

ANOMALIA BENIGNA

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Tabella 16 - Raccomandazioni per la concessione dell'idoneità agonistica nei soggetti con ponte miocardico.

	Classe	LDE
Gli atleti con un ponte miocardico scoperto occasionalmente dopo una Coro-TC eseguita per un TE dubbio/positivo o altri motivi, se non si evidenzia ischemia inducibile (al TCP, all'ECO-stress fisico e/o alla scintigrafia miocardica da sforzo e/o alla coronarografia), non hanno controindicazioni alla pratica sportiva agonistica di tutte le discipline.	I	B
Gli atleti con un ponte miocardico "significativo" (lungo e profondo), con evidenza, diretta o indiretta, di ischemia da sforzo, devono essere esclusi dall'attività agonistica. Il giudizio potrebbe essere rivalutato dopo 6 mesi dalla eventuale correzione chirurgica, se non sono presenti sintomi e segni di ischemia, affidandolo naturalmente a Centri particolarmente esperti.	III	B

Ponti miocardici "lunghi" (> 1 cm) e profondi (≥ 3 mm) possono provocare ischemia da sforz

MANIFESTAZIONI CLINICHE

- Angina Tipica o Instabile
- Infarto Miocardico Acuto
- Aritmie Maggiori
- Morte Improvvisa

PAZIENTI SINTOMATICI con PONTE MIOCARDICO ISOLATO

E' una condizione congenita ma a volte le manifestazioni cliniche possono manifestarsi tardivamente (anche nella VI –VII decade) perché esiste :

- Progressiva disfuzione endoteliale;
- Rimodellamento negativo della coronaria;
- Associazione tra Bridge Miocardico e sviluppo di malattia prossimalmente e distlamente al bridge per incremento dello stress di parete
- Aumento della rigidità del miocardio ventricolare.

*Katsuhide Maeda, MD, et al.*DOI: 10.1016/j.jtcvs.2018.01.081

RM CARDIACA PRESENTA LA MIGLIORE ACCURATEZZA DIAGNOSTICA NELL'INDIVIDUARE L'ISCHEMIA NEI PAZIENTI CON ANAOMALIE CORONARICHE.

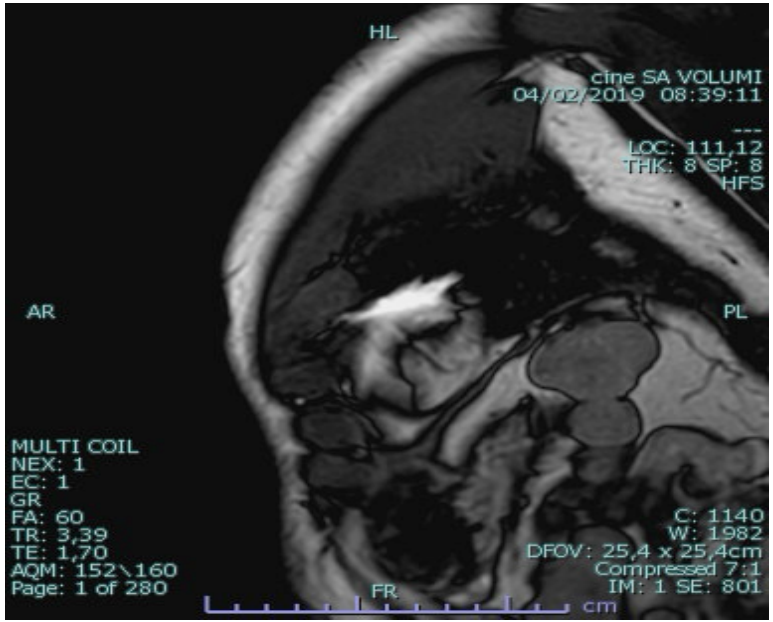
	Echo	CTA	CMR	Nuclear		Invasive Angiography		
				SPECT	PET	Conventional Angiography	Intravascular Ultrasound	Invasive Functional Testing
Imaging factors[a]								
Spatial resolution	+++	++++	++	–	–	+++++	+++++	–
Temporal resolution	++++	+	++	–	–	++++	+++	–
Ionizing radiation exposure	–	++	–	+++	++	++	N/A[b]	N/A[b]
Nephrotoxic contrast exposure	–	+	–	–	–	+	N/A[b]	N/A[b]
Anatomical delineation								
Anomalous coronary origin	++	+++++	++++	–	–	+++	++++	–
Takeoff angle	++	+++++	+++	–	–	+++	+++	–
Ostial narrowing	+	++++	++	–	–	++	+++++	–
Intramural segment	+	++++	++	–	–	+	++++	–
Proximal narrowing and elliptical shape	+	++++	++	–	–	++	++++	–
Assessment of concomitant CAD[c]	–	+++++	++++	+++	++++	+++++	N/A[b]	N/A[b]
Tissue characteristics								
Ischemia[d]	+++	–	++++	+++	++++	–	–	++++
Infarction	+	+	++++	++	+++	–	–	–

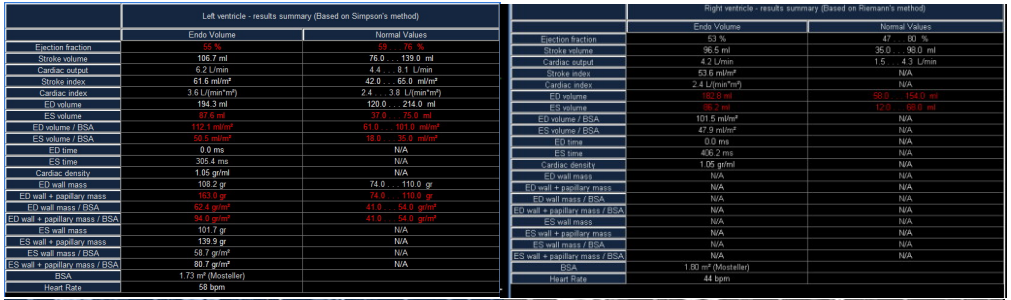
Mario Gaudino et al. JACC 2023; 82:2034-2053.

STRESS CARDIOVASCULAR MAGNETIC RESONANCE: *What is this?*

- **Stress CMR is a cost-effective, noninvasive test that accurately assesses :**

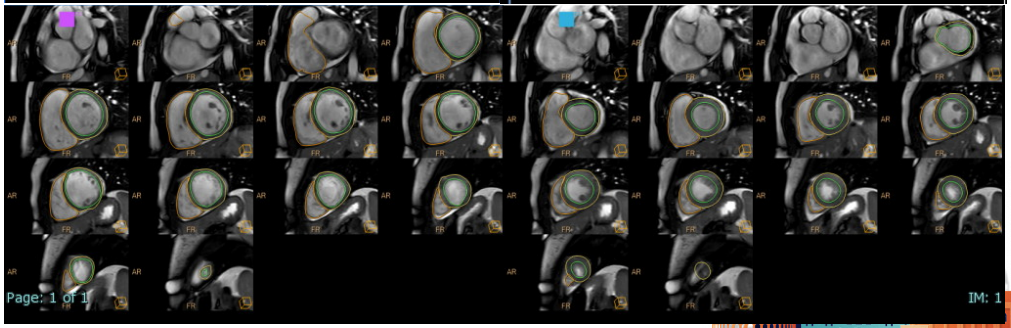
- *Global and regional left and right ventricular function ;*





Left ventricle - results summary (Based on Simpson's method)		
	Endo Volume	Normal Values
Ejection fraction	55 %	59 . . . 76 %
Stroke volume	106.7 ml	76.0 . . . 139.0 ml
Cardiac output	6.2 L/min	4.4 . . . 8.1 L/min
Stroke index	61.6 ml/m²	42.0 . . . 65.0 ml/m²
Cardiac index	3.6 L/(min*m²)	2.4 . . . 3.8 L/(min*m²)
ED volume	194.3 ml	120.0 . . . 214.0 ml
ES volume	87.6 ml	37.0 . . . 75.0 ml
ED volume / BSA	112.1 ml/m²	61.0 . . . 101.0 ml/m²
ES volume / BSA	50.5 ml/m²	18.0 . . . 35.0 ml/m²
ED time	0.0 ms	N/A
ES time	395.4 ms	N/A
Cardiac density	1.05 gr/ml	N/A
ED wall mass	108.2 gr	74.0 . . . 110.0 gr
ED wall + papillary mass	163.0 gr	74.0 . . . 110.0 gr
ED wall mass / BSA	62.4 gr/m²	41.0 . . . 54.0 gr/m²
ED wall + papillary mass / BSA	94.0 gr/m²	41.0 . . . 54.0 gr/m²
ES wall mass	101.7 gr	N/A
ES wall + papillary mass	139.9 gr	N/A
ES wall mass / BSA	58.7 gr/m²	N/A
ES wall + papillary mass / BSA	80.7 gr/m²	N/A
BSA	1.73 m² (Mosteller)	
Heart Rate	58 bpm	

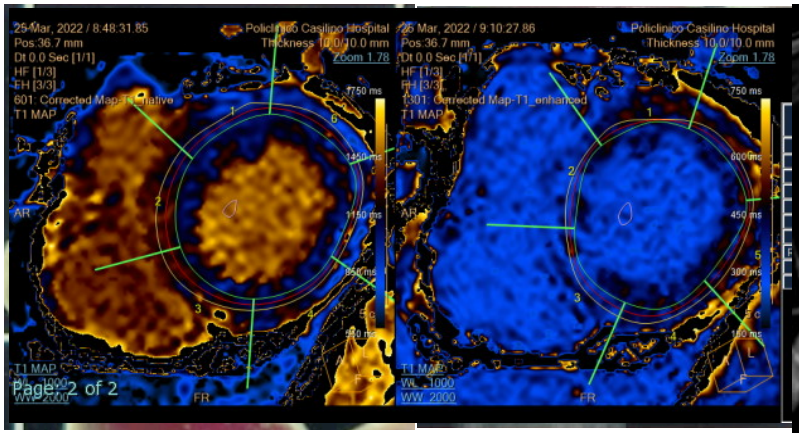
Right ventricle - results summary (Based on Riemann's method)		
	Endo Volume	Normal Values
Ejection fraction	53 %	47 . . . 80 %
Stroke volume	96.5 ml	35.0 . . . 90.0 ml
Cardiac output	4.2 L/min	1.5 . . . 4.3 L/min
Stroke index	53.6 ml/m²	N/A
Cardiac index	2.4 L/(min*m²)	N/A
ED volume	182.8 ml	58.0 . . . 154.0 ml
ES volume	86.3 ml	12.0 . . . 62.0 ml
ED volume / BSA	101.5 ml/m²	N/A
ES volume / BSA	47.9 ml/m²	N/A
ED time	0.0 ms	N/A
ES time	406.2 ms	N/A
Cardiac density	1.05 gr/ml	N/A
ED wall mass	N/A	N/A
ED wall + papillary mass	N/A	N/A
ED wall mass / BSA	N/A	N/A
ED wall + papillary mass / BSA	N/A	N/A
ES wall mass	N/A	N/A
ES wall + papillary mass	N/A	N/A
ES wall mass / BSA	N/A	N/A
ES wall + papillary mass / BSA	N/A	N/A
BSA	1.80 m² (Mosteller)	
Heart Rate	44 bpm	

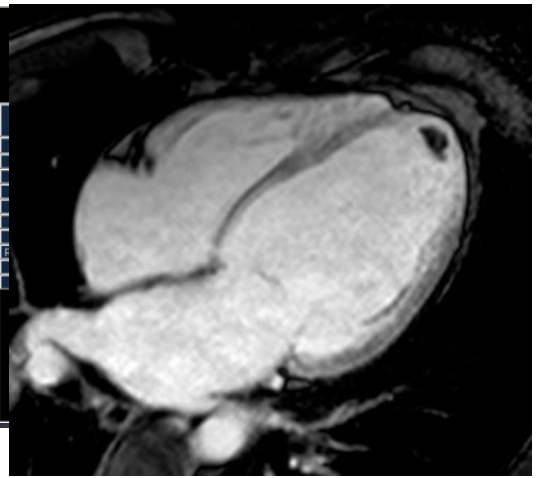


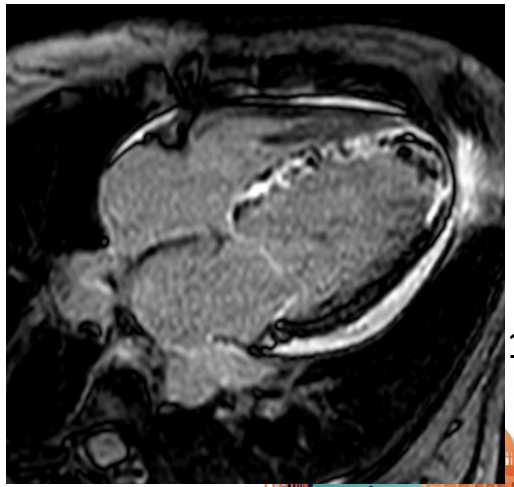
STRESS CARDIOVASCULAR MAGNETIC RESONANCE: *What is this?*

- **Stress CMR is a cost-effective, noninvasive test that accurately assesses :**

- *Global and regional left and right ventricular function ;*
- *Detect and localize fibrosis (post myocardial infarction or diffuse fibrosis) and assess infarction complications;*







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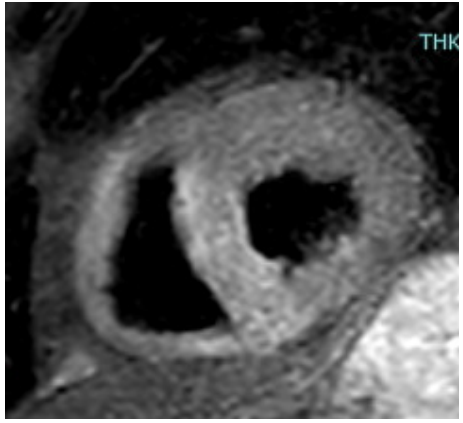
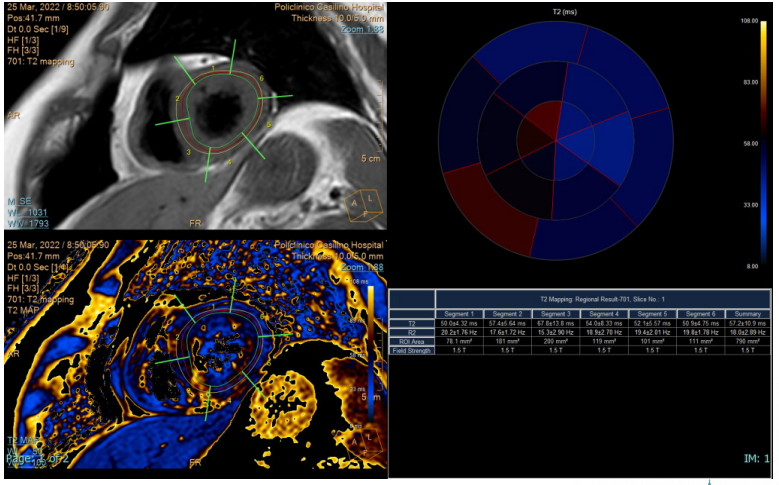
STRESS CARDIOVASCULAR MAGNETIC RESONANCE: *What is this?*

- **Stress CMR is a cost-effective, noninvasive test that accurately assesses :**

- *Global and regional left and right ventricular function ;*
- *Detect and localize myocardial infarction and its complications;*
- *Detect myocardial edema ;*



BB TSE T2 (STIR)

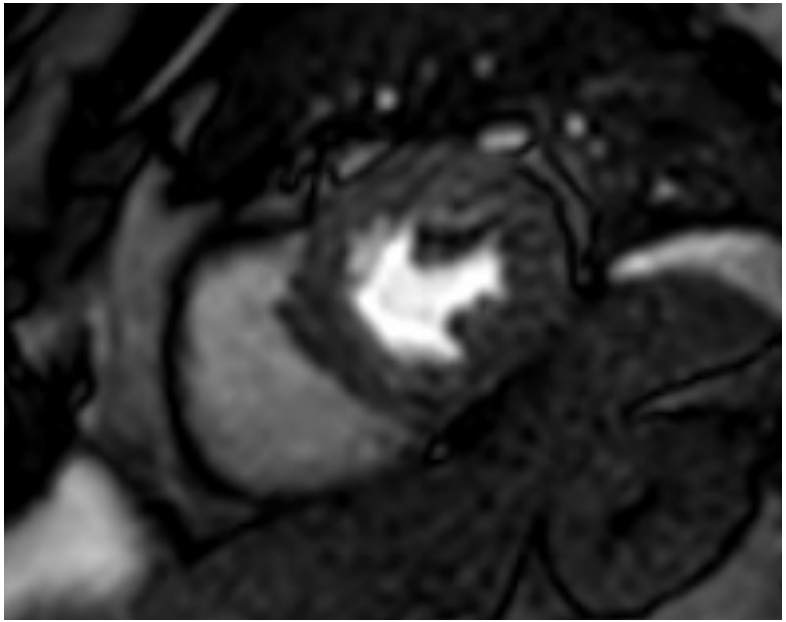


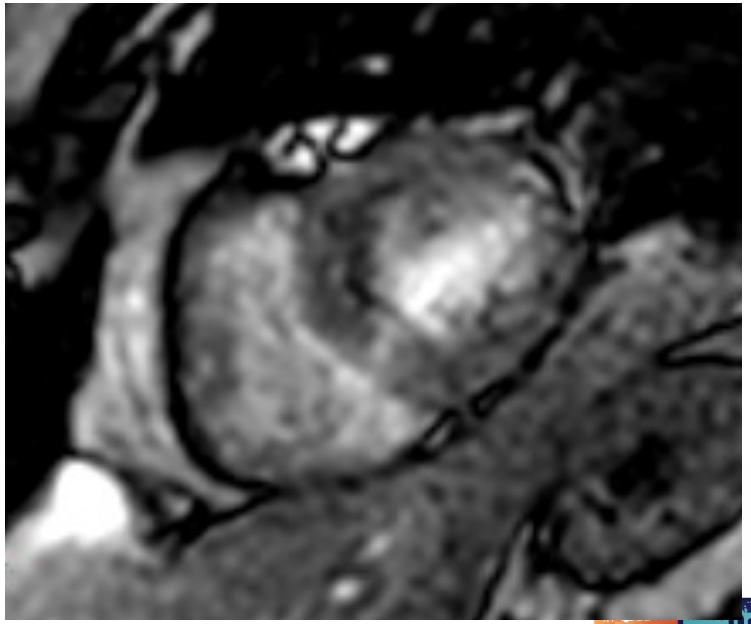
T2 MAPPING

STRESS CARDIOVASCULAR MAGNETIC RESONANCE: *What is this?*

- **Stress CMR is a cost-effective, noninvasive test that accurately assesses :**

- *Detect myocardial ischemia*





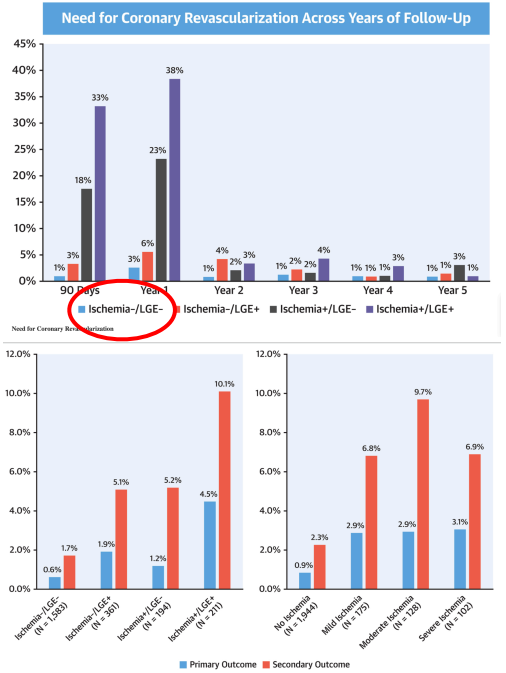
STRESS CARDIAC MAGNETIC RESONANCE:
Prognostic value and Risk Stratification

The SPINS (Stress CMR Perfusion Imaging in the United States) registry demonstrated the prognostic utility of stress CMR (2,349 patients with stable chest pain).

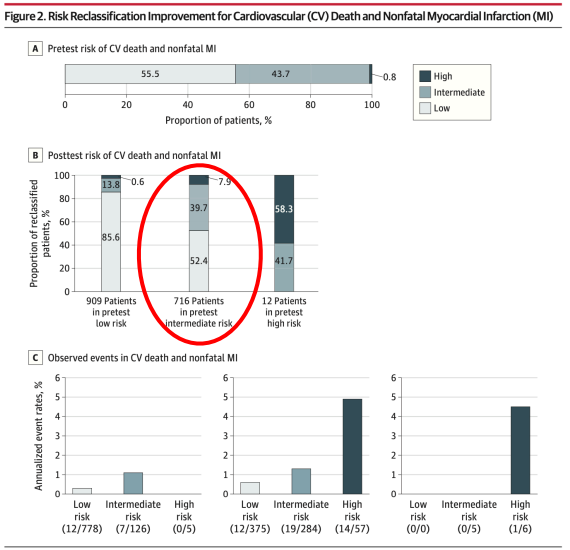
No evidence of ischemia or infarction on stress CMR had a 99.3% event-free rate over a 5.5-year follow-up period.

- ***Stress CMR imaging accurately shift patients into a more appropriate risk category.***

- ***Aid in clinical decision-making by reclassifying a substantial proportion of patients at intermediate risk.***



- 1y Primary outcome: cardiovascular death or nonfatal MI
- 1y Secondary outcome: cardiovascular death, nonfatal MI, hospitalization for unstable angina or congestive heart failure and late unplanned CABG



J Am Coll Cardiol. 2019 Oct 8;74(14):1741-1755

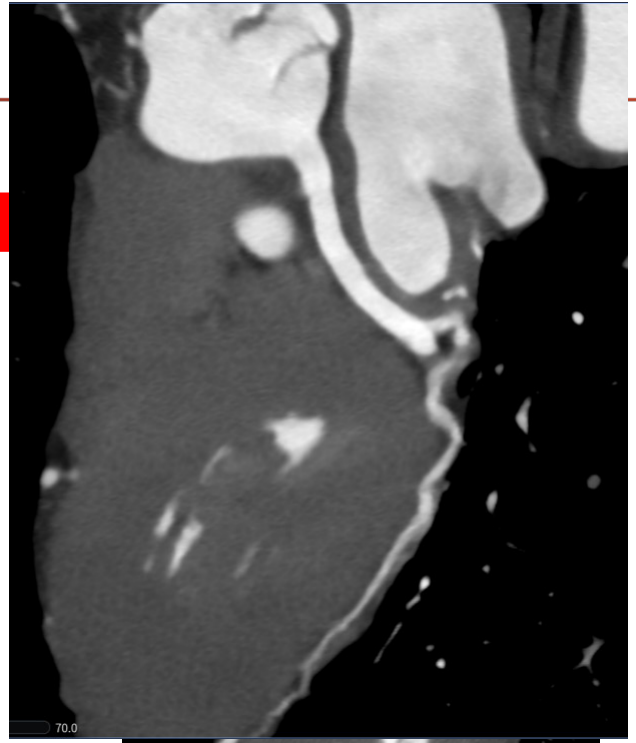
Assenza di radiazioni ionizzanti: Sicura e completamente priva di radiazioni, a differenza delle immagini SPECT o della TC coronarica.

Alta risoluzione spaziale: miglior dettaglio di immagine rispetto all'imaging nucleare (PET/SPECT), migliore accuratezza diagnostica nel rilevare aree di ischemia più piccole o più localizzate.

Analisi quantitativa: Tecniche avanzate di perfusione quantitative (myocardial blood flow - MBF, myocardial transit time - MyoTT).

aso

Uomo di 56 anni.
Giocatore di tennis amat
Ex fumatore.
Dislipidemico.
Assenza di dolore toracic
Test da sforzo dubbio pe
Placca fibrocalifica bifor
(stenosi 20-30%).



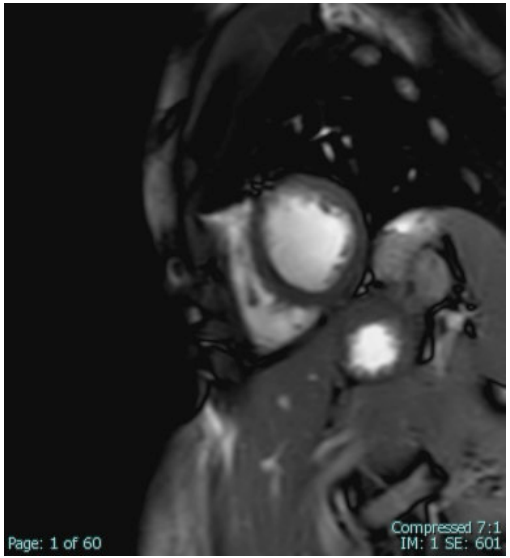
FASE TELEDIASTOLICA

FASE TELESISTOLICA

Caso clinico

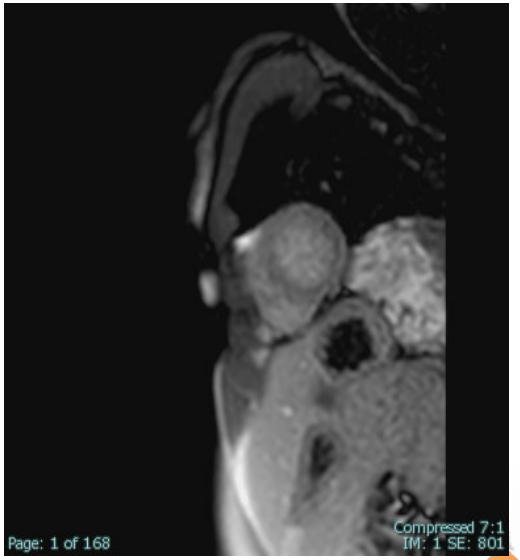
ECG DA SFORZO: DUBBIO PER SEGNI DI ISCHEMIA ALL'ACME DELLLO SFORZO

SSFP-SA CINE REST



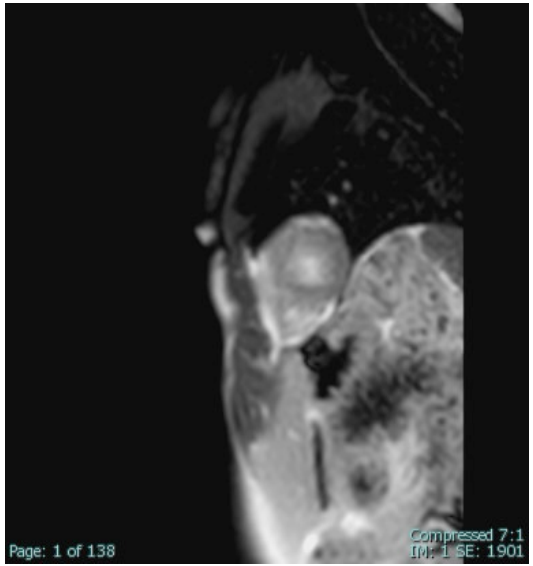
CARDIO-RM DA STRESS

PERFUSION REST



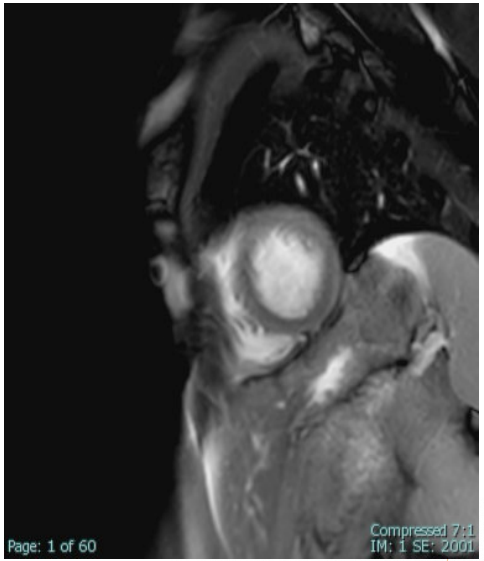
Caso clinico

PERFUSION STRESS



NON DEFICIT DELLA RISERVA CORONARICA

SSFP-SA CINE STRESS



Conclusioni

- La STRESS CMR è una valutazione non invasiva che permette in un singolo esame la valutazione dell'ischemia miocardica inducibile, della vitalità miocardica e della funzione cardiaca ed è ampiamente utilizzata per la valutazione di pazienti con malattia ischemica nota o sospetta grazie alla sua eccellente accuratezza diagnostica;

- - La rivascolarizzazione dovrebbe sempre essere guidata da una valutazione funzionale e la STRESS CMR rappresenta il test per la valutazione della malattia coronarica emodinamicamente significativa con la migliore sensibilità e specificità;

- - L'assenza di radiazioni ionizzanti, la non invasività e la sua accuratezza diagnostica la pone come valida alternativa nella detection di eventuale ischemia inducibile in pazienti sportivi con anomalie coronariche, tra cui i bridge miocaridici.

GRAZIE …

dr.armandofusco@gmail.com