

ECHOCARDIOGRAPHY AND CARDIAC MAGNETIC
RESONANCE: BENEFITS, LIMITS AND ADDED VALUE IN
DIFFERENT CLINICAL SETTINGS

Myocardial and Pericardial diseases

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What we are going to talk about... CMR in myopericardial diseases

1. Echo vs. CMR: Cardiologist vs. Radiologist in the CMR lab: friends or foes?
2. Echo vs. CMR: Strengths and Weaknesses
3. CMR: Morphology, Function and Tissue characterization
4. Specific settings: CMPs, Myocarditis, Pericarditis



1. Echo vs. CMR: Cardiologist vs. Radiologist: Friends or Foes in the CMR lab?

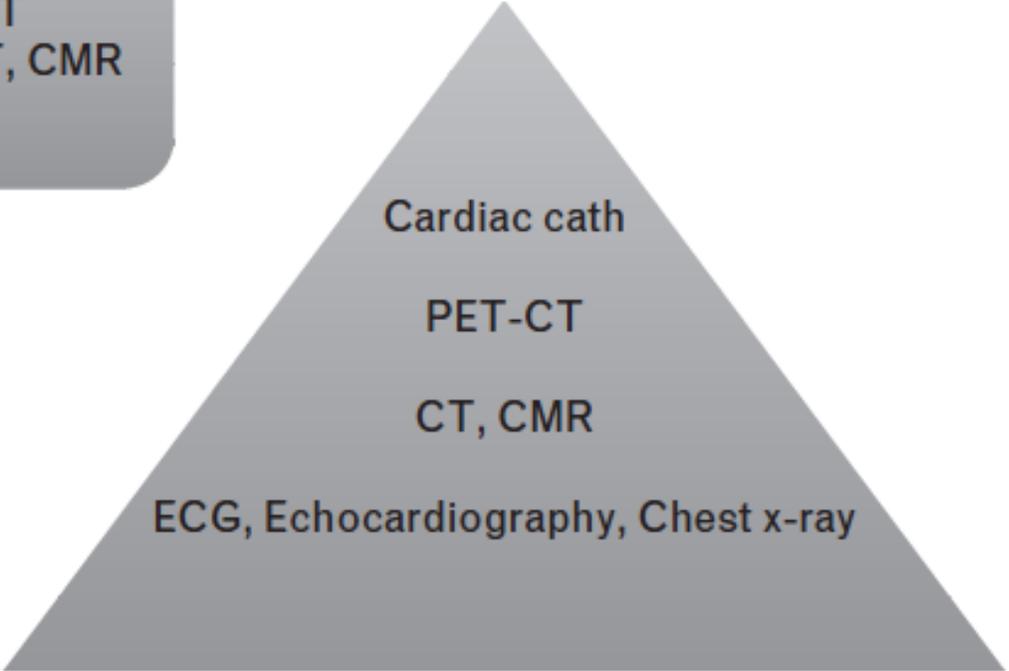


2. Echo vs. CMR: Strengths and Weaknesses

J Cardiovasc Med 2016, 17:774–782

	TTE	CT	CMR
Technical aspects			
Availability			
Cost			
Exam duration (min)			
Safety			
Patient access and monitoring			
Pericardium			
Pericardial thickness			
Pericardial calcifications			
Pericardial inflammation			
Motion of layers (adhesions)			
Effusion detection			
Effusion characterization			
Pericardial masses			
Guiding/monitoring pericardiocentesis			
Cardiac morphology (including tissue chara			
Cardiac function			
Systolic			
Diastolic function			
Septal motion (coupling)			
Respiratory changes			

Anatomy: Echo, CT, CMR
 Function: Echo, CMR
 Inflammation: CMR, PET-CT
 Tissue characterization: CT, CMR
 Concomitant diseases: CT



3. CMR: Morphology, Function and Tissue characterization

Sequenze a sangue nero
IR-TSE (MORFOLOGIA)

Sequenze cine a sangue
bianco (FUNZIONE)

Edema e Fibrosi
(CARATTERIZZAZIONE
TESSUTALE)

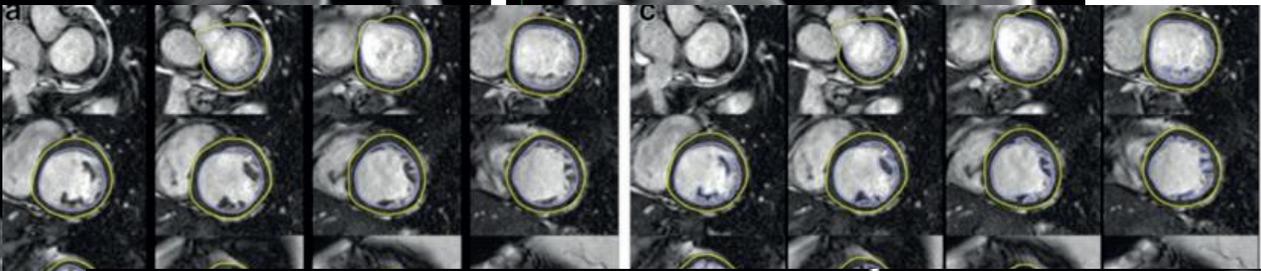
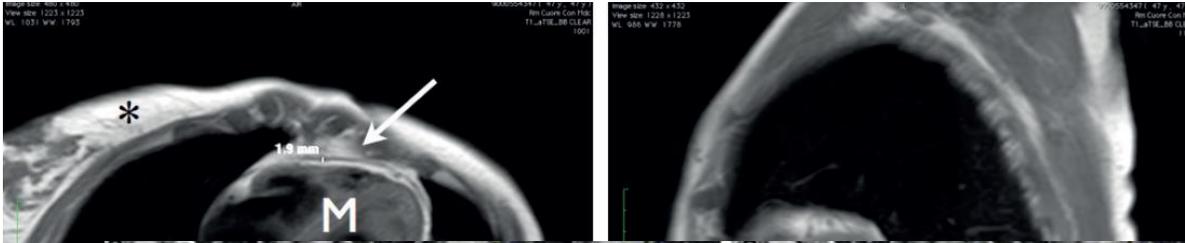
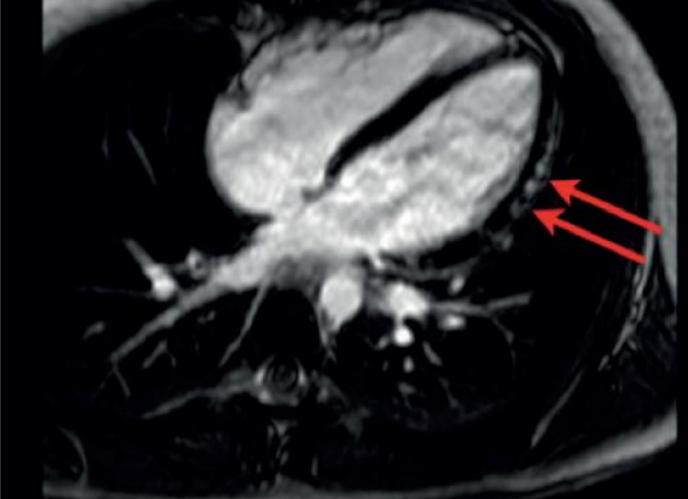
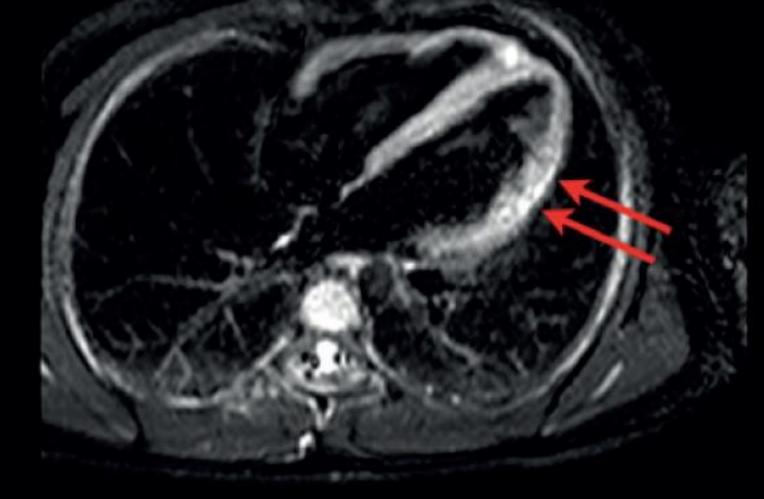
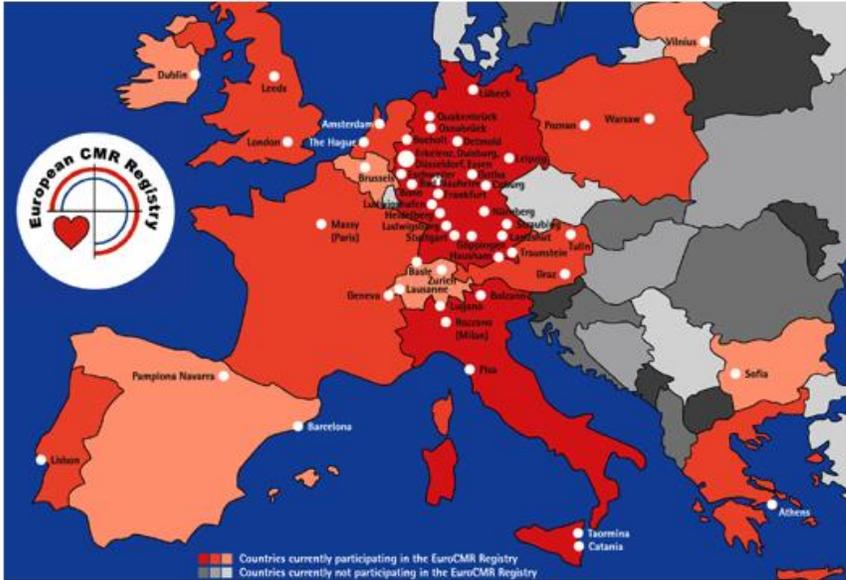


Immagine T2-pesata

Contrasto tardivo



4. Specific settings: CMPs, Myocarditis, Pericarditis



EuroCMR registry

Torino (1120 CMRs):
CMPs= 27%
Myo/Peri= 18%
CMPs+Myo/Peri= 45%

≤44 yrs 45 – 59 yrs 60 – 74 yrs ≥75 yrs

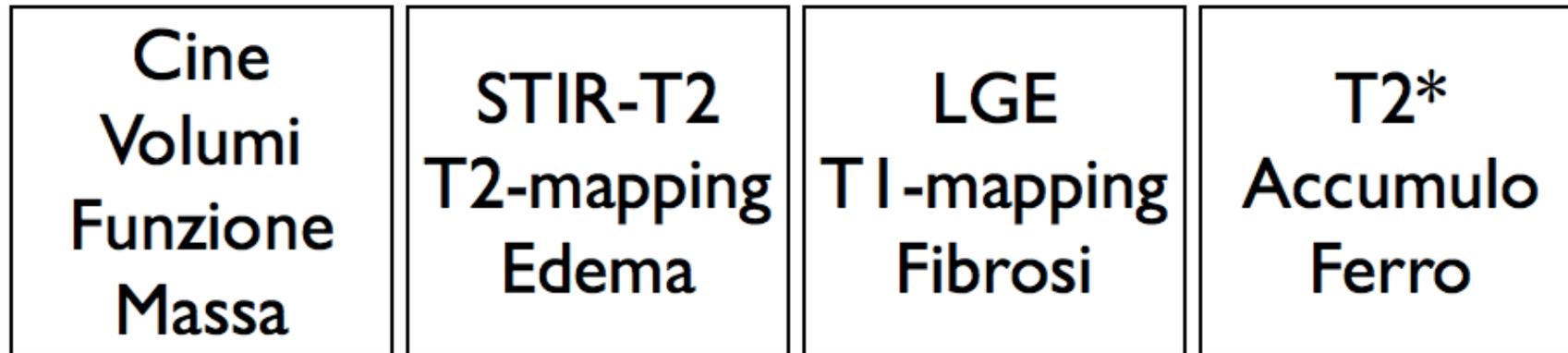
Indication

Ischemia/CAD	12.1%	37.7%	48.1%	49.3%
Myocarditis/CMP		63.6%	36.6%	22.5%
Stress CMR	13.7%	38.0%	47.5%	47.9%

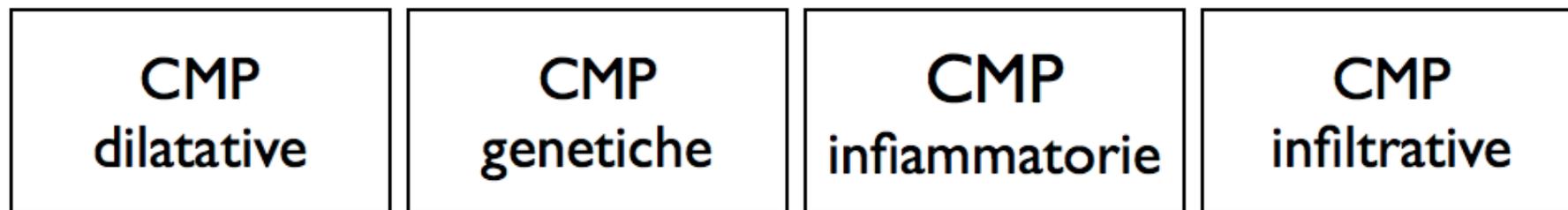
Sospetta Cardiomiopatia non ischemica



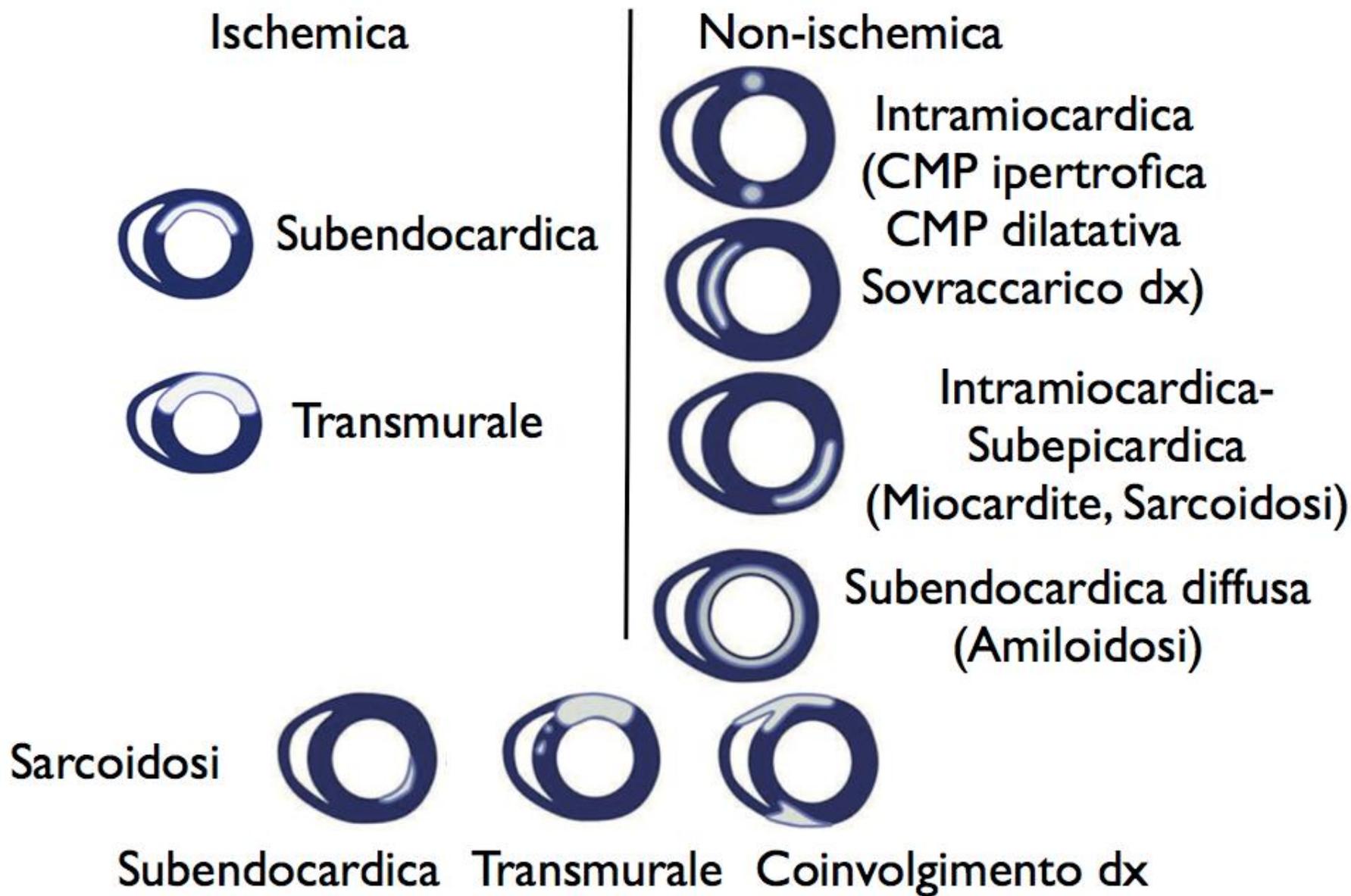
RM cardiaca



Definizione diagnostica e inquadramento prognostico



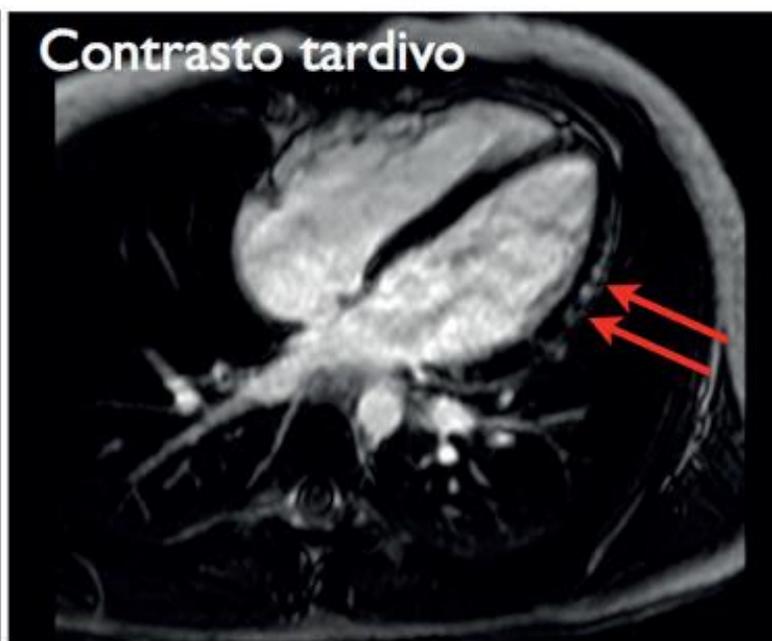
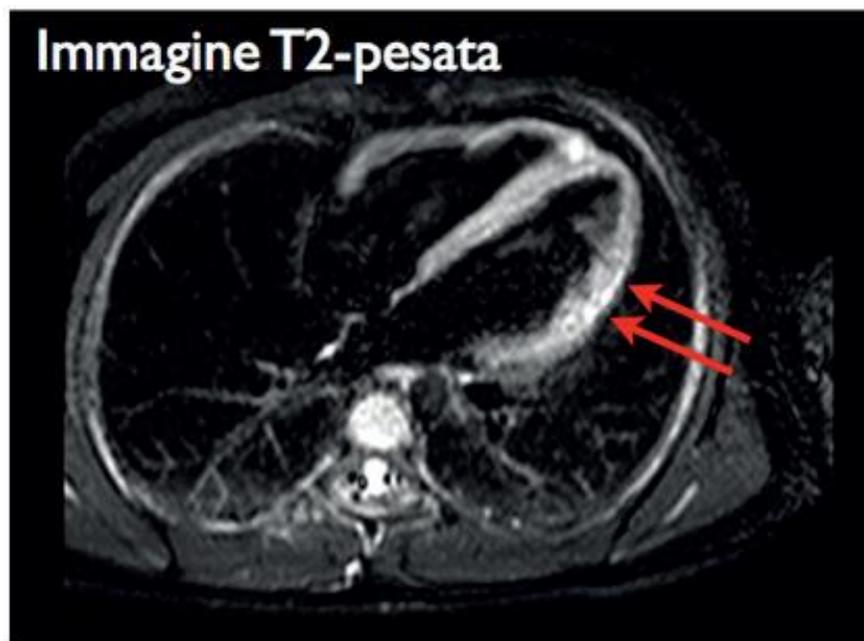
Modalità di captazione del gadolinio



Sensibilità e specificità dei criteri RM per miocardite acuta (vedi testo per la spiegazione)

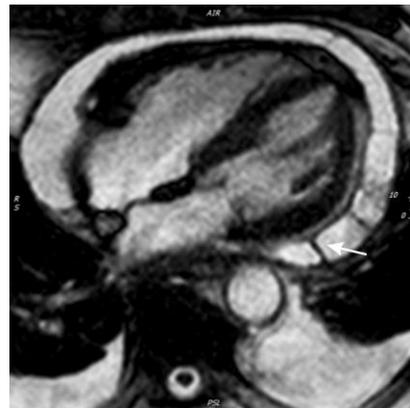
Criterio	Sequenza RM	Dato quantitativo	Sensibilità	Specificità
Edema	STIR T2	T2 SI >2,0	70%	71%
Iperemia	EGE	EGE ratio >4,0	74%	83%
Fibrosi	LGE	LGE >5 DS*	60%	86%

EGE: early gadolinium enhancement; LGE: late gadolinium enhancement; SI: signal intensity; *segnale di LGE >5 deviazioni standard rispetto al segnale dal miocardio remoto alla zona colpita da miocardite

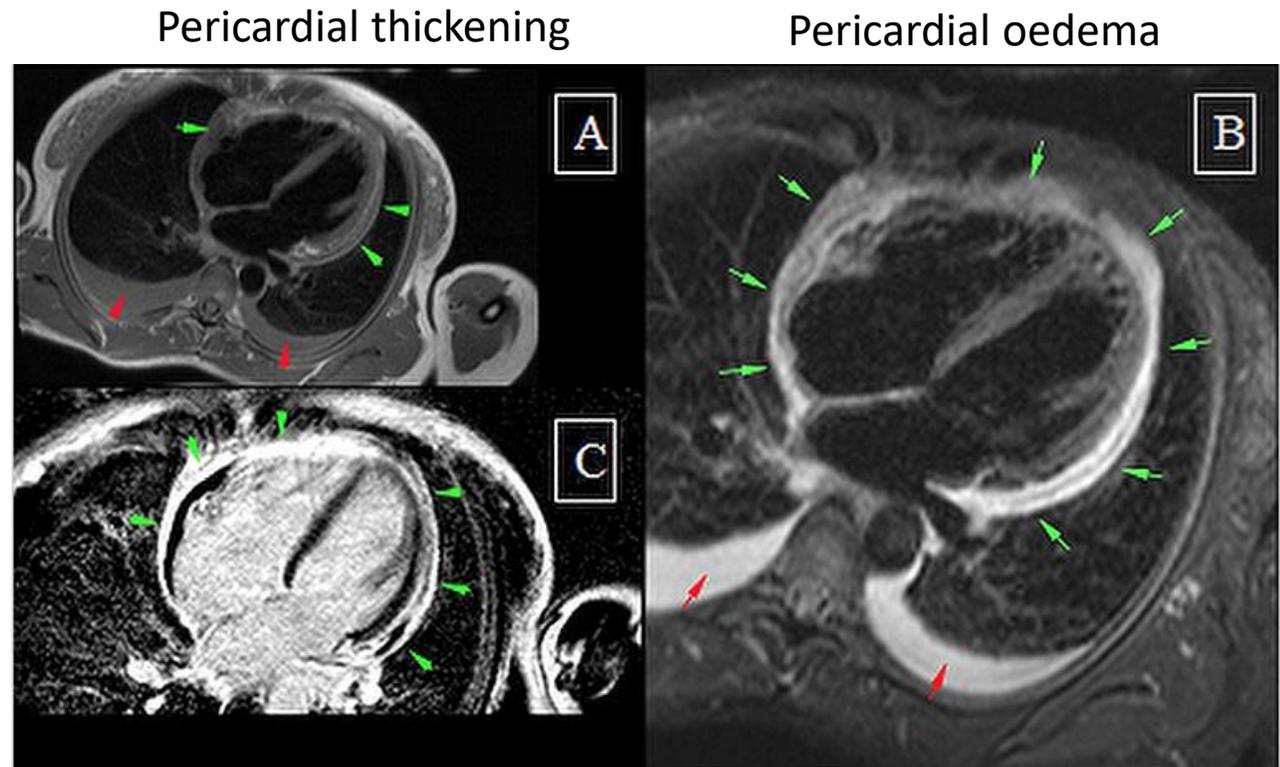


CMR criteria for pericarditis

1. Pericardial thickening $\geq 3\text{mm}$
2. Pericardial oedema
3. Pericardial LGE
4. Pericardial effusion



Pericardial effusion

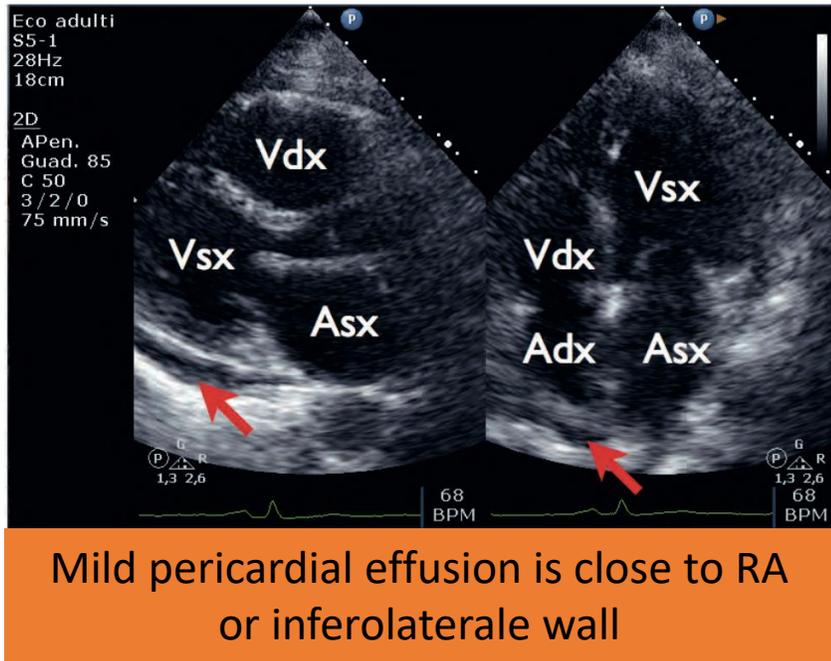


Pericardial thickening

Pericardial oedema

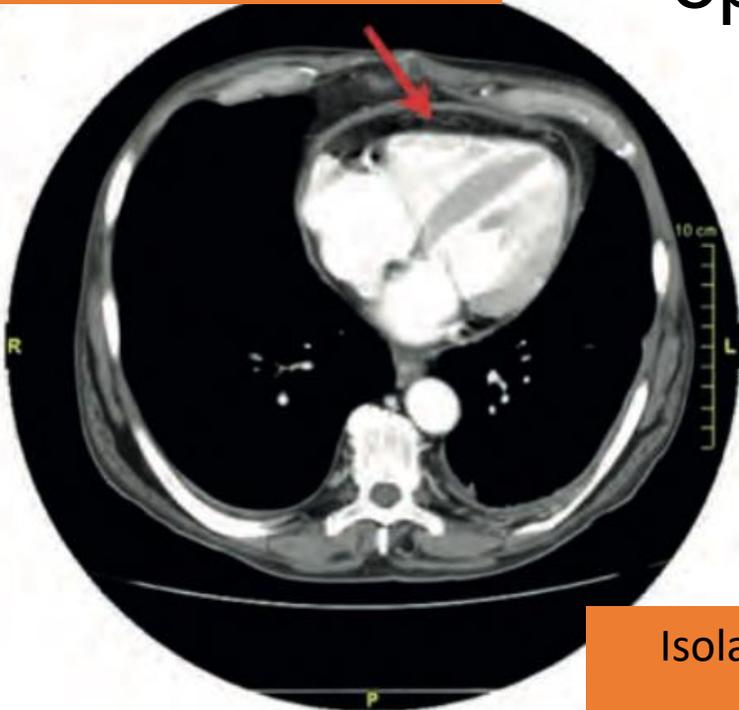
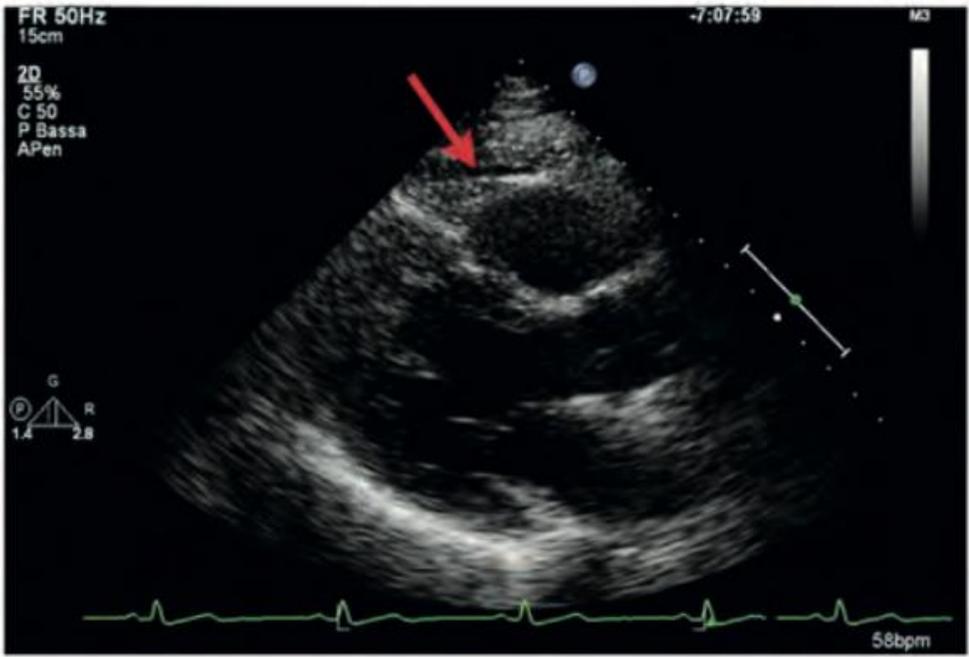
Pericardial LGE

Pleural effusion



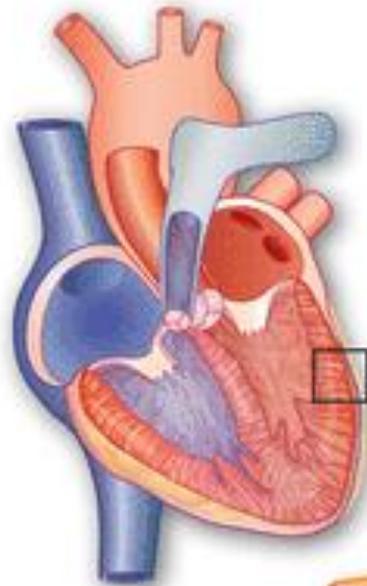
Be aware of epicardial fat!

A



Isolated anterior echo free-space is usually epicardial fat!

Epicardial fat on CMR



Myocardium

Epicardial fat

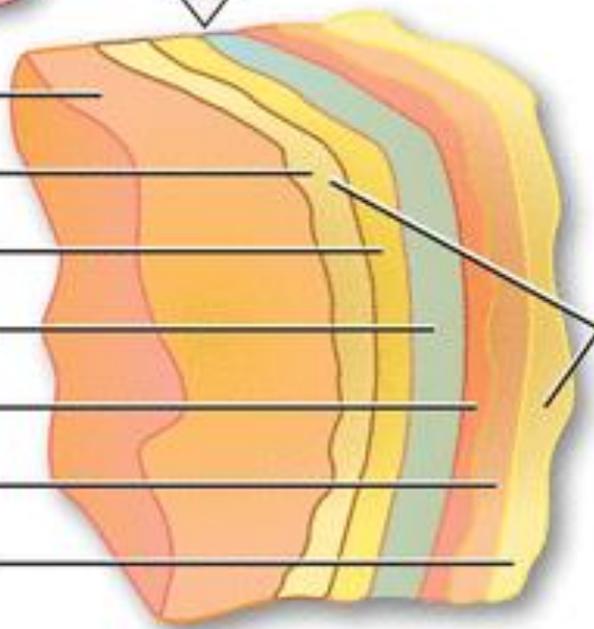
Visceral layer of serous pericardium

Pericardial cavity

Parietal layer of serous pericardium

Fibrous pericardium

Paracardial fat



Pericardial fat

Dimensione Immagine: 512 x 512
WL: 1356 WW: 2712

ASDX

9003867558 (58 y , 58 y)

Rm Cuore Con Mdc
Cardio 2011-5



Zoom: 271% Angoli L-R: 36°, S-I: -54°

Im: 1/30 Series: 8

LittleEndianExplicit

Spessore: 8.00 mm Posizione: -3.39 mm

PISN

TE: 1.672 TR: 3.829

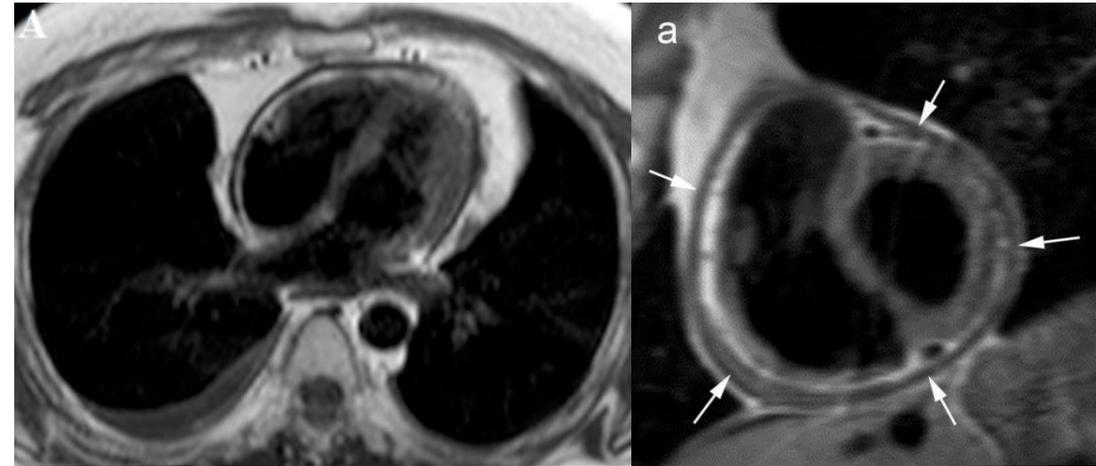
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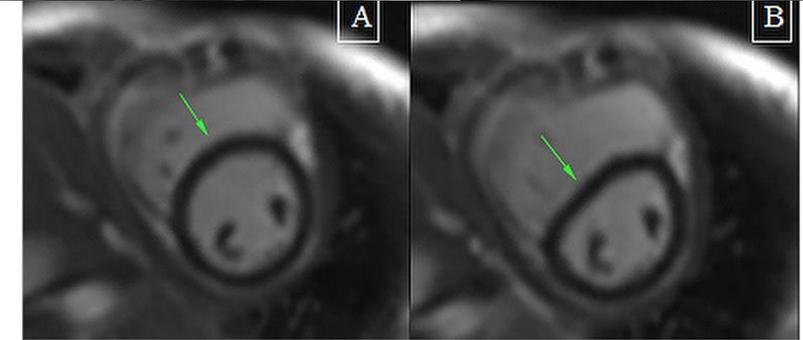
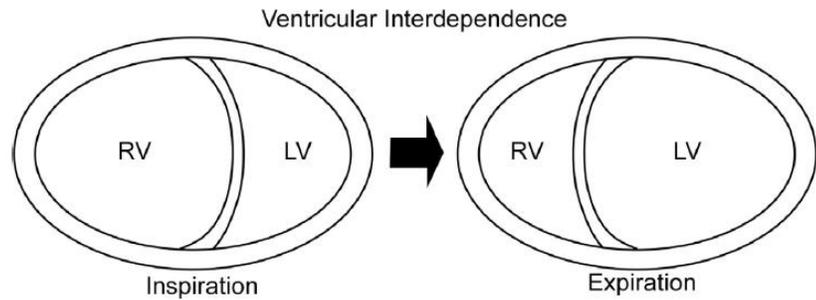
Made In OsiriX

Main CMR findings in constriction

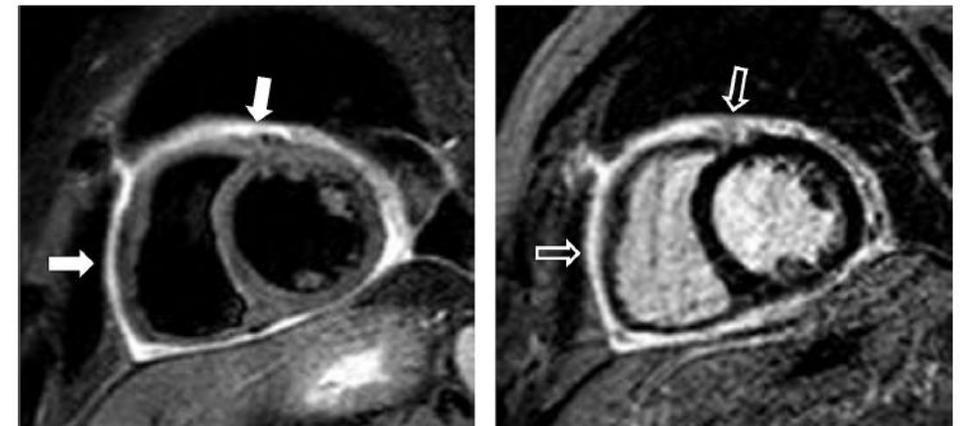
1. Pericardial thickening



2. Ventricular interdependence



3. Pericardial inflammation

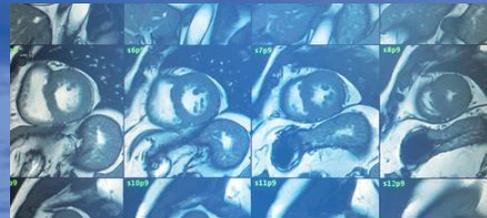


Take home messages

- ✓ Echo and CMR are complementary techniques providing different data;
- ✓ Echo comes first but CMR is necessary whenever a better evaluation of morphology, function, and tissue characterization is needed;
- ✓ CMPs, Myocarditis and Pericarditis represent at least 1/3 of clinical indications for CMR;
- ✓ A team work between Cardiologists and Radiologists provides the best scores in the interest of the patient!

TEAM
TOGETHER
EVERYONE
ACHIEVES
MORE

and we did it....



Manuale pratico di risonanza
magnetica cardiaca

A cura di
Massimo Imazio, Monica Andriani,
Maura Nigro, Luisa Lobetti Bodoni



 Il Pensiero Scientifico Editore

Thank you very much for your attention!