31 GIORNATE CARDIOLOGICHE TORINESI

TURIN
October
24th-26th
2019

UNIVERSITÀ DEGLI STUDI DI TORINO
Facoltà di Medicina e Chirurgia
Dipartimento di Discipline Medico-Chirurgiche
Sezione di Radiodiagnostica

Direttore: Prof. Paolo Fonio

Azienda Ospedaliera Universitaria
Città della Salute e della scienza di Torino
Dipartimento di Diagnostica per Immagini
S.C.D.U.- Radiodiagnostica Universitaria

How to optimize a cardiac RM examination?

riccardo.faletti@unito.it

Torino, 25th October 2019

- Before CMR to optimize examination
- Patient characteristic and clinical conditions, MR sequences
- Contrast media administration

Cardiac MR is the answer but which is the question?

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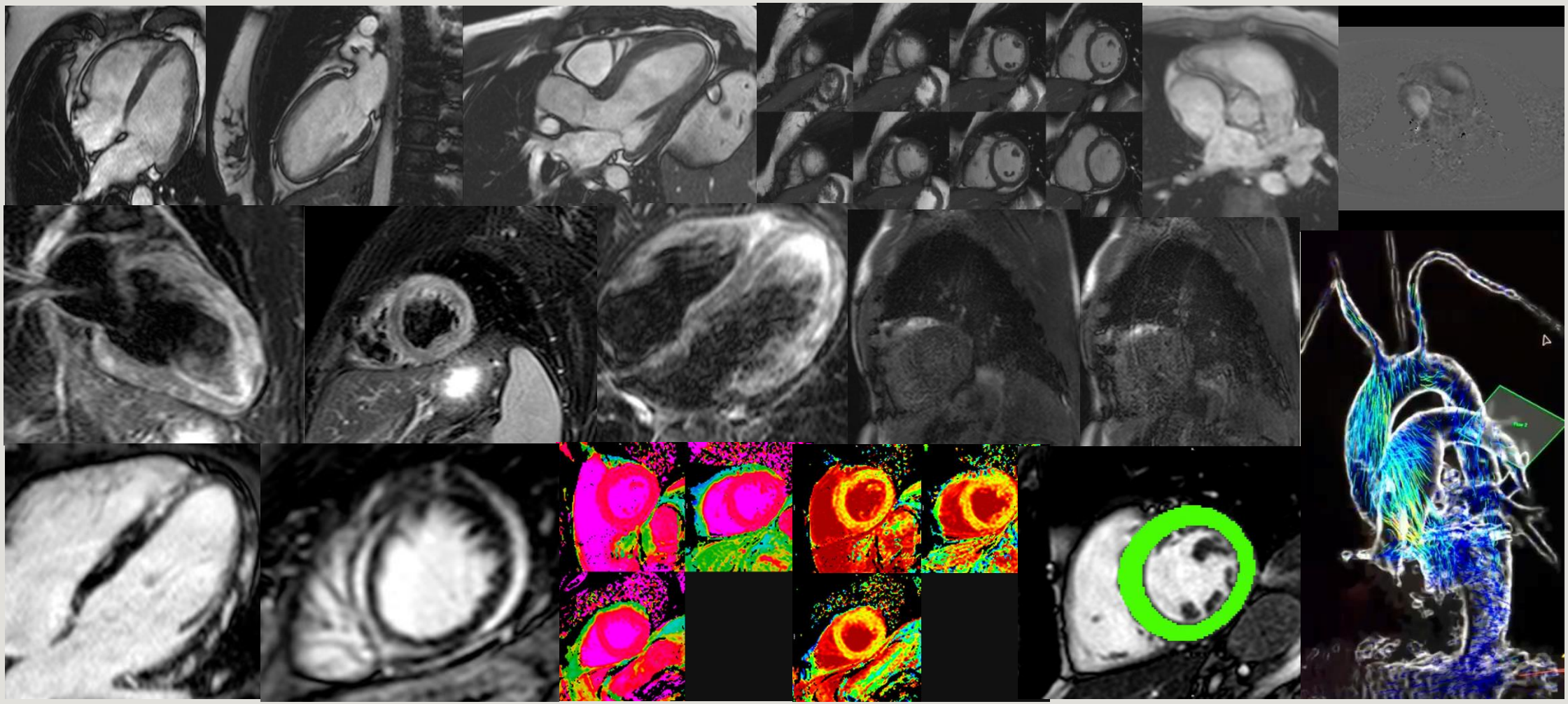

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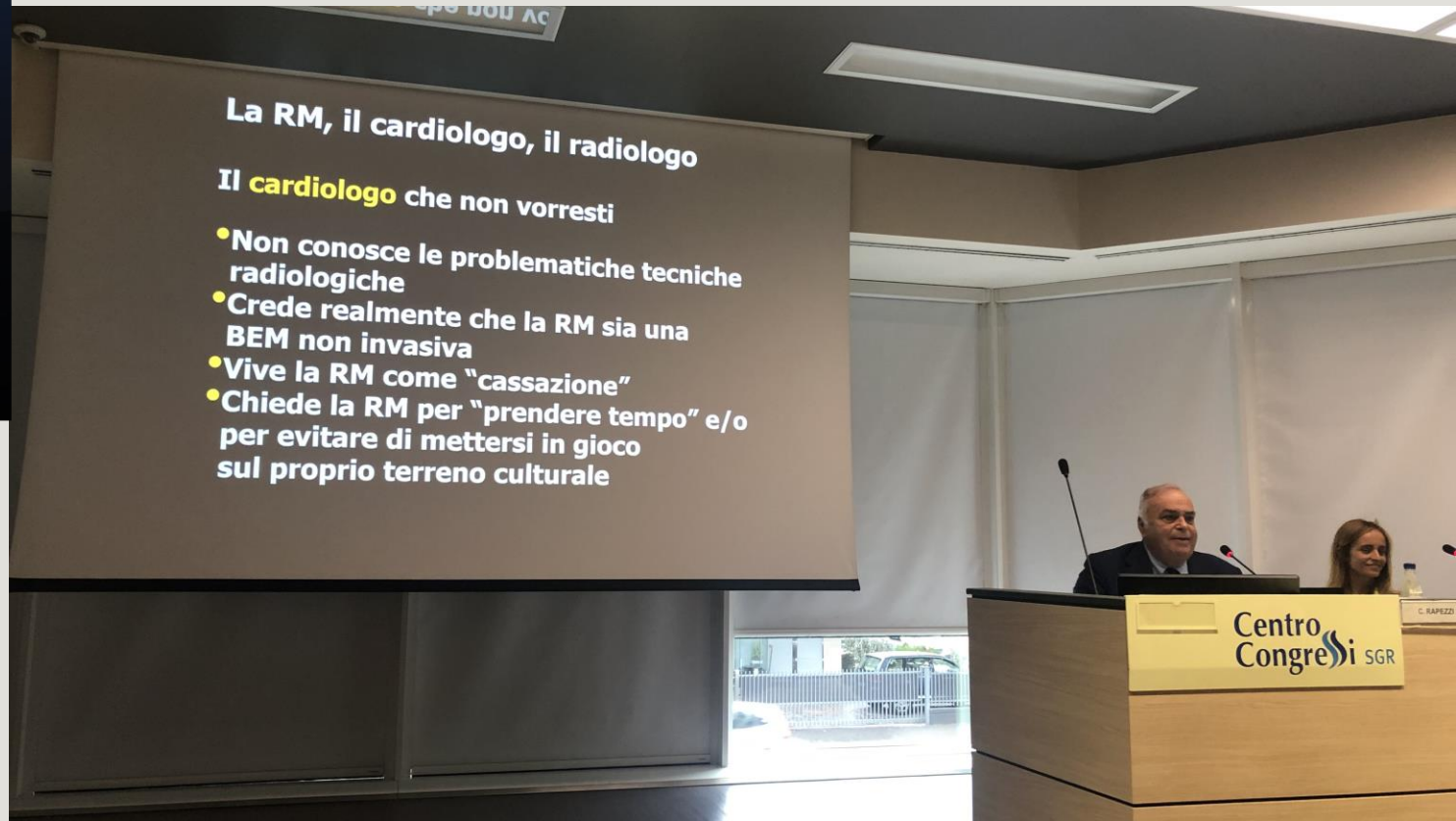
Rimini, 2 Ottobre 2019

RISONANZA MAGNETICA CARDIACA OGGI
Radiologo e Cardiologo insieme



Patient characteristic and clinical conditions, MR sequences

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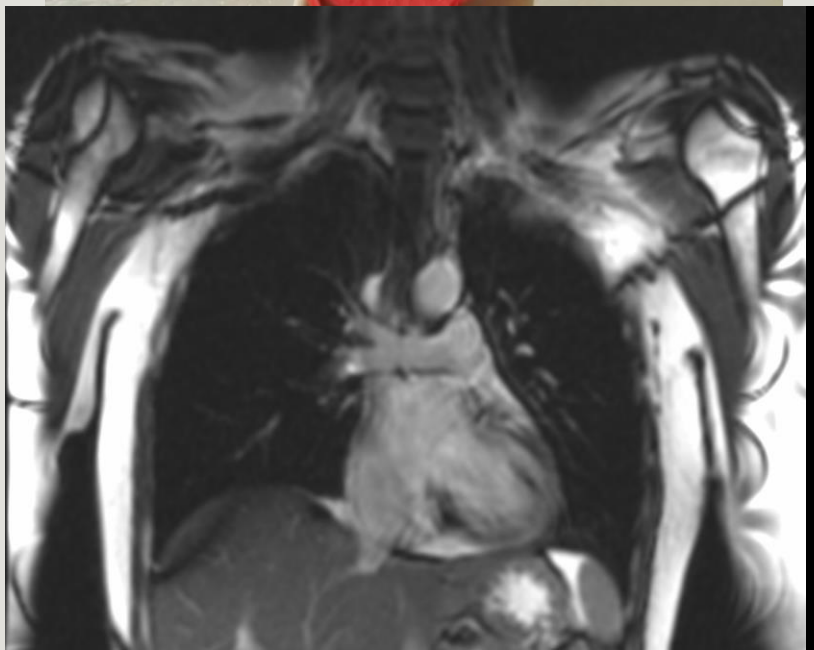
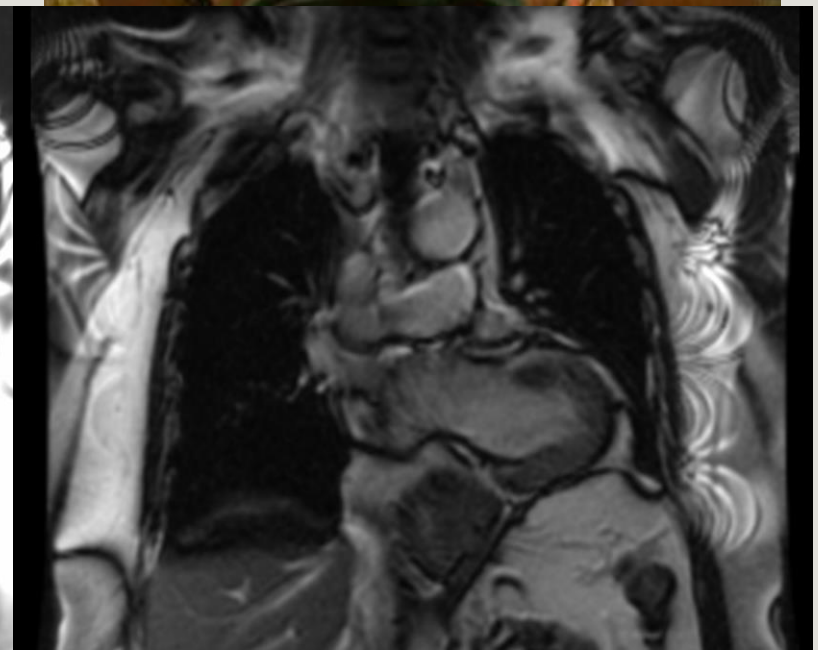
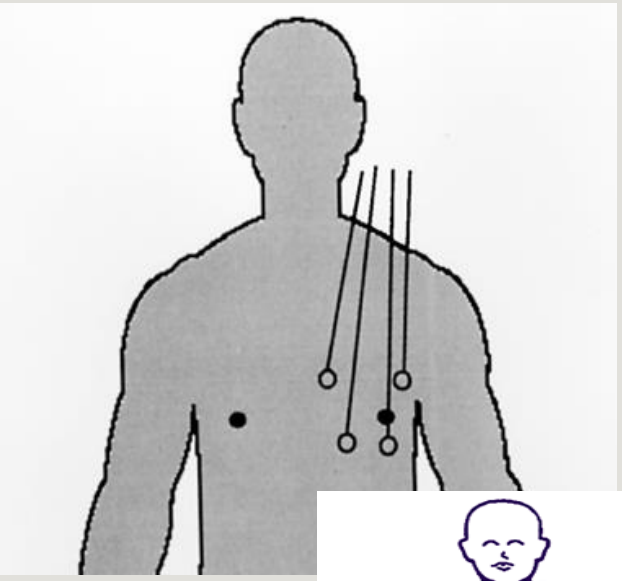
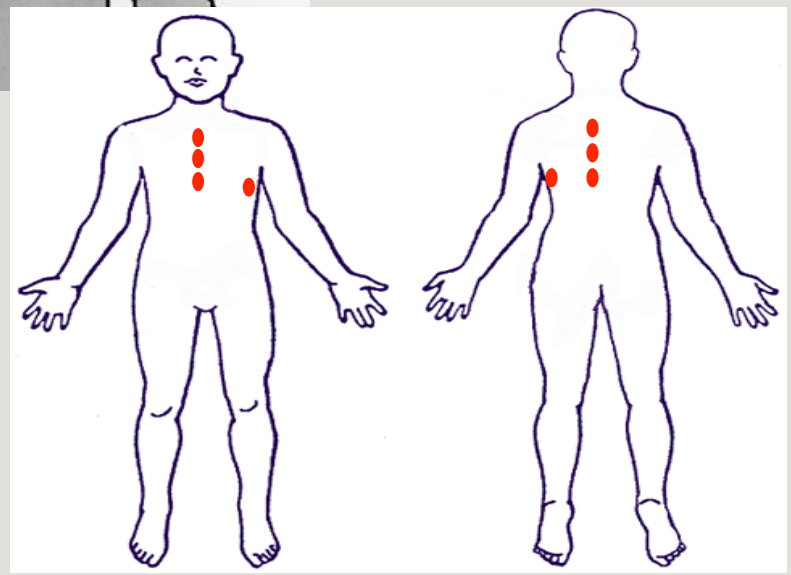
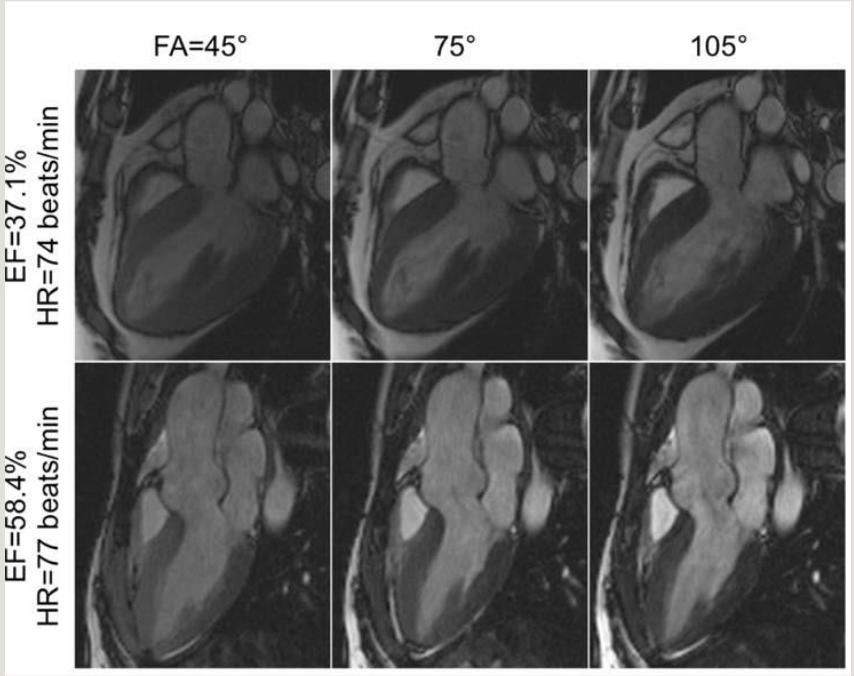


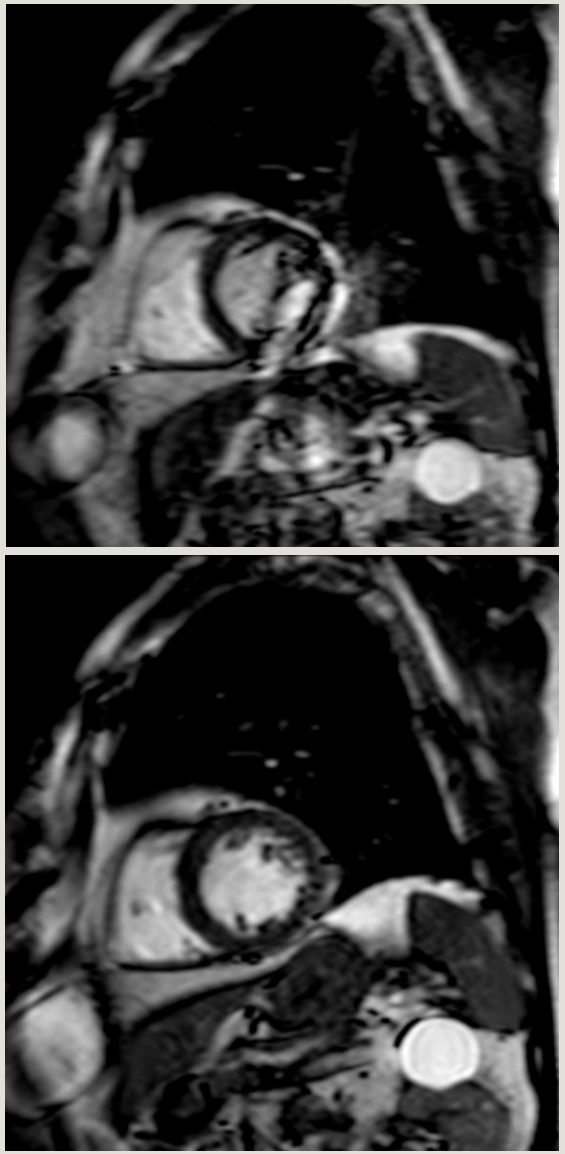




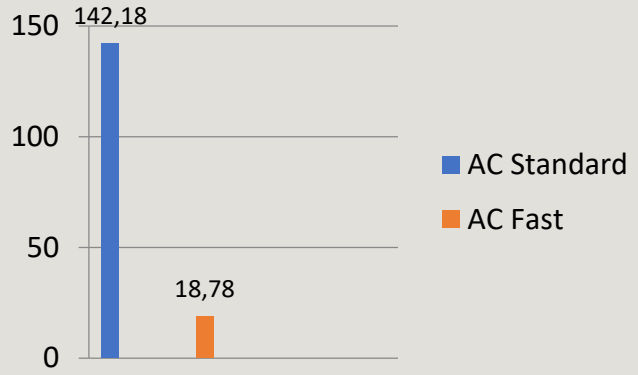




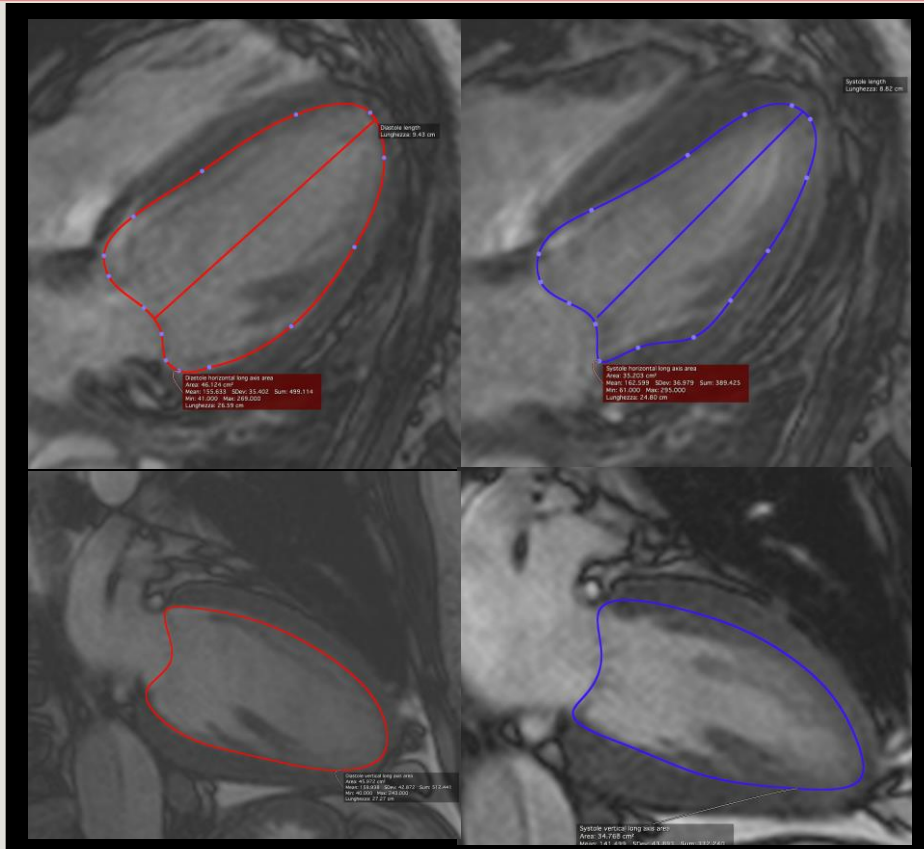
Magnetic Resonance in Medicine 73:1095–1103 (2015)
Optimal Flip Angle for High Contrast Balanced SSFP Cardiac Cine Imaging

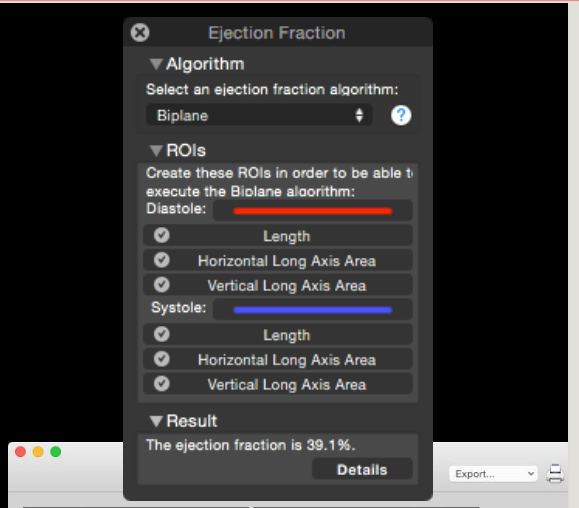


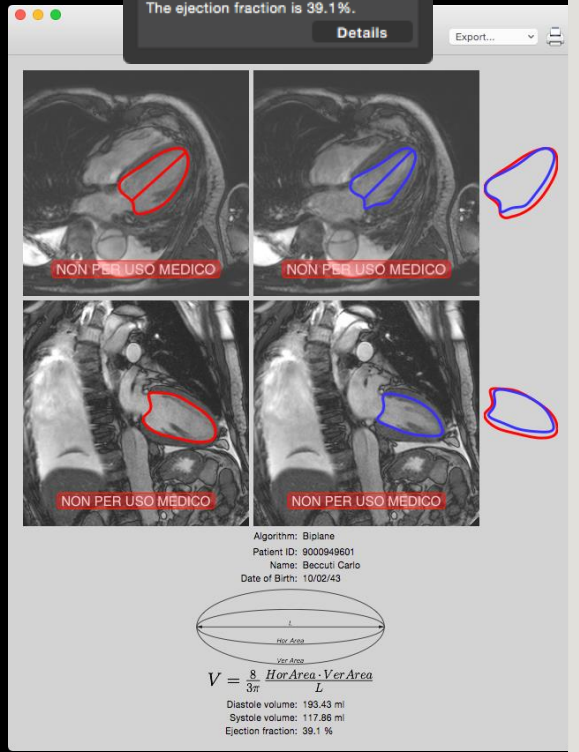
Parametri	AC Standard	AC Fast
Fasi cardiache	30	20
Spessore	8 mm	10 mm
Matrice	220 x 220	140 x 120
Gap slices	0 mm	6 mm
Turbo SENSE	1,7	3
Voxel size	1,67 x 1,67 mm	2,00 x 2,00 mm

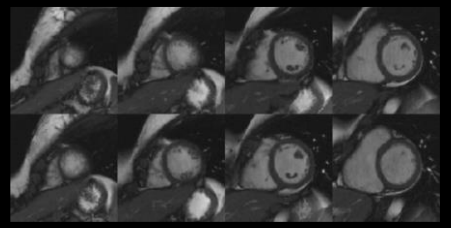


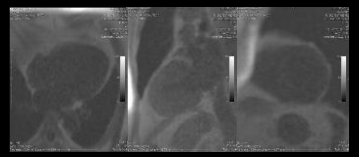
- **LV EDV** p= 0,2360
- **LV ESV** p= 0,1537
- **RV EDV** p= 0,7089
- **RV ESV** p= 0,2914
- **LV EF** p= 0,2455
- **RV EF** p= 0,1698

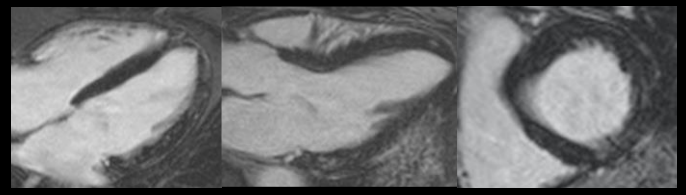


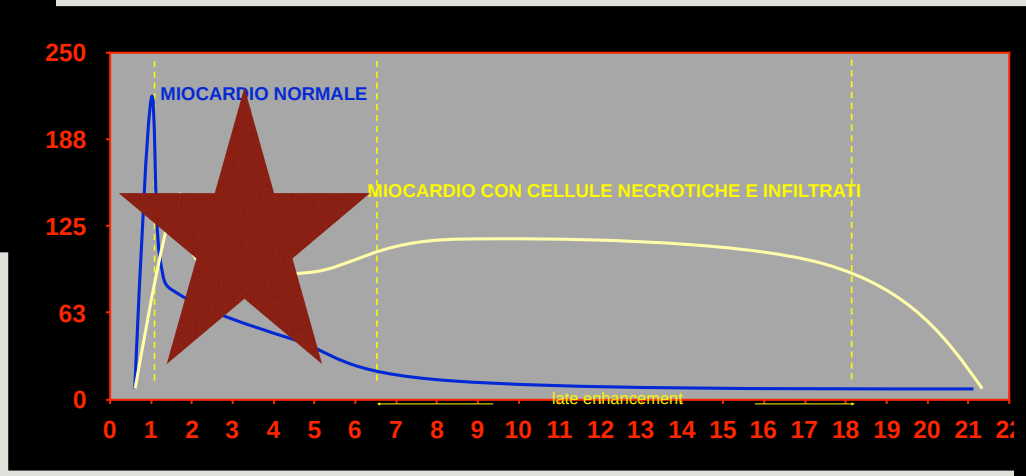

Ejection Fraction
Algorithm
Select an ejection fraction algorithm:
Biplane
ROIs
Create these ROIs in order to be able t
execute the Biolane algorithm:
Diastole:
Length
Horizontal Long Axis Area
Vertical Long Axis Area
Systole:
Length
Horizontal Long Axis Area
Vertical Long Axis Area
Result
The ejection fraction is 39.1%.
Details

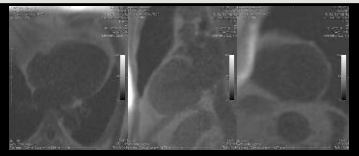

Export...
NON PER USO MEDICO
NON PER USO MEDICO
NON PER USO MEDICO
NON PER USO MEDICO
Algorithm: Biplane
Patient ID: 9000949601
Name: Beccuti Carlo
Date of Birth: 10/02/43
Hor Area
Ver Area
$V = \frac{8}{3\pi} \frac{HorArea \cdot VerArea}{L}$
Diastole volume: 193.43 ml
Systole volume: 117.86 ml
Ejection fraction: 39.1 %

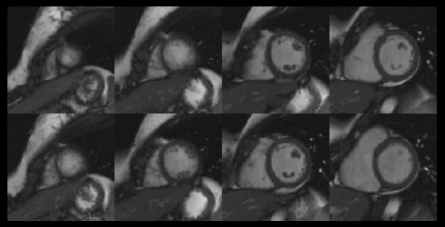


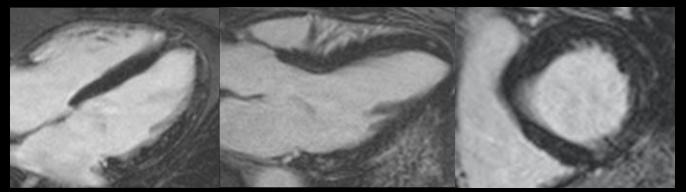





250
188
125
63
0
MIOCARDIO NORMALE
MIOCARDIO CON CELLULE NECROTICHE E INFILTRATI
late enhancement
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21







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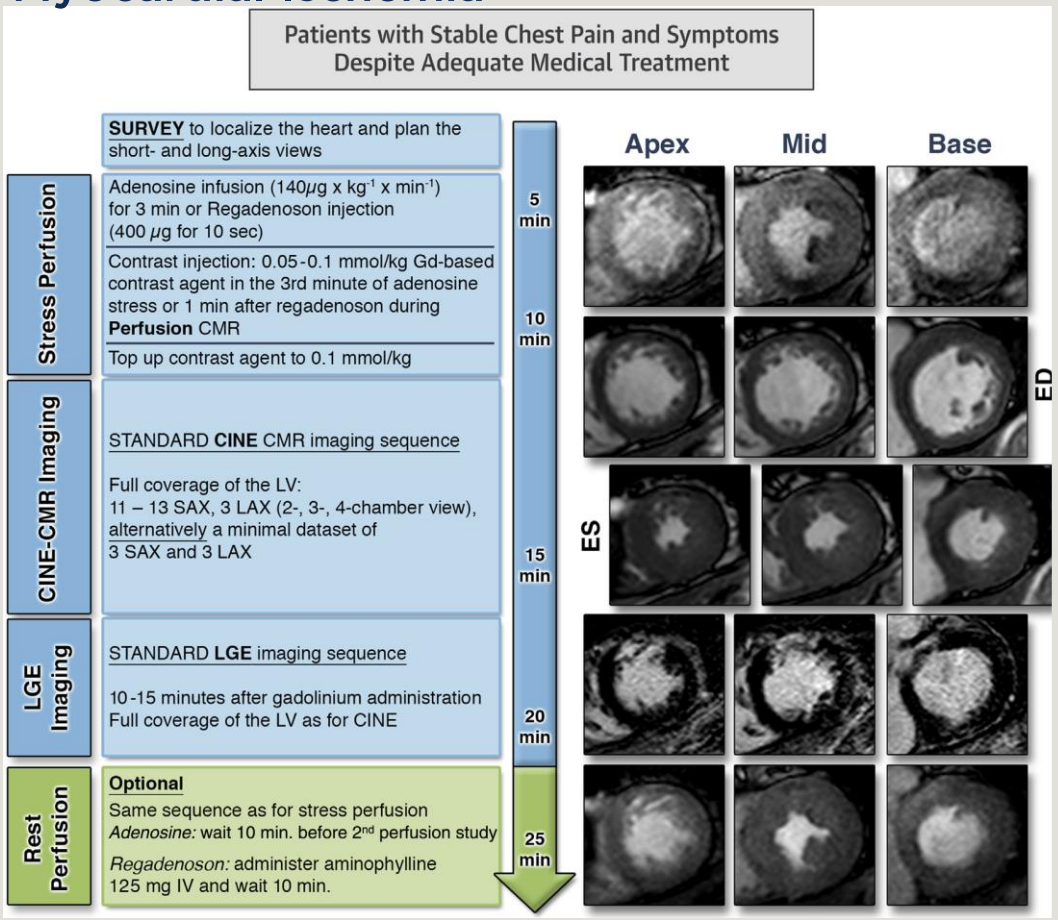
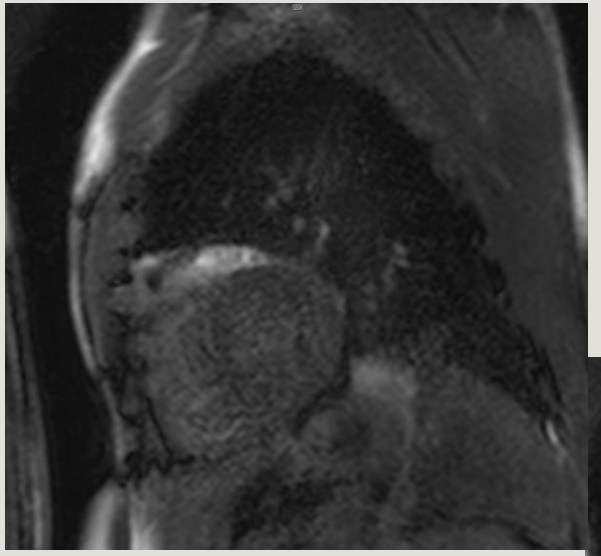
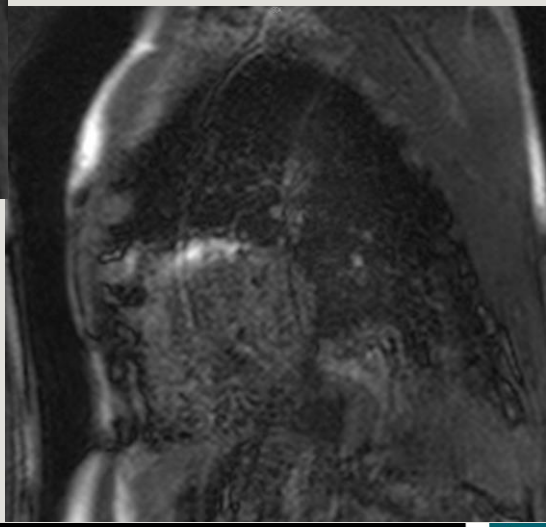
CMR First-Pass Perfusion for Suspected Inducible Myocardial Ischemia







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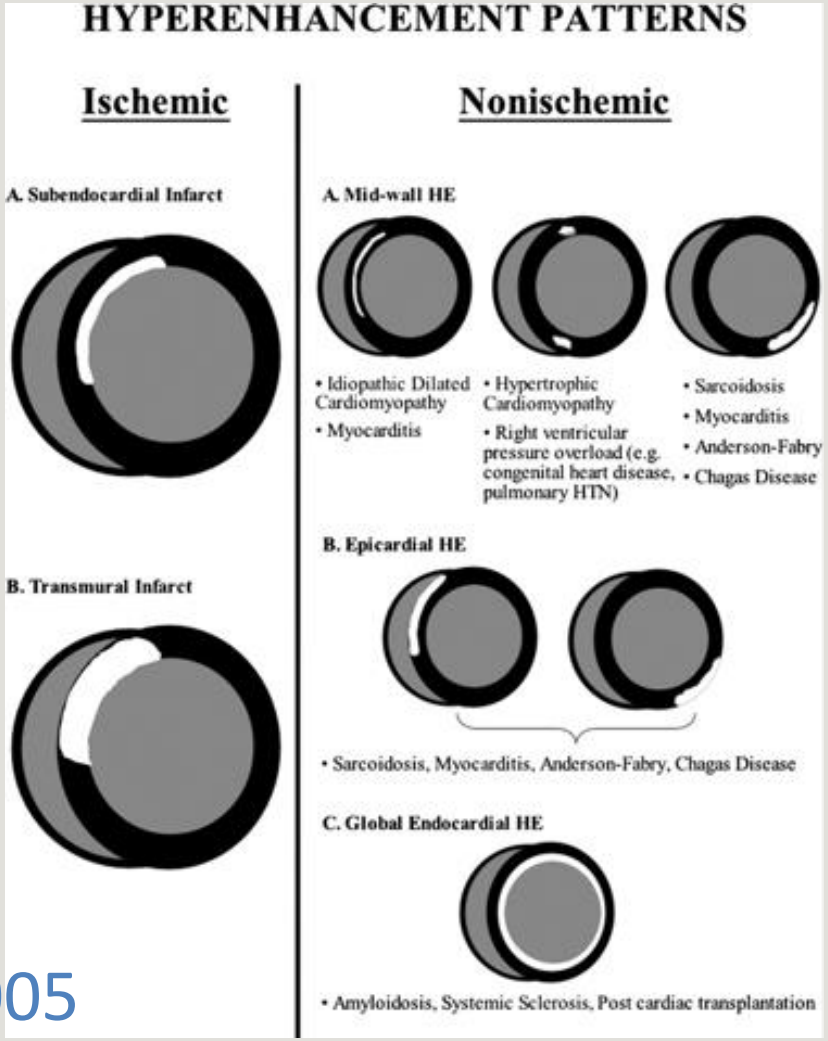
Erik B. Schelbert, MD, MS
John P. Greenwood, MBChB, PhD
James C. Moon, MD, MRCP

Splenic Switch-off: A Tool to Assess Stress Adequacy in Adenosine Perfusion Cardiac MR Imaging[1]

Radiology
radiology.rsna.org ▪ Radiology: Volume 276: Number 3—September 2015

Mahrholdt H, Wagner A, Judd RM, Sechtem U, Kim RJ. Delayed enhancement cardiovascular magnetic resonance assessment of non-ischaemic cardiomyopathies. Eur Heart J. 2005 Aug;26(15):1461-74.



2005

When Should We Use Contrast Material in Cardiac MRI?

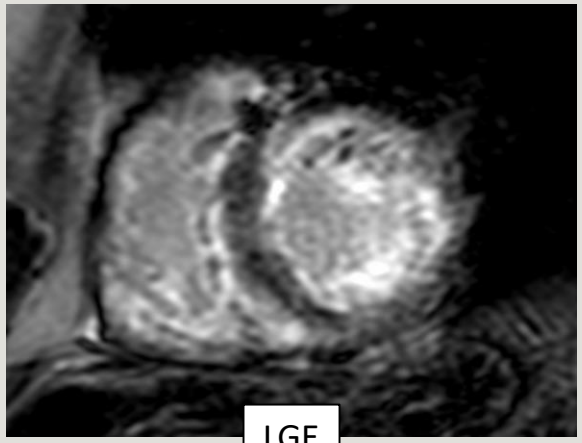
Elisabeth H.M. Paiman, MD* and Hildo J. Lamb, MD, PhD

Indication	MRI protocol with contrast material	MRI protocol without contrast material
Myocardial infarction (viability assessment, postreperfusion therapy)	LGE imaging ECV mapping	Native T1 mapping
Myocardial ischemia (viability assessment, postreperfusion therapy)	Stress perfusion imaging	Stress wall motion imaging
Nonischemic cardiomyopathy (including arrhythmia and myocarditis)	LGE imaging ECV mapping Early gadolinium enhancement (for myocarditis)	Native T1 mapping T2-weighted black and bright blood imaging (not discussed) T2 and T2* mapping (not discussed)
Cardiac mass	First-pass imaging Postcontrast T1-weighted imaging LGE imaging	T1- and T2-weighted imaging (with and without fat suppression) Native T1 and T2 mapping
Coronary artery anomalies/patency	Contrast-enhanced T1-weighted MRA	Time-of-flight imaging Balanced SSFP imaging
Large vessels (including congenital disease and pulmonary vein evaluation pre- and postablation)	Contrast-enhanced T1-weighted MRA (also for pulmonary vein evaluation)	Balanced SSFP imaging (thoracic aorta) Partial-Fourier FSE imaging (peripheral arteries) Time-of-flight imaging Phase-contrast imaging Quiescent-interval slice-selective (QISS) imaging

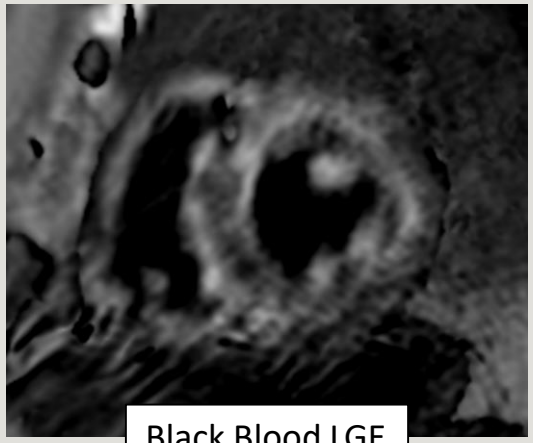
2017

Clinical experience

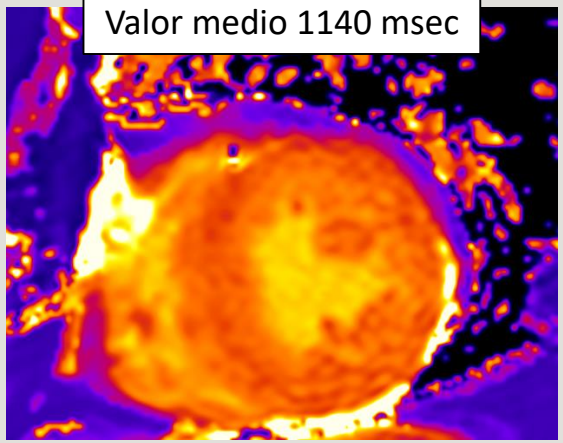
CINE-SSFP



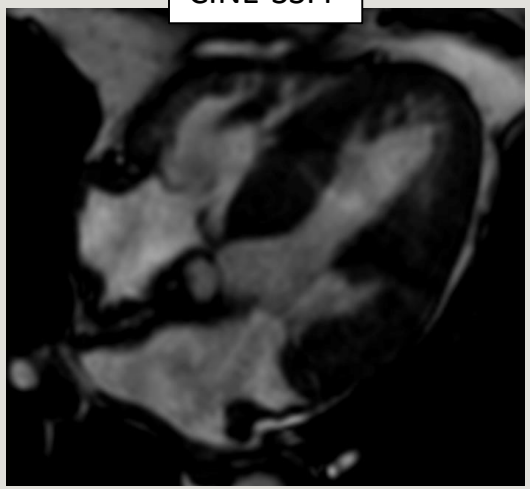
LGE

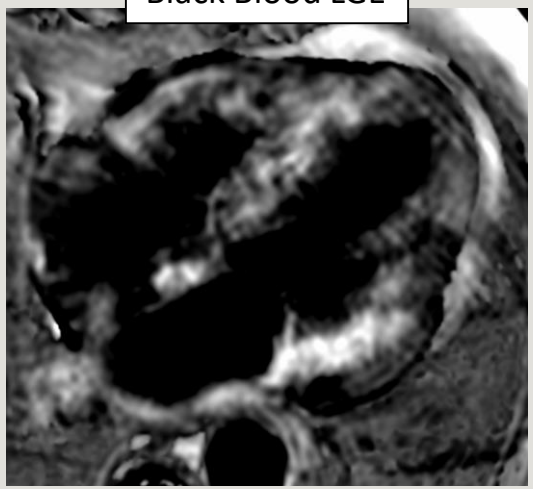


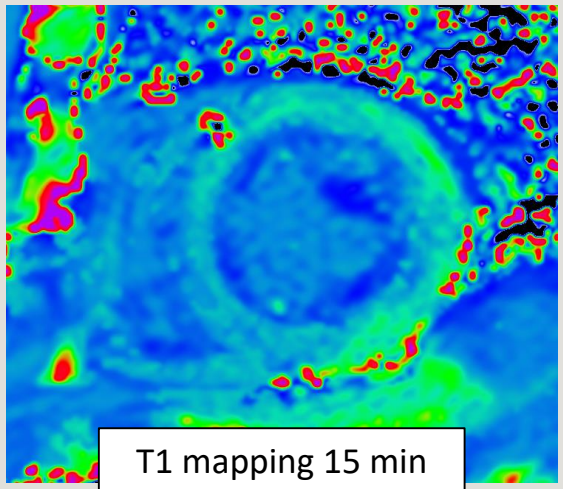
Black Blood LGE



T1 mapping nativo
Valor medio 1140 msec

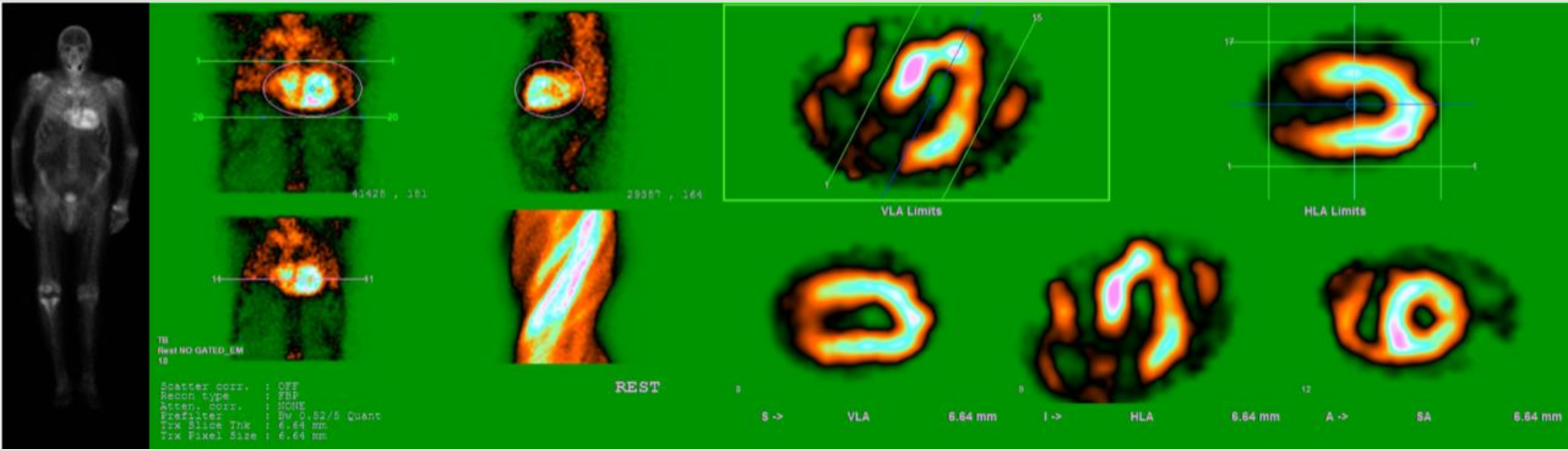






T1 mapping 15 min
Valor medio ECV 55%

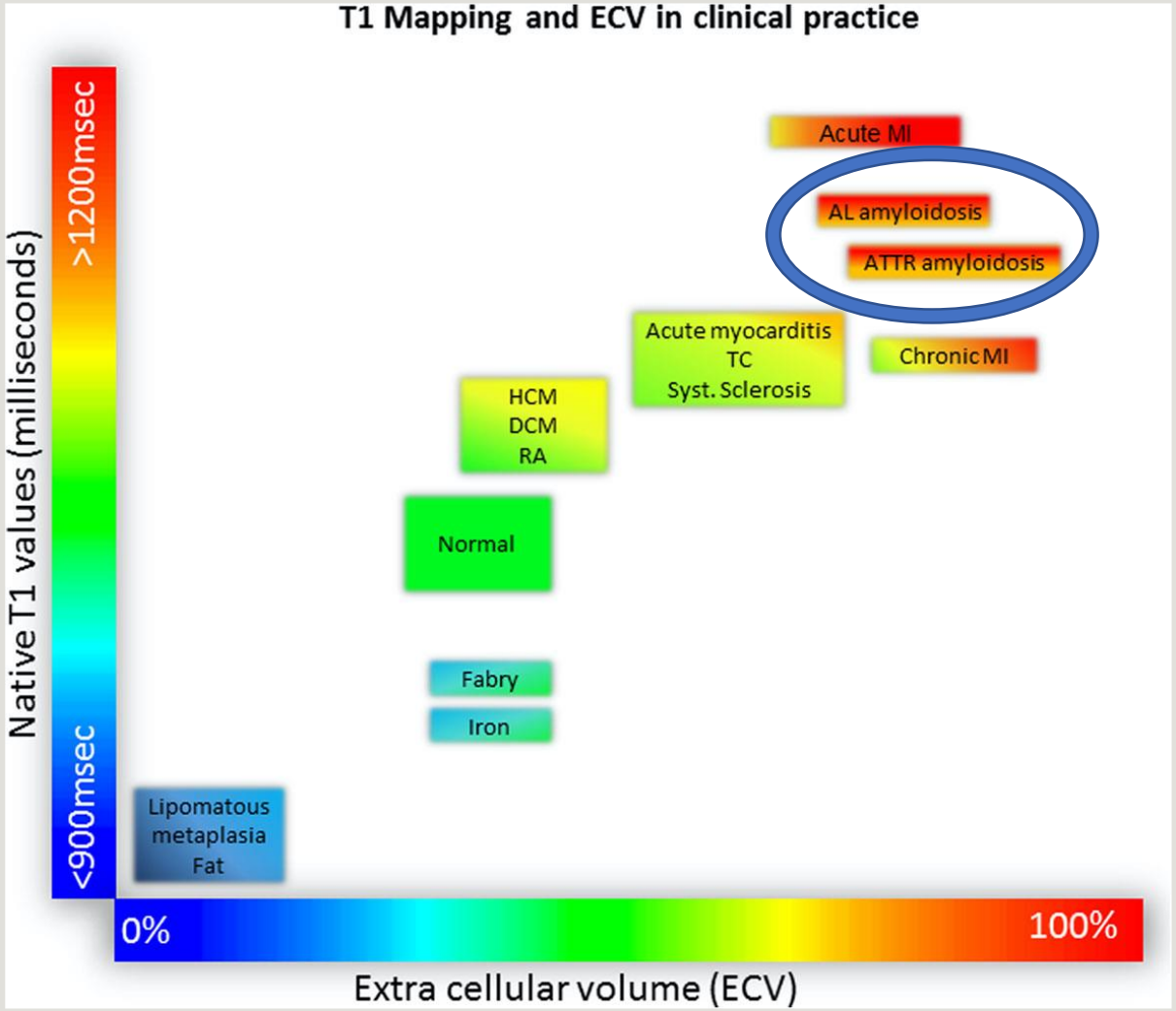
Clinical experience



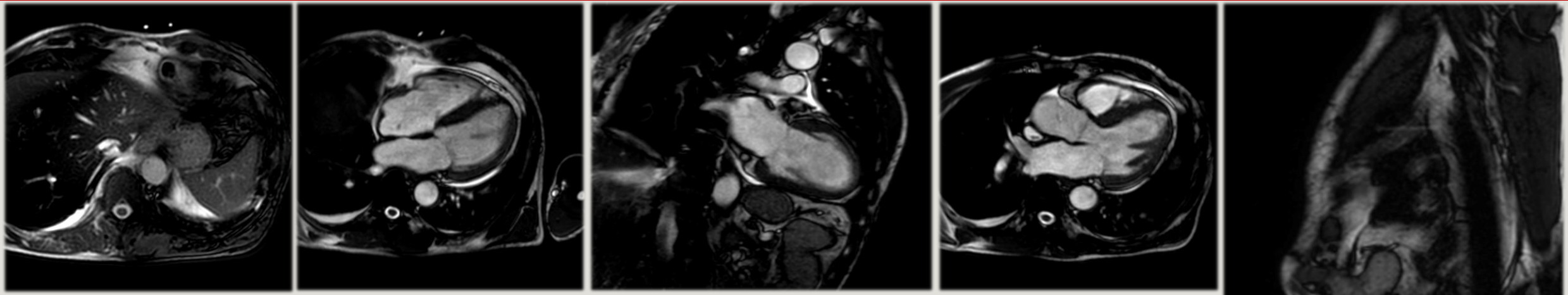
Clinical experience

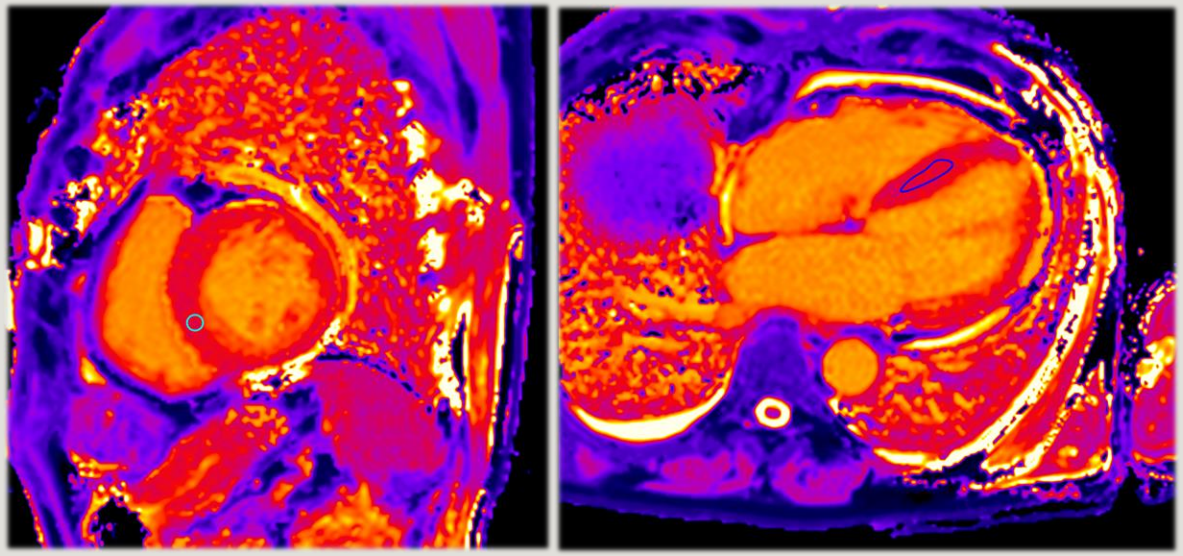
Patient male, 75 yo.

- known CAD treated with DES and recent hospitalization for dyspnea and subsequent nephrotic syndrome.
- Clinical and echocardiographic suspicion of cardiac amyloidosis in renal failure.



Clinical experience





Native T1: 1100 msec

Take Home Message

To optimize a cardiac MR examination it is essential to evaluate the clinical indication and use a study protocol appropriate to the information requested and the technical requirements available.

Knowledge of the technique is fundamental to obtain the best compromise between image quality and acquisition time