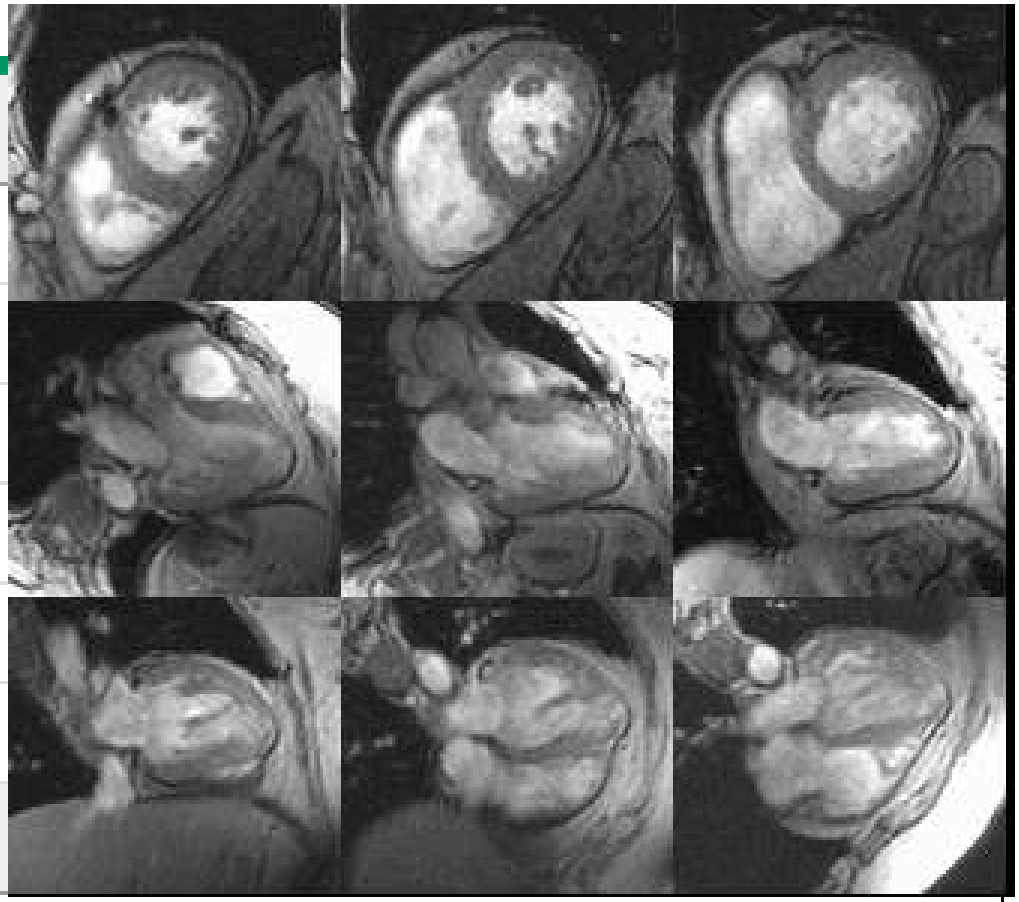
Risonanza magnetica cardiaca
confronto con le metodiche tradizionali:
Ruolo attuale nella clinica,indicazioni,limiti

Advantages and disadvantages of cardiac MRI



Advantages
Three-dimensional tomographic images
High resolution
Intrinsic high contrast
No ionizing radiation
No interference from lung or bone
Multiple imaging techniques in a single system
Disadvantages
Contraindicated with certain medical implants such as aneurysm clips and pacemakers
Acquisition time can be lengthy
Electrocardiogram can be distorted by the magnetic field interfering with monitoring of acutely ill patients
Requires gating
Claustrophobic

The New York Times
Wednesday, May 30, 2007

Health

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS

FITNESS & NUTRITION | HEALTH CARE POLICY | MEN

An M.R.I. Machine For Every Doctor? Someone Has to Pay

By REED ABELSON
Published: March 13, 2004

PRINT

	CAD	VALVULOPATIA	MIOCARDIOPATIA
ecocardiografia	+	+++	++
SPECT	+++	-	-
MRI	++	+	+++
CT	++	+	-

Quale ruolo ha la risonanza magnetica cardiaca nella pratica clinica?

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doi:10.1016/j.jacc.2006.07.003

ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR APPROPRIATENESS CRITERIA

ACCF/ACR/SCCT/SCMR/
ASNC/NASCI/SCAI/SIR 2006 Appropriateness
Criteria for Cardiac Computed Tomography
and Cardiac Magnetic Resonance Imaging*

Quando uno studio di imaging è appropriato?

"uno studio di imaging appropriato è quello in cui l'informazione incrementale attesa associata al giudizio clinico supera le conseguenze negative attese di un margine sufficientemente ampio per una specifica indicazione per la quale il trattamento è generalmennte considerato come accettabile e ragionevole."

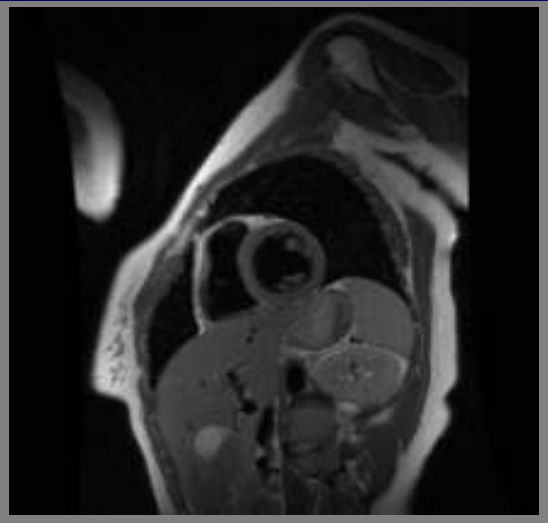
Indicazioni appropriate (Score 7 – 9)

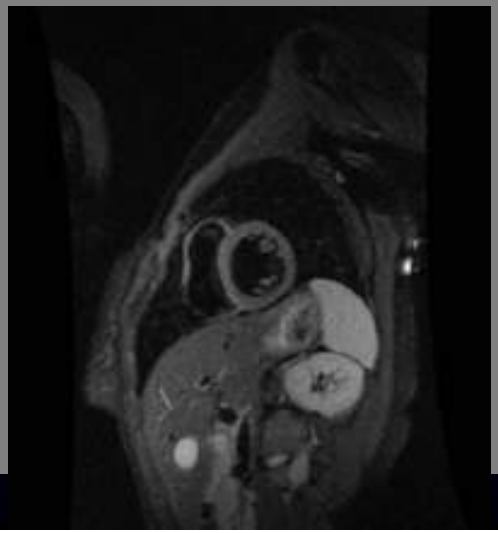
INDICAZIONI APPROPRIATE (SCORE 9)

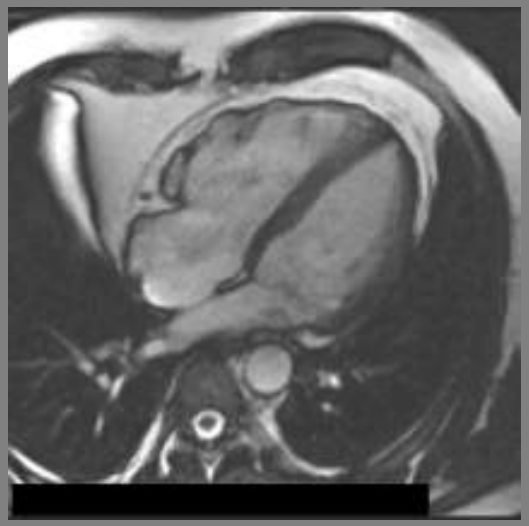
CARDIOPATIE CONGENITE

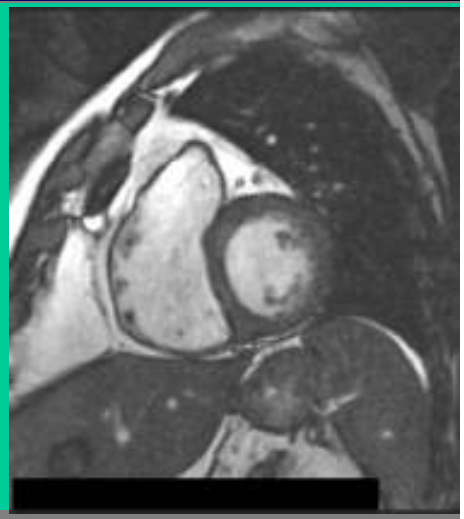
INDICAZIONI APPROPRIATE (SCORE 9)

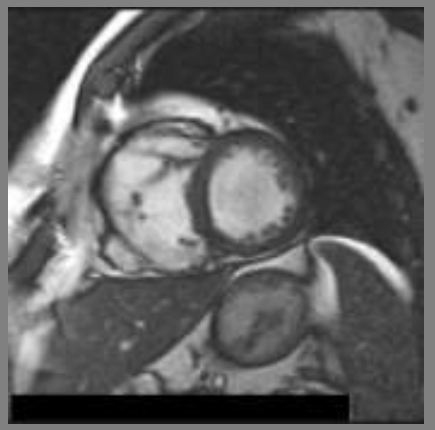
CARDIOPATIA ARITMOGENA VENTRICOLO DESTRO











Indicazioni appropriate CRM (Score 8)

- **Valutazione funzione dopo IMA o scompenso cardiaco**
- **Scarsa finestra eco o test discordanti clinicamente rilevanti**

» E-Journal - Volume 5

PRINT VERSION

16 May 2007 Vol5 N°33

Topic: Non-invasive imaging: Echocardiography, MR/CT, Nuclear

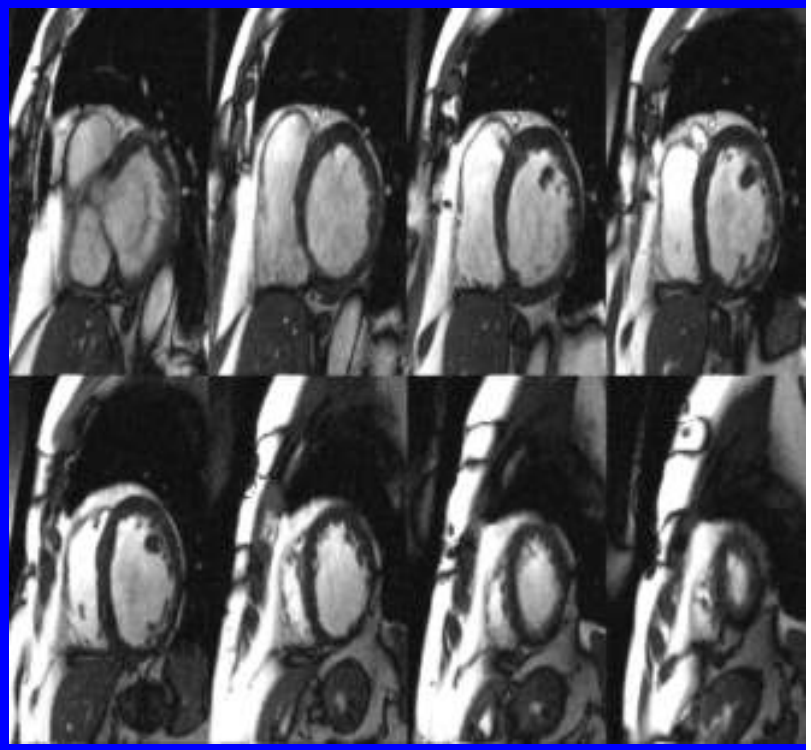
Cardiovascular magnetic resonance imaging in patients with heart failure

Prof. E. Nagel
Berlin, Germany
Treasurer, working group on Cardiovascular Magnetic Resonance

Within one CMR examination a number of different questions can be answered:

- Ventricular volume
- Stroke volume
- Ejection fraction
- Wall thickness and thickening
- Valvular function
- Regurgitant volume
- Fibrosis (amount, transmurality, underlying etiology)

If these questions can be adequately solved with echocardiography, the underlying etiology can be determined and a more exact quantification is not needed, MR imaging is not required. However, if open questions remain, CMR helps to answer these questions and, thus, optimally guide therapy.



Indicazioni appropriate CRM (Score 7-9)

- Valutazione di massa e volumi e funzione LV/RV
- Valutazione cardiopatie congenite
- Valutazione per dissezione aortica
- Malattia aritmogena del VDx
- Pazienti con sincope o aritmie ventricolari
- Valutazione di masse cardiache ed uso di contrasto per perfusione ed enhancement
- Valutazione del pericardio
- Valutazione delle vene polmonari per ablazione **FA**

RISONANZA MAGNETICA CARDIACA
CARDIOPATIA ISCHEMICA

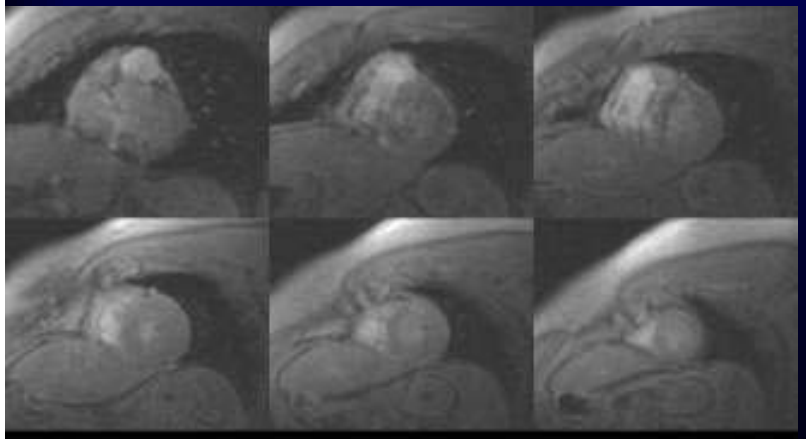
- ***Analisi della funzione e cinetica parietale***

Analisi combinata: cinetica –perfusione- vitalità

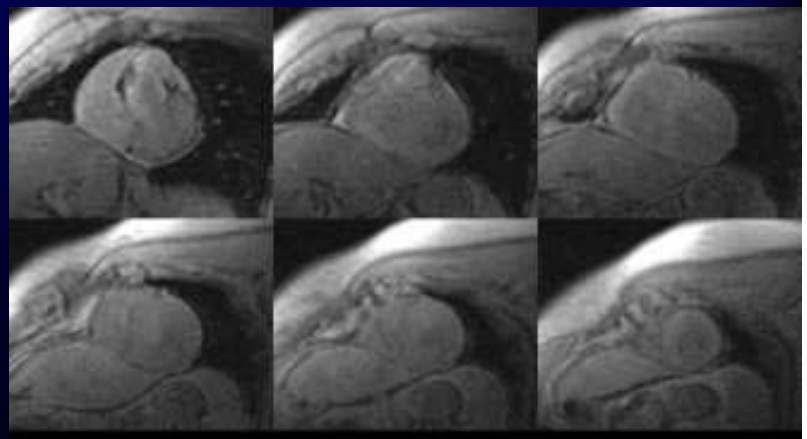
- ***Studio delle coronarie: anomalie …***

riposo

stress



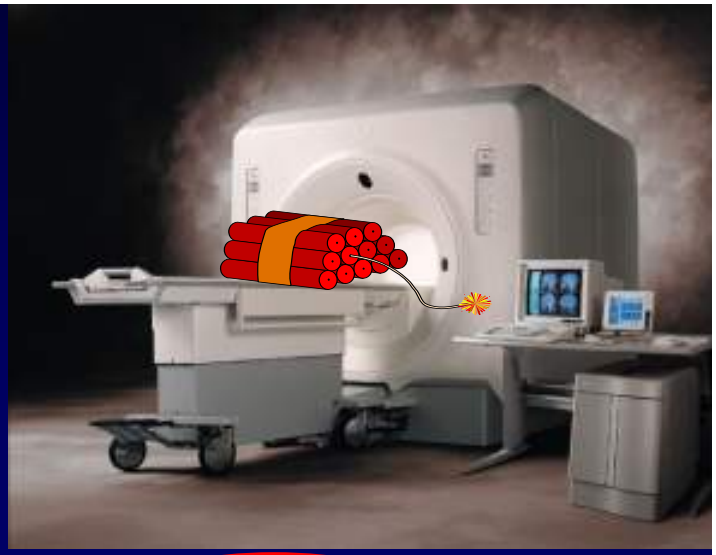
Ischemia inferosettale da malattia RCA



RM da stress

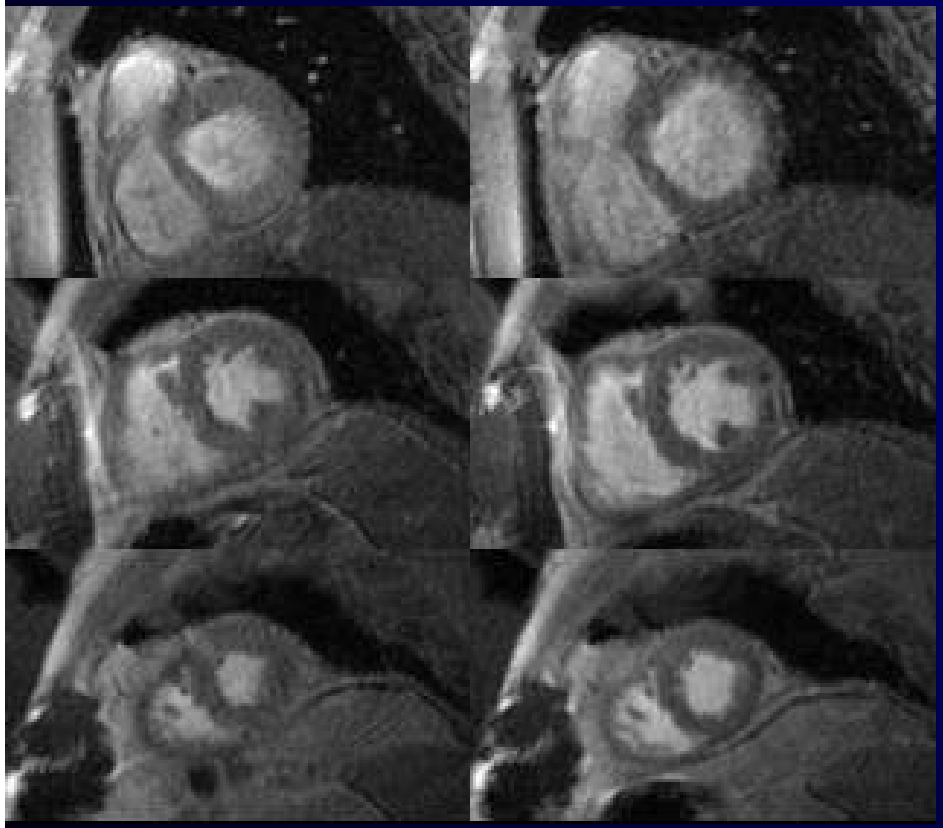
Hundley, Circulation 2002
Jahnke,Circulation 2007

Sensibilità speificità 83%
Alto valore prognostico



È un esame sicuro?

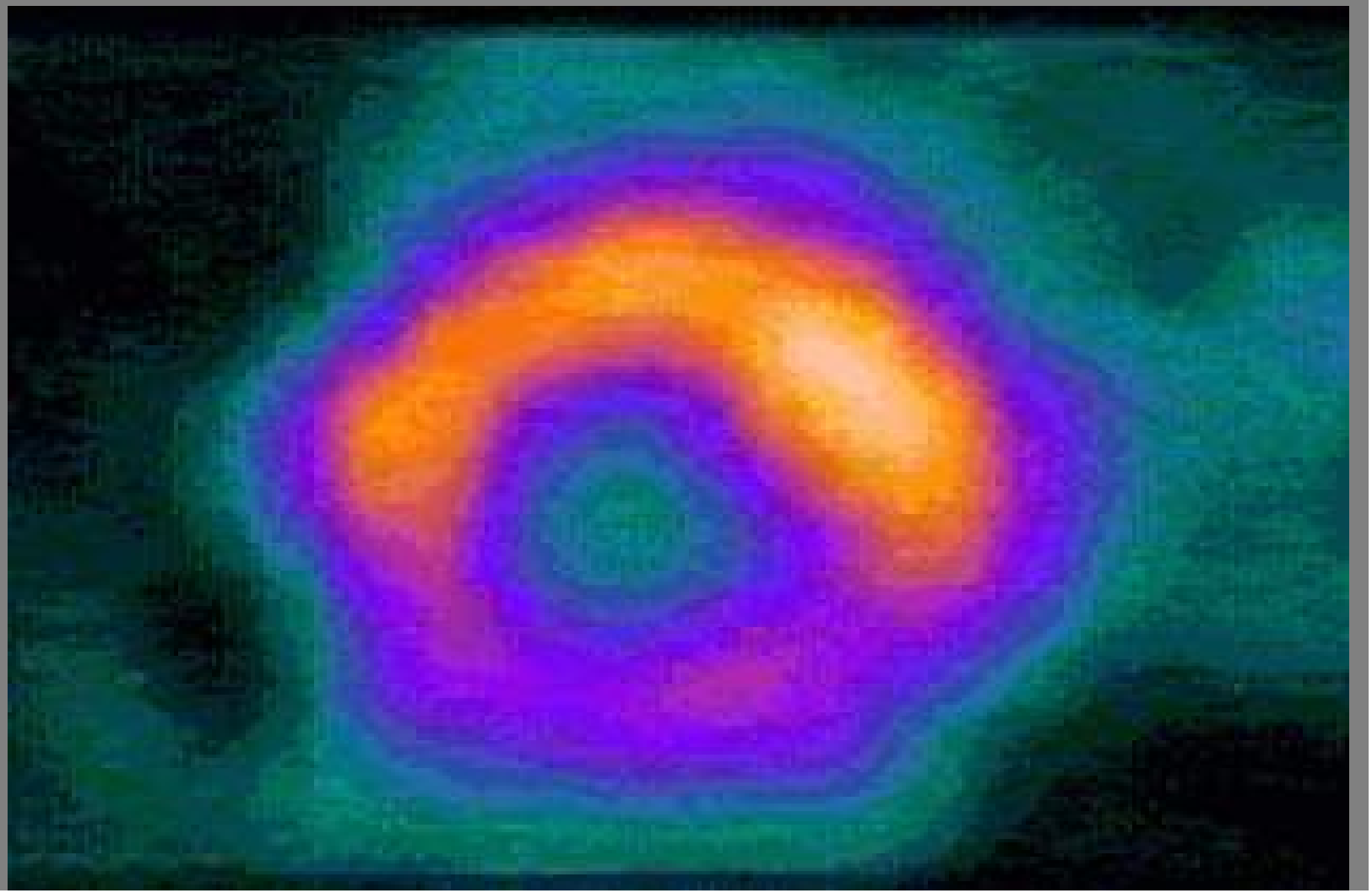
Stress dobutamina per sospetta CAD

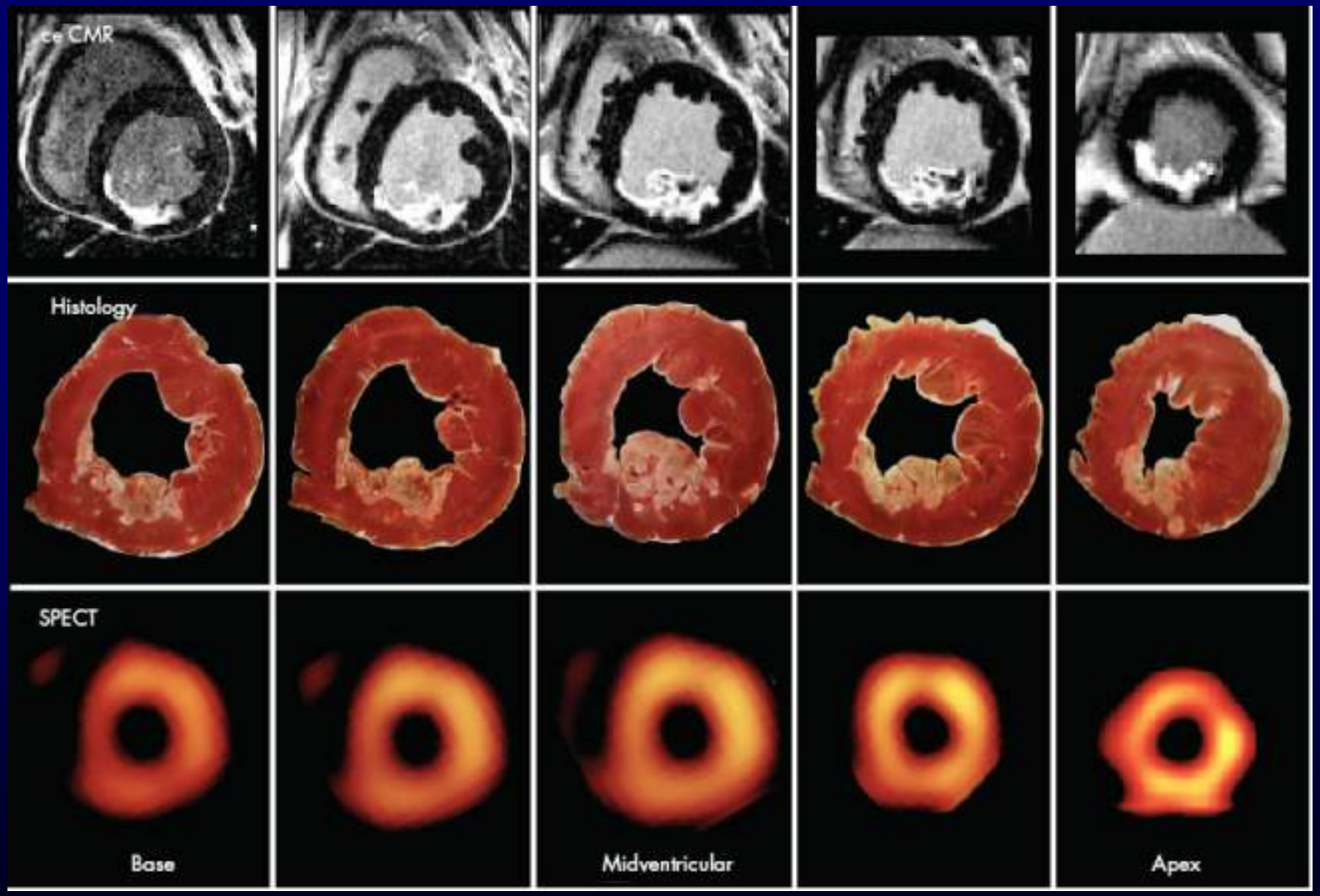


riposo ***stress***

Quale utilità clinica?
in pazienti con eco non eseguibile

Viability Studies: Change in Paradigm "**bright is dead**"

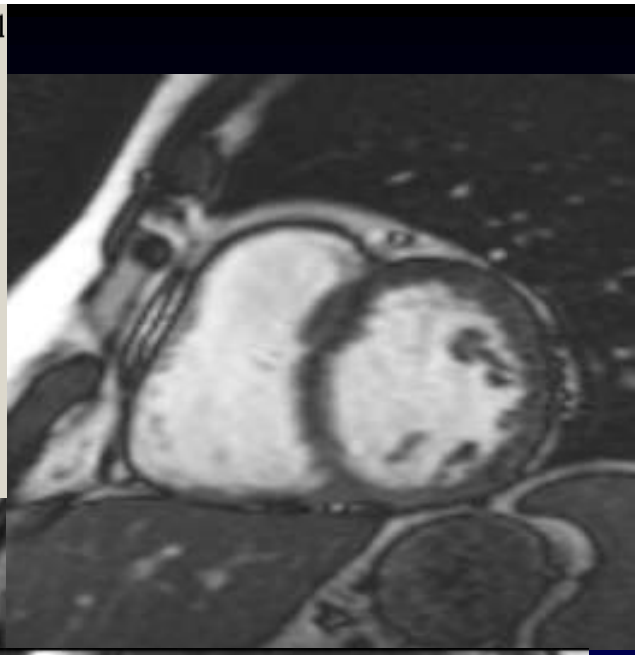


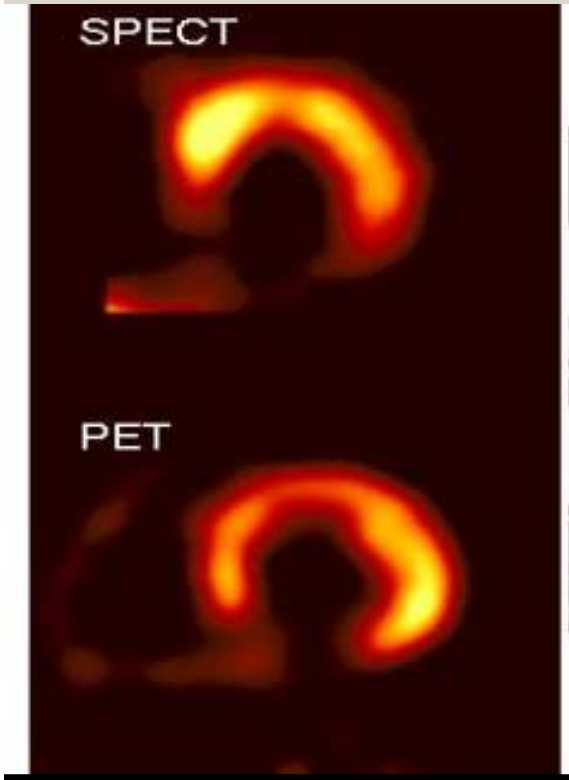

ce CMR
Histology
SPECT
Base
Midventricular
Apex

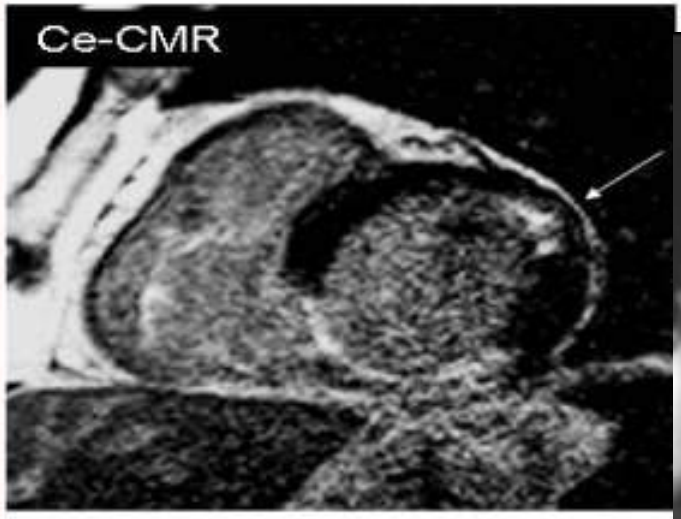
Sensitivity, specificity, and predictive values of ce-CMR and PET/SPECT for the prediction of recovery of regional myocardial function

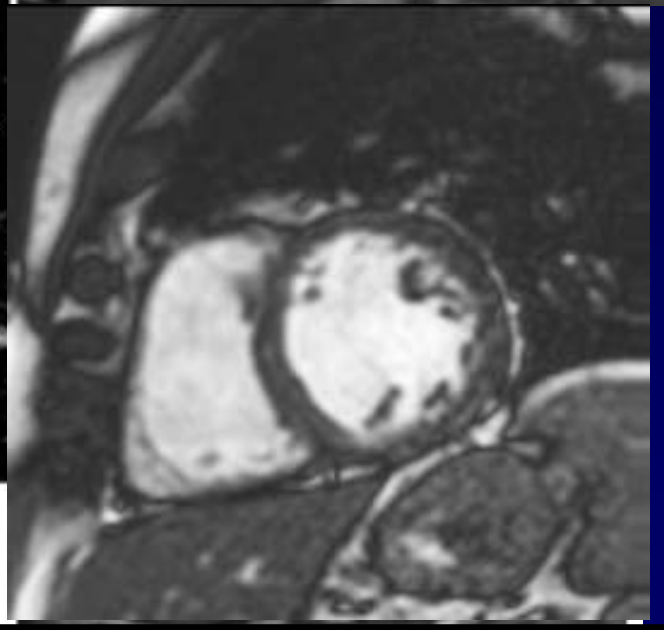
	ce-CMR	PET/SPECT
Sensitivity (%)	97 (91;99)	87 (78;93)
Specificity (%)	68 (11;97)	76 (37;94)
Positive predictive value (%)	73 (59;83)	73 (58;84)
Negative predictive value (%)	93 (72;99)	77 (40;94)

Numbers in brackets give 95% confidence intervals.

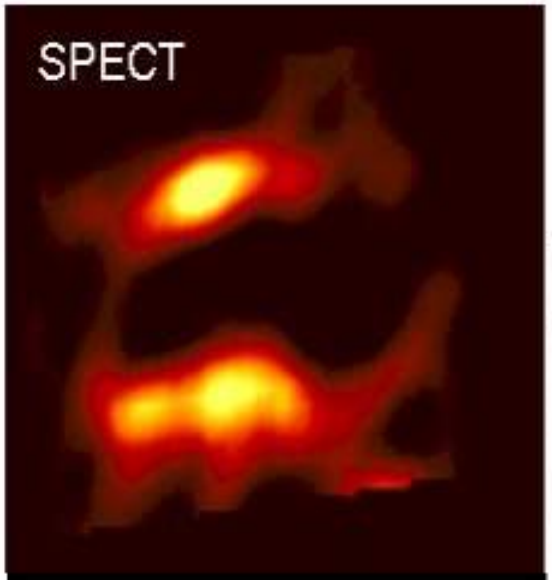


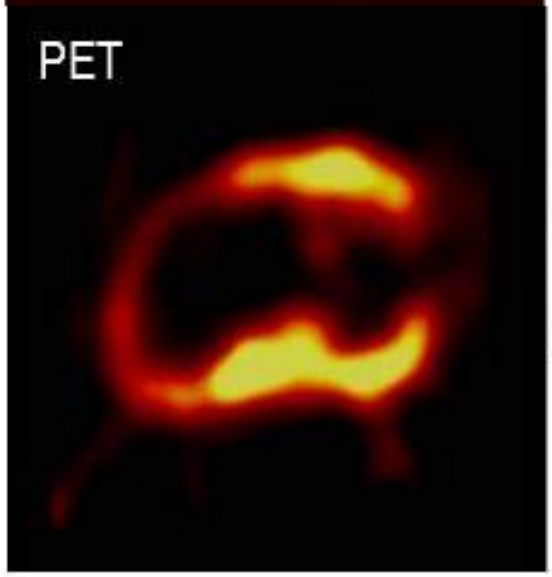


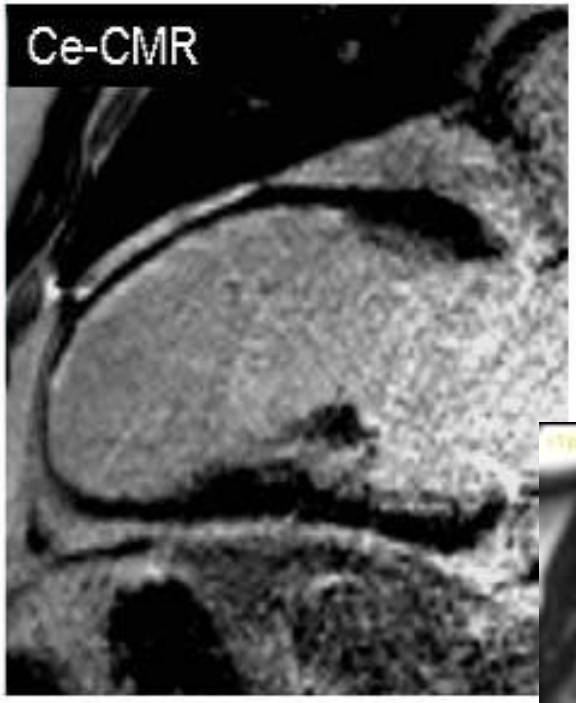




Assessment of reversibile myocardial dysfuntion in chronic ischaemic disease: comparision of CE-MR and SPCT and PET- **EHJ 2006**







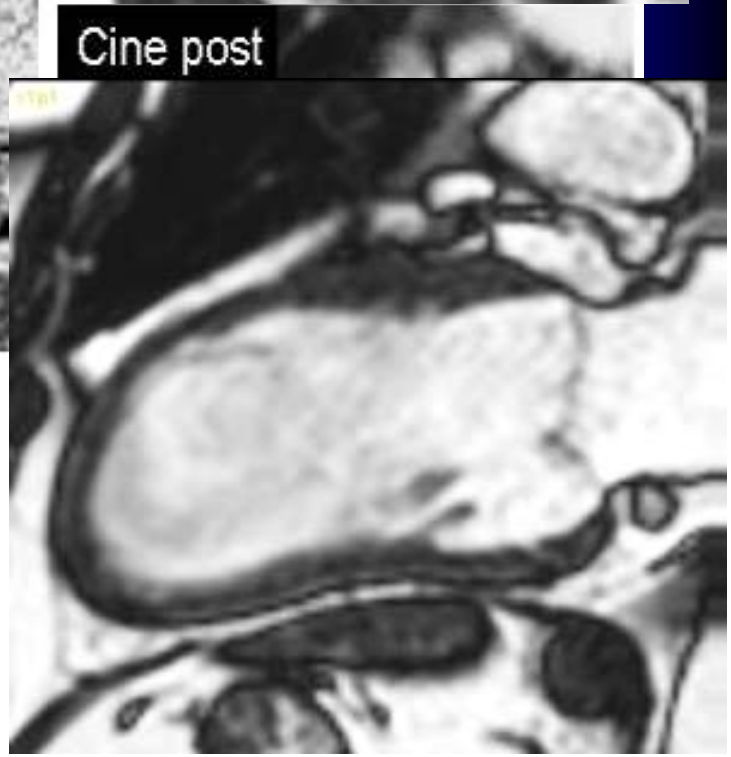
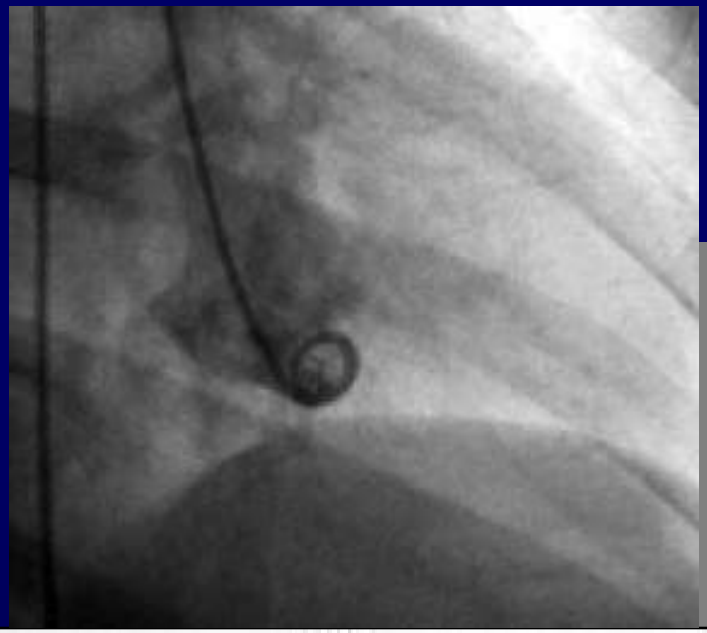
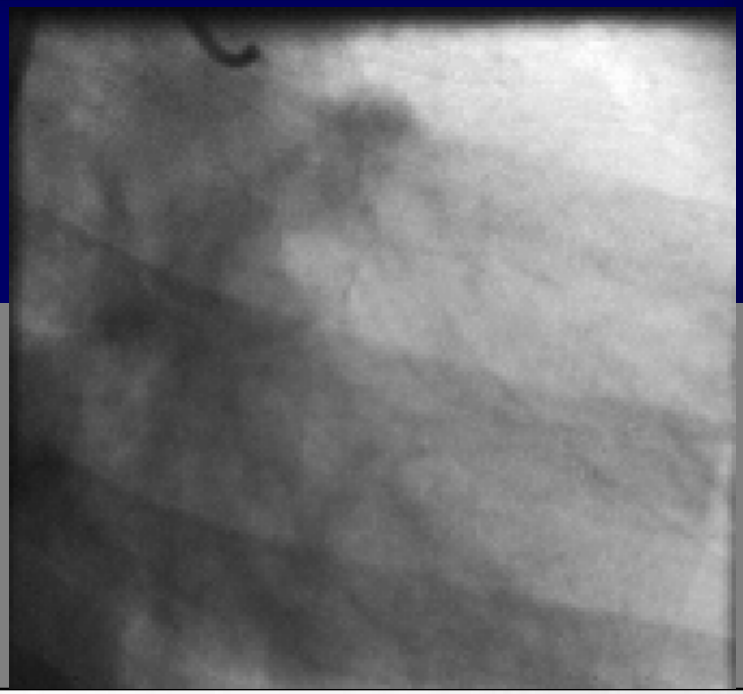
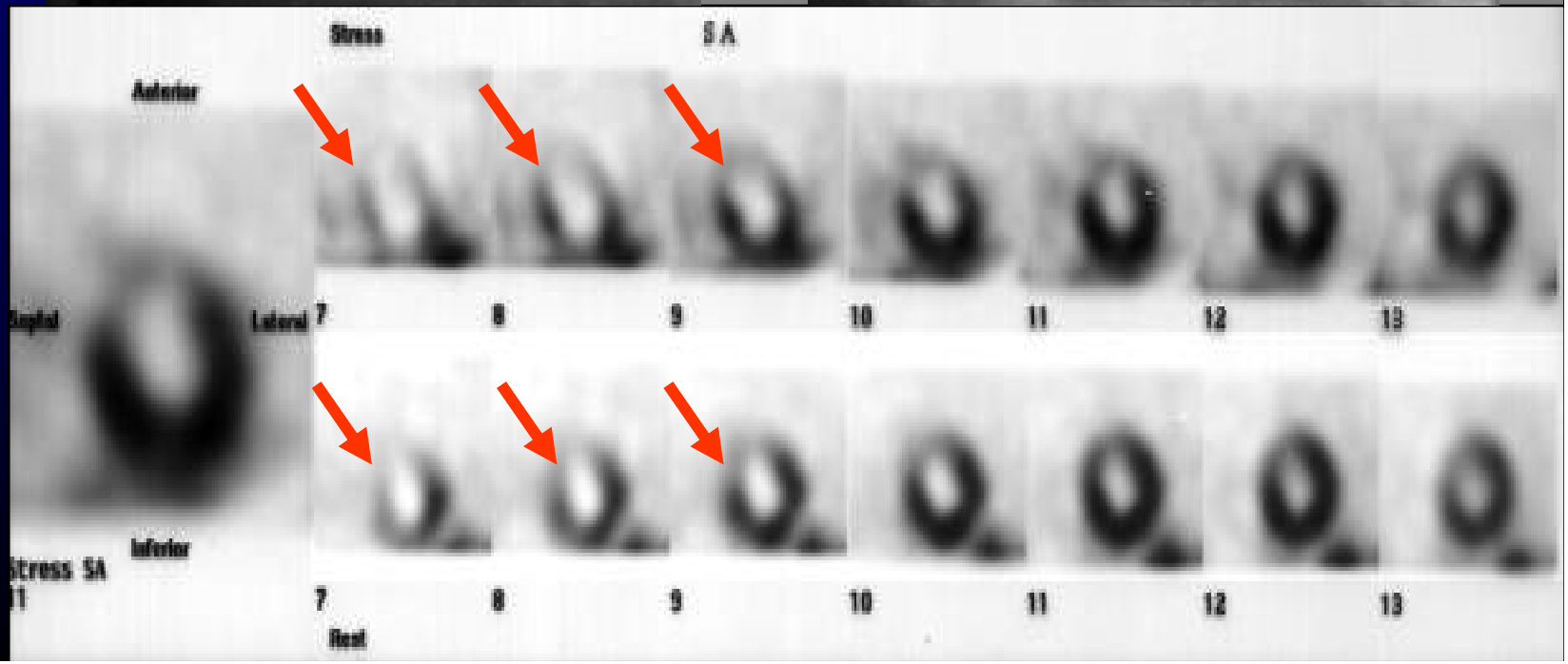


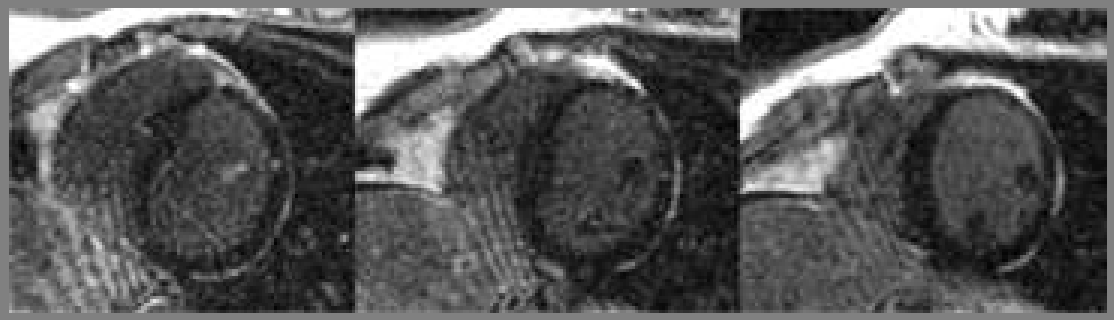
Figure 5

Caso clinico

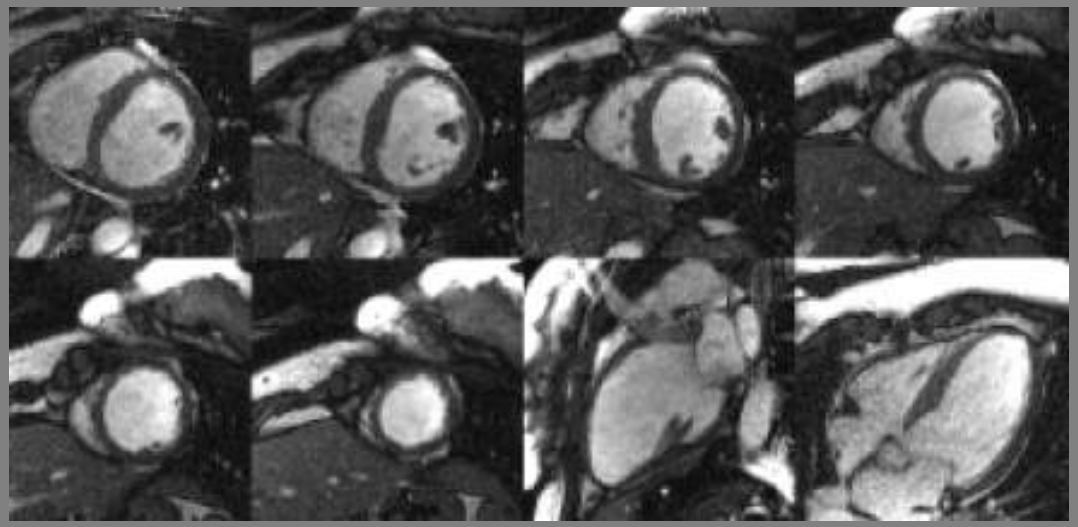




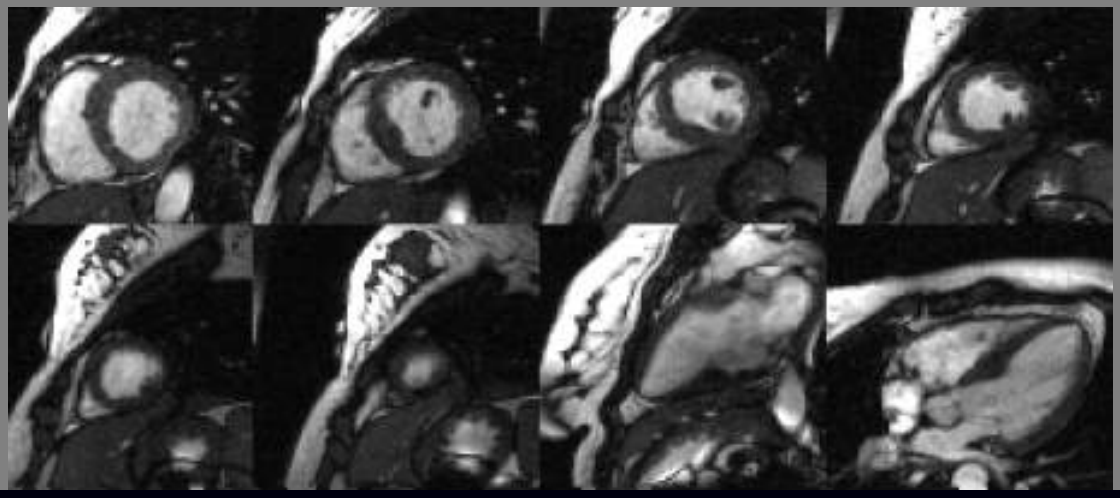




Late Enhancement Viability Study



before CABG



3 months after bypass surgery

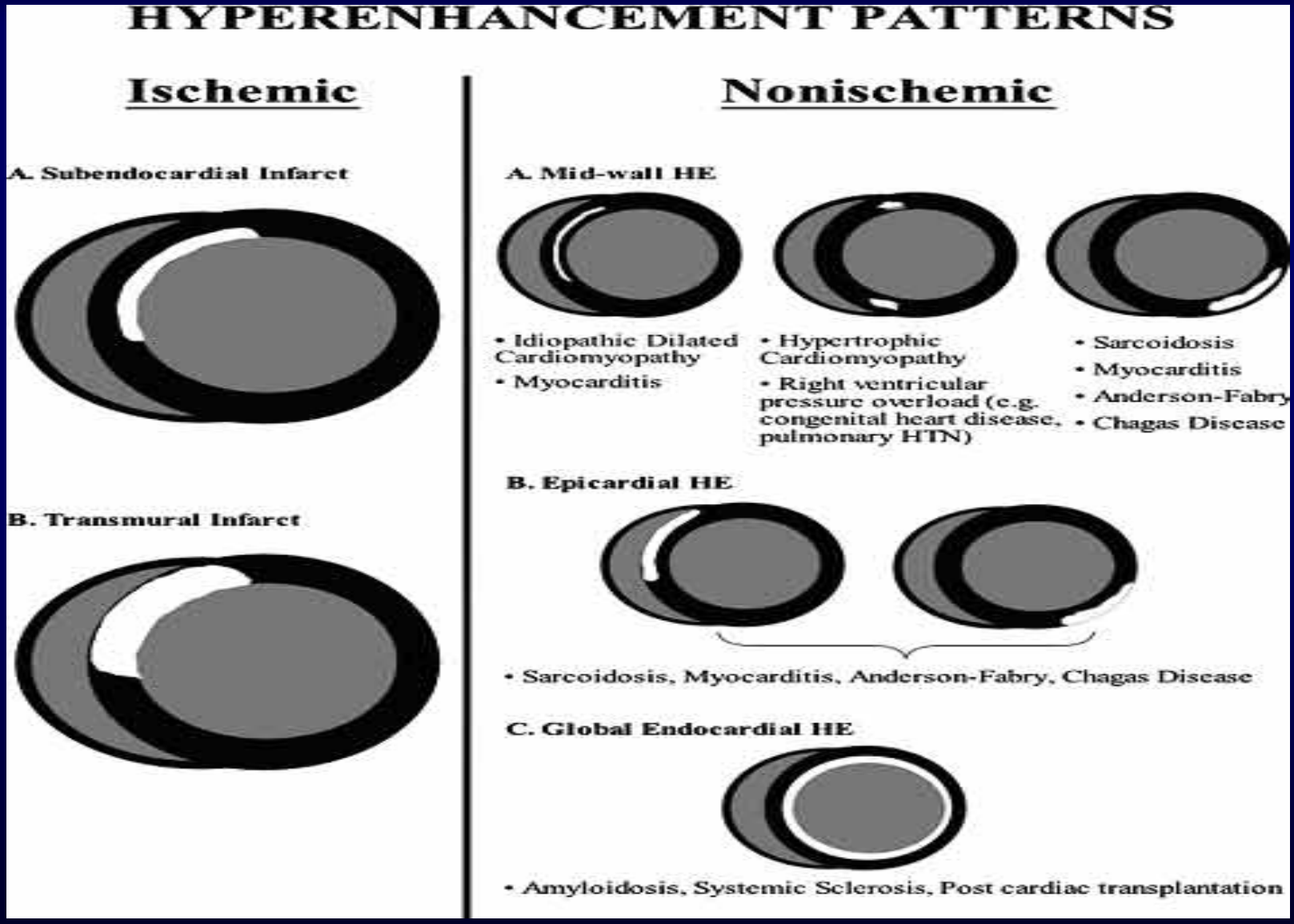
CeMR ha elevata accuratezza, anche in segmenti con severa disfunzione, non richiede stress farmacologico,basso rischio, è tecnicamente facile ed è meno osservatore dipendente

Indicazioni appropriate CRM (Score 7-9)

Identificazione di cicatrice e vitalità (uso di late gadolinium enhancement)

Determinazione della sede e dell'estensione della necrosi miocardica,

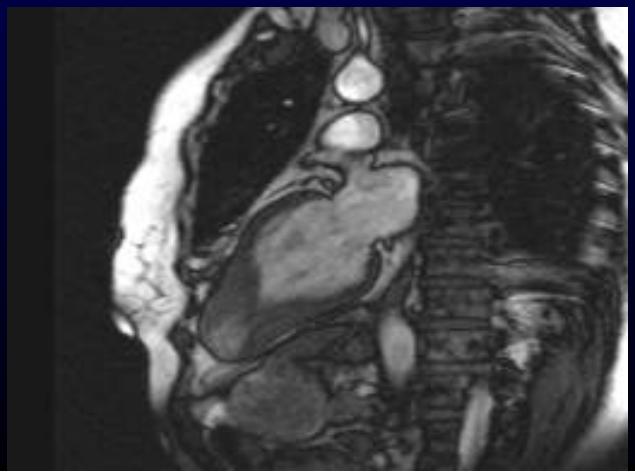
- Diagnosi di vitalità prima della rivascolarizzazione
- Stabilire la probabilità di recupero di funzione dopo rivascolarizzazione o terapia medica
- Valutazione della vitalità mediante SPECT o eco-dobutamina con risultati equivoci o indeterminati

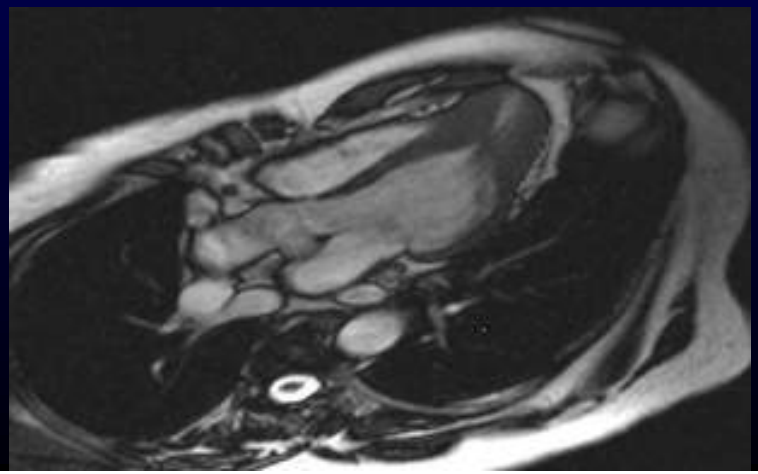


Typical enhancement patterns in patients with ischemic (left) and nonischemic (right) etiologies of myocardial fibrosis. (From Mahrholdt et al, Eur Heart Journal 2005.

Indicazioni appropriate CRM (Score 7-9)

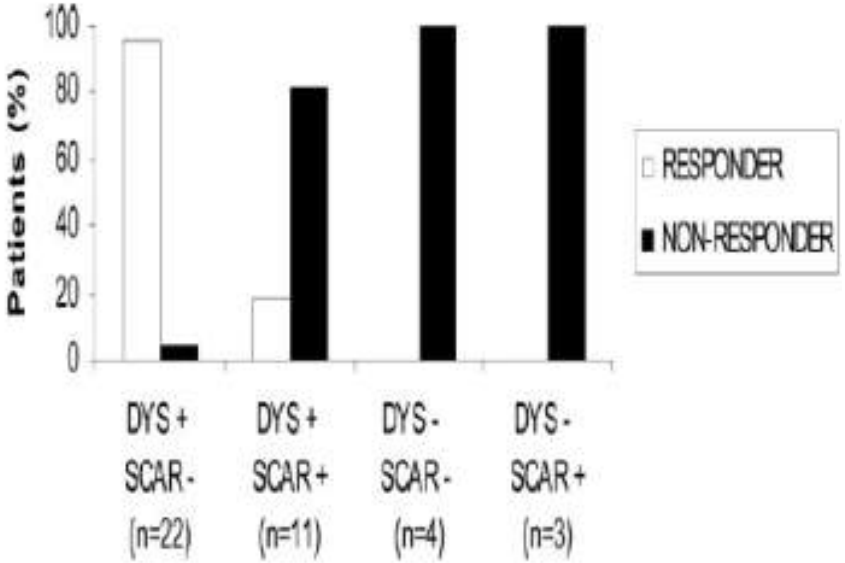
- **Valutazione di specifiche cardiomiopatie (infiltrative amiloidosi, sarcoidosi) HCM , terapie cardiotossiche)**
- **Miocarditi o IMA con coronarie normali**
- **Positività enzimi senza coronaropatia**

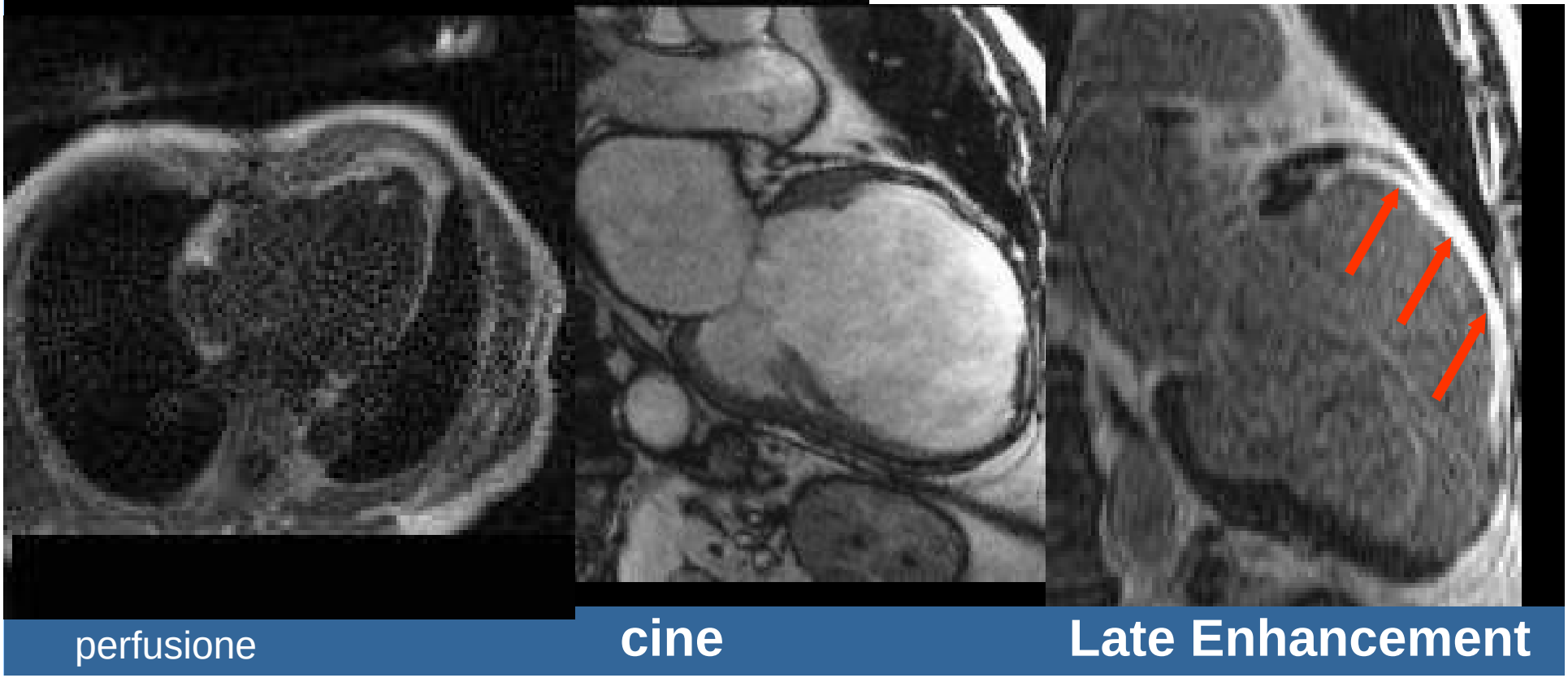




RM e resincronizzazione

Nell'ultimi due anni sono apparsi lavori che stimano entità e sede della cicatrice nella valutazione per la CRT. (Bleeker Circulation 2006, JACC 2006,2007)





perfusione | cine | Late Enhancement

l'obiettivo/sfida della ricerca clinica con Risonanza Magnetica.

- La capacità di identificare e quantizzare la "fibrosi" nell'ambito delle varie cardiopatie deve integrarsi con la comprensione del suo significato clinico e prognostico per il singolo paziente

QUANTO COSTA UN ESAME CARDIO RM ?

One-Stop Shop

PET	1100
RM	300
AORTO	325
SPECT	140
ECO	60

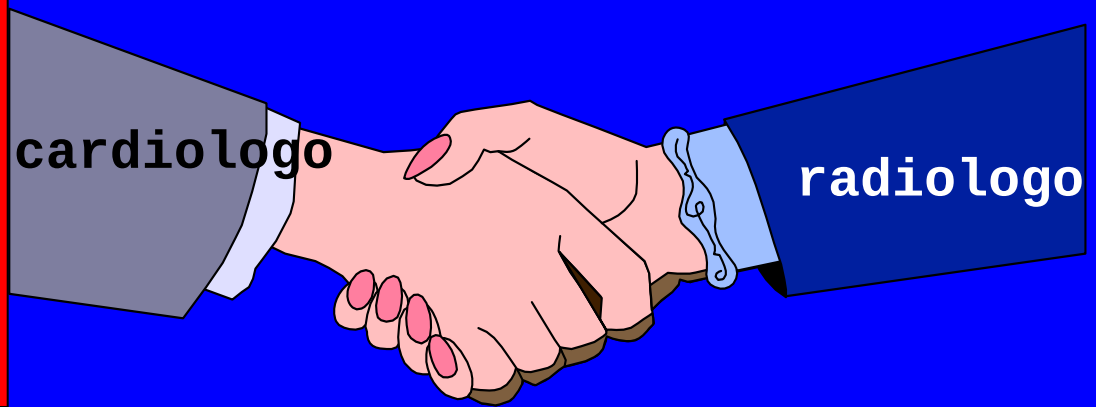
COSA FARE PER MIGLIORARE L'APPROPRIATEZZA

...the local availability or quality of equipment or personnel may influence the selection of imaging procedures.

- Disponibilità e diffusione macchina

- Maggiore diffusione nella cultura cardiologica

Standardizzazione delle sequenze



RM nella pratica clinica: quando, perché e per chi

- Se le risposte ai nostri quesiti clinici sono soddisfatte dall'eco RM non richiesta.
- Studio della **vitalità**
- Studio di miocardiopatie e congeniti
- Positività enzimi con coronarie normali
- Esame prima della CRT
- **Ricercare immagini non solo belle ma anche e soprattutto utili.**