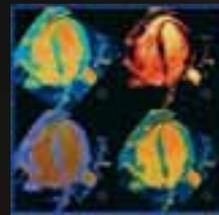


**L'imaging non invasivo con RM e TC
nella selezione
del paziente da sottoporre a
resincronizzazione ventricolare**

**ECOCARDIO
CHIRURGIA**



Stefano Pedretti
U.O. Cardiologia 3 – Elettrofisiologia –
Dipartimento cardio-toracico “A. De Gasperis”
– A. O. Niguarda Ca’ Granda - Milano



CLINICA
ECG
ECOCARDIO



Risposta favorevole alla

CRT:

65-75%



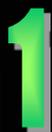
Nessuna risposta:

30%

2 Dissincronia
meccanica



Valore
fisiopatologico della
dissincronia



Insufficienza
cardiaca
sintomatica



CRT: IL
CANDIDATO
IDEALE



Correggibilità

PERCHE' IL PAZIENTE NON HA RISPOSTO?

Criteri di selezione errati

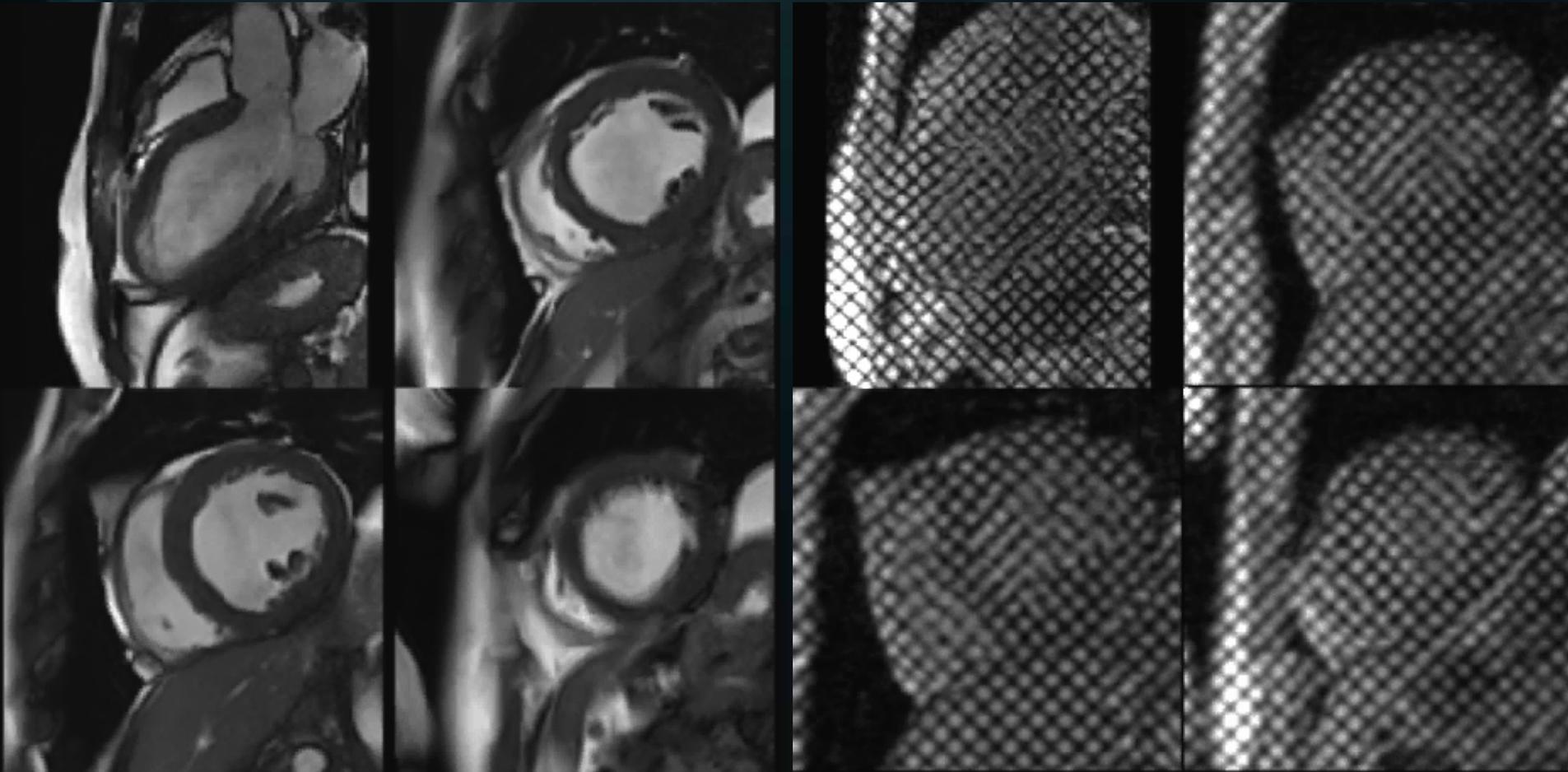
Il paziente non aveva una significativa dissincronia meccanica

**IMAGING AVANZATO (RM,
TC):
QUALE RUOLO?**

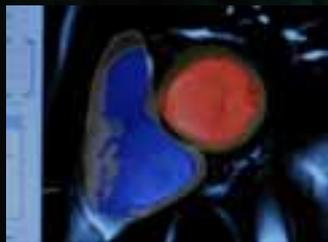
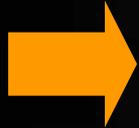
La stimol. elettrica non ha corretto la dissincronia meccanica

La stimolazione non è stata ottimizzata

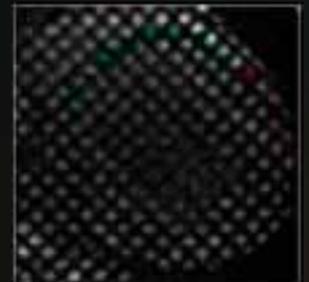
RISONANZA MAGNETICA CARDIACA



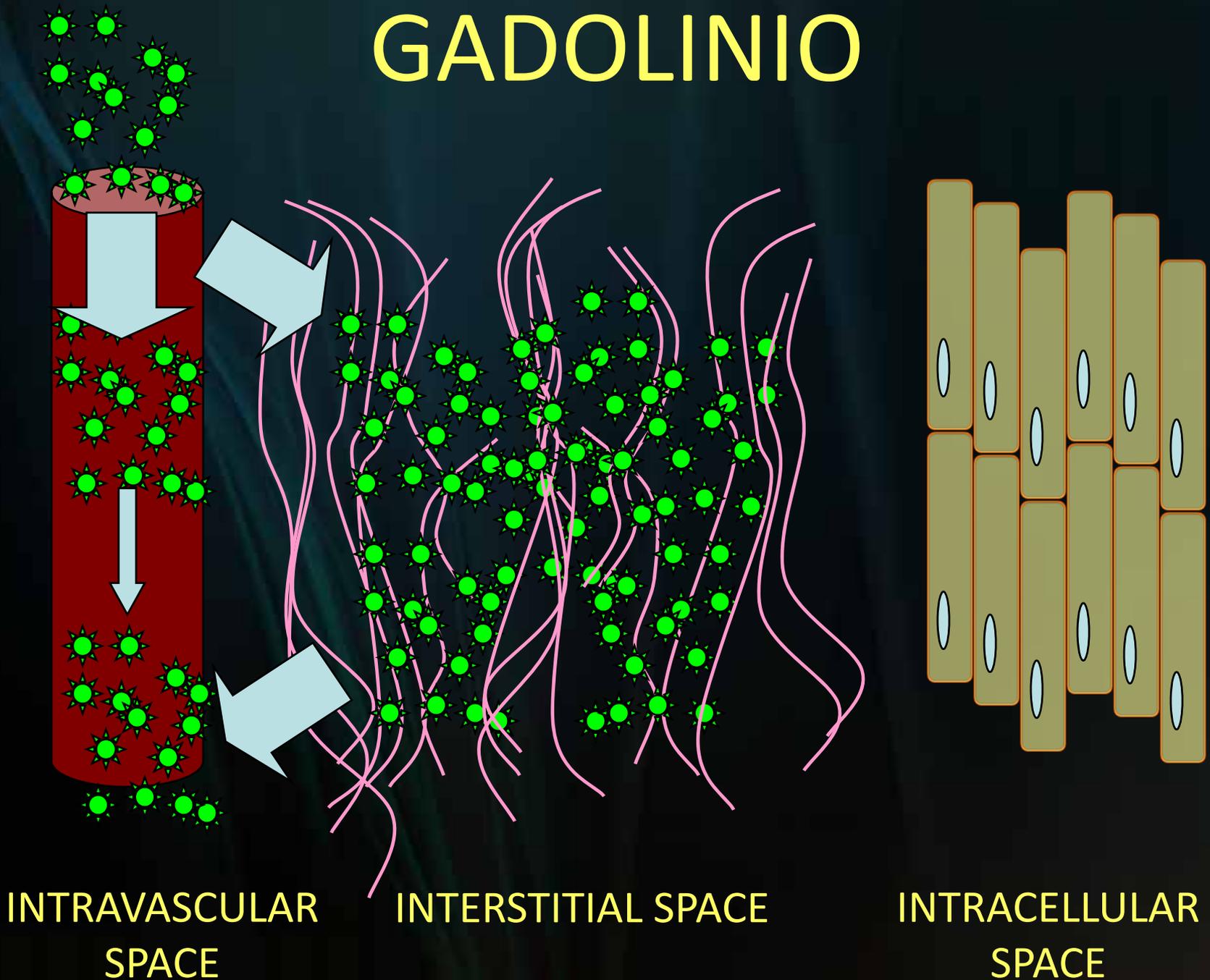
CINE



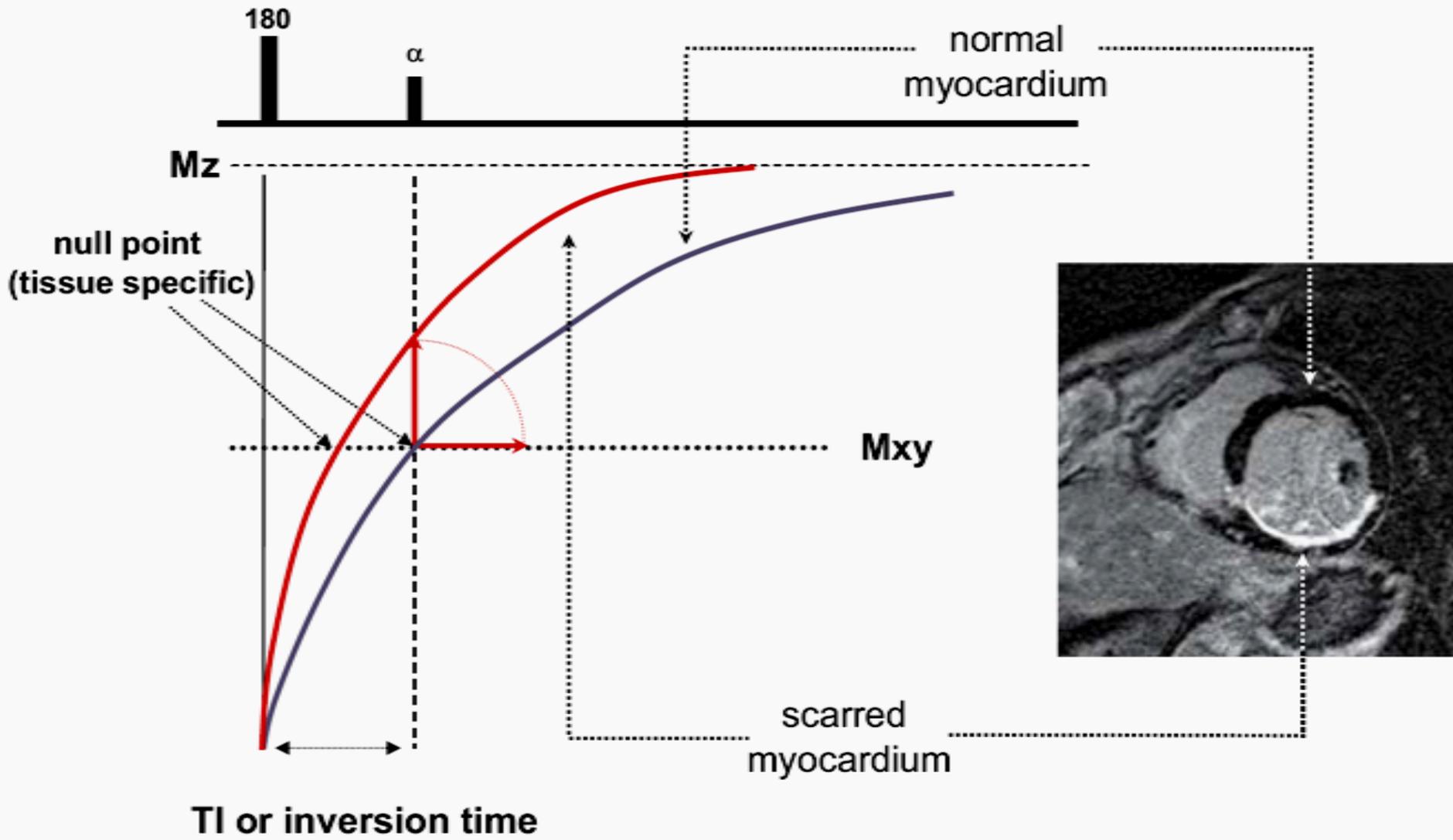
TAGGING



GADOLINIO



HOW TO IMAGE LGE: INVERSION-RECOVERY TECHNIQUE



“NON RESPONDERS” – SCAR BURDEN

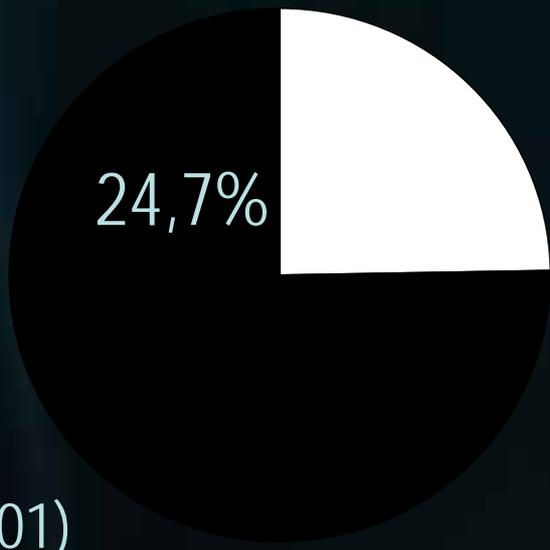


Σ

Responder



Nonresp.



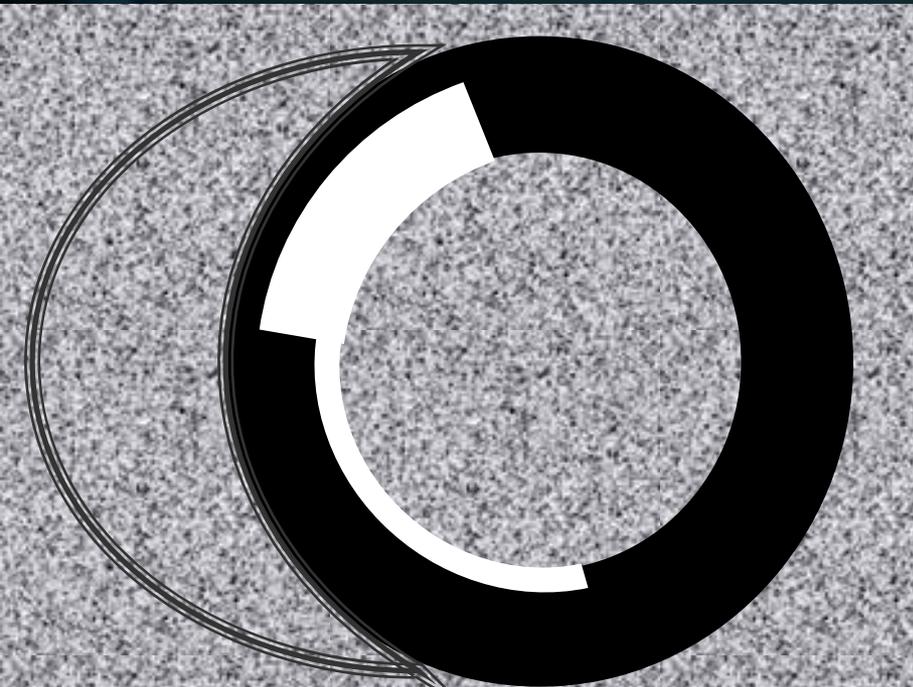
($p < 0,01$)

Cut-off: 15%

Se 0.85 - Sp 0.90

Per l'identificazione dei nonresponders

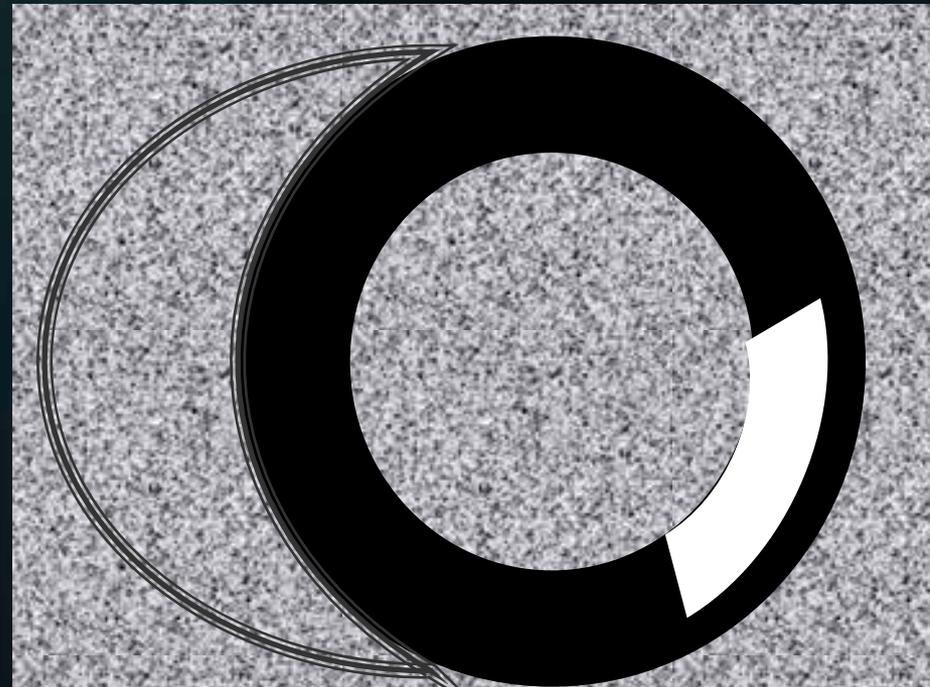
“NON RESPONDERS” – SCAR DISPOSITION



Septal LGE \leq 40%

Se 1 - Sp 1

Per l'identificazione dei responders



infero-lateral LGE $>$ 50 %

Se 0.71 - Sp 0.87

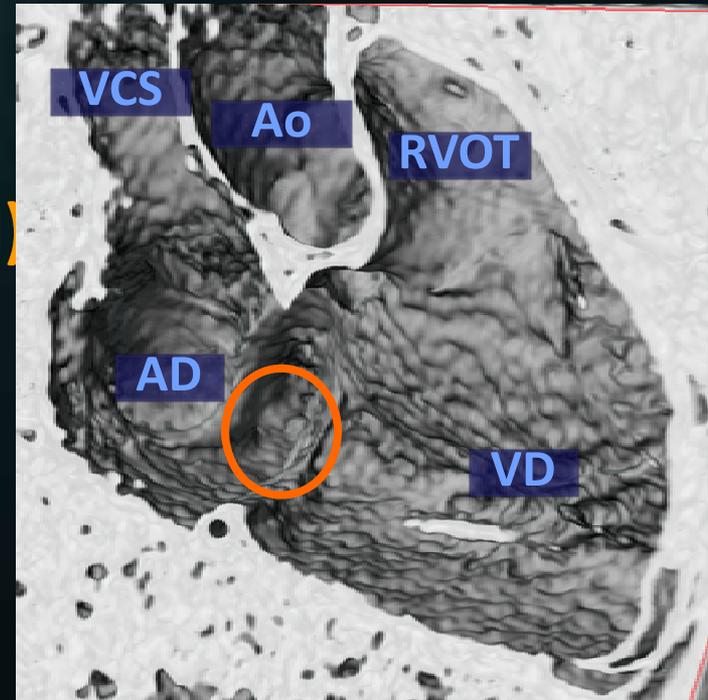
Per l'identificazione dei nonresponders

FAILURE OF CS DETECTION / INCANNULATION

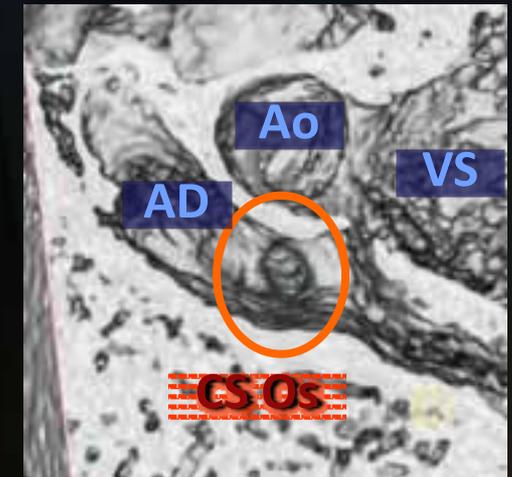
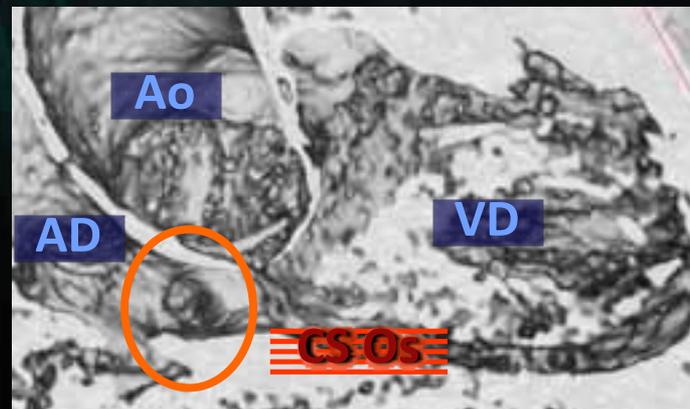
3D "WHOLE HEART" SEQUENCE

(WITH OR WITHOUT GADOLINIUM)

Cuore normale
(Senza mdc)



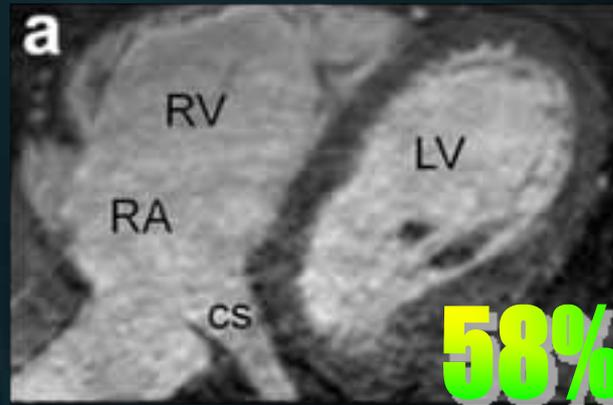
CMIO dilatativa
(Con mdc)



CARDIAC VENOUS SYSTEM

3D "WHOLE HEART"
CON GD-DTPA

HIGH QUALITY



RATE OF LATERAL VEIN DETECTION

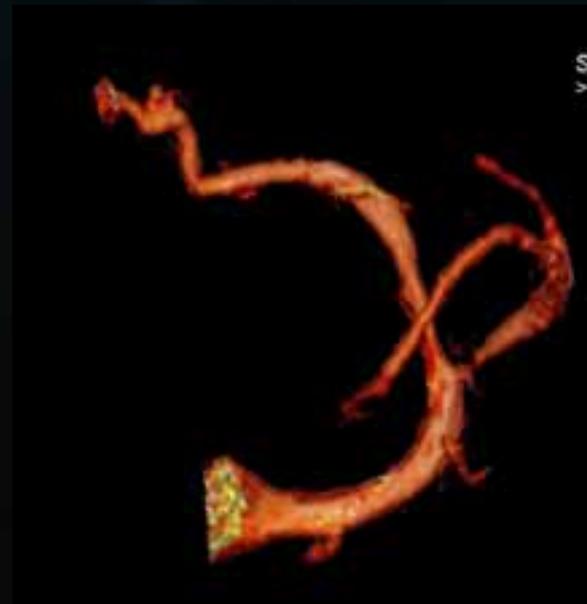
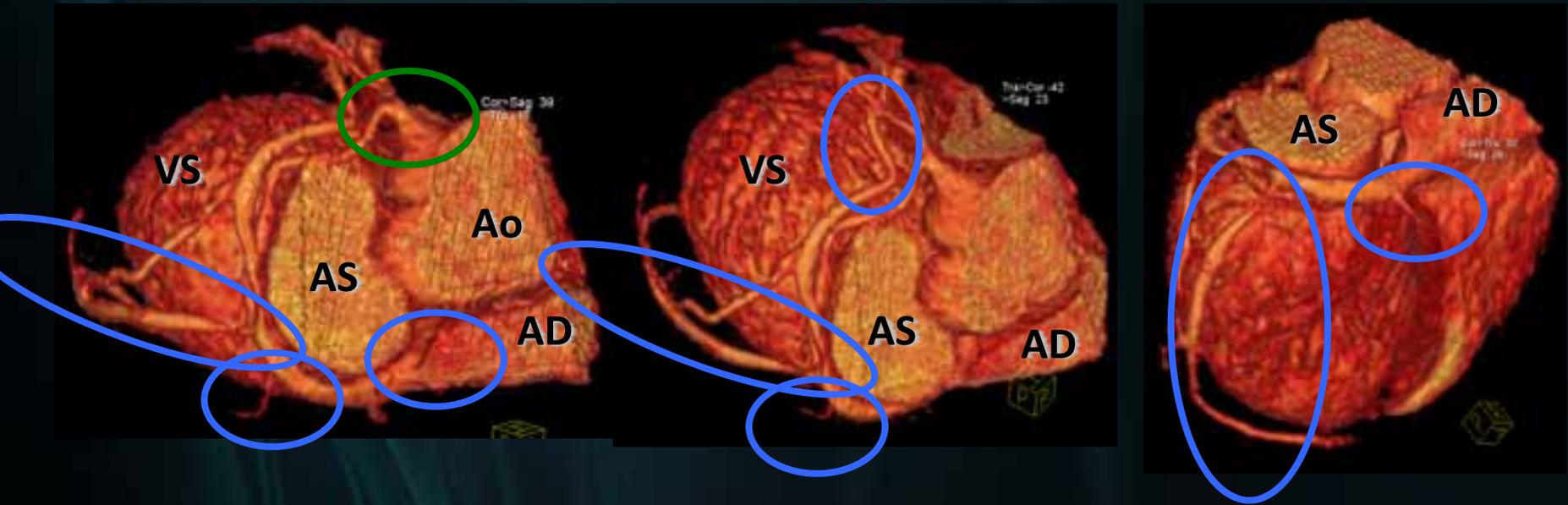
89%

LOW QUALITY



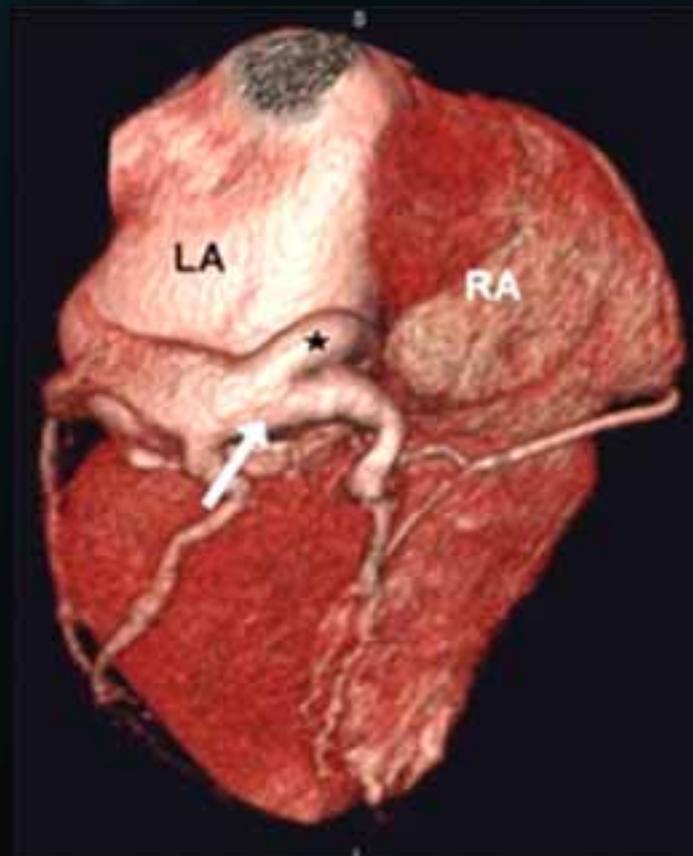
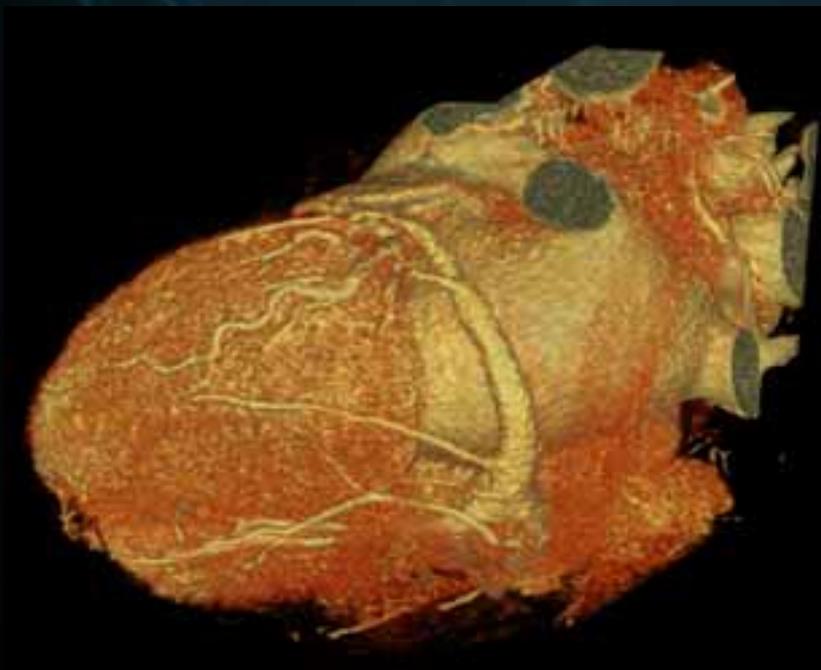
54%

CARDIAC VENOUS SYSTEM

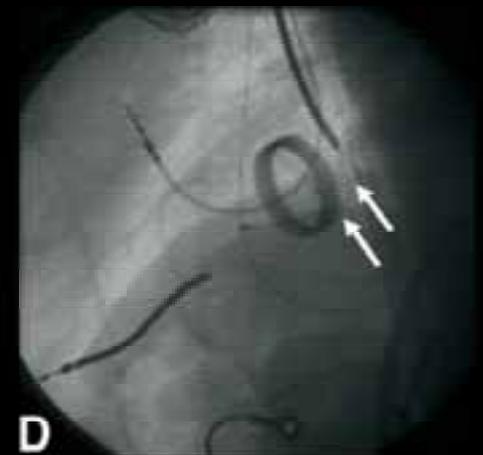
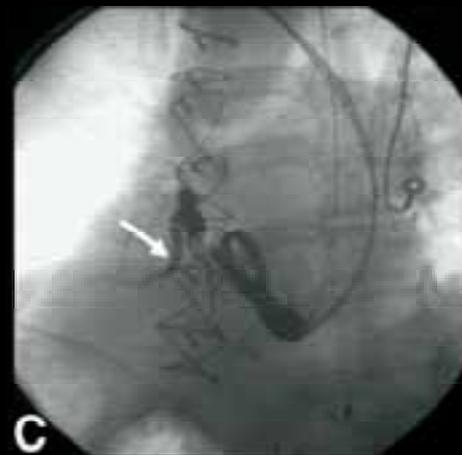
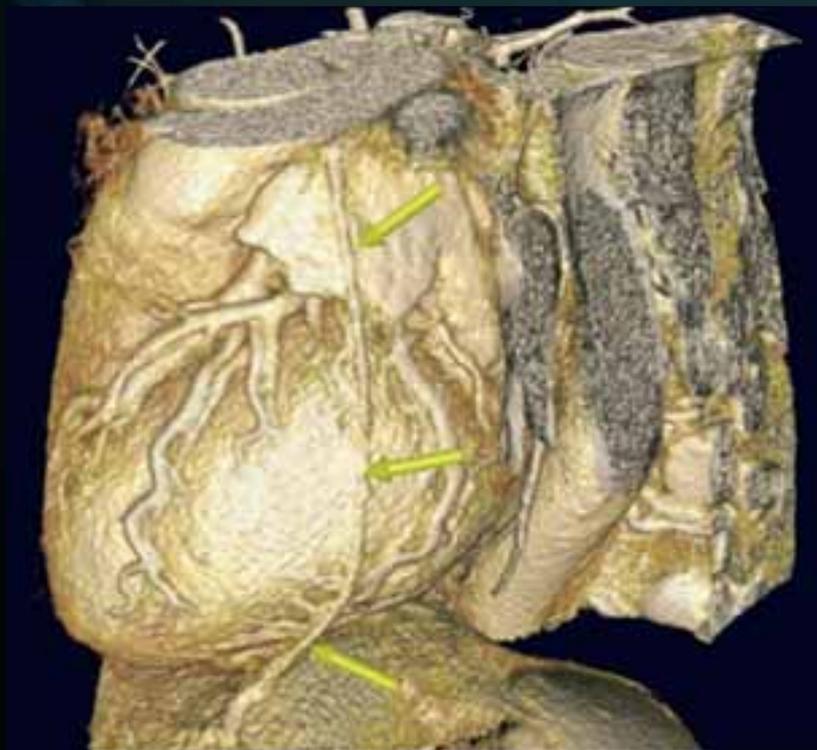


CORONARO-TC

SISTEMA VENOSO CARDIACO: ANATOMIA E VARIANTI



CORONARO-TC: FASCIO PERICARDIOFRENICO



Tops *et al.*
Noncoronary Cardiac MDCT

JACC: CARDIOVASCULAR IMAGING, VOL. 1, NO. 1, 2008
JANUARY 2008:94-106

NON-RESPONDER – CASO CLINICO 1

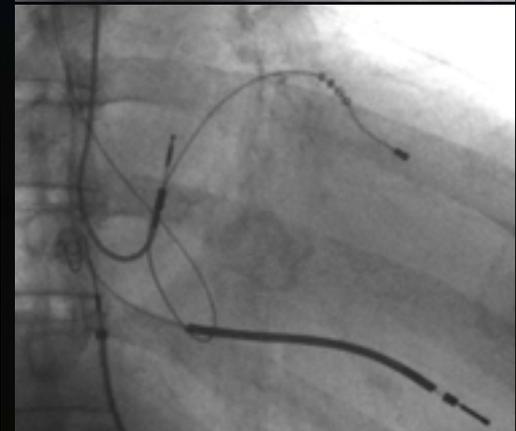
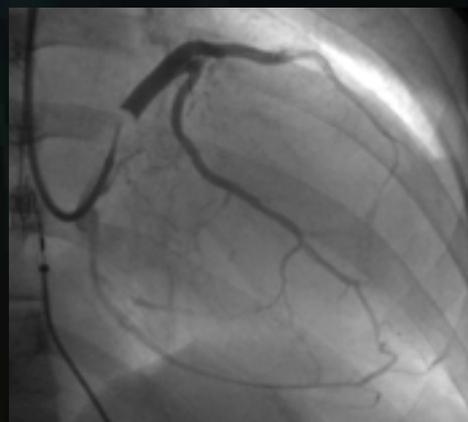
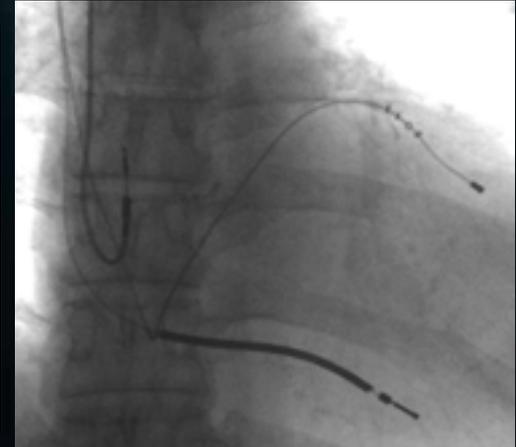
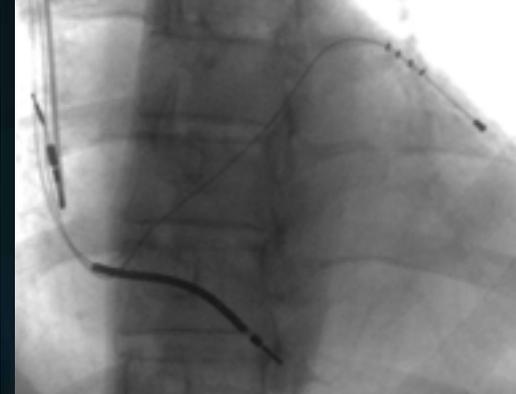
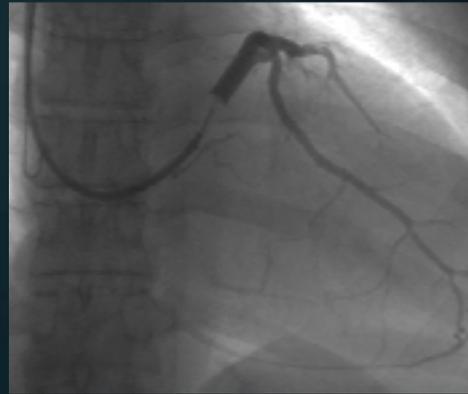
- F 63 aa
- Cardiomiopatia dilatativa
- Coronarie normali
- NYHA II
- BBS

ECOCARDIOGRAMMA:

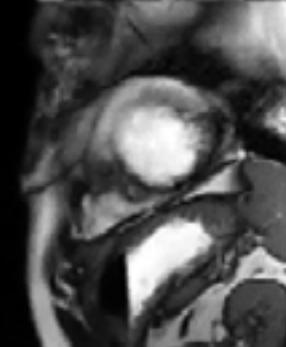
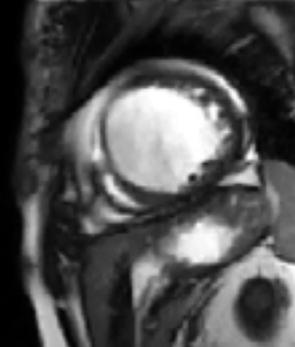
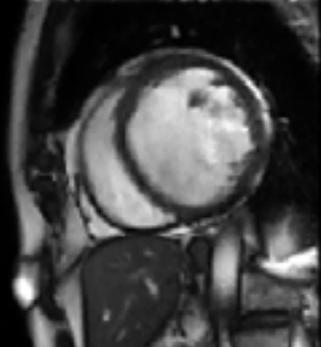
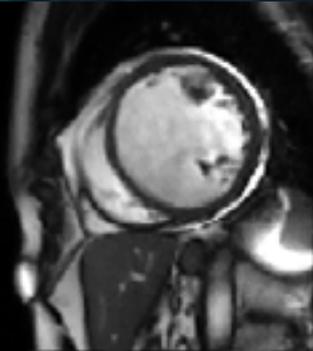
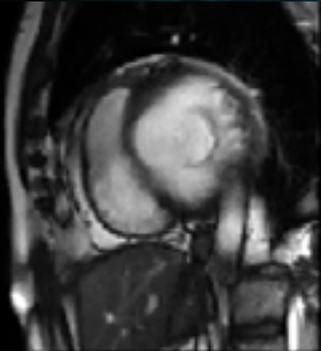
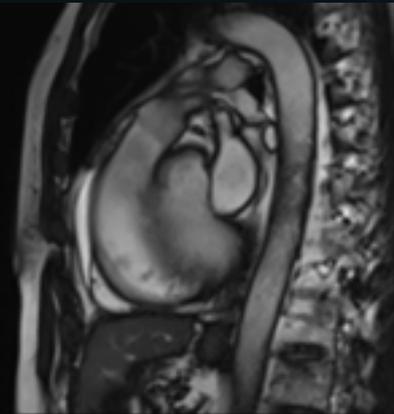
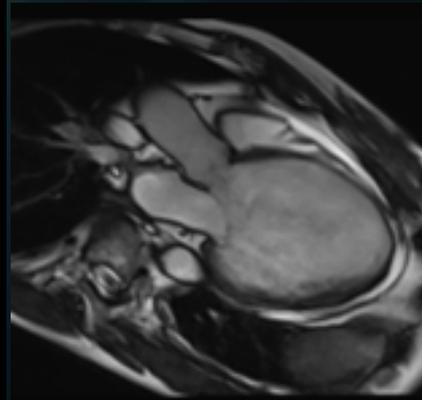
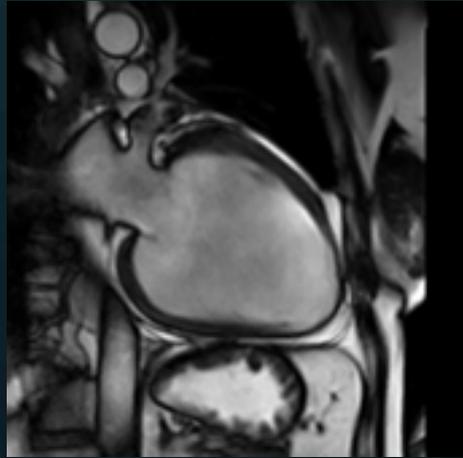
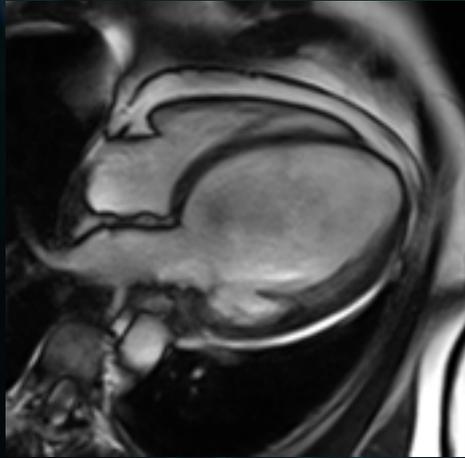
- FEVS 22%
- Ipocinesi diffusa, acinesi settale
- IM 2-3+ su 4+

FOLLOW-UP:

- NYHA II
- FEVS 26% → 23%



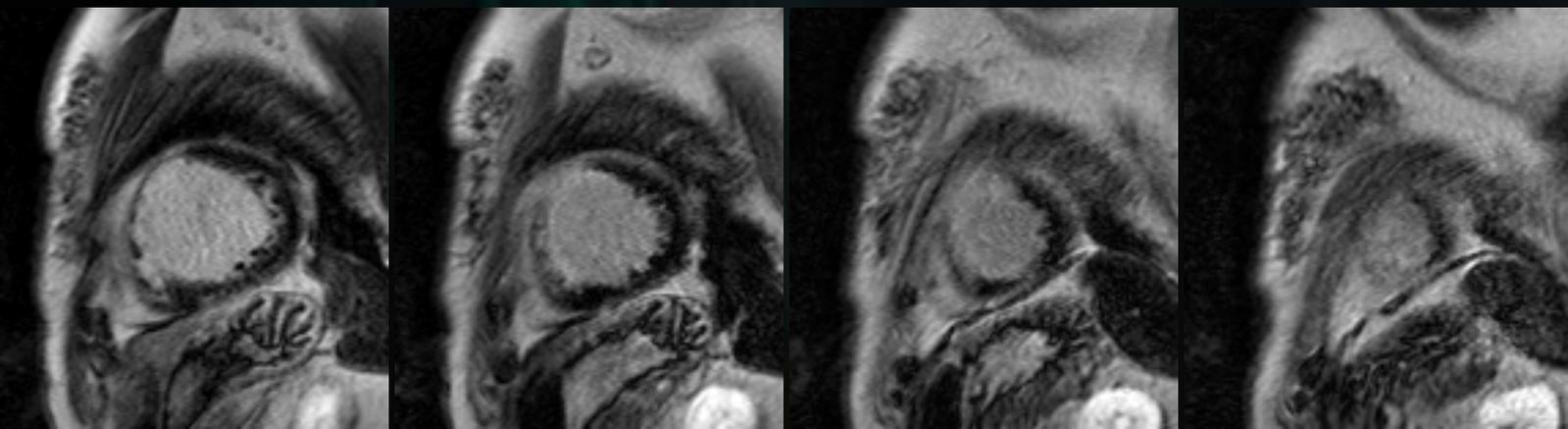
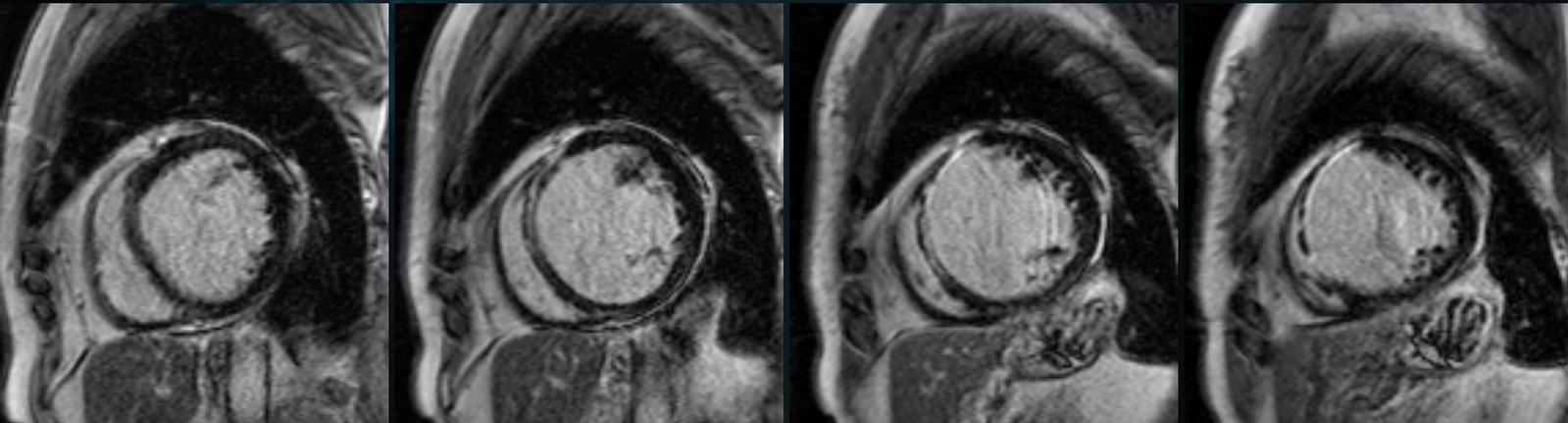
CASO CLINICO 1 - CMR



FEVS: 24%

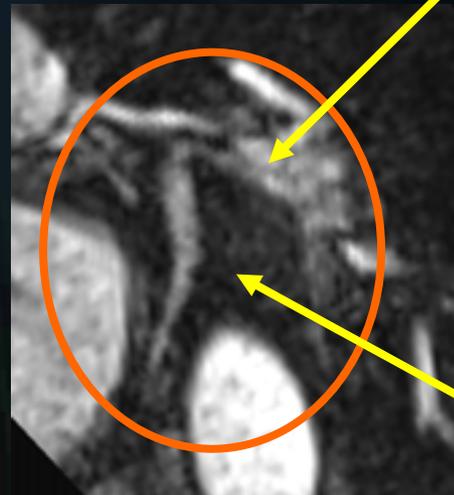
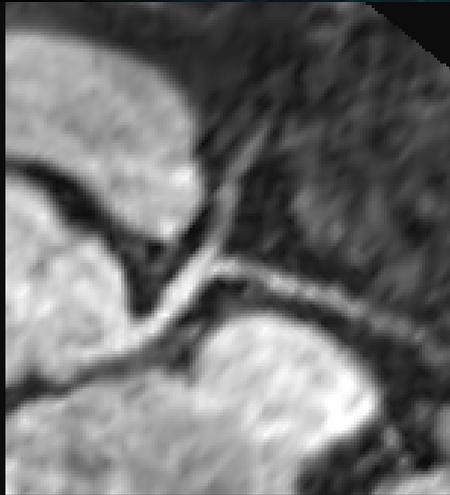
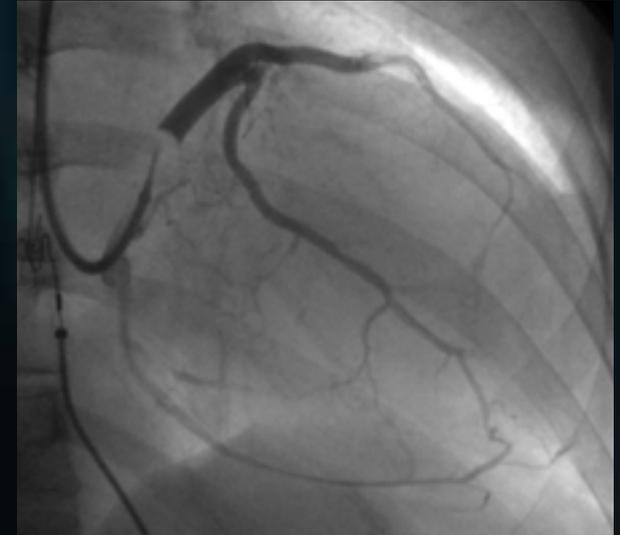
FEVD: 30%

CASO CLINICO 1 – DELAYED ENHANC.



IMA
SETTALE

CASO CLINICO 1 - CMR



CASO CLINICO 1 - CONCLUSIONI

VALORE AGGIUNTO DELLA RMC

Cardiomiopatia ISCHEMICA POST-
INFARTUALE

ELEVATA % DI FIBROSI

BBS E DISSINCRONIA
PROBABILMENTE SECONDARI

PROBABILI CAUSE DI FAILURE

Criteria di selezione errati

Il paziente non aveva una significativa
dissincronia meccanica

**La dissincronia meccanica non era un
elemento centrale**

Non è stato possibile incannulare il seno
coronarico

Non è stata trovata una sede adatta
all'impianto

Stimolazione del nervo frenico

**La stimol. elettrica non ha corretto la
dissincronia meccanica**

La stimolazione non è stata
ottimizzata

NON-RESPONDER – CASO CLINICO 2

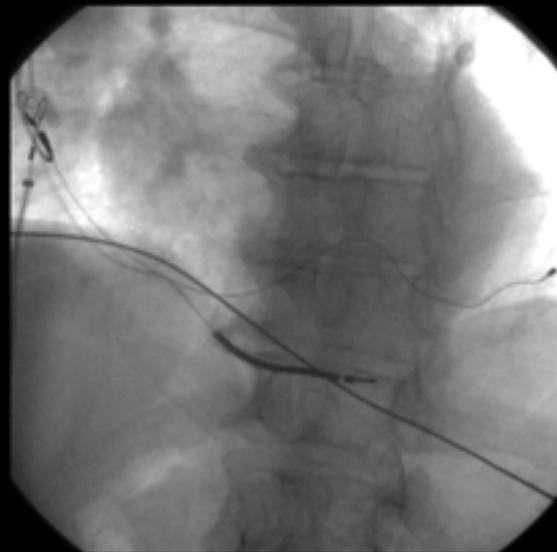
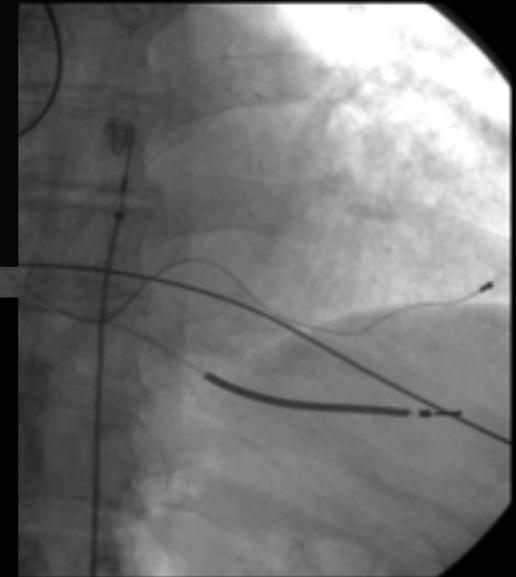
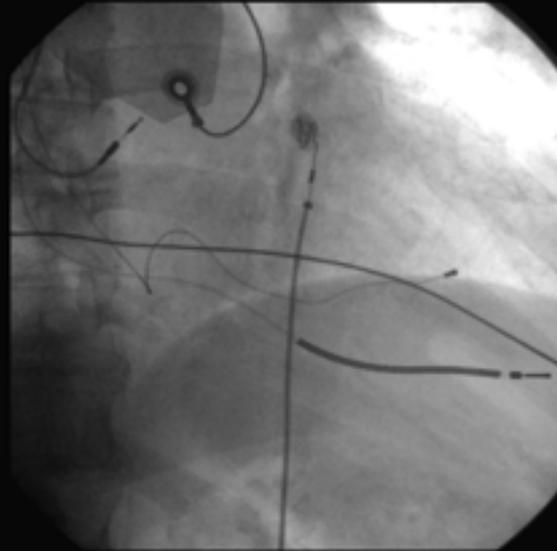
- M 63 aa
- Cardiomiopatia dilatativa
- Stenosi Cx 70%
- NYHA IIb
- BBS

ECOCARDIOGRAMMA:

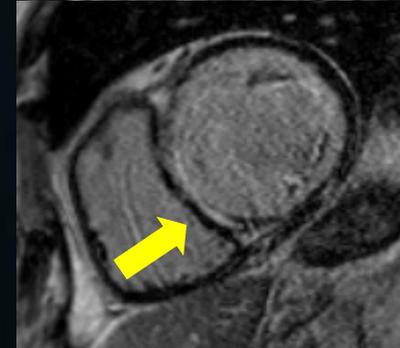
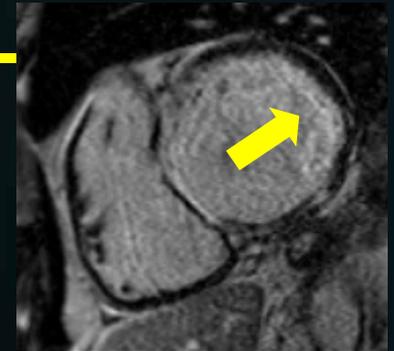
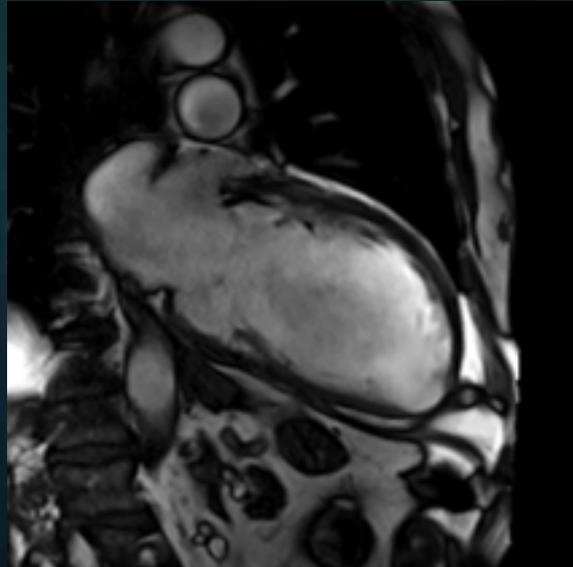
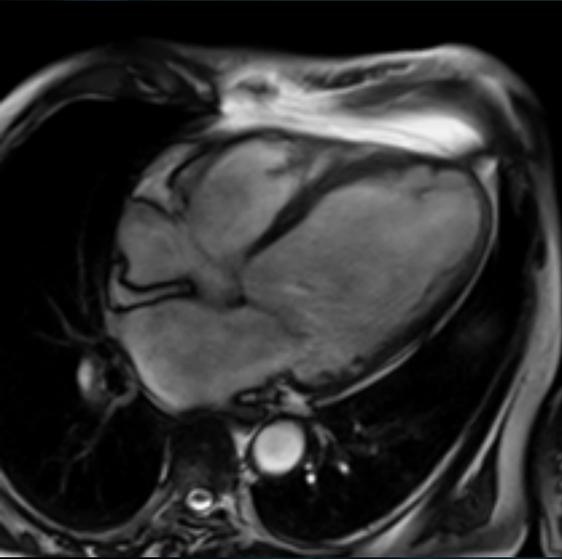
- FEVS 25%
- Ipocinesi diffusa
- IM 2-3+ su 4+
- I Ao 2+ su 4+

FOLLOW-UP:

- FEVS E NYHA INVARIATE
- †† DOPO 1 ANNO PER SCOMPENSO REFRATTARIO

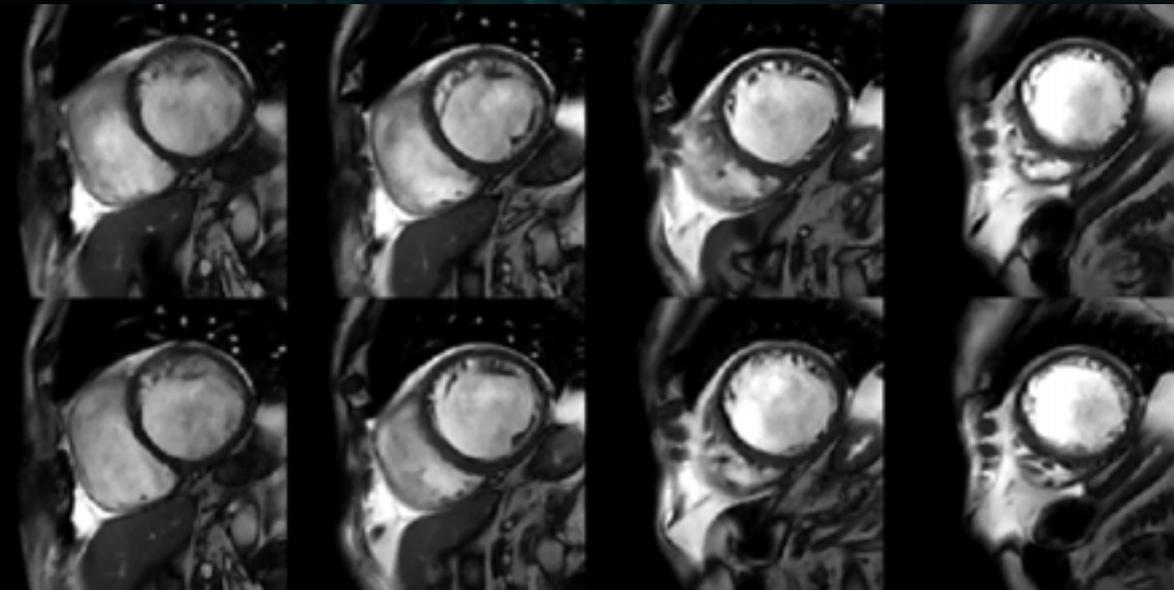
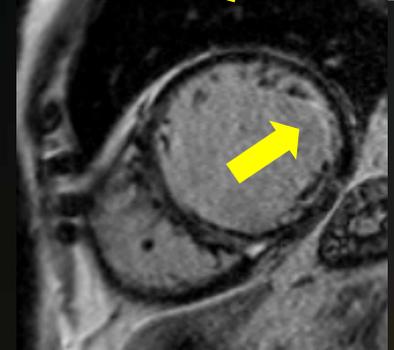


CASO CLINICO 2 - CMR

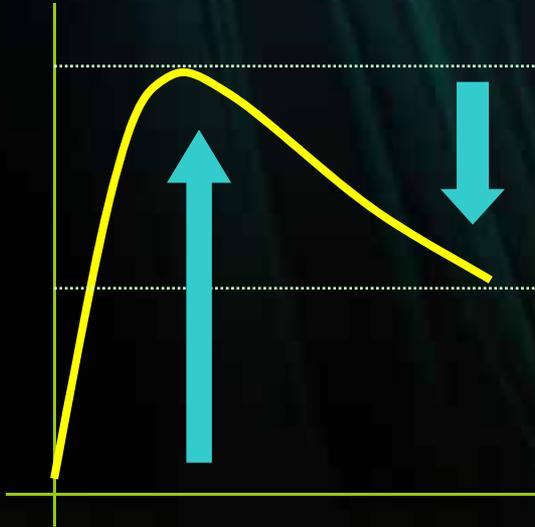
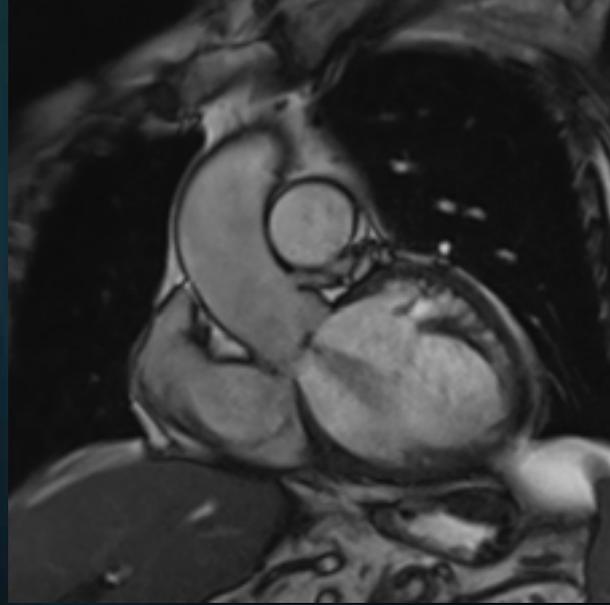
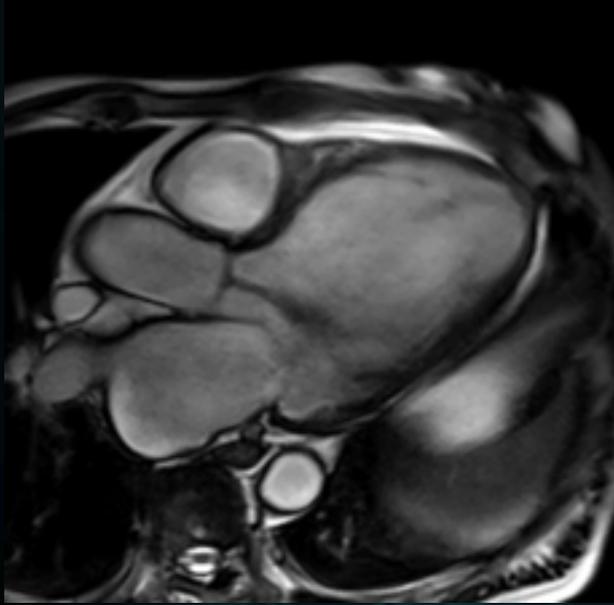


FEVS: 24%

FEVD: 78%



CASO CLINICO 2 - CMR



FRAZIONE DI RIGURGITO AORTICO: **48%**

(>50%: IAo SEVERA)

CASO CLINICO 2 - CONCLUSIONI

VALORE AGGIUNTO DELLA RMC

Cardiomiopatia VALVOLARE

SIGNIFICATIVA % DI FIBROSI

BBS E DISSINCRONIA
PROBABILMENTE SECONDARI

PROBABILI CAUSE DI FAILURE

Criteria di selezione errati

Il paziente non aveva una significativa
dissincronia meccanica

**La dissincronia meccanica non era un
elemento centrale**

Non è stato possibile incannulare il seno
coronarico

Non è stata trovata una sede adatta
all'impianto

Stimolazione del nervo frenico

La stimol. elettrica non ha corretto la
dissincronia meccanica

La stimolazione non è stata
ottimizzata

NON-RESPONDER – CASO CLINICO 3

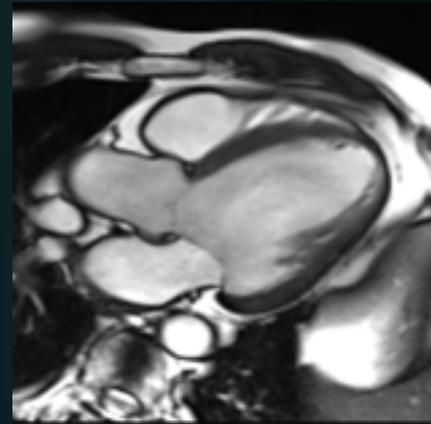
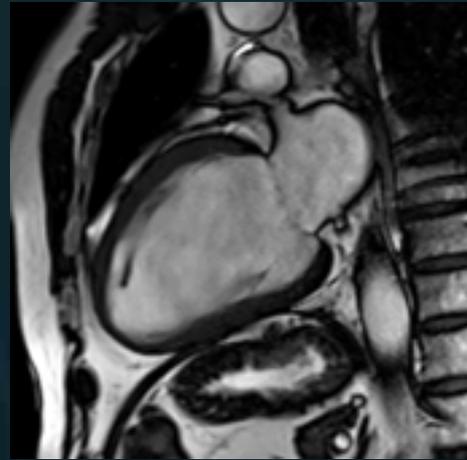
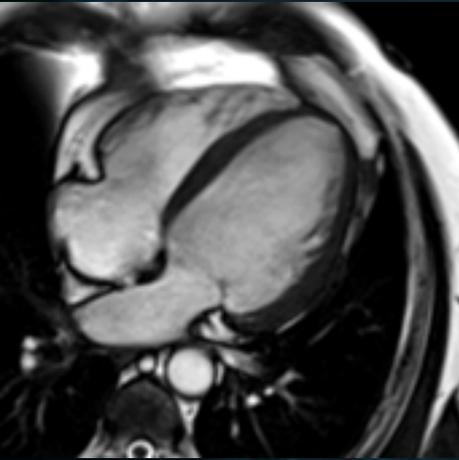
- **Cardiomiopatia dilatativa**
- **NYHA IIb, VO2max 15,9 (52%)**
- **Diabete 2, BMI 28**
- **Coronaropatia non critica, SPECT-**
- **BBS**
- **Ipocinesi diffusa, acinesi inferiore**
- **FEVS 30%**
- **Dissincronia + (CARE-HF 2 su 3)**

MDCT: STENOSI INTERMEDIA IVA



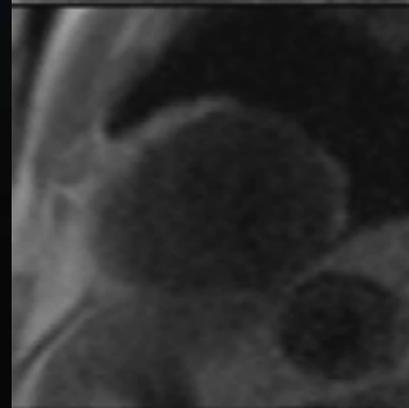
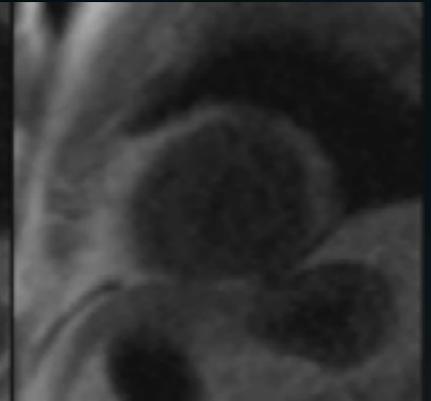
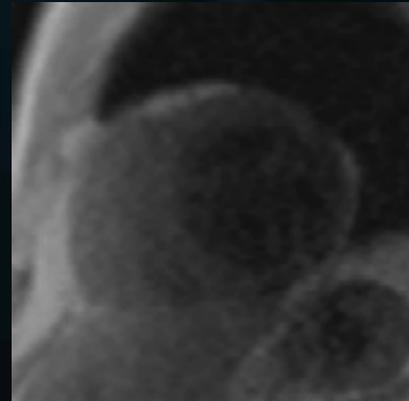
- **VALUTAZIONE ISCHEMIA E VITALITA': CMR-ADENOSINA**

CASO CLINICO 3 - CMR-STRESS

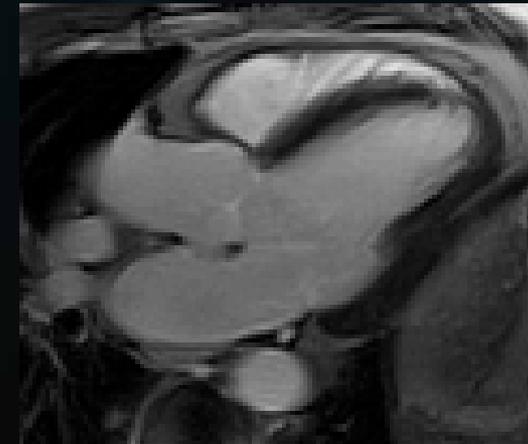
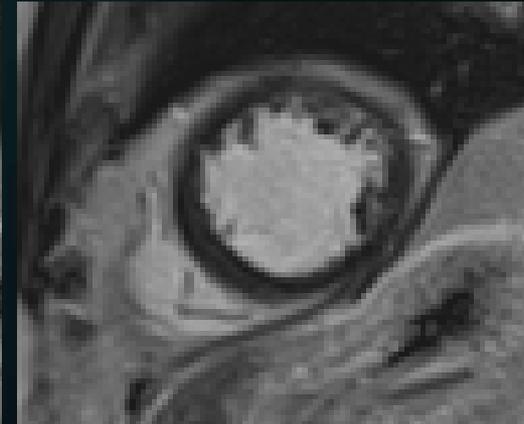
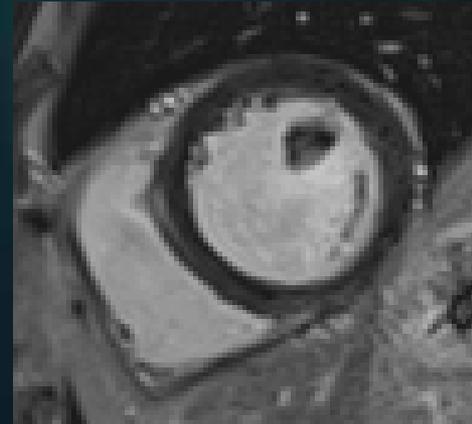
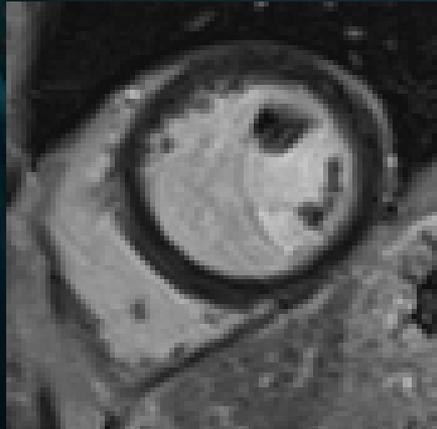


BASALE

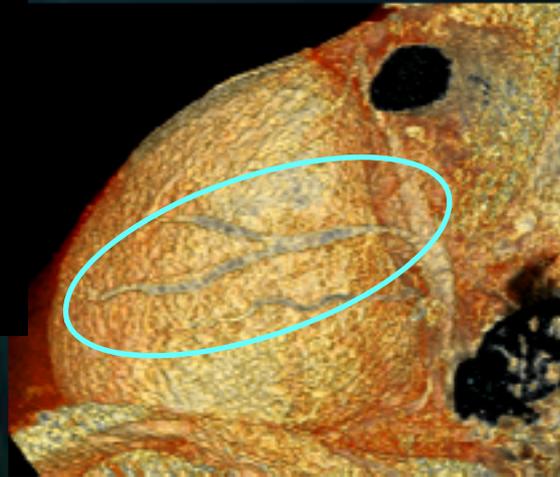
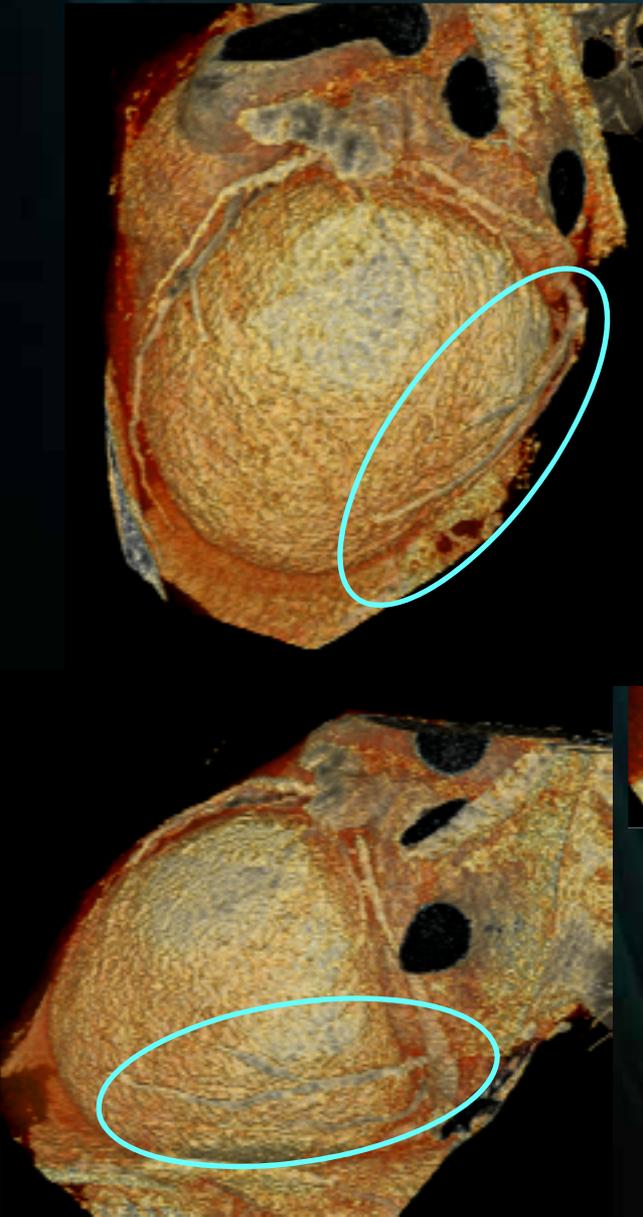
STRESS



CASO CLINICO 3 - LGE



CASO 3 – IMPIANTO



ICD-CRT

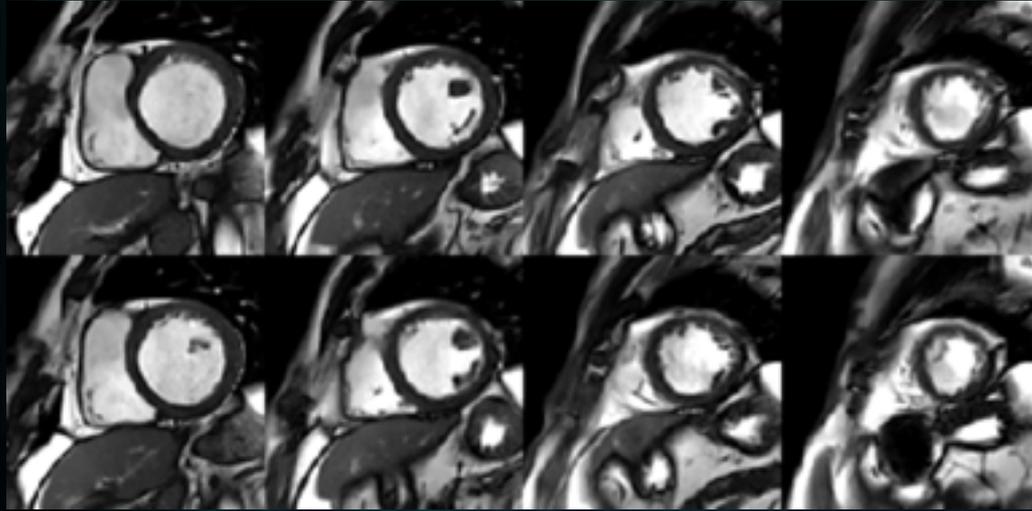
Small, illegible text, likely a placeholder or a very small font.

f.Up:

-NYHA II

-FEVS 30%

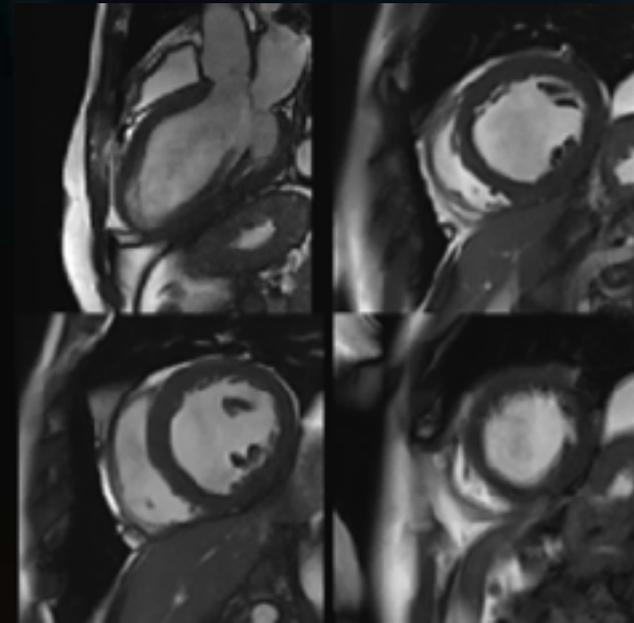
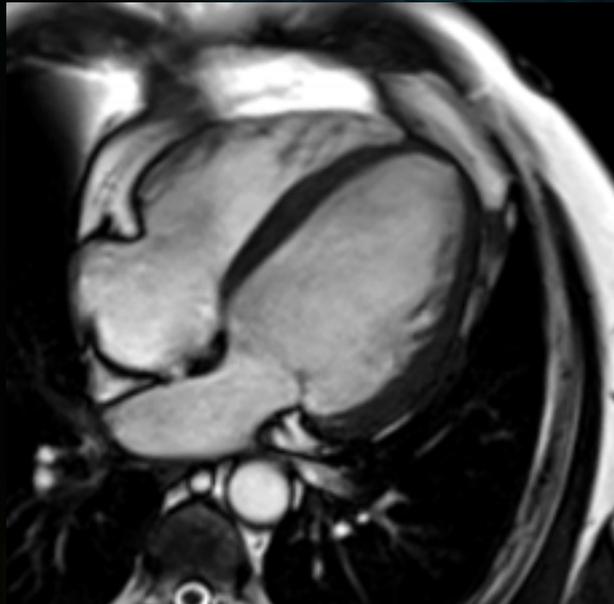
CASO CLINICO 3 - FE



FEVS-CMR:

40%

DISSINCRONIA?



CASO CLINICO 2 - CONCLUSIONI

VALORE AGGIUNTO DELLA RMC

Cardiomiopatia NON ISCHEMICA

Disfunzione VS MODERATA

Probabilmente DISSINCRONIA NON SEVERA

PROBABILI CAUSE DI FAILURE

Criteri di selezione errati

Il paziente non aveva una significativa dissincronia meccanica

La dissincronia meccanica non era un elemento centrale

Non è stato possibile incannulare il seno coronarico

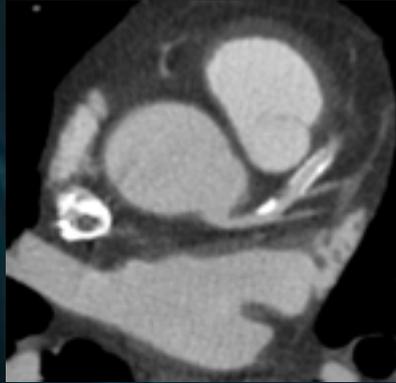
Non è stata trovata una sede adatta all'impianto

Stimolazione del nervo frenico

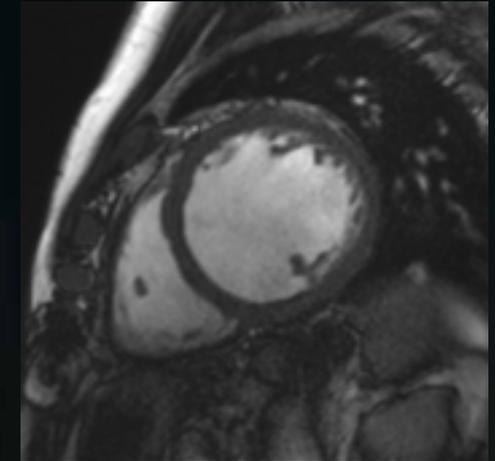
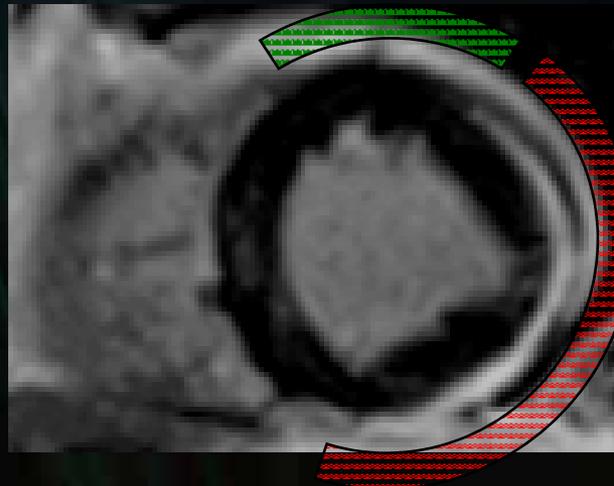
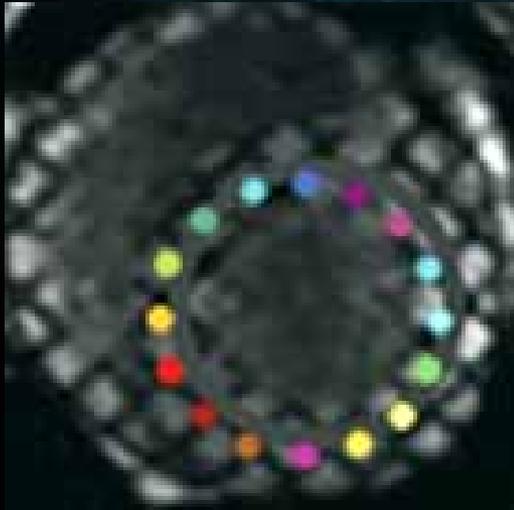
La stimol. elettrica non ha corretto la dissincronia meccanica

La stimolazione non è stata ottimizzata

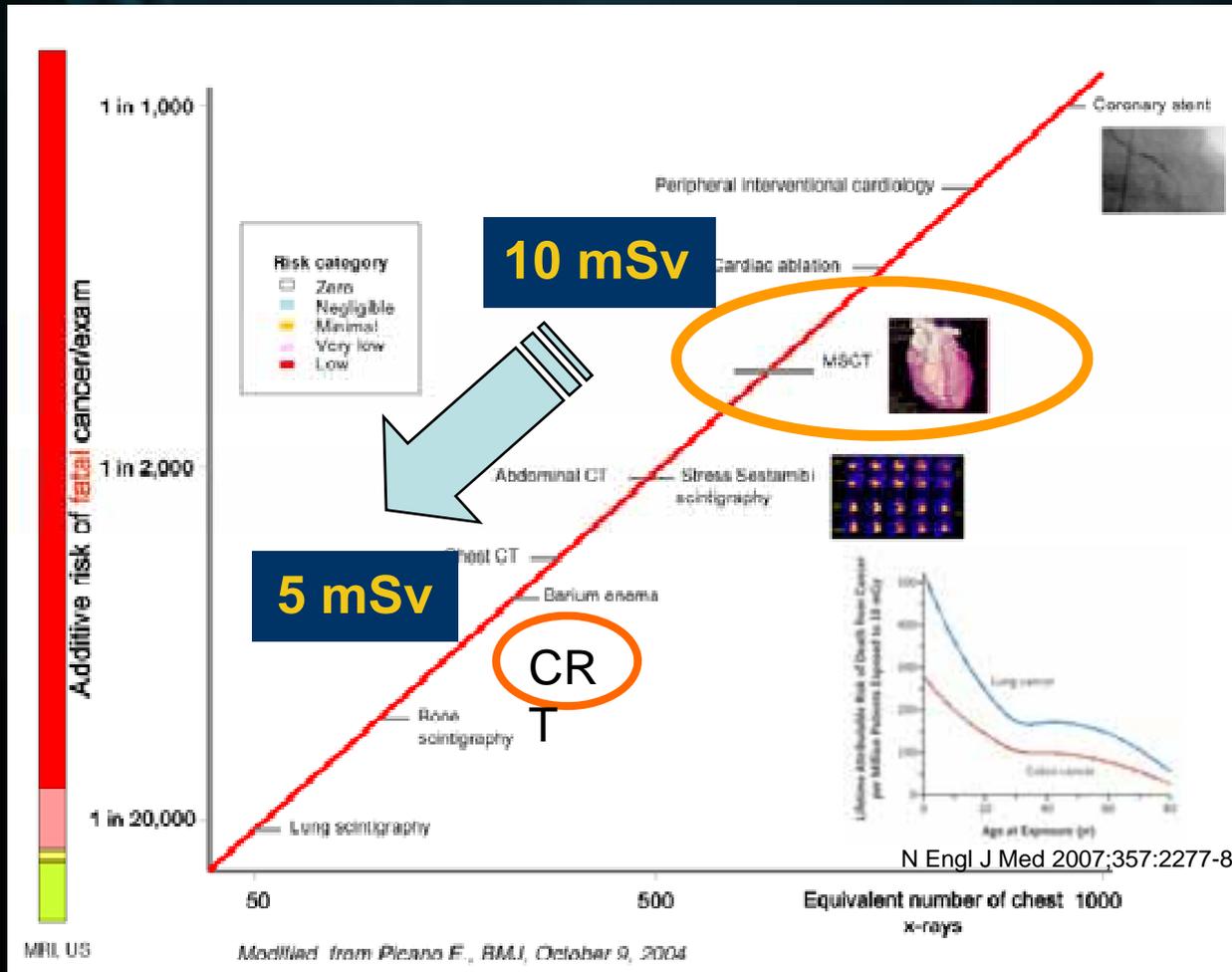
CONCLUSIONI



CT
MR



CT – Radioesposizione e MDC



MDC



- **Reazione acuta severa**

1:2500

- **Nefropatia**