

Pearls and Pitfalls of Cardiac Imaging

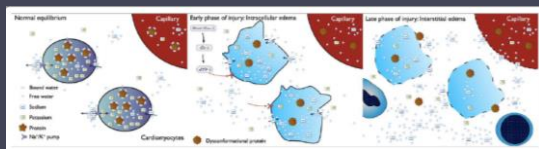
What we see when others miss :CMR

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OUTLINES

- When CMR is better than other imaging modalities in different cardiovascular diseases
- When CMR is worse than other imaging modalities

How to assess area of myocardial injury?



Friedrich MG. Nat Rev Cardiol 2010; 3 : 385-7

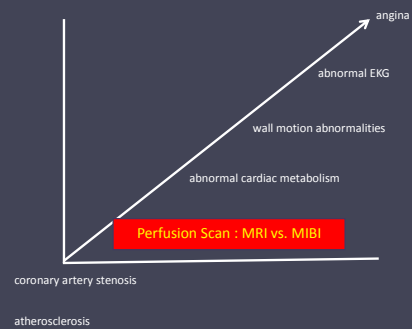
	Irreversible Injury (Infarcted)	Reversible Injury (Viable)	Normal (Remuscle)
Total Water Content <i>reference 33, 34)</i>	↑ ~8%	↑ 0-10%	--
End Diastolic Wall Thickness <i>reference 40)</i>	↑ ~100%	Minimal Change	--
Electrolytes <i>reference 33, 34, 35, 36)</i>	↑↑ Changes	Minimal Change	--
Ultrastructure <i>reference 34, 37)</i>	↑↑ Changes	Minimal Change	--

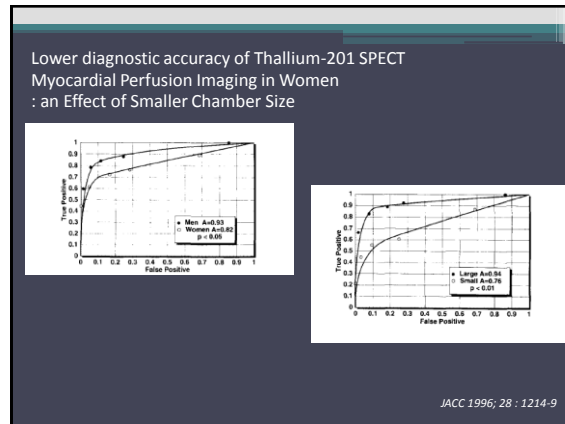
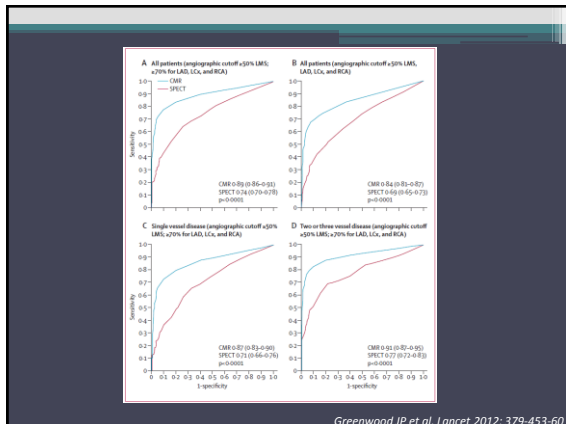
B Myocardium at Risk

Corresponding images for ²³Na MRI and TTC staining are shown.

Friedrich MG. JACC Cardiovascular Imaging 2011; 1014-1021

IHD :When CMR “sees” but others don’t





Value of Cardiovascular Magnetic Resonance Stress Perfusion Testing for the Detection of Coronary Artery Disease in Women

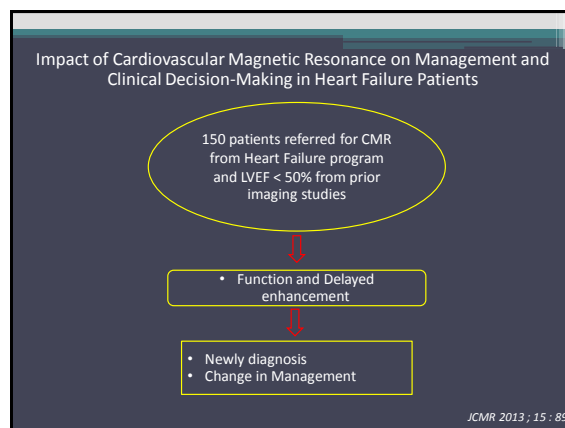
	Combine CMR stress test		
	Sensitivity	Specificity	Accuracy
Single vessel disease	71%	88%	85%
2-vessel disease	100%	88%	89%
3-vessel disease	100%	88%	89%
Multi-vessel disease	100%	88%	90%

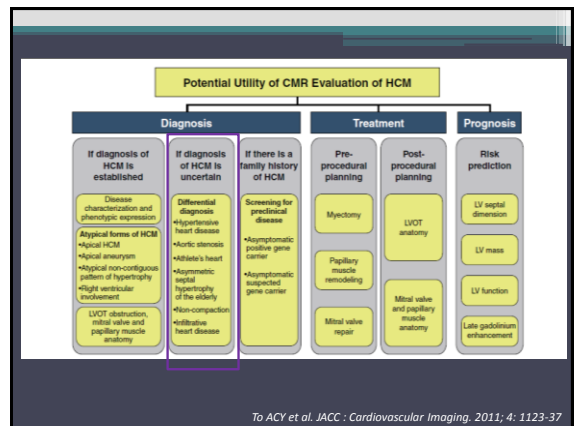
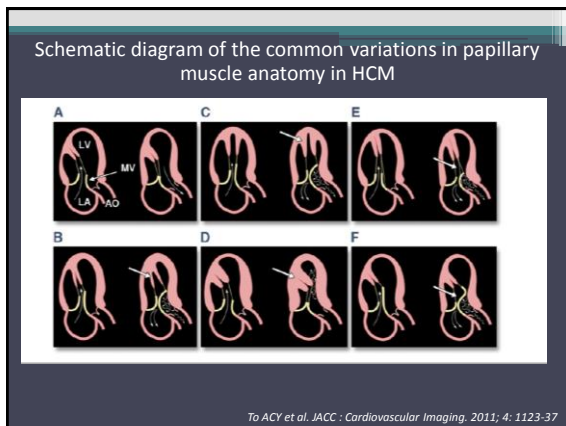
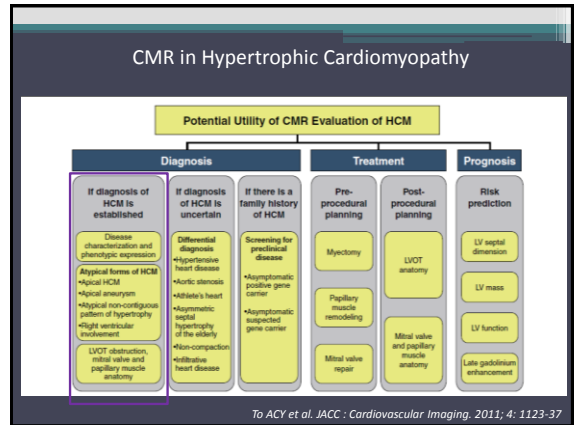
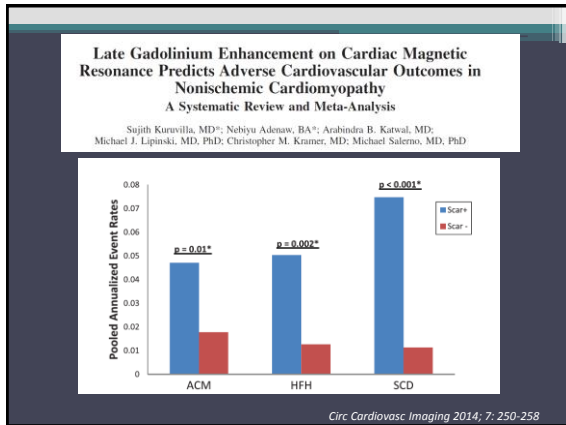
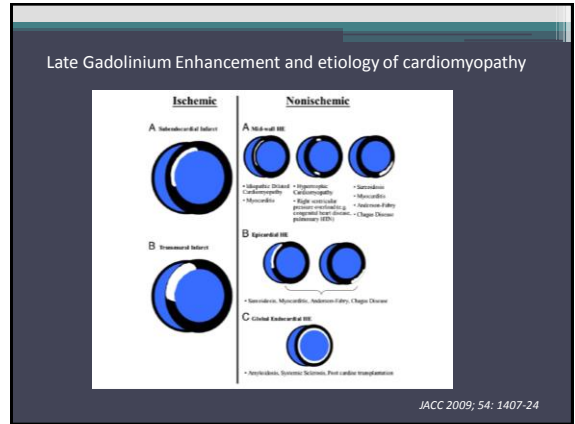
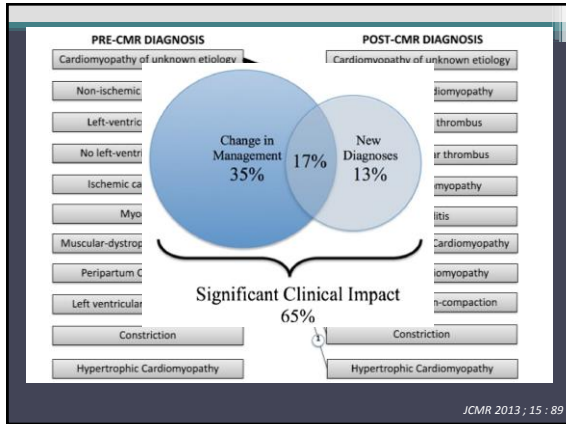
J. Am. Coll. Cardiol. Img. 2008; 1: 436-45

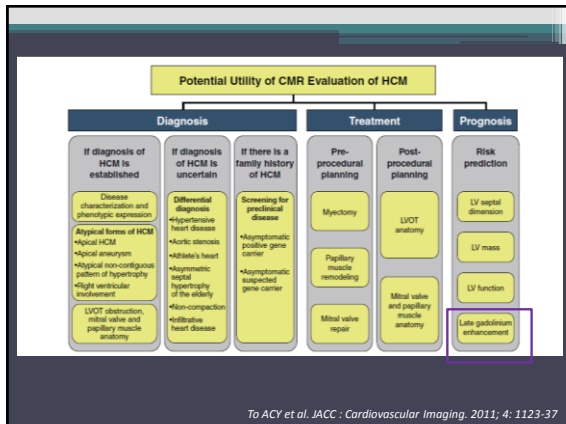
CMR vs. Nuclear imaging

	advantage	disadvantage
Nuclear perfusion	<ul style="list-style-type: none"> Well-established clinical data Able to perform exercise-stress MPI Able to perform in ESRD patients Able to quantify myocardial blood flow Whole-heart coverage 	<ul style="list-style-type: none"> Lower spatial resolution Radiation exposure Two days scan Attenuation artifacts (breast, bowel etc)
CMR	<ul style="list-style-type: none"> Better spatial resolution (2 mm) No radiation exposure One hour scan (45 minutes) Better cardiac function and wall motion assessment Better subendocardial infarction detection 	<ul style="list-style-type: none"> Less-established clinical data Not able to do exercise-stress Not able to perform in patients with GFR < 30 ml/minute/1.73 m2 Poor image quality in arrhythmic patients Claustrophobic problem Not able to quantify myocardial blood flow

CMR in Heart Failure patients





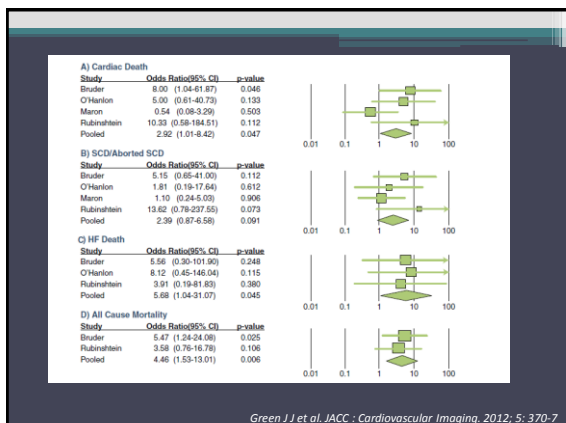


Prognostic Value of Late Gadolinium Enhancement in Clinical Outcomes for Hypertrophic Cardiomyopathy

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 Michael Salerno, MD, PhD*‡
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Adverse Cardiovascular Events	Pooled OR	95% CI	p Value
Cardiac death	2.92	1.01–8.42	0.047
SCD/aborted SCD	2.39	0.87–6.58	0.091
SCD	1.45	0.47–4.52	0.519
HF death	5.68	1.04–31.07	0.045
All-cause mortality	4.46	1.53–13.01	0.006

Green JJ et al. JACC : Cardiovascular Imaging, 2012; 5: 370-7c



When CMR is worse than other imaging modalities

- PFO
- Structural abnormalities of valvular leaflets
- Infective endocarditis
- Patients with arrhythmia or cannot hold the breath
- Patients with metallic artifacts

Take Home Message

- Think of CMR when you are searching for
 - ACS : Myocardial salvage
 - IHD : CMR perfusion is better than Nuclear perfusion
 - Right ventricular disease : ARVD etc
 - Etiologies of heart failure : Myocarditis, EMF etc
 - HCM : Inadequate morphology assessment by echo : Prognosis assessment
- Do not think of CMR when you are searching for
 - Small and high mobile structure : IE, valve leaflet assessment

THANK YOU FOR YOUR ATTENTION