BEST Meeting

19 October 2016
CARDIOLOGY UPDATE

Dr.Uma Velupandian MBBS, MD, MRCP, PhD

Consultant Cardiologist, Barnsley Hospital

Honorary Consultant Cardiologist, Leeds General Infirmary

Our Cardiologist Team at Barnsley

- Consultant Cardiologist = 4
- Registrars/Middle grade doctor = 3
- Junior Doctors FY&CT = 5
- Cardiac Nurse Specialist = 3
- Cardiac Physiologists
- Secretaries
- PIU nurses

Our Team Today

- Dr.Uma Velupandian, Consultant Cardiologist
- Ms.Nicola Wilkinson, Lead Cardiac Specialist Nurse
- Mr.Daniel Kaye and Mr.Mark Balchin, Cardiac Nurse Specialist
- Ms. Mandy Houghton, Cardiac Nurse Specialist, Community Heart Failure

About Me

Barnsley Hospital NHS Trust
Population: 250,000

Leeds Teaching Hospital NHS Trust
Population: > 1 million tertiary care

My interests

- General Cardiology
- Cardiac Imaging
  - Echocardiography
    - Transthoracic
    - Transoesophageal including complex valve assessments
    - LV contrast Echocardiography
    - Stress Echocardiography
  - Cardiac MRI – Structural & Stress Perfusion
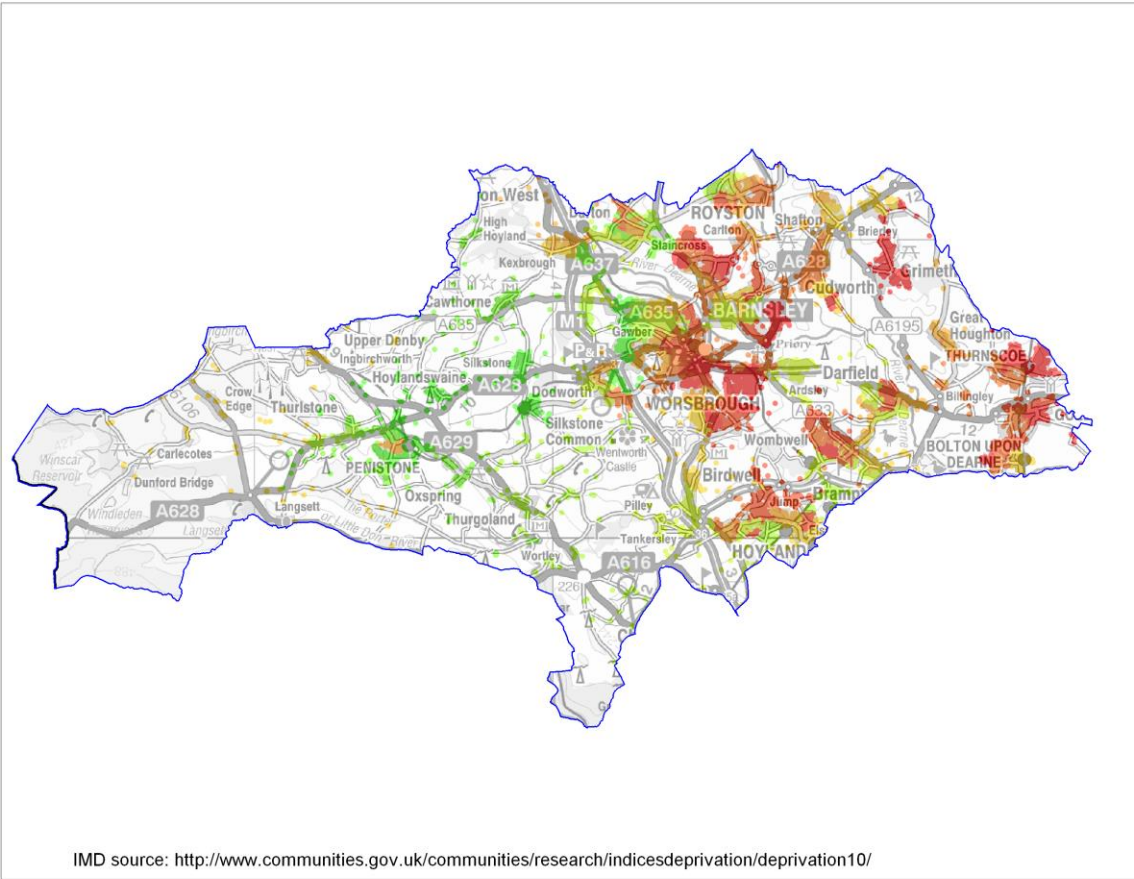- Diagnostic Coronary Angiogram incl TAVI Assessment

BARNSLEY

Index of Multiple Deprivation 2010
Barnsley PCT & MDC

IMD 2010 Ranking
relative to England

- 0.9 to 1 Least deprived
- 0.8 to 0.9
- 0.7 to 0.8
- 0.6 to 0.7
- 0.5 to 0.6
- 0.4 to 0.5
- 0.3 to 0.4
- 0.2 to 0.3
- 0.1 to 0.2
- 0 to 0.1 Most Deprived

Postcode centroids
coloured by IMD 2010.
PCT & LA boundaries
included.

IMD source: http://www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/

YHPHO
YORKSHIRE & HUMBER
PUBLIC HEALTH OBSERVATORY

Barnsley

Health summary for Barnsley

The chart below shows how the health of people in this area compares with the rest of England. This area's result for each indicator is shown as a circle. The average rate for England is shown by the black line, which is always at the centre of the chart. The range of results for all local areas in England is shown as a grey bar. A red circle means that this area is significantly worse than England for that indicator; however, a green circle may still indicate an important public health problem.

🔴 Significantly worse than England average

🟡 Not significantly different from England average

🟢 Significantly better than England average

England Worst — England Average (25th Percentile / 75th Percentile) — England Best
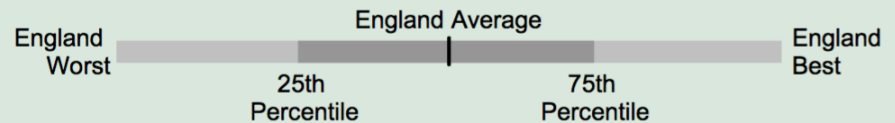
Domain	Indicator	Local No. Per Year	Local Value	Eng Avg	Eng Worst	England Range	Eng Best
Our communities	1 Deprivation	72969	32.4	19.8	83.0	🔴	0.0
	2 Proportion of children in poverty ‡	10690	25.0	21.9	50.9	🔴	6.4
	3 Statutory homelessness ‡	56	0.6	2.0	10.4	🟢	0.0
	4 GCSE achieved (5A*-C inc. Eng & Maths)	1157	44.4	58.4	40.1	🔴	79.9
	5 Violent crime	2491	11.0	14.8	35.1	🟢	4.5
	6 Long term unemployment	1205	8.2	5.7	18.8	🔴	0.9
Children's and young people's health	7 Smoking in pregnancy ‡	650	22.0	13.7	32.7	🔴	3.1
	8 Breast feeding initiation ‡	1856	63.0	74.5	39.0	🔴	94.7
	9 Obese Children (Year 6) ‡	425	19.7	19.0	26.5	🟡	9.8
	10 Alcohol-specific hospital stays (under 18)	43	88.1	61.8	154.9	🔴	12.5
	11 Teenage pregnancy (under 18) ‡	232	53.2	38.1	64.9	🔴	11.1
	12 Adults smoking ‡	n/a	25.7	20.7	33.5	🔴	8.9

Barnsley Health

	6 Long term unemployment	1299	5.2	5.7	10.3		5.5
Children's and young people's health	7 Smoking in pregnancy ‡	650	22.0	13.7	32.7		3.1
	8 Breast feeding initiation ‡	1856	63.0	74.5	39.0		94.7
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	11 Teenage pregnancy (under 18) ‡	232	53.2	38.1	64.9		11.1
Adults' health and lifestyle	12 Adults smoking ‡	n/a	25.7	20.7	33.5		8.9
	13 Increasing and higher risk drinking	n/a	22.1	22.3	25.1		15.7
	14 Healthy eating adults	n/a	20.3	28.7	19.3		47.8
	15 Physically active adults ‡	n/a	12.0	11.2	5.7		18.2
	16 Obese adults ‡	n/a	28.4	24.2	30.7		13.9
Disease and poor health	17 Incidence of malignant melanoma	34	14.5	13.6	26.8		2.7
	18 Hospital stays for self-harm ‡	496	227.3	212.0	509.8		49.6
	19 Hospital stays for alcohol related harm ‡	6404	2351	1895	3276		910
	20 Drug misuse	1819	12.2	8.9	30.2		1.3
	21 People diagnosed with diabetes ‡	12518	6.4	5.5	8.1		3.3
	22 New cases of tuberculosis	6	2.7	15.3	124.4		0.0
	23 Acute sexually transmitted infections	1836	807	775	2276		152
	24 Hip fracture in 65s and over ‡	232	453	452	655		324
Life expectancy and causes of death	25 Excess winter deaths ‡	118	15.9	18.7	35.0		4.4
	26 Life expectancy – male	n/a	76.8	78.6	73.6		85.1
	27 Life expectancy – female	n/a	80.4	82.6	79.1		89.8
	28 Infant deaths ‡	12	4.1	4.6	9.3		1.2
	29 Smoking related deaths	485	284	211	372		125
	30 Early deaths: heart disease and stroke ‡	224	84.7	67.3	123.2		35.5
	31 Early deaths: cancer ‡	373	140.5	110.1	159.1		77.9
	32 Road injuries and deaths ‡	87	38.6	44.3	128.8		14.1

‡ Substantially similar to indicator proposed in the Public Health Outcomes Framework published January 2012

Our Services
General Cardiology

- Outpatient Clinics: New and Follow up
- RACPC
- One stop Heart Failure Clinic
- Post MI Clinic
- GP Open Access (Consultant opinion)
  - ECG
  - Echocardiogram
  - Holter monitoring (24 Hour ECG)
  - 24 Hour Ambulatory Blood Pressure Monitoring

Our Services
Inpatient Cardiology

- Coronary Care Unit: 7 beds (shared with respiratory – has NIV)
- Cardiology Ward – 25 Beds
- Cardiology Inreach service to Acute Medicine – 7 day service
- Acute Pacing on call service – 24/7
- Cardiology Weekend Ward Rounds

Cardiac Investigations

- Cardiac Physiology: ECG, Holter, ABPM, Cardiac Event Recorders, Exercise Tolerance Tests including CPEX
- Echocardiography:
  - TTE
  - Contrast Echocardiography – Bubble contrast + LV Contrast
  - Stress Echocardiogram
  - TOE including Acute TOE on ITU
- Tilt Table Testing (Care of Elderly)

Cardiac Investigations

- Cardiac CT: CT Calcium Score & CT Coronary angiogram (Radiology department led)
- Myoview – Nuclear Perfusion Scan (Nuclear medicine)
- Advanced Cardiac MRI (LGI)
  - Structural Heart Disease – Cardiomyopathy
  - IHD assessment – Stress Perfusion
  - Aortic diseases
  - Congenital Heart Disease

Cardiac Procedures

- Diagnostic Coronary Angiography – Radial & Femoral
  - Coronaries + Grafts
  - Complex TAVI Assessment
  - Right Heart Catheterisation
- Pacemaker implantation: Single and Dual Chamber; MRI Compatible
- Loop recorder implantation
- Pericardiocentesis (emergency)
- DC Cardioversion – Nurse Led & Registrar Supervision
- EECP therapy for refractory Angina

Our Links to Tertiary Care

- Sheffield Teaching Hospital – Northern General
  - Coronary interventions acute and elective
  - Electrophysiology, Ablation and Complex Devices
  - Cardiac Surgery – CABG, Valves, Aortic
- Leeds Teaching Hospital – Leeds General Infirmary
  - MRI
  - TAVI
  - Adult Congenital Heart Disease

Case Study from RACPC

Rapid Access Chest Pain Clinic

19th October 2016

Nicola Wilkinson
Mark Balchin
Daniel Kaye
Cardiac Nurse Specialists

Rapid Access Chest Pain Clinic

National Service Framework 2000

Standard 8: Patients suspected of having stable angina will be reviewed by a specialist in the RACPC within two weeks.
Prompt investigations for those in whom it is indicated.

NICE Guidelines

Chest pain of recent onset: assessment and diagnosis, published 24th March 2010.

NICE estimated risk of CVD according to chest pain symptoms, risk factors, age and gender.

Function of the Clinic

- A one-stop service involving clinical assessment and investigation

- To identify patients in need of evidence based treatments and revascularisation

- Early referral for necessary investigations

- Identify and advise on cardiac risk factors, lifestyle advice and referral to appropriate services (smokestop etc)

- Provide reassurance for patients with non-cardiac outcomes

- Initiate medications or advise GP

Criteria for referral

GP referral only (A+E not funded to refer)

Chest pain within past 12 weeks

Symptoms suggestive of angina

Age 30 and above

Refer via Choose and Book service

Patients should be able to attend an out-patient clinic

Referral Exclusions

- Patients suspected of ACS should not be referred (A+E)

- Patients who have been seen in cardiology in the past 12 months should be referred to the main cardiology clinic

- Patients with symptoms suggestive of heart failure should have a BNP and be referred to the one stop diagnostic heart failure clinic

- Patients with symptoms suggestive of cardiac arrhythmias should be referred to general cardiology

- Patients with multiple cardiac problems or complicated chest pain history should be referred to the main cardiology clinic

Clinic Overview

Patient assessment:

               History taking

               Examination

               12 lead ECG if unable to perform ETT

               CVD risk scoring as per NICE guidelines

               Investigations as deemed appropriate

Consultation with patient:

               Discuss outcomes/diagnosis

               Lifestyle advice and appropriate referrals for support

               Check patients understanding

               Prescribe appropriate medications

               Formulate management plan including letter for GP

CNS reviews every patient case history with Cardiologist/middle grade

Table 1 Percentage of people estimated to have coronary artery disease according to typicality of symptoms, age, sex and risk factors

Age (years)	Non-anginal chest pain				Atypical angina				Typical angina			
	Men		Women		Men		Women		Men		Women	
	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
35	3	35	1	19	8	59	2	39	30	88	10	78
45	9	47	2	22	21	70	5	43	51	92	20	79
55	23	59	4	25	45	79	10	47	80	95	38	82
65	49	69	9	29	71	86	20	51	93	97	56	84

For men older than 70 with atypical or typical symptoms, assume an estimate > 90%.

For women older than 70, assume an estimate of 61–90% EXCEPT women at high risk AND with typical symptoms where a risk of > 90% should be assumed.

Values are per cent of people at each mid-decade age with significant coronary artery disease (CAD) .

Hi = High risk = diabetes, smoking and hyperlipidaemia (total cholesterol > 6.47 mmol/litre).

Lo = Low risk = none of these three.

The shaded area represents people with symptoms of non-anginal chest pain, who would not be investigated for stable angina routinely.

Note:

These results are likely to overestimate CAD in primary care populations.

If there are resting ECG ST-T changes or Q waves, the likelihood of CAD is higher in each cell of the table.

Case Study

55 year old male with left sided chest pains over recent months on exertion, relieved by GTN. Walking up hills more difficult and has to rest.

RF: Smoking   ECG: NSR 68bpm   BP: 102/50mmHg

ETT: Bruce protocol 4:44mins, stopped due to chest pain, horizontal ST depression

Existing Medications: Aspirin, Statin, Losartan, Lansoprazole, GTN spray

Medications commenced: ISMN

Referred for echocardiogram and diagnostic angiogram

Outcome: CABG

Case Study

66 year old woman with a 2 month history of tightness under her left breast occurring at rest as well as exertion. Symptoms occurring daily, lasting up to a few minutes at a time and easing with rest.

RF: Smoking   ECG: NSR 76bpm
         BP:140/70mmHg
ETT: Bruce protocol 4:14mins, stopped due to fatigue, no ST changes, minimal chest pain symptoms.

Existing medications: Doxazosin, Bendroflumethiazide, Simvastatin, Lansoprazole, Amitriptyline, Salbutamol, Fluticasone.

Referred for cardiac CT+/- CT angio. Result negative for CAD.

Imaging Modalities Available for RACPC patients at Barnsley

- Low Risk group: Cardiac CT calcium Score + CT Coronary Angiogram

- Intermediate Risk Group-Functional Study
  – Stress Echo – Treadmill & Dobutamine
  – Stress Perfusion imaging – Nuclear
  – Stress Perfusion imaging – Cardiac MRI

- High Risk Group – Diagnostic Coronary Angiogram (Radial/Femoral access)

CT Calcium Score

Chest pain of recent onset

CT calcium scoring factsheet

Implementing NICE guidance

- Agatston Score for coronary calcium
  - 1-400 Offer CT coronary angiogram
  - > 400 invasive diagnostic coronary angiogram recommended

Calcium Score	Presence of CAD
0	No evidence of CAD
1-10	Minimal evidence of CAD
11-100	Mild evidence of CAD
101-400	Moderate evidence of CAD
Over 400	Extensive evidence of CAD

The radiation exposure from a CT coronary angiogram is ?

A. No radiation exposure

B. Equal to a Chest x-ray

C. Equal to CT Scan of Abdomen and pelvis

✓ D. Equal to a barium swallow

E. More than a Nuclear perfusion scan
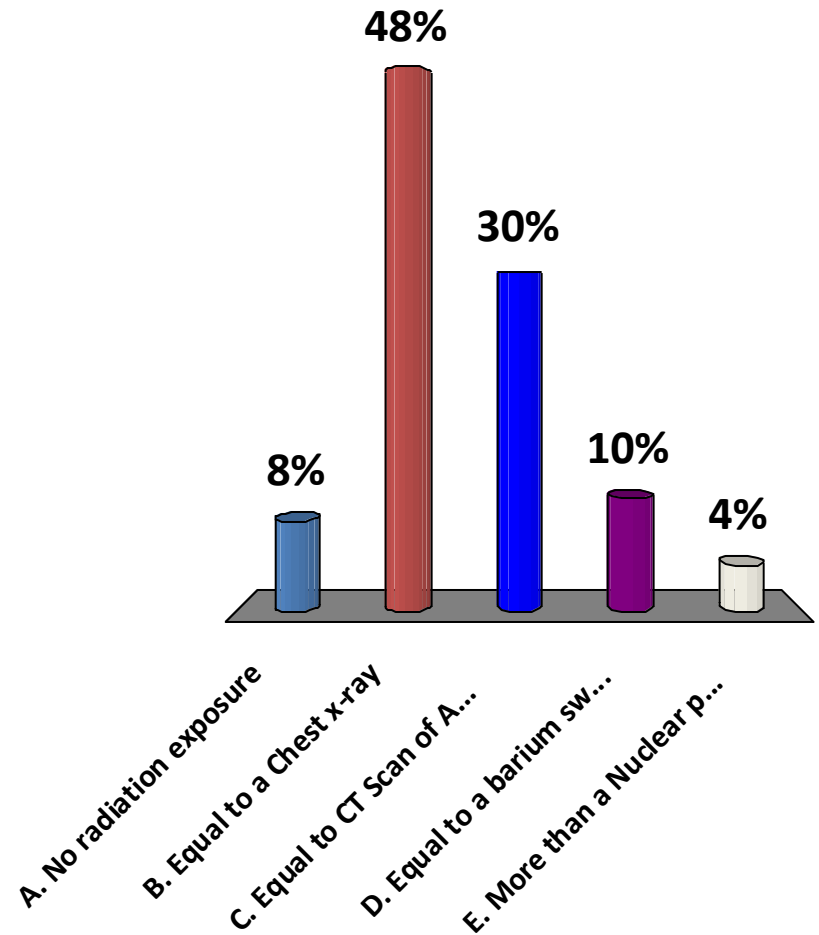
- CXR = 0.1 mSv
- CT Calcium Score = 1.5 – 3 mSv
- Barium Swallow = 1.5 mSv
- Average environmental radiation exposure = 3 mSv per year
- Nuclear Scan (myoview) = 6 – 8 mSv
- CT Abdomen and Pelvis = 10 mSv
- CT Coronary Angiogram = 12 mSV
- Conventional Angiogram = 4.6 to 15.8mSv

CT Coronary Angiogram vs Treadmill ETT

- CT coronary angiogram

- Pros:

  - High Sensitivity;

  - Quick;

  - Cost effective;

  - Independent of patient functional capacity

- Cons:

  - Radiation Exposure

What percentage of patients attending RACPC will require CT Coronary angiogram ?
& what percentage of those tested would be negative?

- A – 34% & 60%

- B – 7% & 80%

- C – 17% & 70%

- D - 50% & 46%
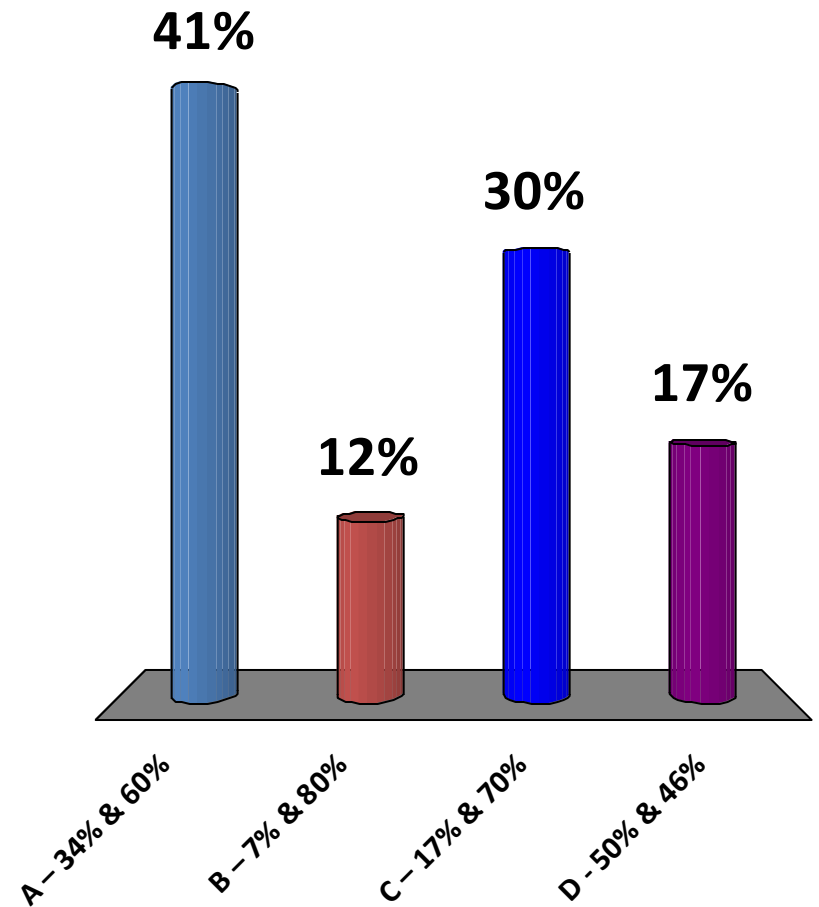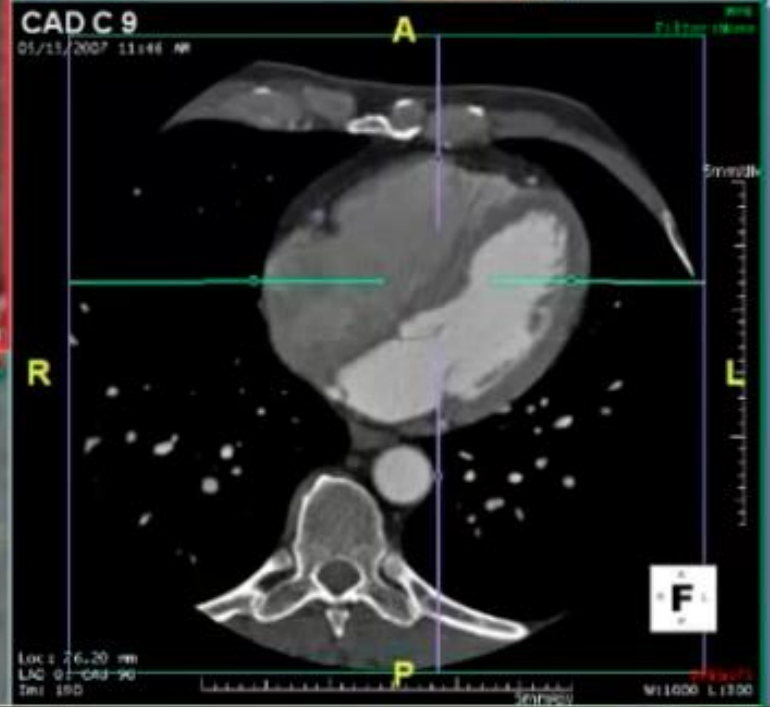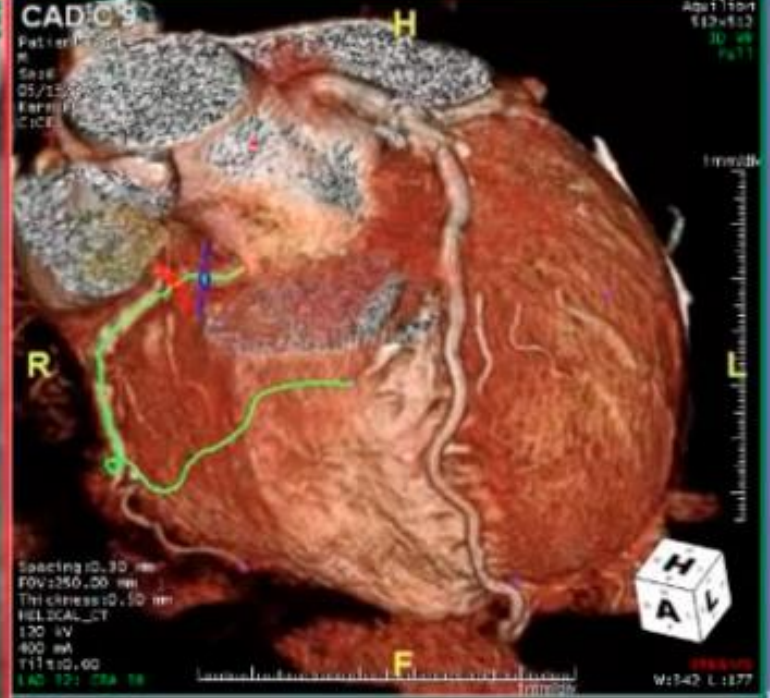
CT Coronary Angiog
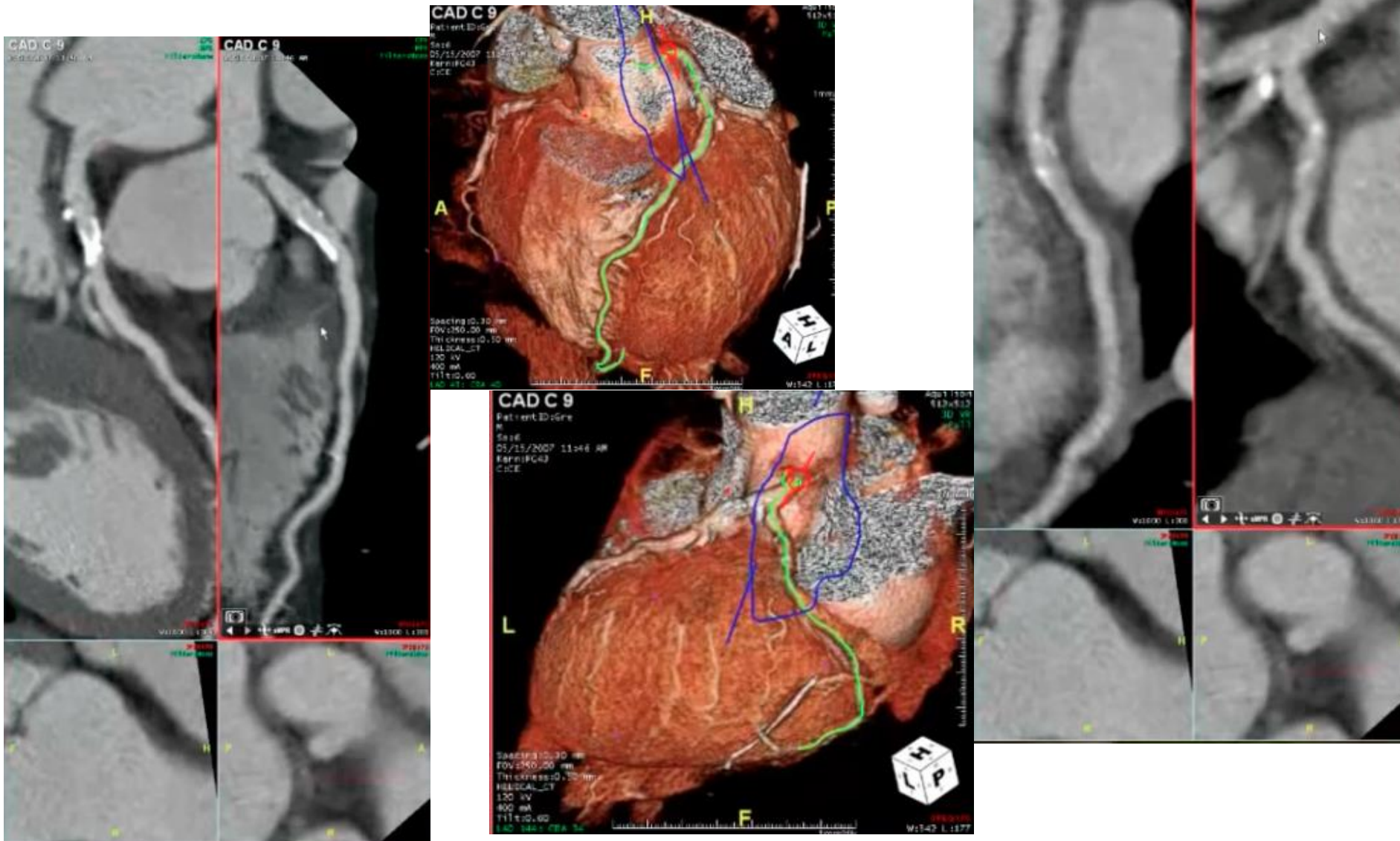
Which Functional Test

STRESS ECHO

- No radiation exposure
- Less expensive
- Well tolerated
- With TMT –assesses func capacity
- Sensitivity = 85%; Specificity = 88%

NUCLEAR SCAN

- Radiation exposure
- More expensive
- Well tolerated
- Cannot assess viability
- Sensitivity 86%; Specificity 74%

Which Functional Test

STRESS PERFUSION CARDIAC MRI

- Certain centres only
- No radiation
- Sensitivity 91% and Specificity 81%
- Other causes of chest pain eg HH
- Less well tolerated if claustrophobic

Most patients:

- Stress Echo – TMT/Dob
- Myoview
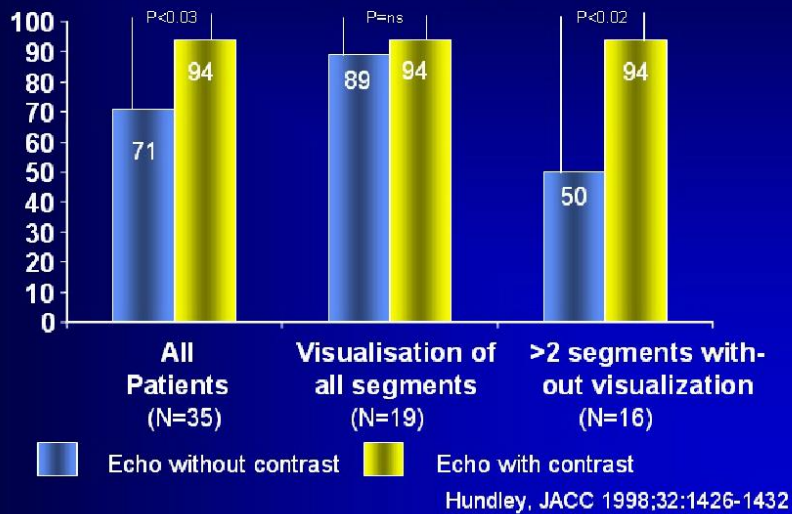
- Stress MRI – previous MI; LVSD

Stress Echocardiogram
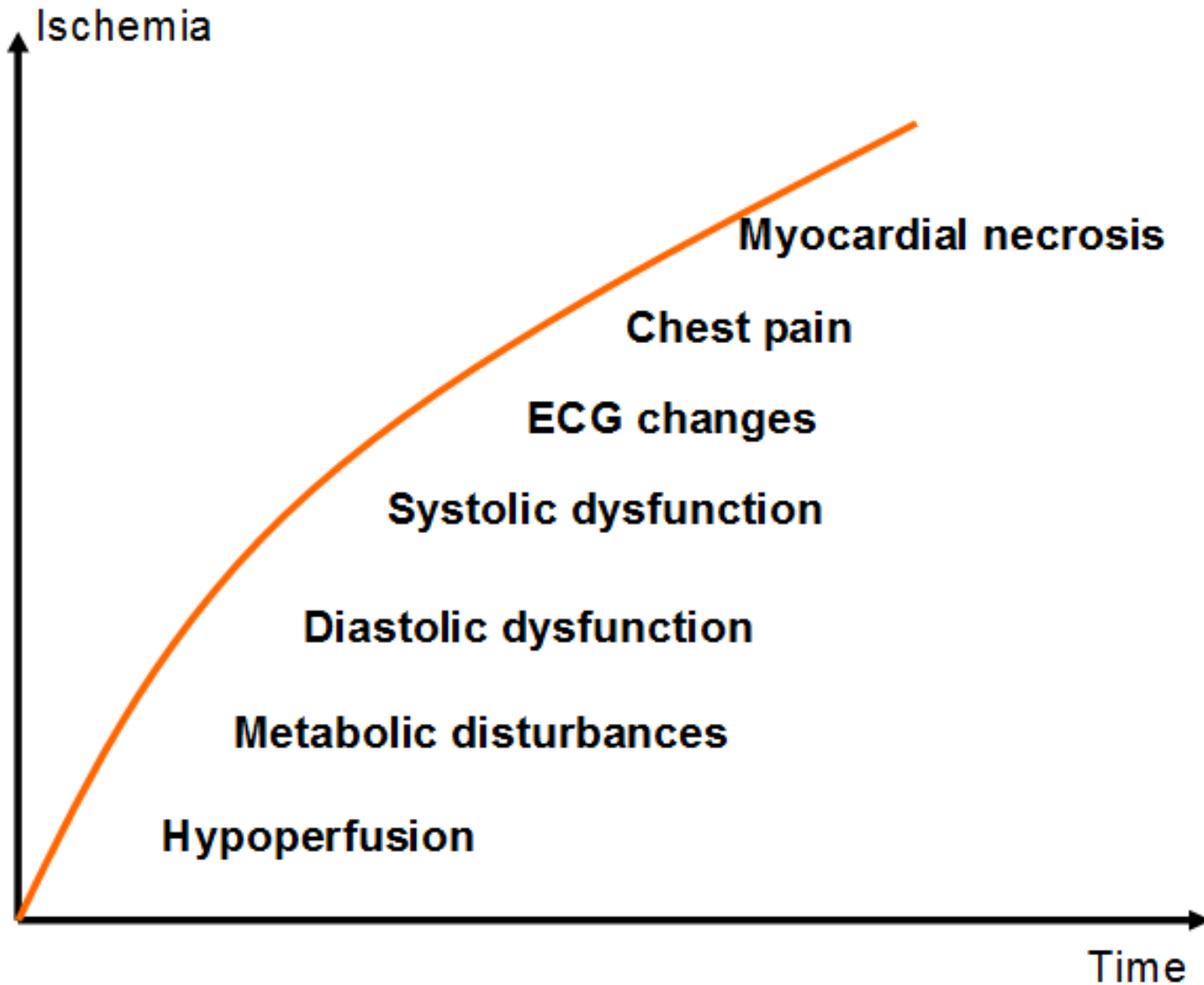
LV Contrast echocardiography
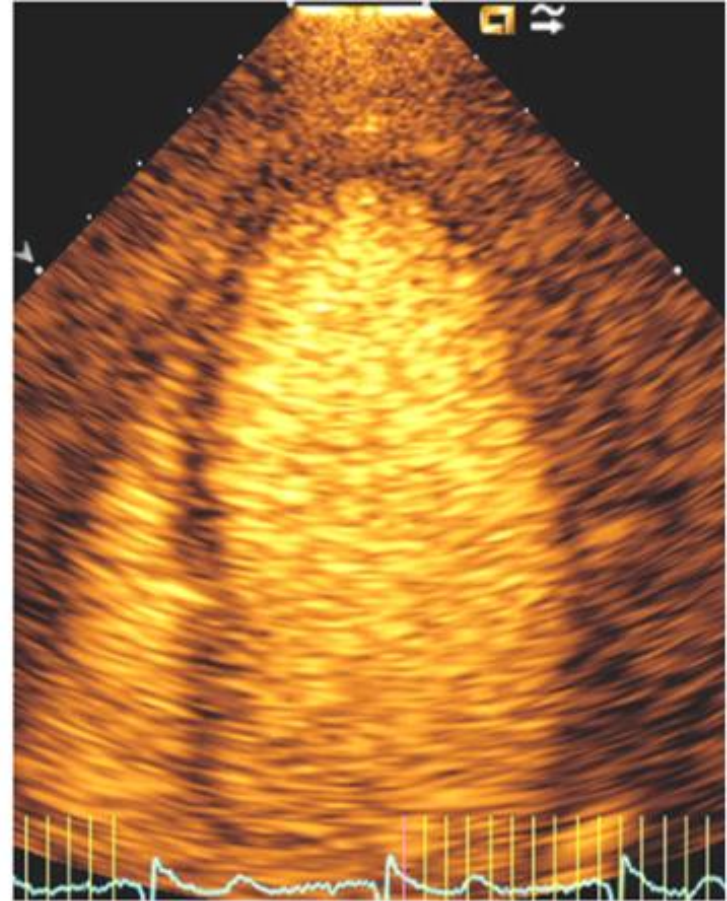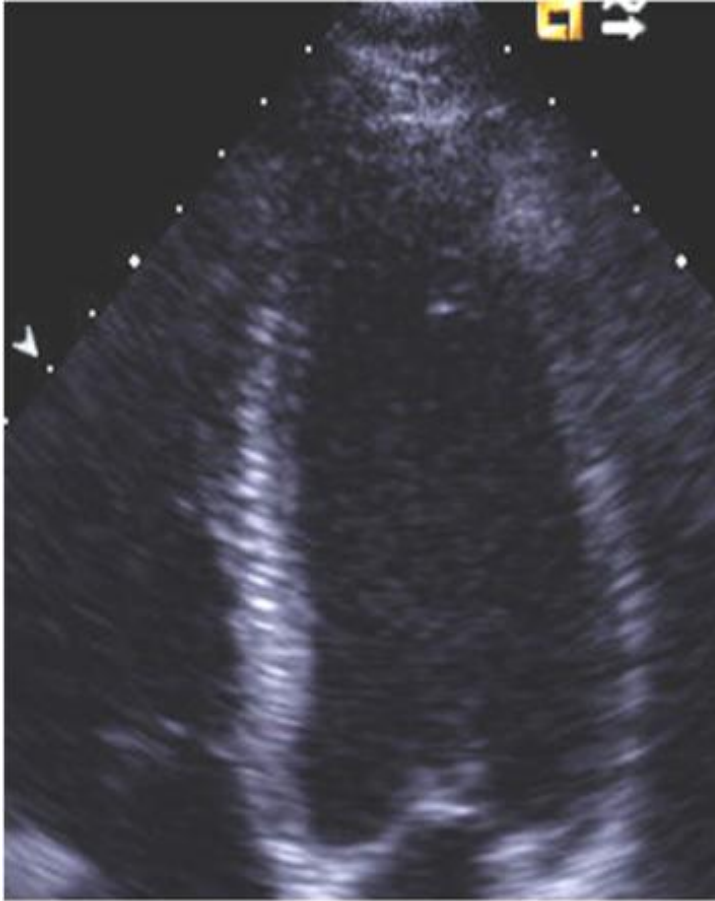
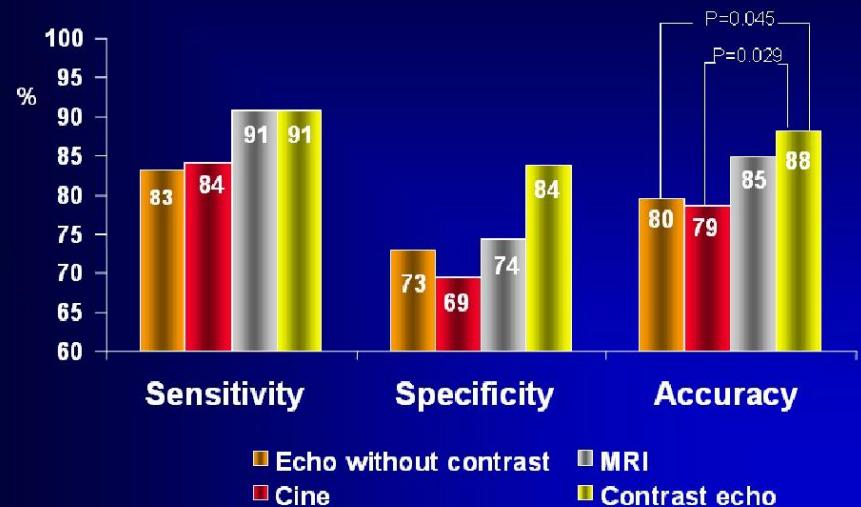# LV Contrast

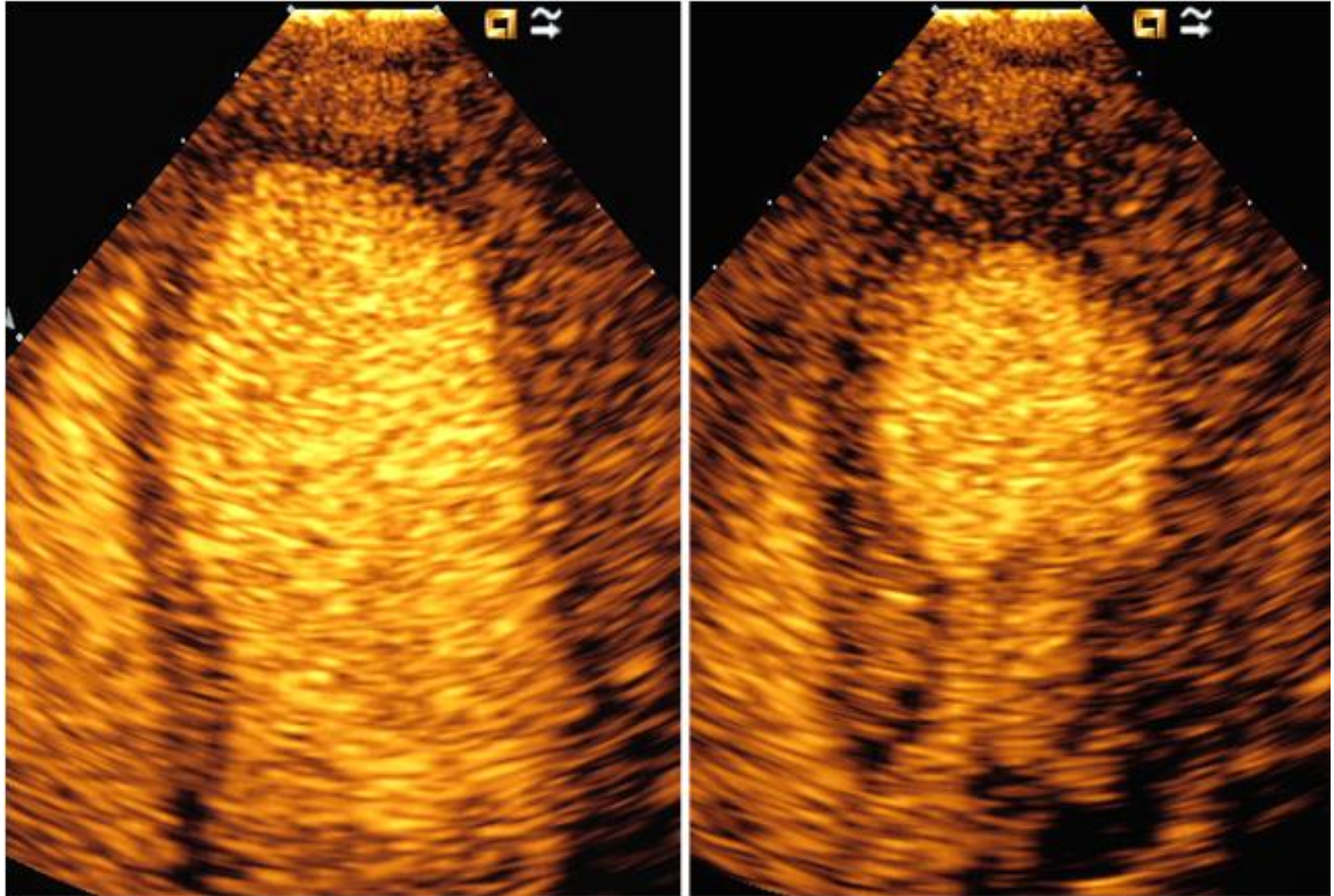Effect of Contrast Echo on Accuracy in Global LV Function Analysis — Correct classification of systol. LV-function as normal, mildly impaired, severely impaired (%). Hundley, JACC 1998;32:1426-1432

Accuracy of Modalities to Detect RWMA Defined by Panel. Hoffmann, JACC 2006;47:121-8

Stress Echocardiogram
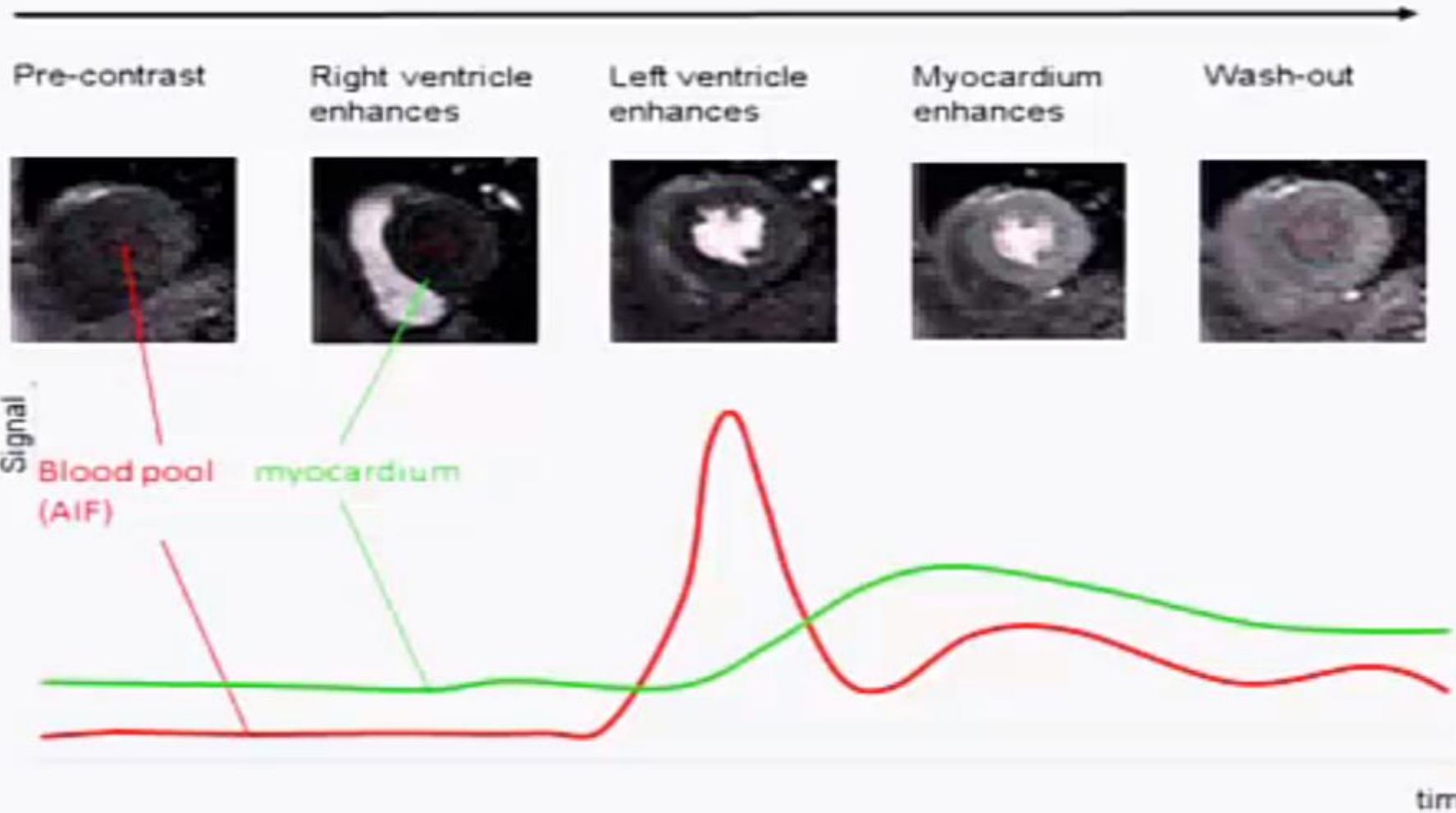
Cardiac MRI

Cardiac MRI stress perfusion

Stress Perfusion Cardiac MRI

Criteria for a true perfusion defect

- Occurs first when contrast arrives in LV myocardium
- Persists beyond peak myocardial enhancement
- > 1 pixel wide
- Subendocardial predominance or endo-epi gradient
- Conforms to coronary distribution