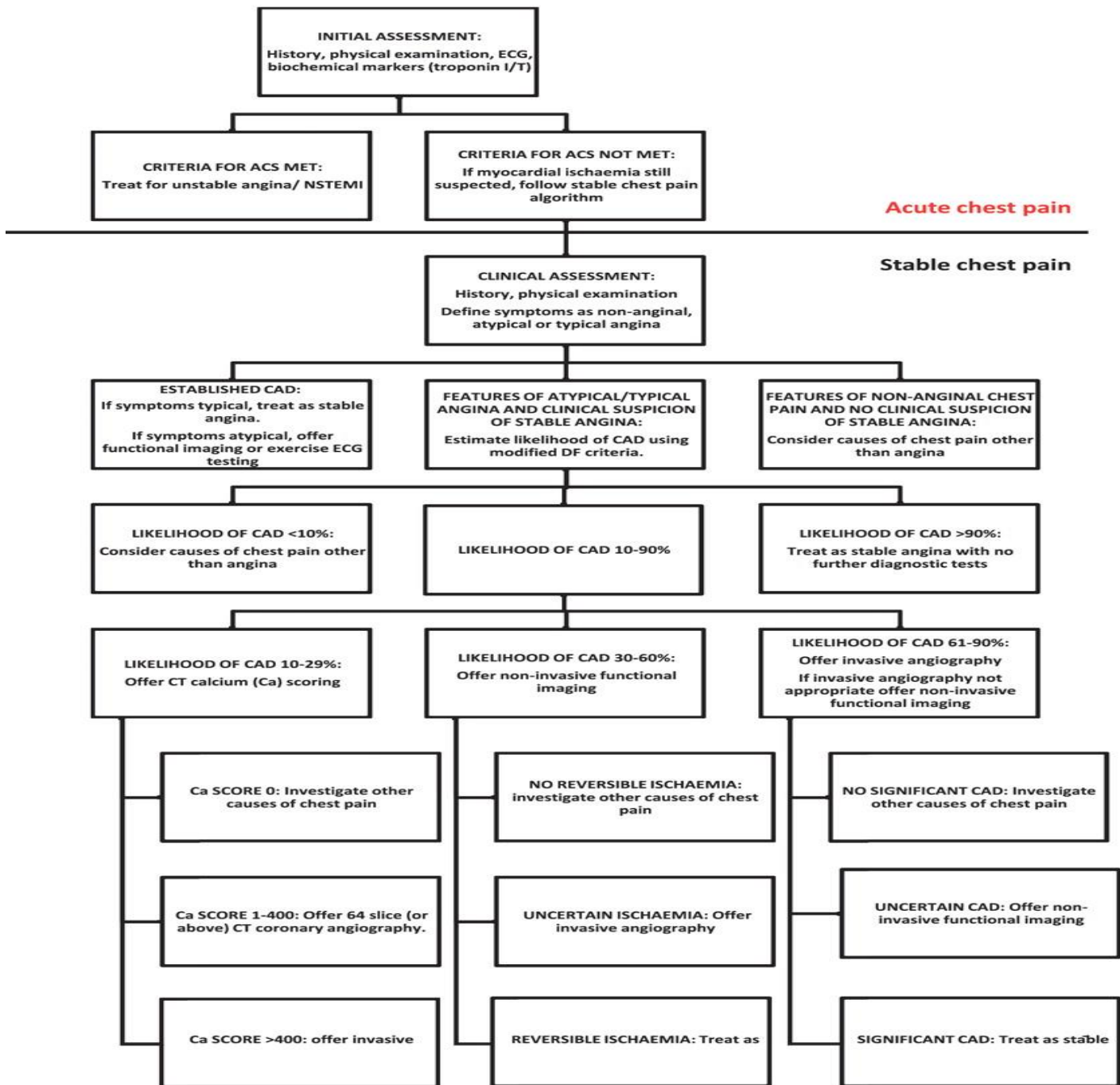


Chest pain

Julian Collinson
Consultant Cardiologist
Chelsea and Westminster Hospital



Assessment

Take a detailed clinical history documenting:

- the age and sex of the person
- the characteristics of the pain, including its location, radiation, severity, duration and frequency, and factors that provoke and relieve the pain
 - constricting discomfort in the front of the chest, or in the neck, shoulders, jaw, or arms
 - precipitated by physical exertion
 - relieved by rest or GTN within about 5 minutes.
- any associated symptoms, such as breathlessness
- any history of angina, MI, coronary revascularisation, or other cardiovascular disease **and**
- any cardiovascular risk factors.

Carry out a physical examination to:

- identify risk factors for cardiovascular disease
- identify signs of other cardiovascular disease
- identify non-coronary causes of angina (for example, severe aortic stenosis, cardiomyopathy) **and**
- exclude other causes of chest pain.

- Unless clinical suspicion is raised based on other aspects of the history and risk factors, exclude a diagnosis of stable angina if the pain is non-anginal . Other features which make a diagnosis of stable angina unlikely are when the chest pain is:
 - continuous or very prolonged **and/or**
 - unrelated to activity **and/or**
 - brought on by breathing in **and/or**
 - associated with symptoms such as dizziness, palpitations, tingling or difficulty swallowing.
- Consider causes of chest pain other than angina (such as gastrointestinal or musculoskeletal pain).
 - If the estimated likelihood of CAD is less than 10%, first consider causes of chest pain other than angina caused by CAD.

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)^[1].

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

Lo = Low risk = none of these three.

The 'non-anginal chest pain' columns represent 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.

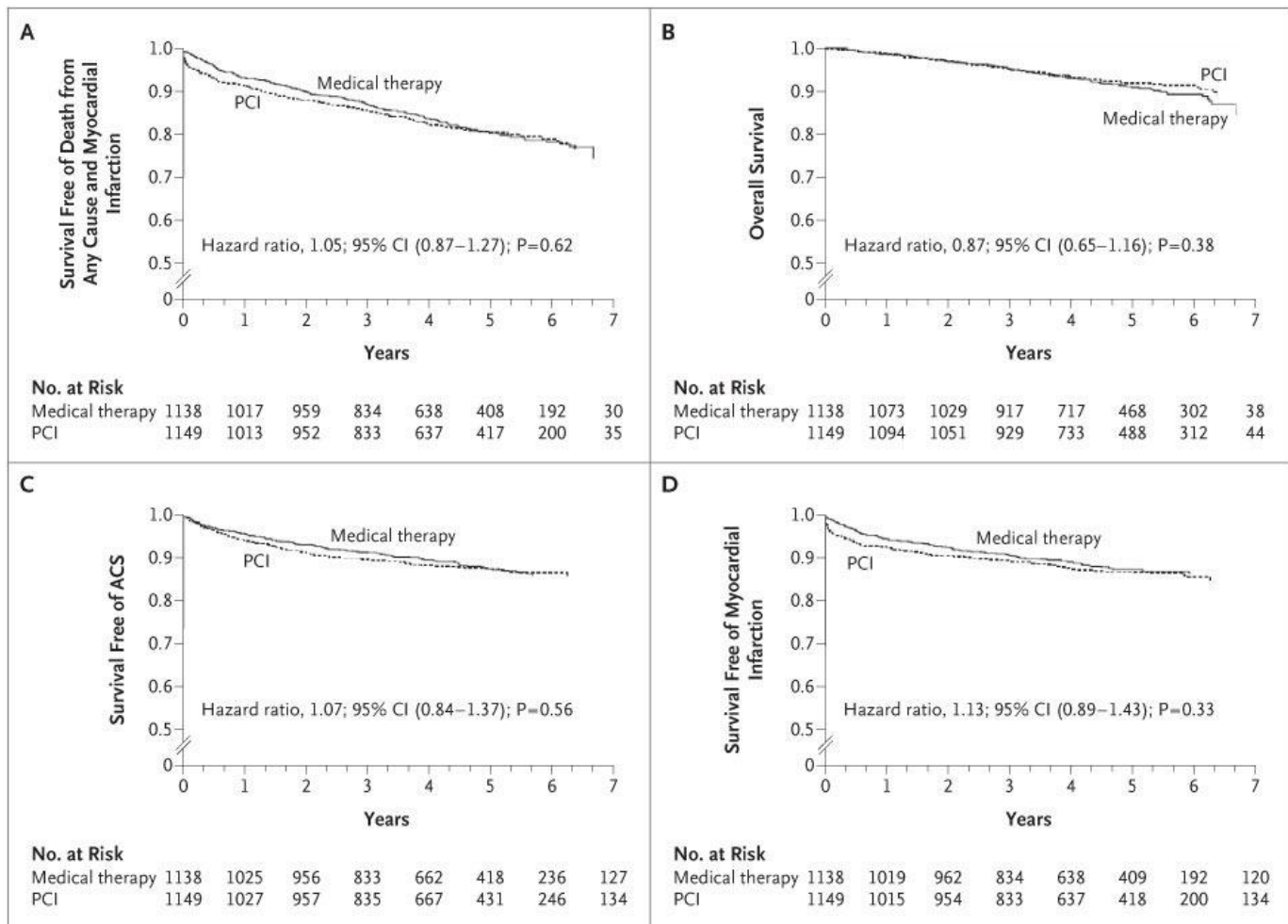
If there are resting ECG ST-T changes or Q waves, the likelihood of CAD is higher in each cell of the table.

[1] Adapted from Pryor DB, Shaw L, McCants CB et al. (1993) Value of the history and physical in identifying patients at increased risk for coronary artery disease. Annals of Internal Medicine 118(2): 81–90.

Investigation

- High risk – angiography
- Medium risk – functional testing
- Low risk – CT
 - Calcium score suggested

Kaplan-Meier Survival Curves



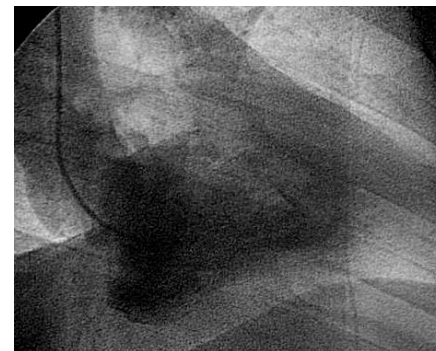
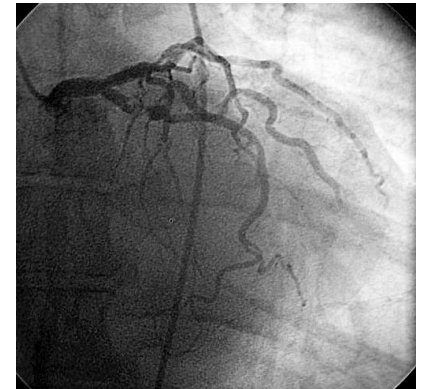
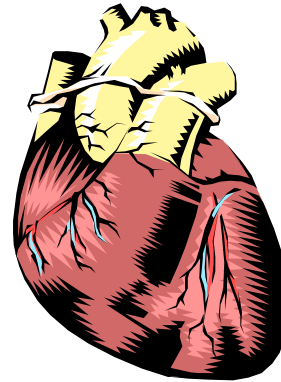
Boden WE et al. N Engl J Med 2007;356:1503-1516



Cardiac Catheterisation

Left heart catheter

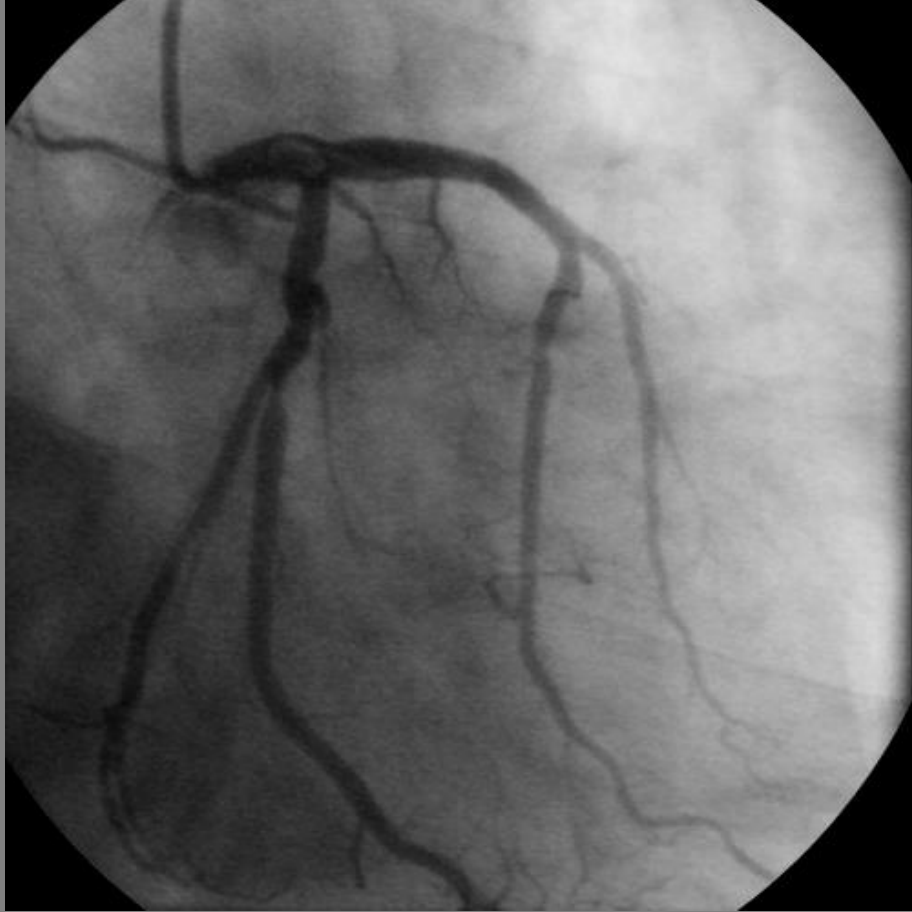
- coronary arteriography
- left ventriculogram

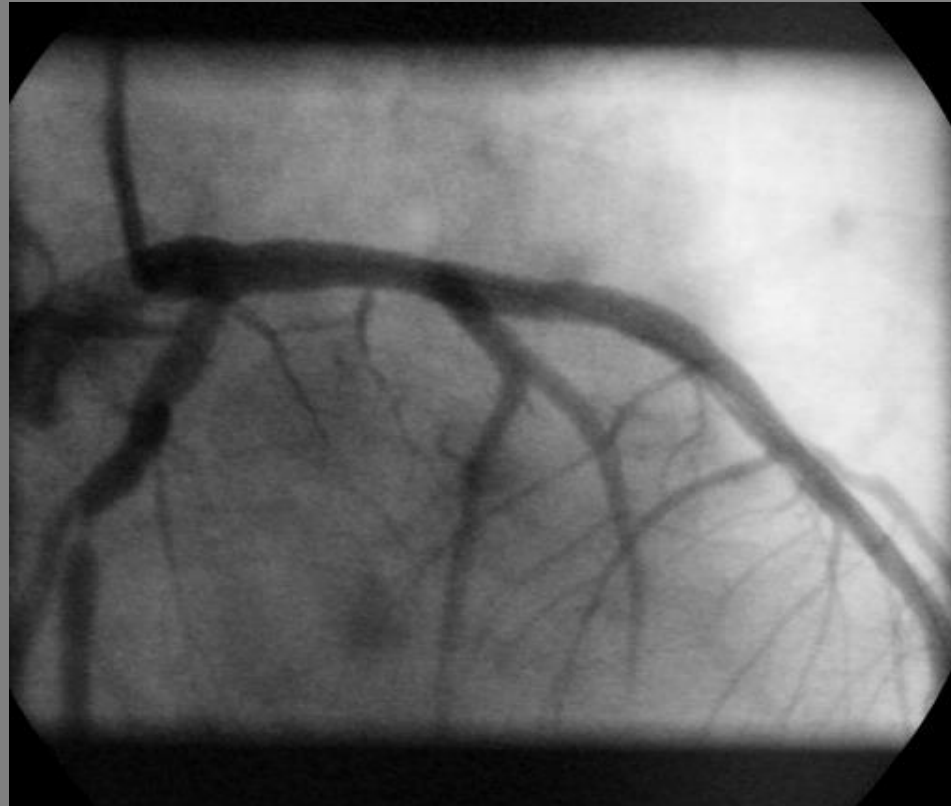
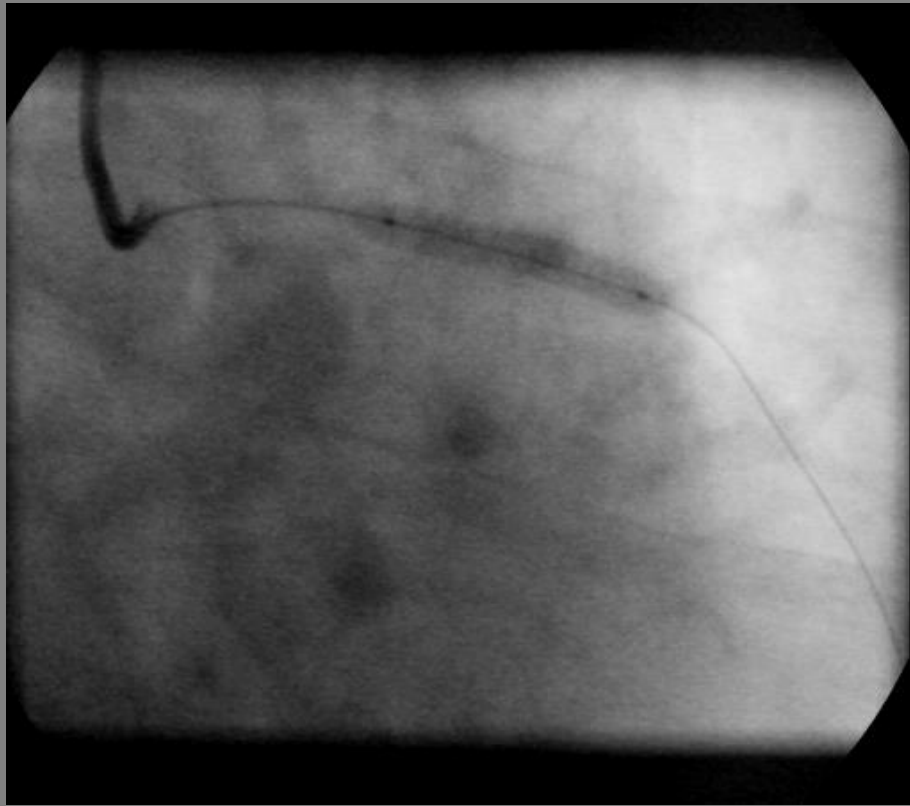


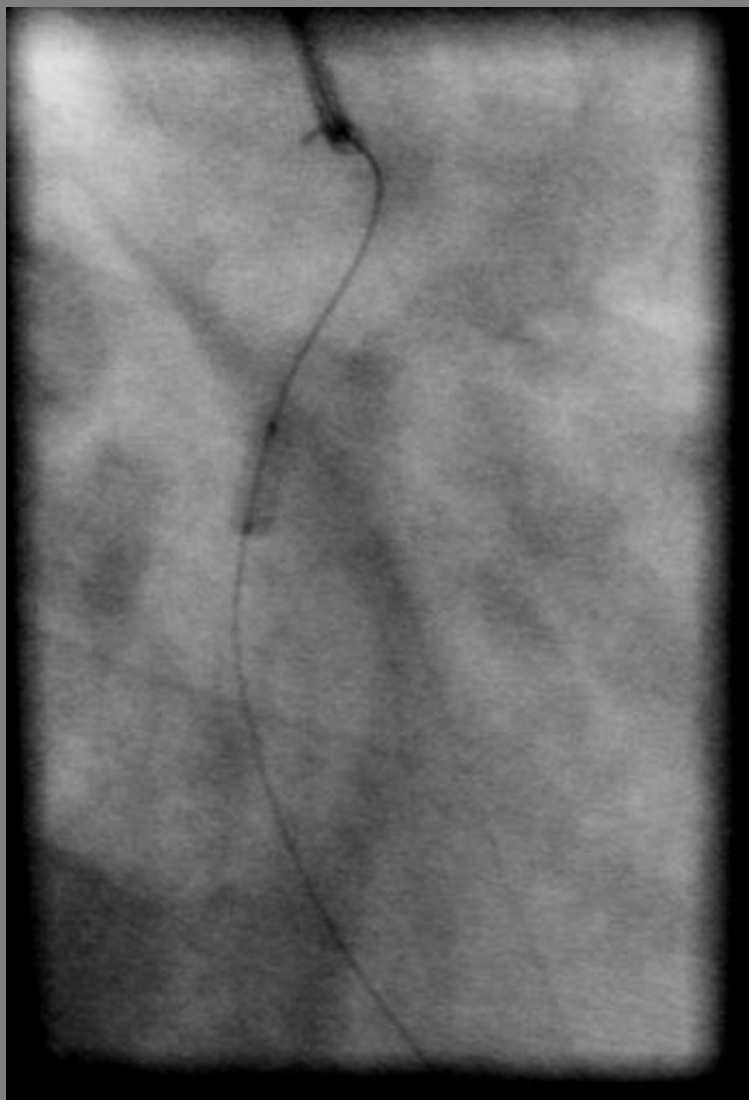
Forssman 1929

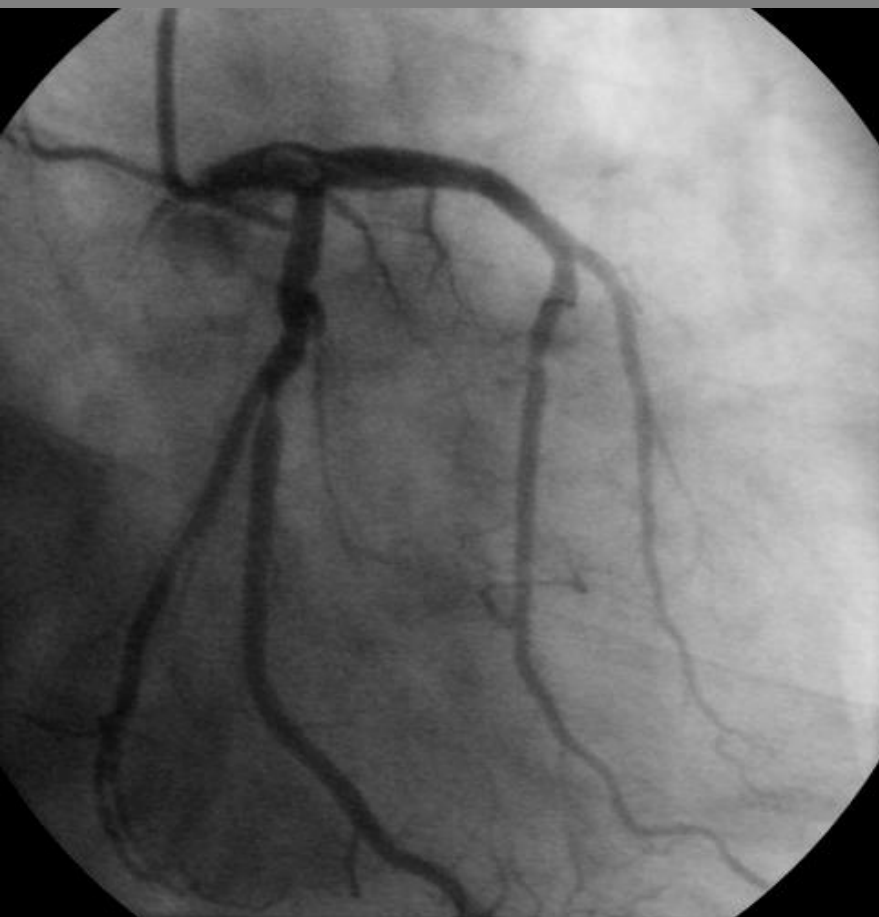
Judkins 1958

Sones 1962







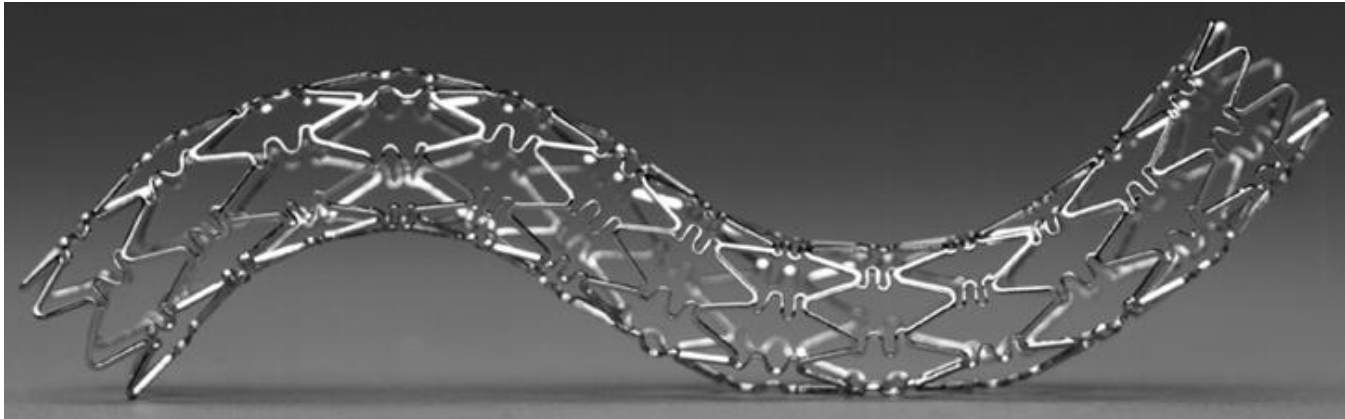


pre

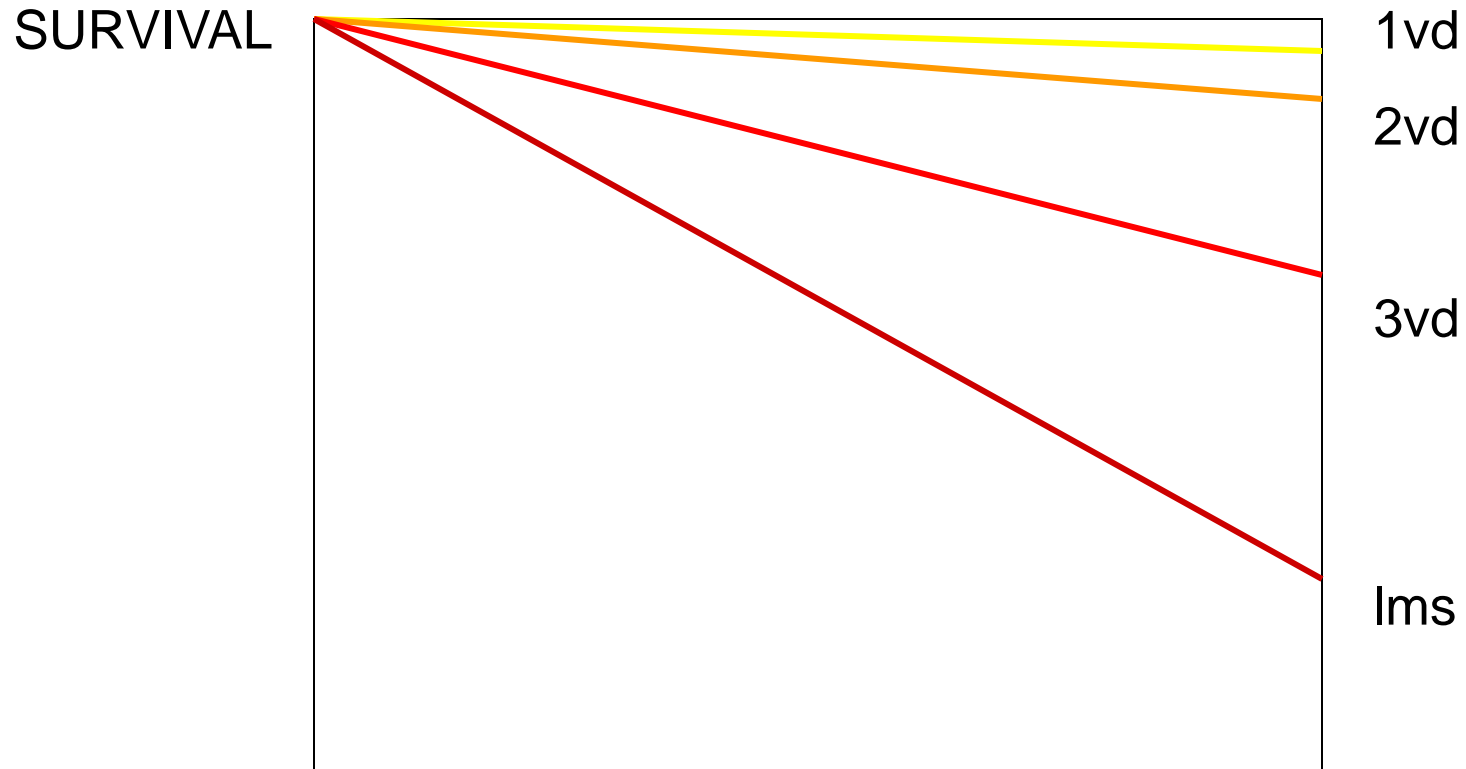


post

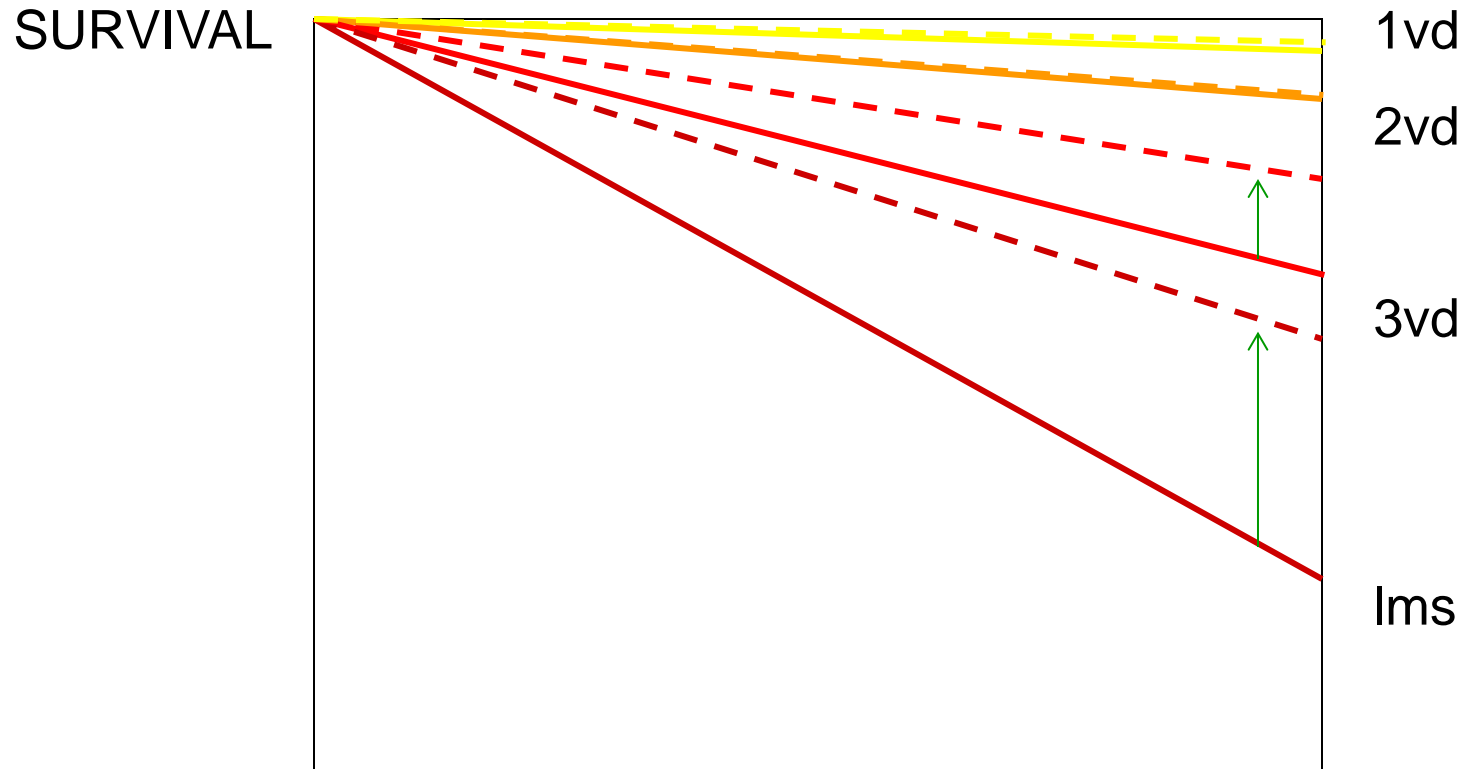
Stent



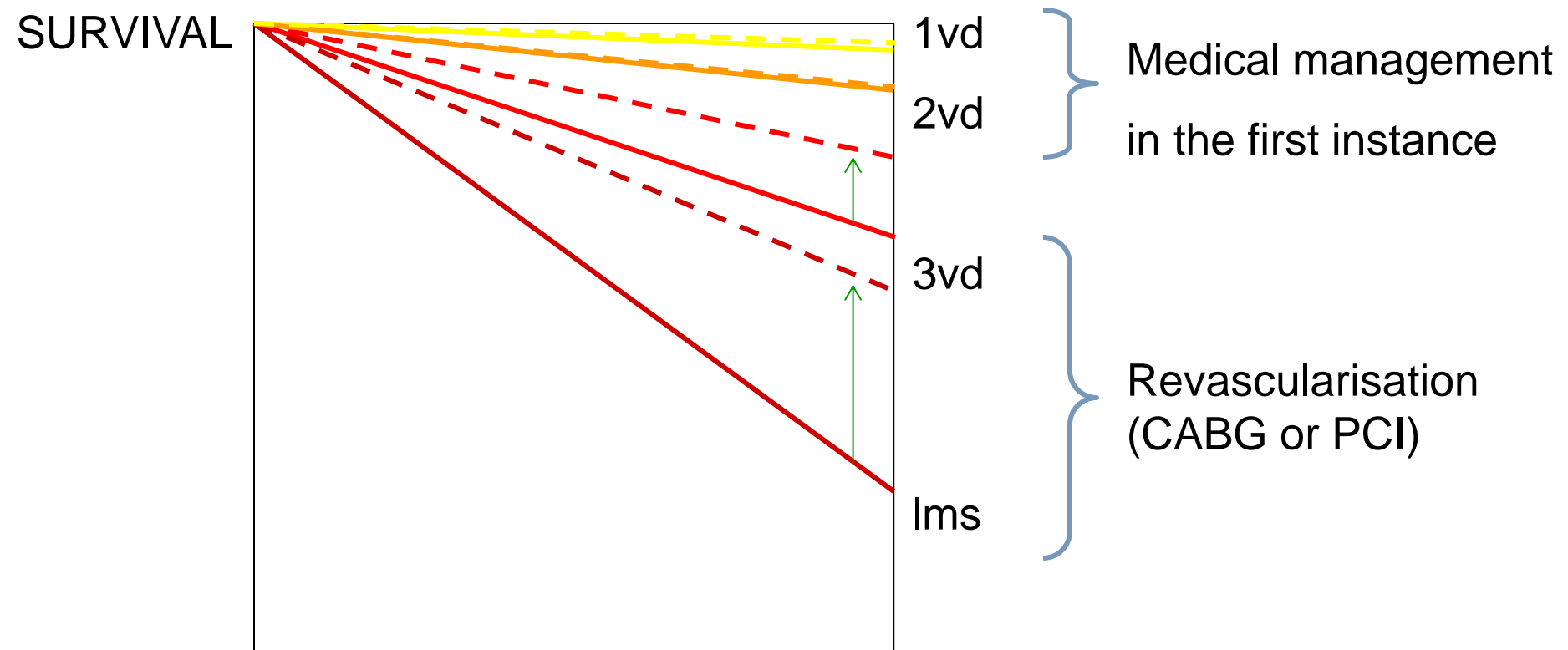
Cardiac Catheterisation : Extent of Disease + Prognosis



Early CABG Trials



Cardiac Catheterisation : Deciding Treatment



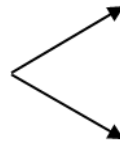
Who needs Cardiac Catheterisation ?

patients
with
angina

coronary arteriography (left heart catheter)

Who needs Cardiac Catheterisation ?

patients
with
angina



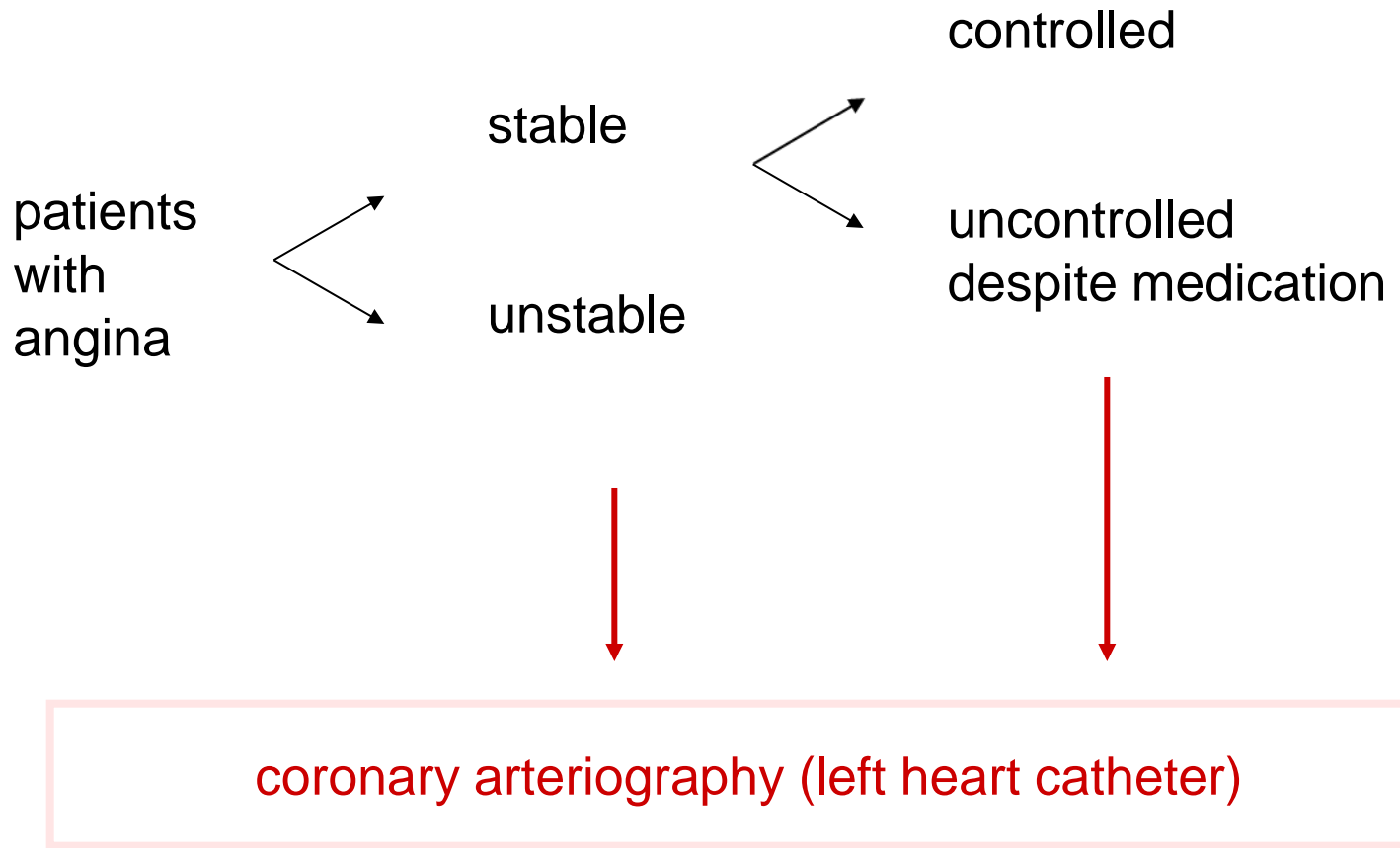
stable

unstable

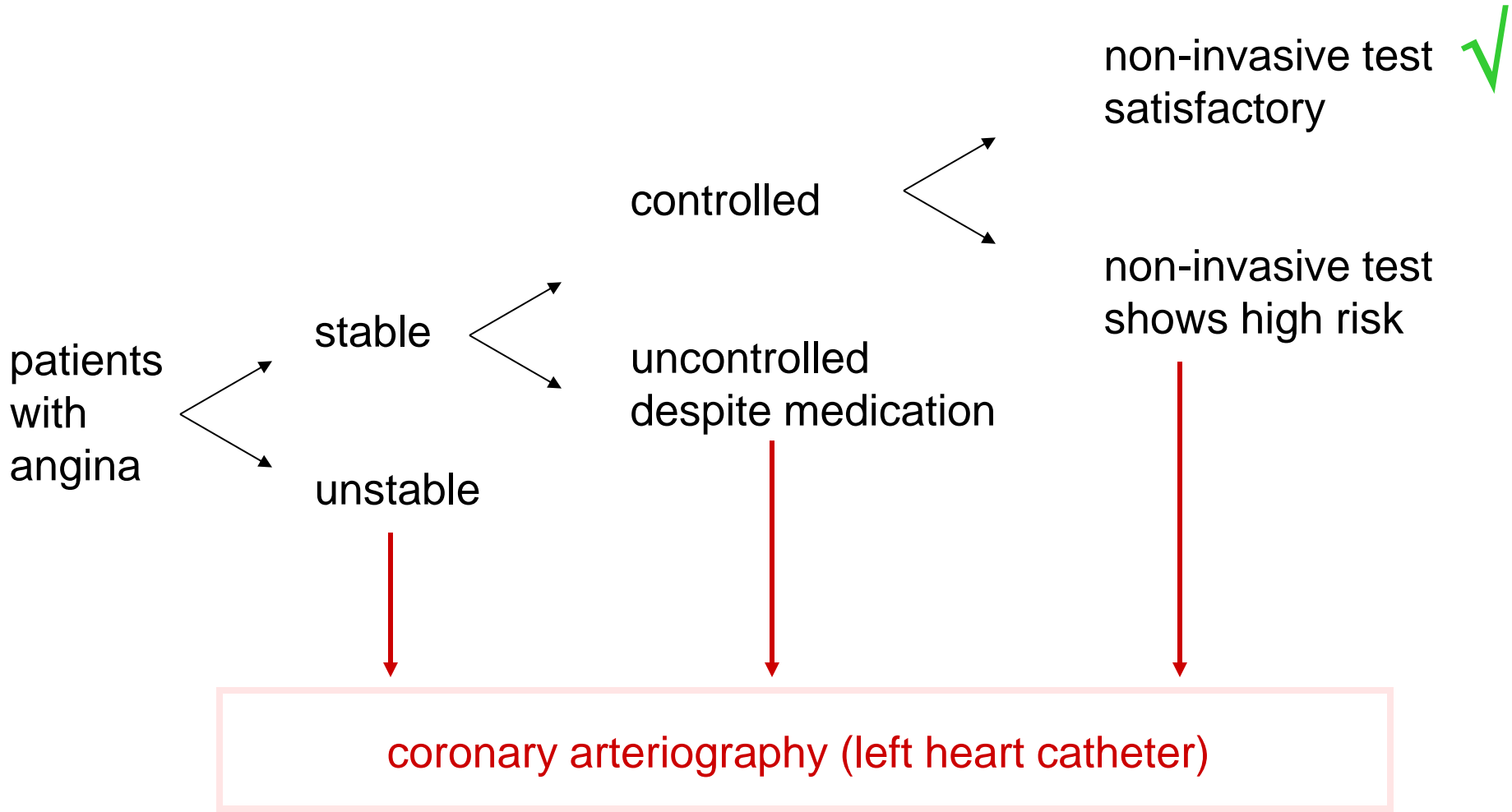


coronary arteriography (left heart catheter)

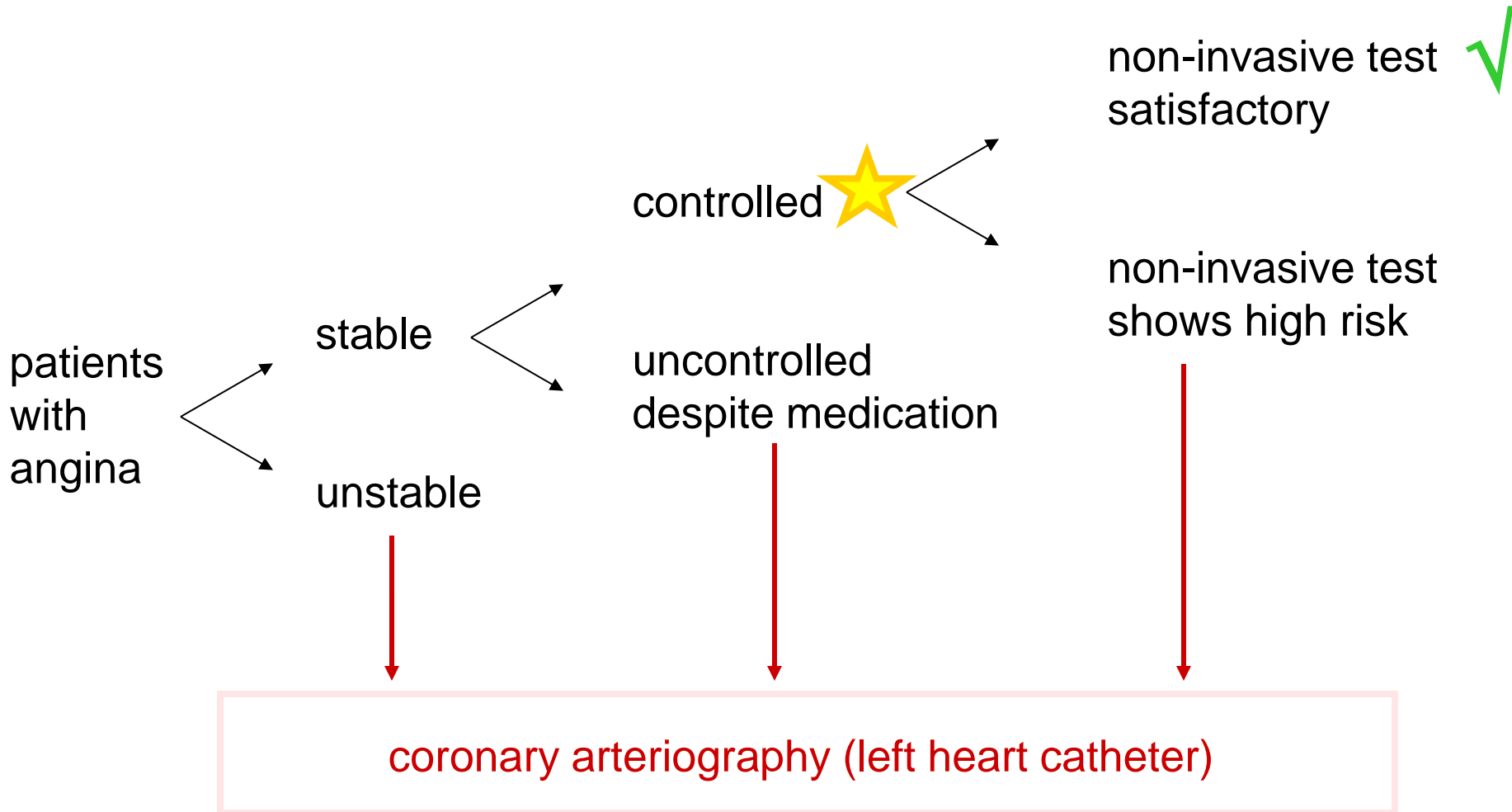
Who needs Cardiac Catheterisation ?



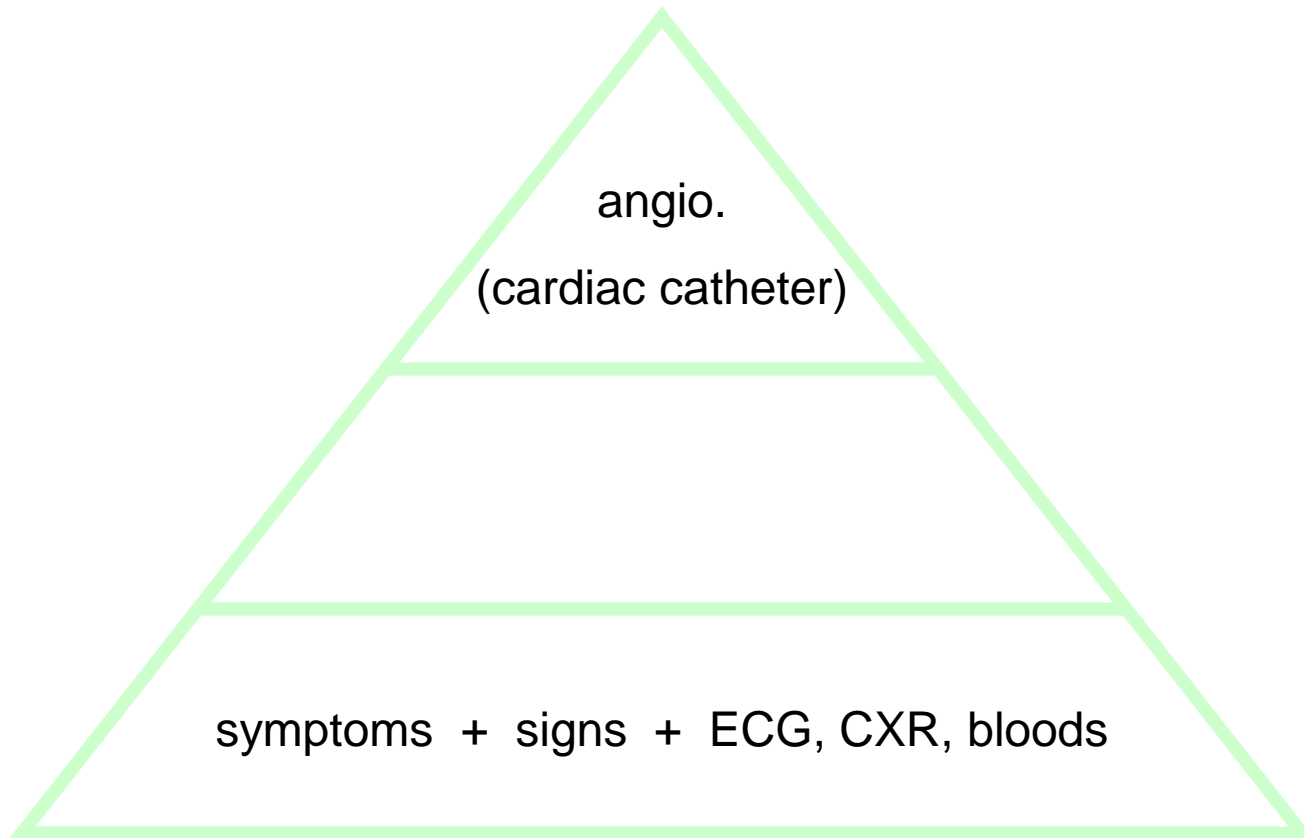
Who needs Cardiac Catheterisation ?

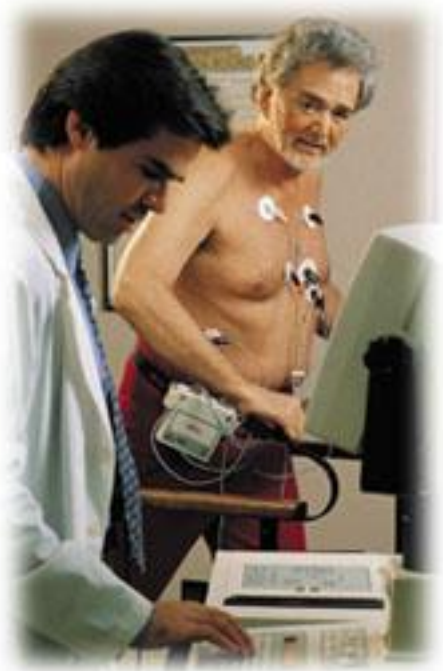


Who needs Cardiac Catheterisation ?

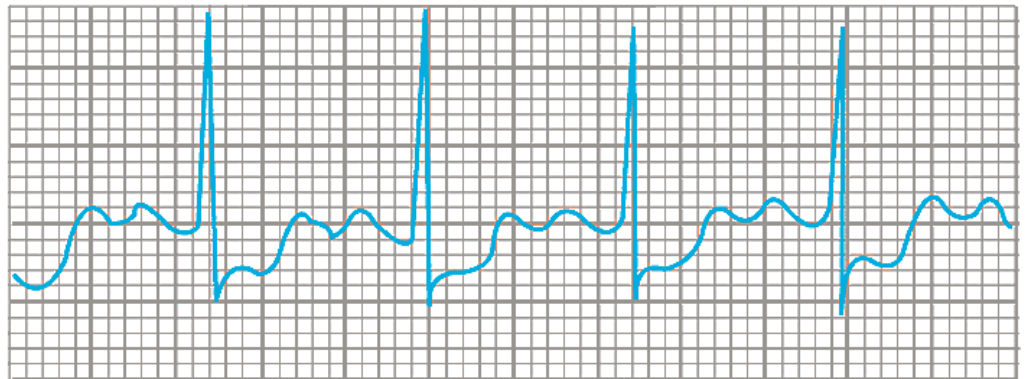
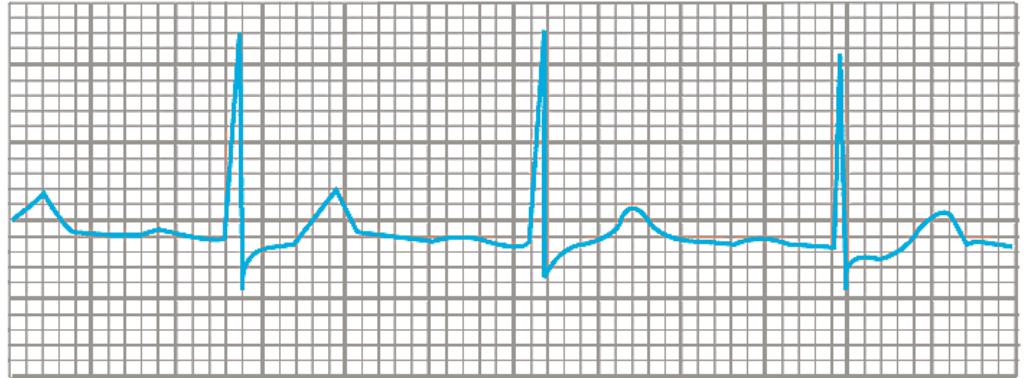


Non-Invasive Assessment



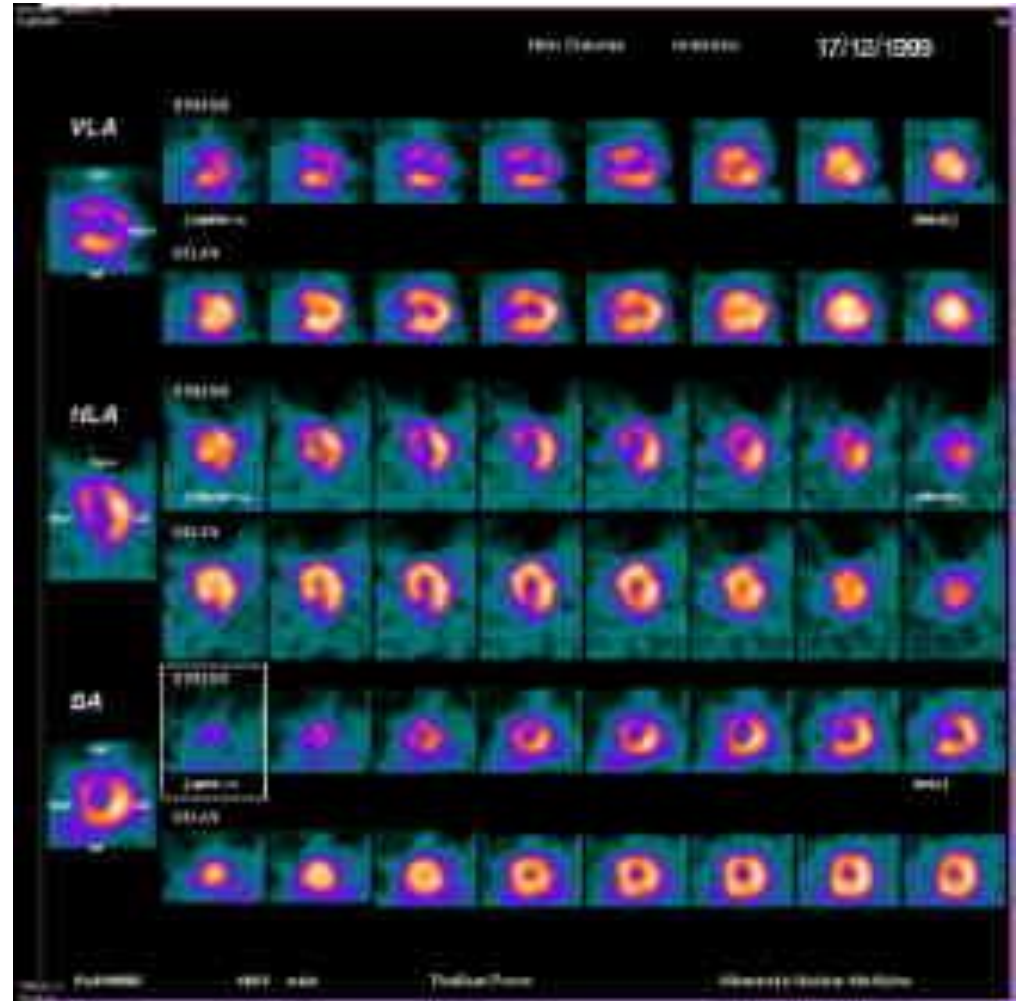


Exercise test



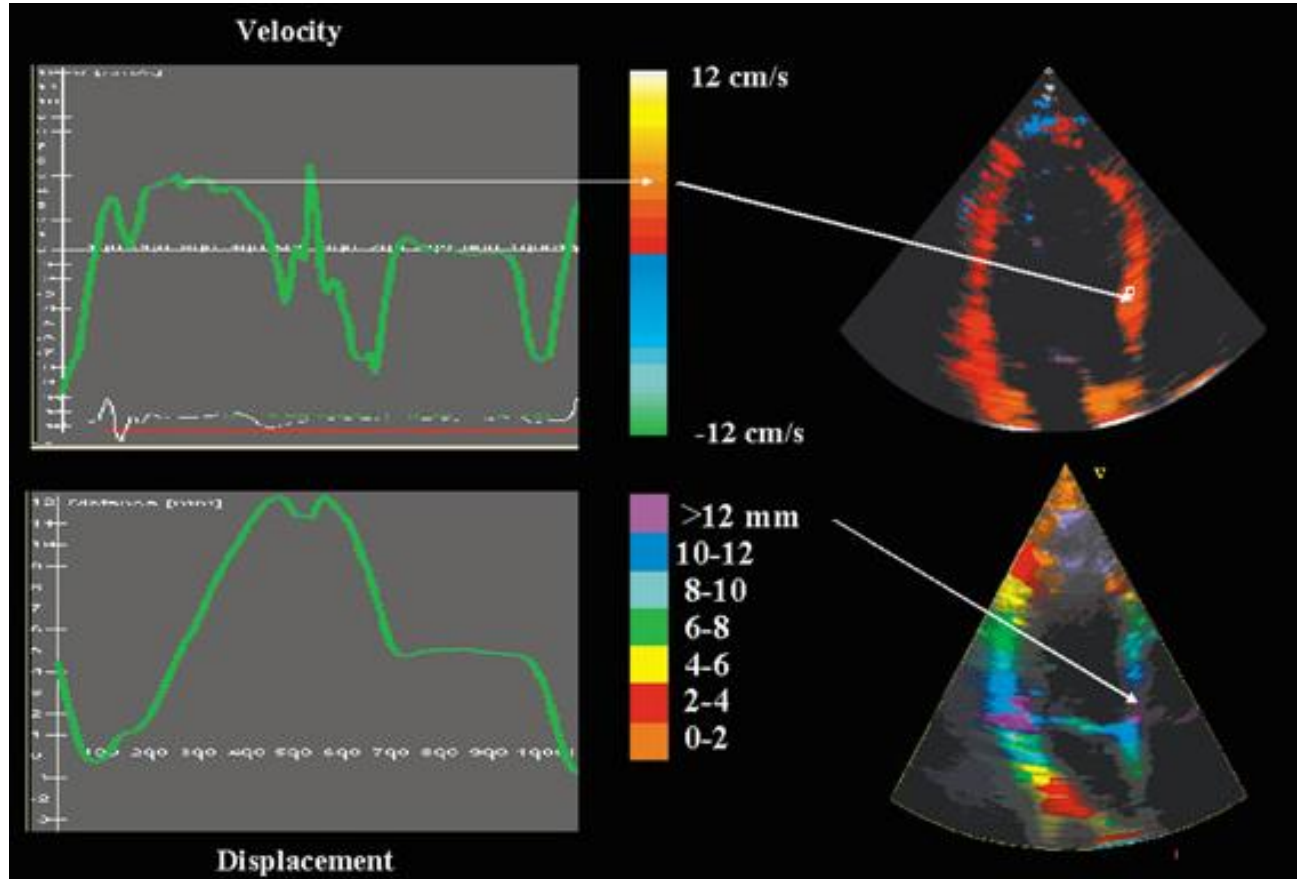


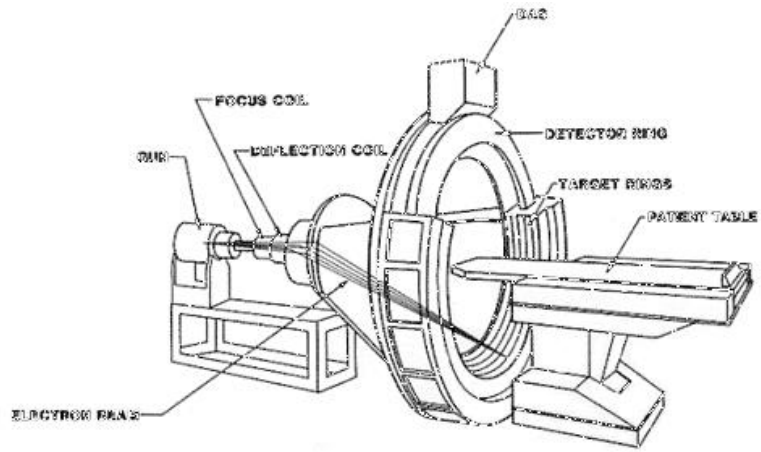
Myocardial perfusion scan
“Thallium”





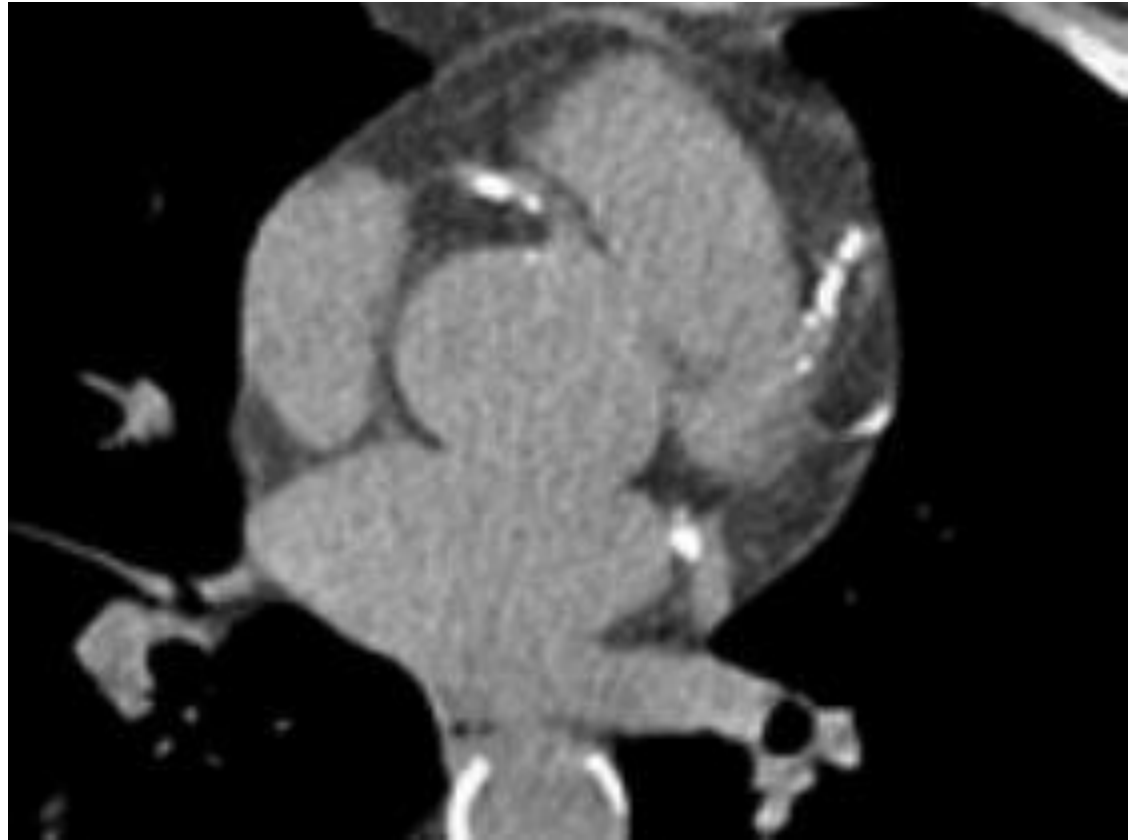
Stress echo

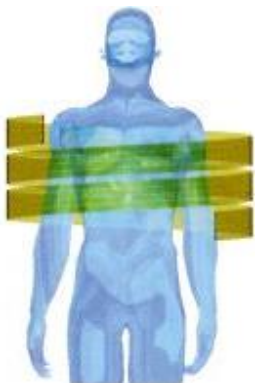


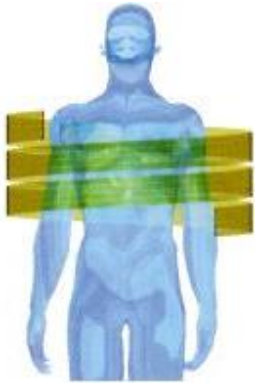


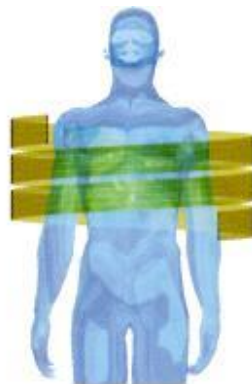
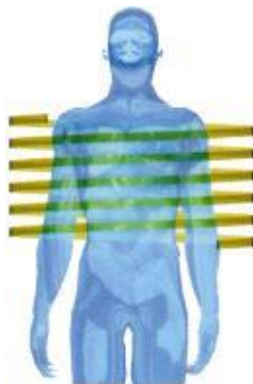
EBCT

coronary calcification score

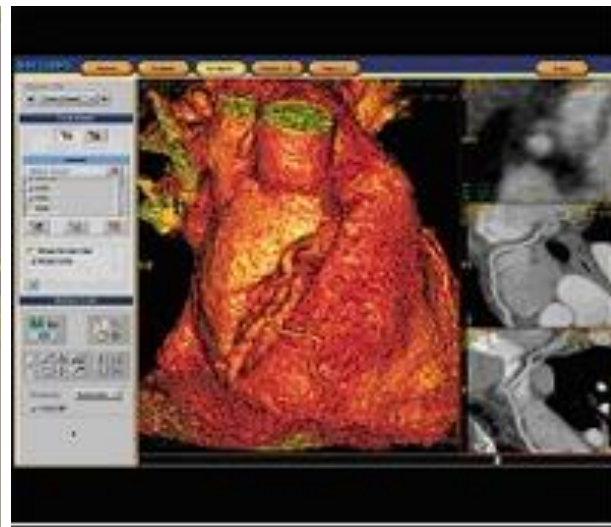
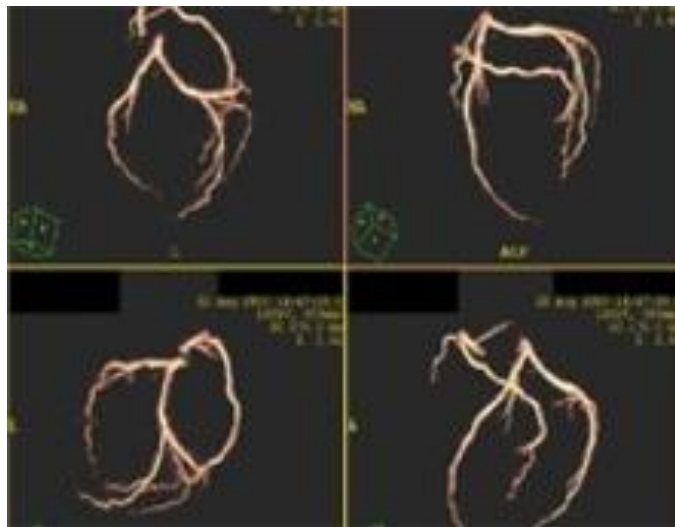
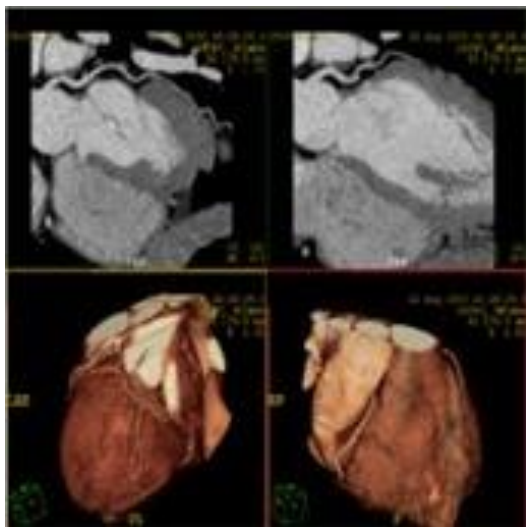








Multi-Slice CT angio



Royal Brompton Hospital
Sensation 64
CT54168
Rows: 1024
Cols: 1024

R

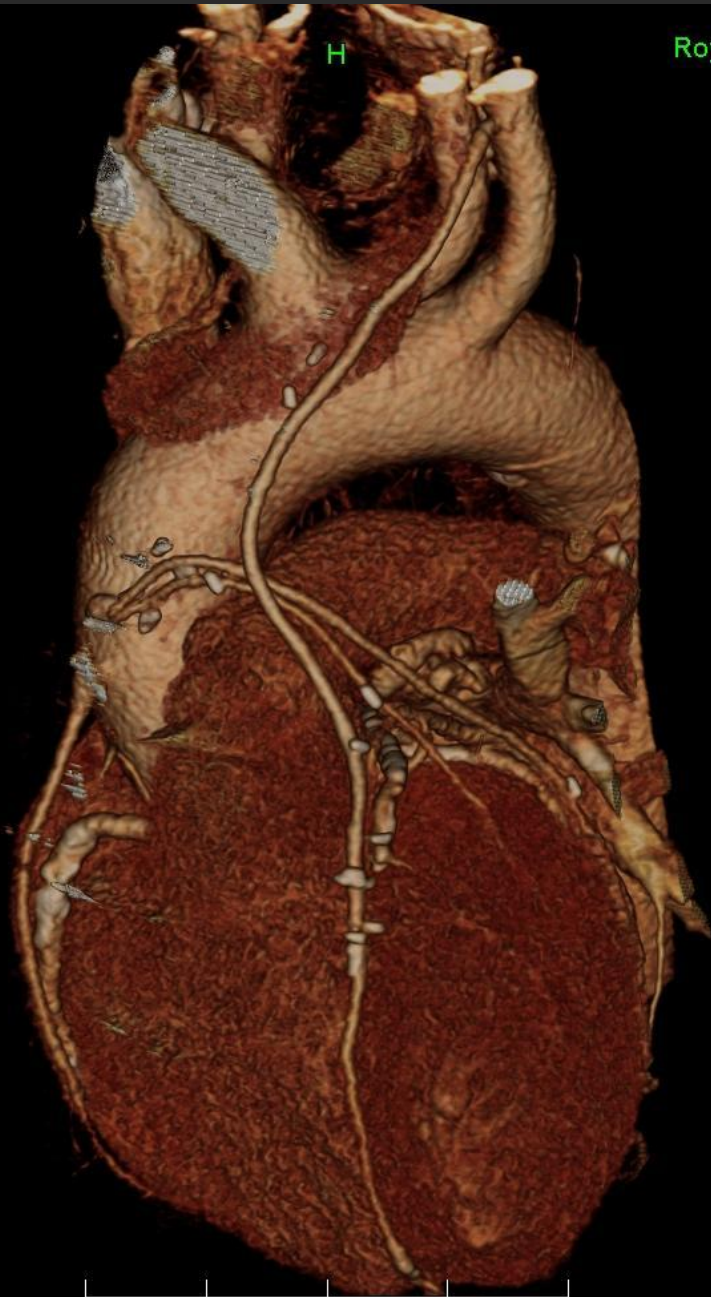
H

L

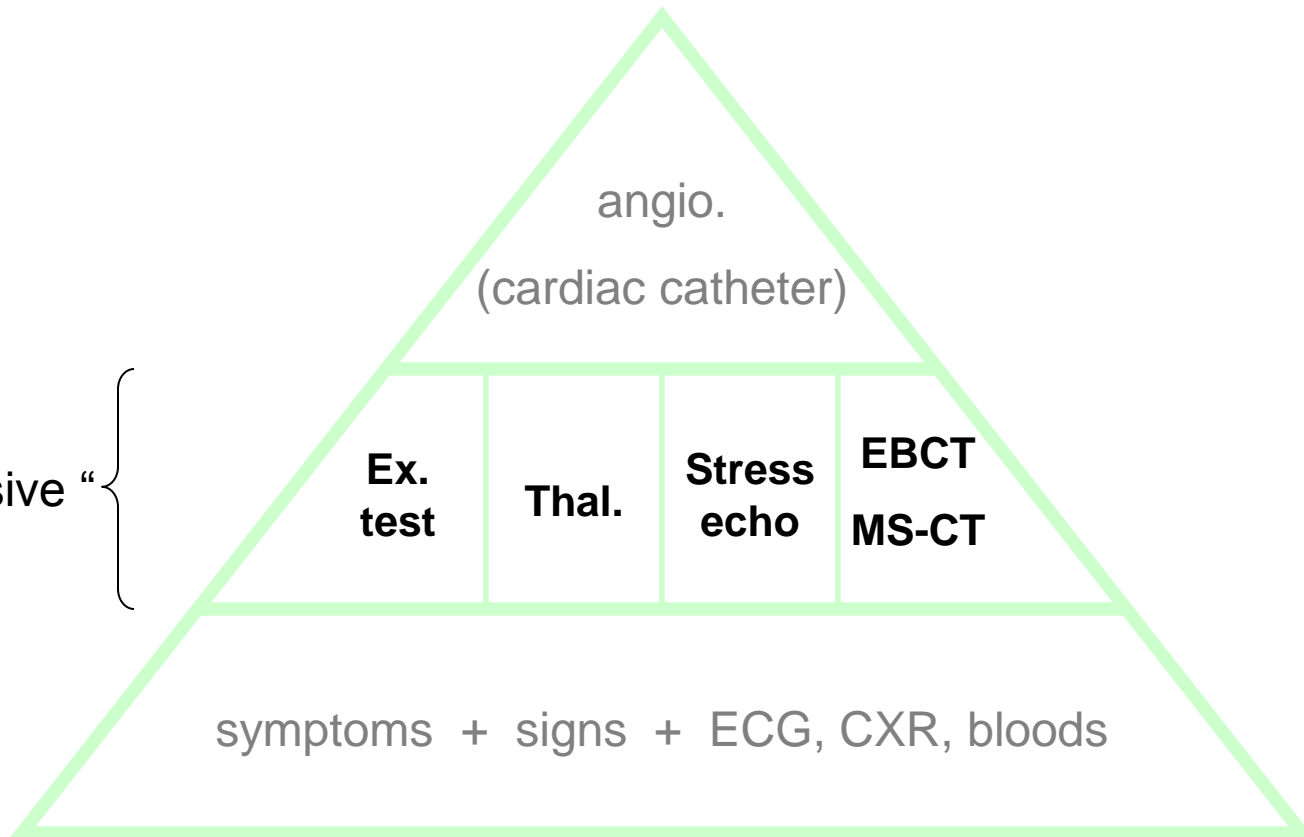
%R-R: 55.0
120.000 kV
412 mA
Tilt: 0.000
FOV: 183.000 mm
Thickness: 0.750 mm
LAO 49 CRA 27

20.00 mm/div

F 20.00 mm/div

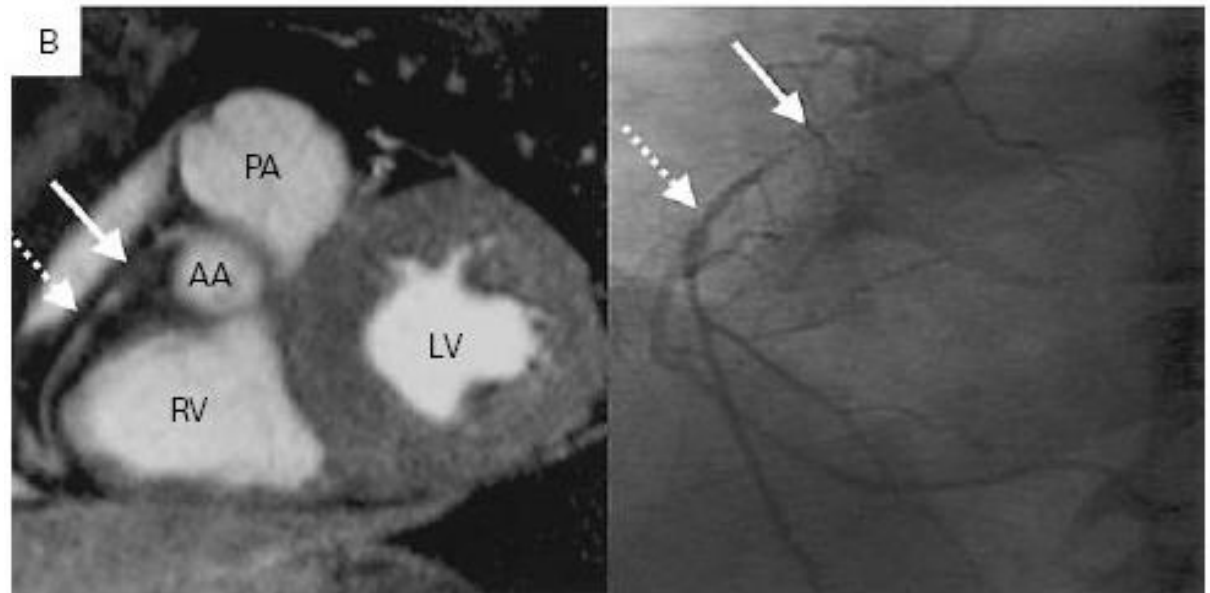


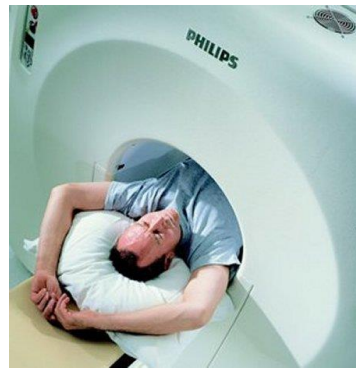
Non-Invasive Assessment



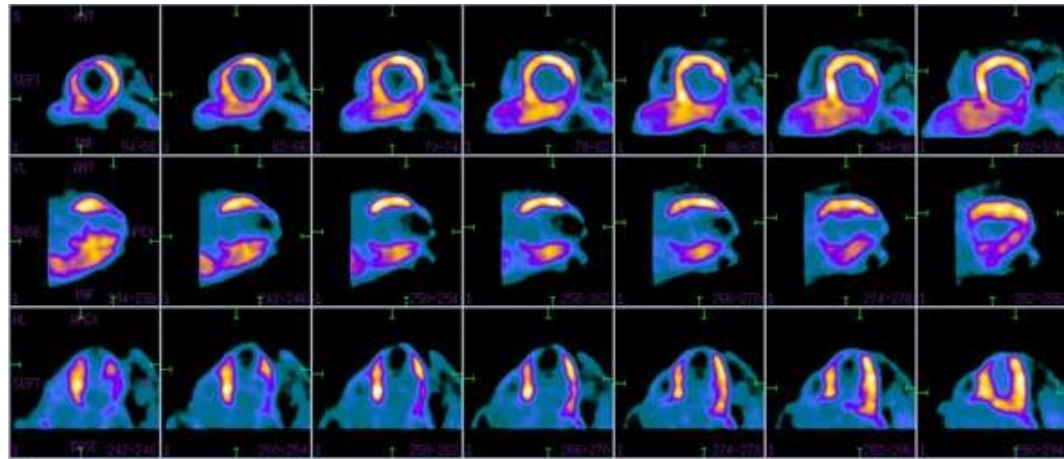


MRI angio



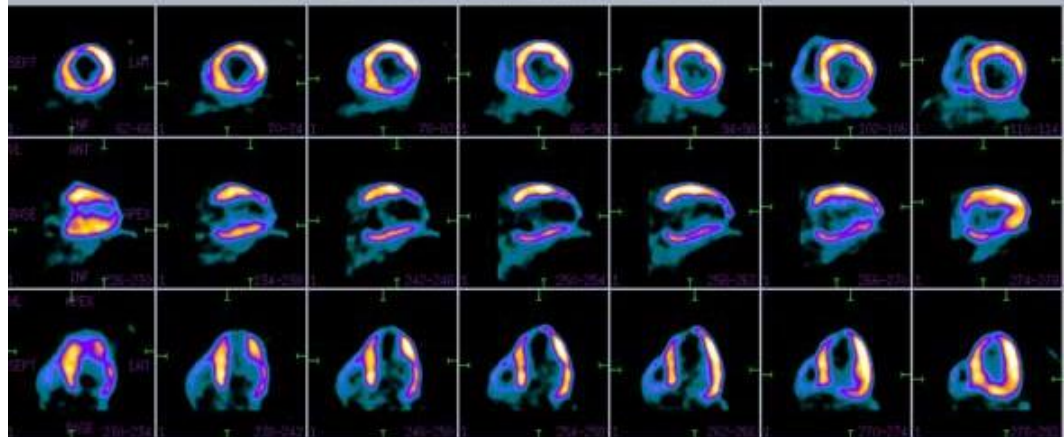


PET scan



TOP: NH3
BOTTOM: FDG

Both scans: 10 minutes emission and 23 sec transmission



Case

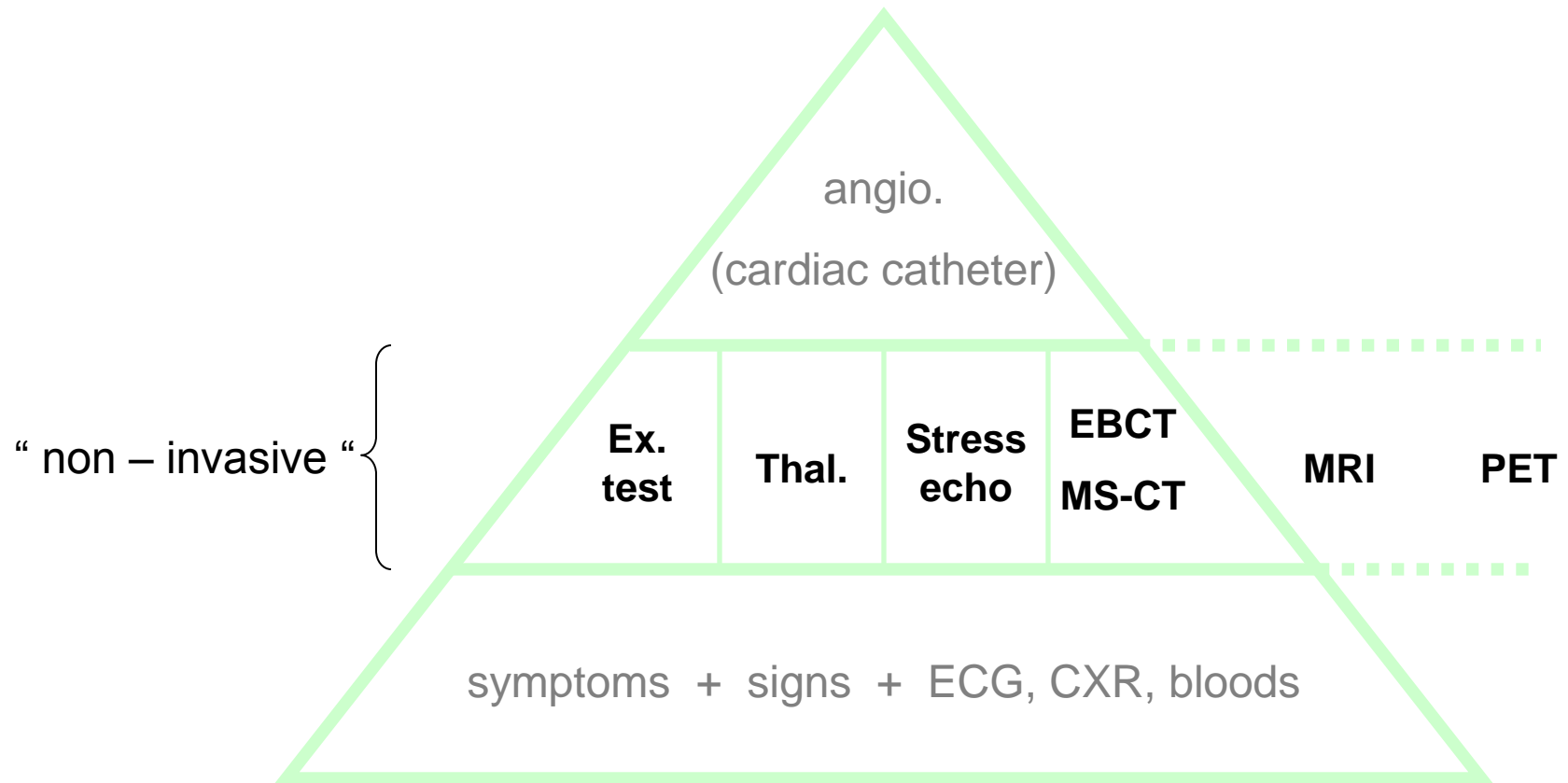
- 45 year old man
- Non-smoker, DM or hyperlipidaemia
- Presented with chest discomfort after exercise.
- No relevant findings on examination
- ECG - normal.

- On the basis of age, sex, risk factors, and symptoms, the patient's pre-test probability of coronary artery disease was 21%
- Referred for calcium scoring. The calcium score was 11.
- Therefore, CTCA was performed which identified a 70% stenosis of the left anterior descending coronary artery.
- Stress perfusion cardiac MRI showed reduced perfusion
- He was managed for stable angina on the basis of these findings

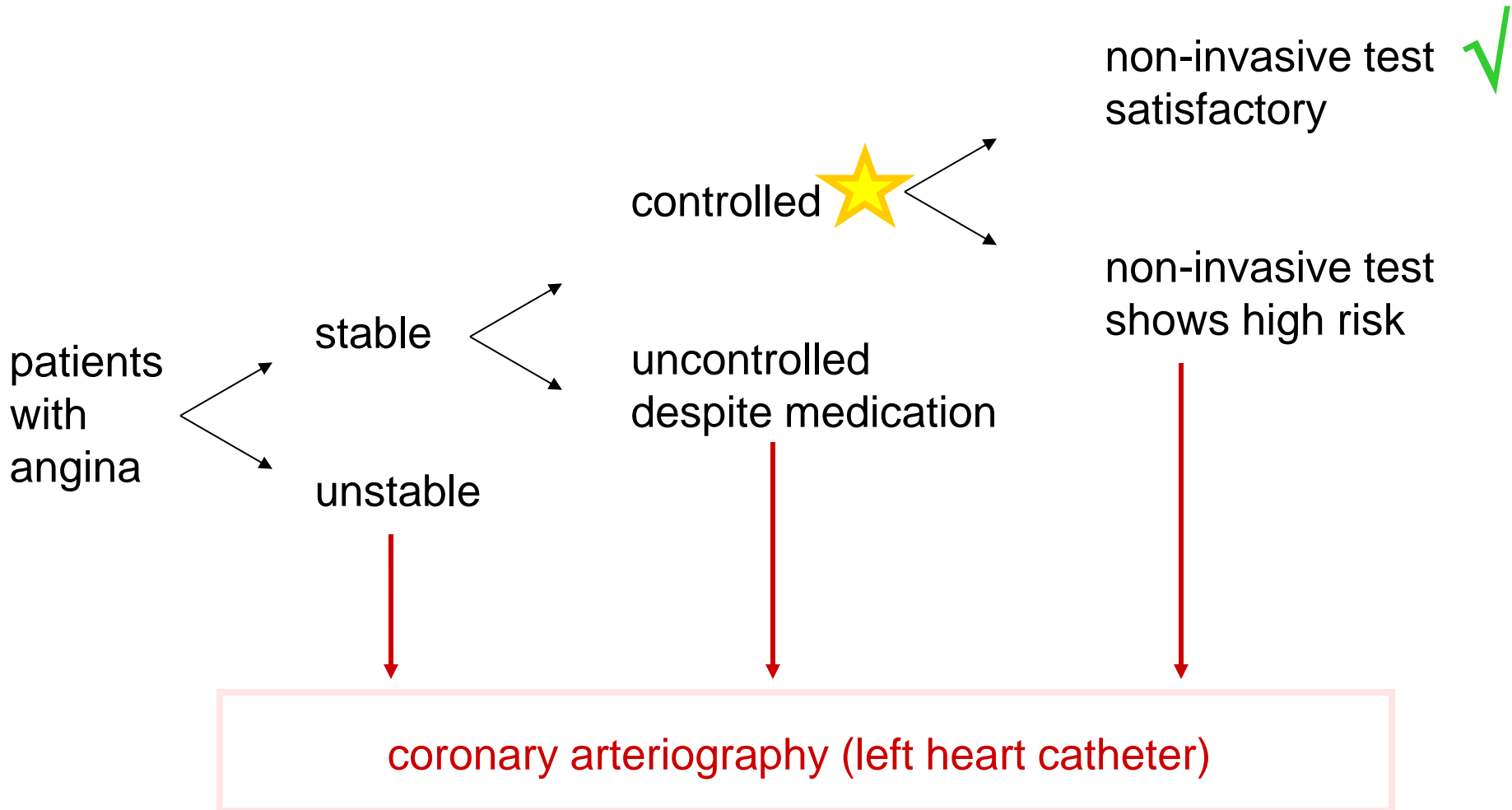
Discussion....

- The patient has angina – start treatment
- The typical history significantly increases the probability of significant coronary disease
- How reassuring is the calcium score?
- Would invasive angiography have been quicker and reduced the number of tests?

Non-Invasive Assessment

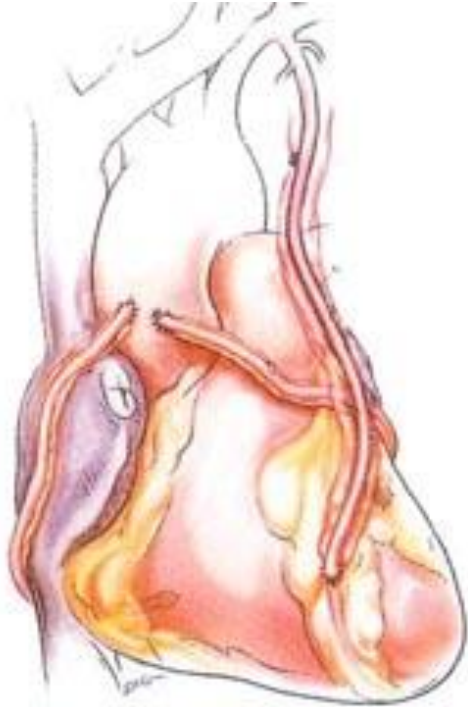


Who needs Cardiac Catheterisation ?



Coronary Revascularisation

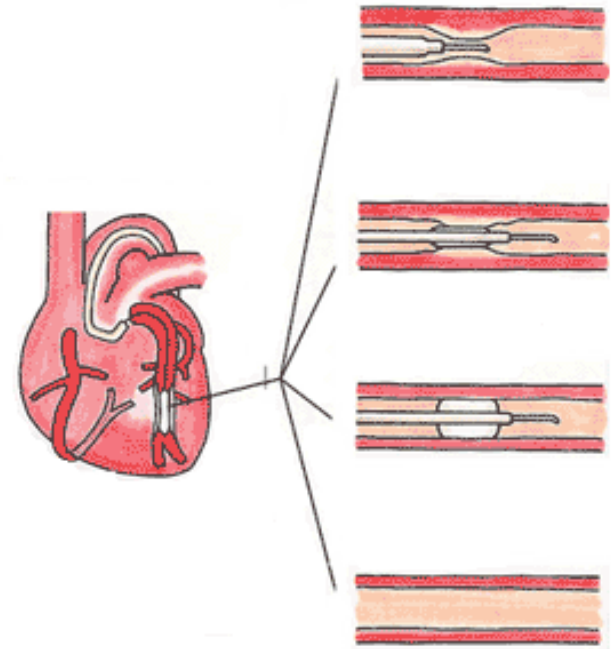
CABG



Sabiston 1966 SVG

Floyd Loop 1971 ITA

PCI (PTCA+)



Grüntzig 1977 coronary balloon angioplasty

Sigwart 1986 coronary stent