

CARDIAC DIAGNOSTIC TESTS for Chest Pain

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Conflict Disclosure

Dr Michael Chan

FINANCIAL DISCLOSURE

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Other: None related to this talk

By the end of this session , participants should be able to :

1. Know the uses and limitations of different tests for coronary heart disease
e.g. Exercise stress tests, MIBI, echocardiogram, Cardiac CT, coronary angiogra
2. Determine what is the best test for a particular patient.
3. Know how to go about ordering a test.
4. Interpret the test result and formulate a plan to act on, based on test result

Case

- 59 year old woman, 5 years post-menopause.
- c/o sub-sternal **chest pain**, no radiation, for 6 months, once a week, lasts 5 minutes; may or may not be exertional. Usually during emotional upset.
- No syncope, no PND, No orthopnea. Can walk 2 km without difficulty
- PMH: no documented heart dis; non-smoker, no DM; “borderline HTN, not need pills”. Never hospitalized. Don’t know family history.
- P/E: BP 145/90, “otherwise unremarkable”

Case

- What is differential diagnoses?
- What tests should I order ?

Pretest probability of coronary heart disease in patients with chest pain according to age, gender, and symptoms

Age	Nonanginal pain		Atypical angina		Typical angina	
	Men	Women	Men	Women	Men	Women
30-39	4	2	34	12	76	26
40-49	13	3	51	22	87	55
50-59	20	7	65	31	93	73
60-69	27	14	72	51	94	86

The probability values are expressed as the percent of patients with significant coronary artery disease on angiography. Combined data from Diamond, GA, Forrester, JS, *N Engl J Med* 1979; 300:1350; and from Weiner, DA, Ryan, TJ, McCabe, CH, et al, *N Engl J Med* 1979; 301:230.

Chest X Ray



Other tests?

Other tests?

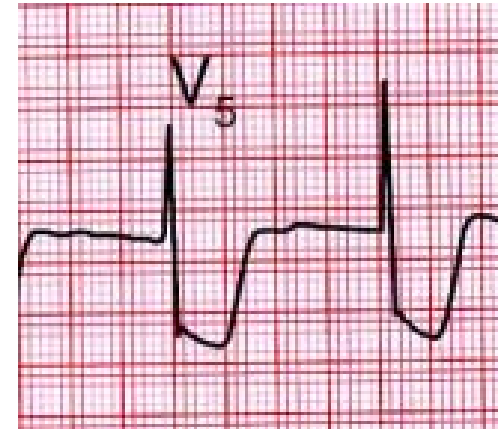
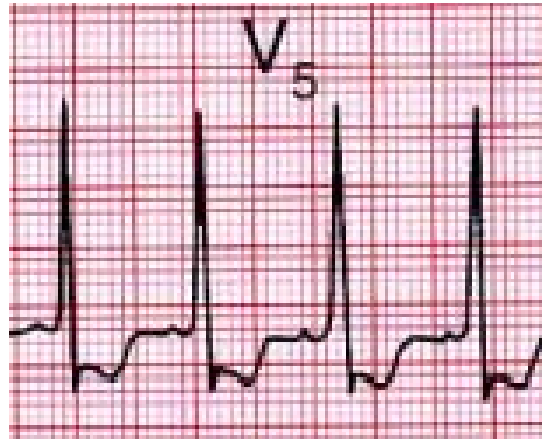
- Exercise Stress Tests ?
- Echocardiography / Stress Echo ?
- Nuclear Cardiology Tests ?
- Cardiac CT ?
- Cardiac Catheterization & Coronary Angiogram
- Gastroscopy ?

Cardiac Treadmill Exercise Stress Test



ST Segment Depression

ST Depression



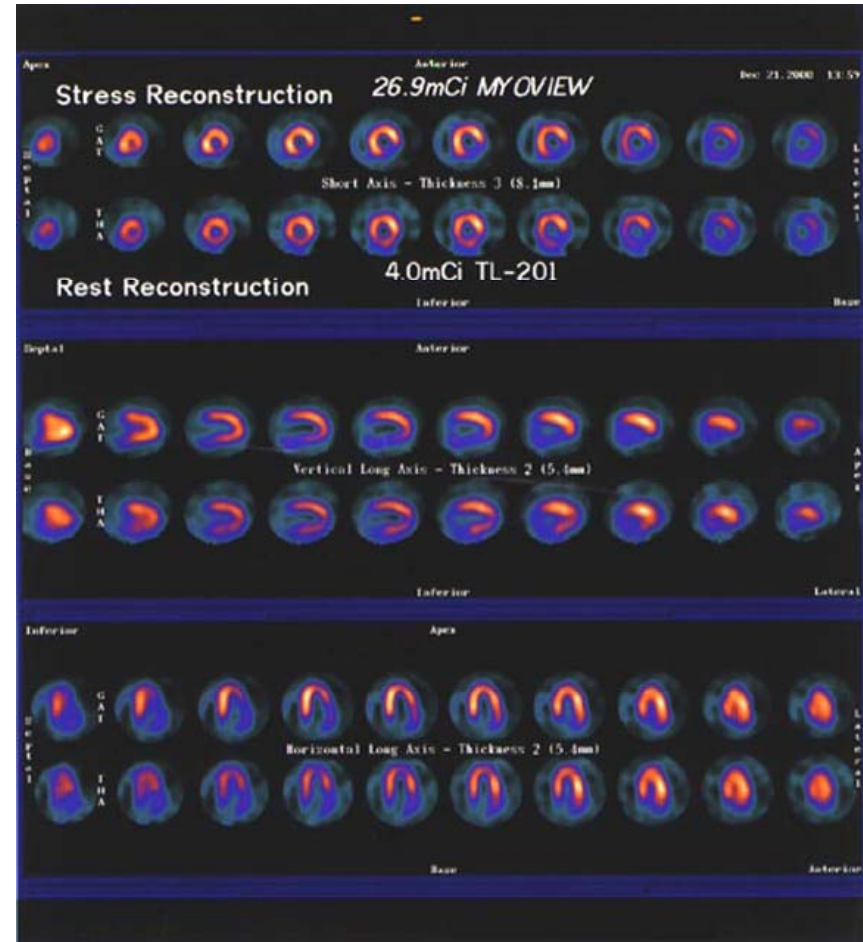
High Risk Indicators

Exercise Stress Testing

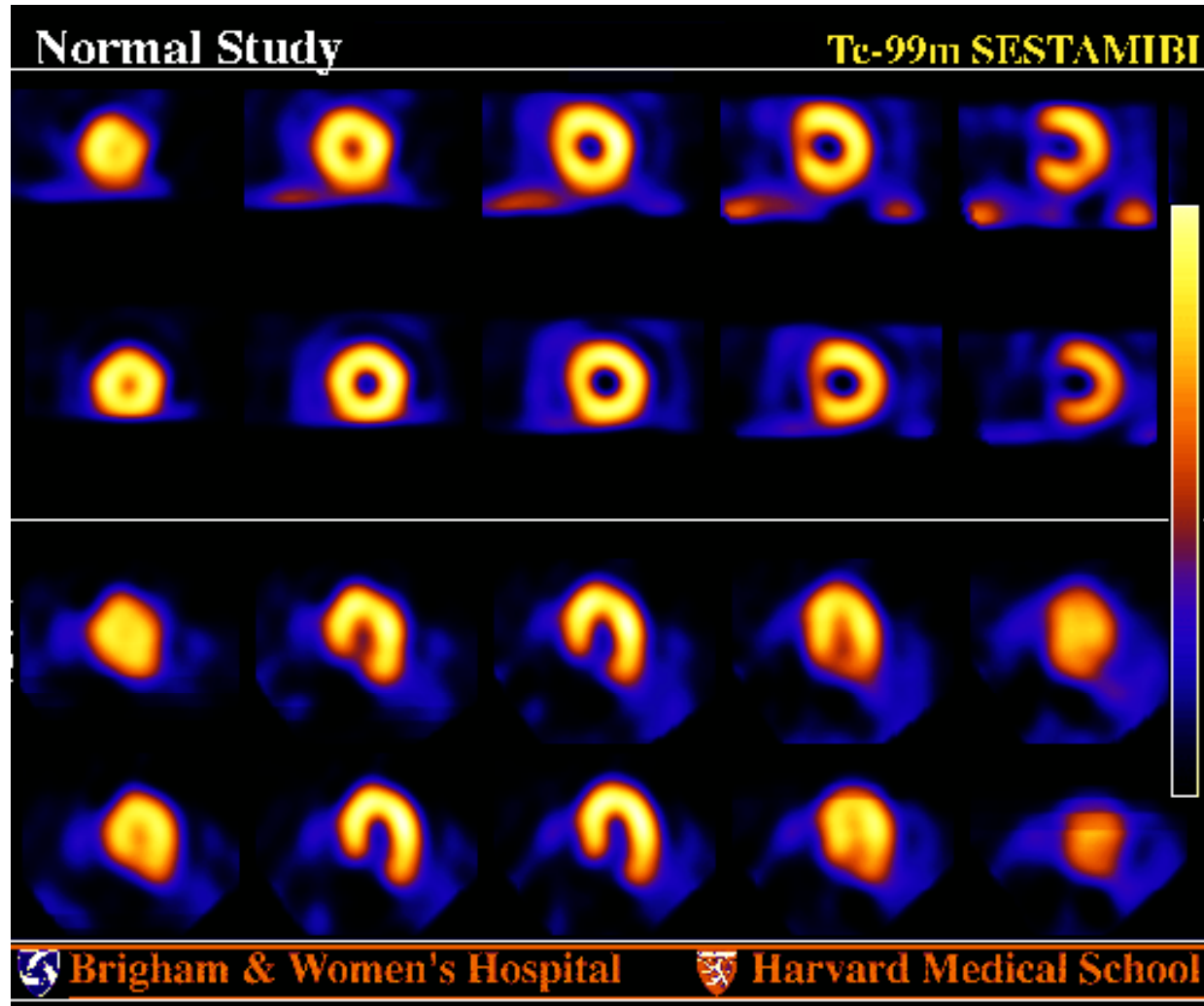
- Early positive-stage I: Mortality $>5\%$ /year
- Strongly positive > 2.5 mm ST depression
- ST elevation > 1 mm in leads without Q waves
- Fall in SBP >10 mm HG
- Early onset ventricular arrhythmia's
- Chronotropic incompetence Ex HR <120 /min not due to drugs
- Prolonged Ischaemic changes in recovery
 > 2 mm lasting > 6 minutes in multiple leads

ECHOCARDIOGRAPHY

Nuclear Myocardial Perfusion scan MIBI / Thallium heart scan



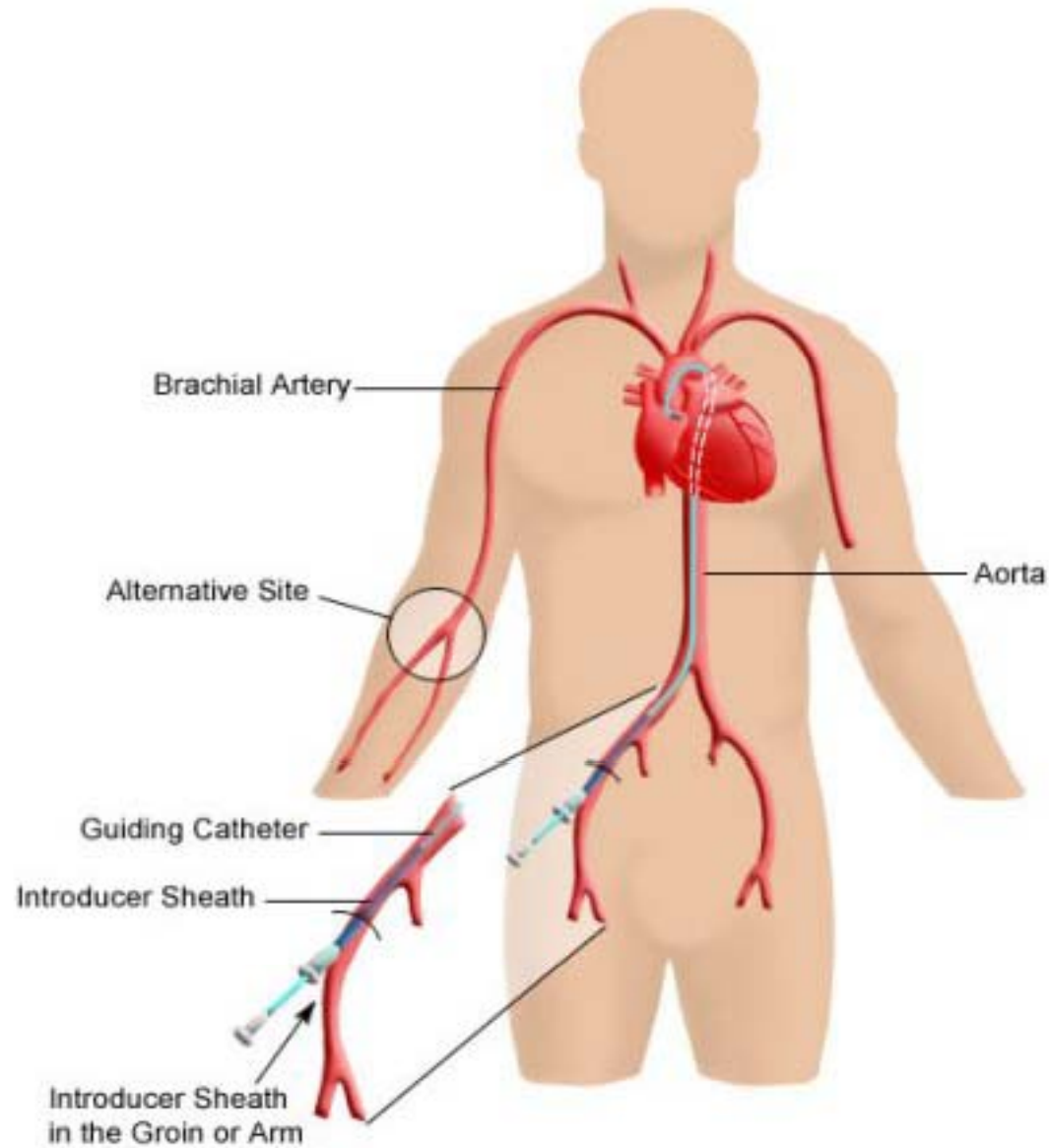
Normal Study



What if the stress test(s) are highly indicative of cardiac ischemia ?

- What should be the next step?
- Treatment ?
- More tests?

CARDIAC CATHETERIZATION



Cardiac Catheterization



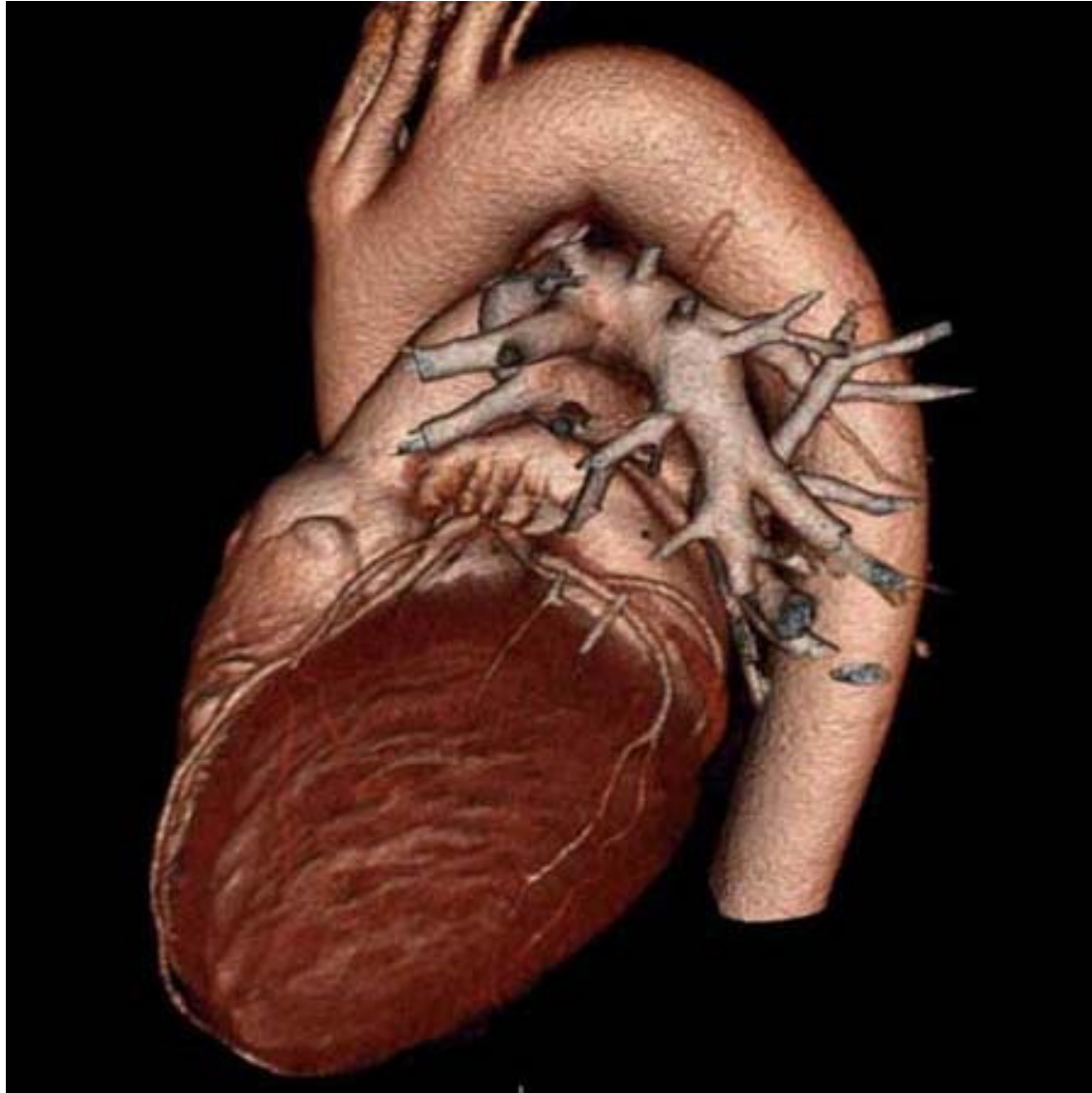
What if the stress test(s) are equivocal for cardiac ischemia ?

- What should be the next step?
- Treatment ?
- More tests?

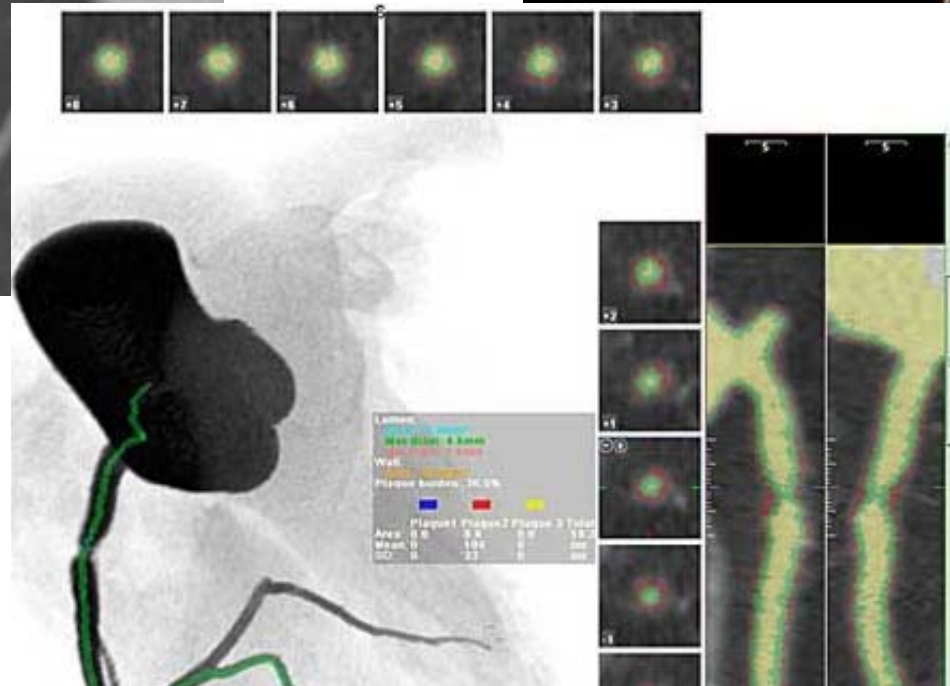
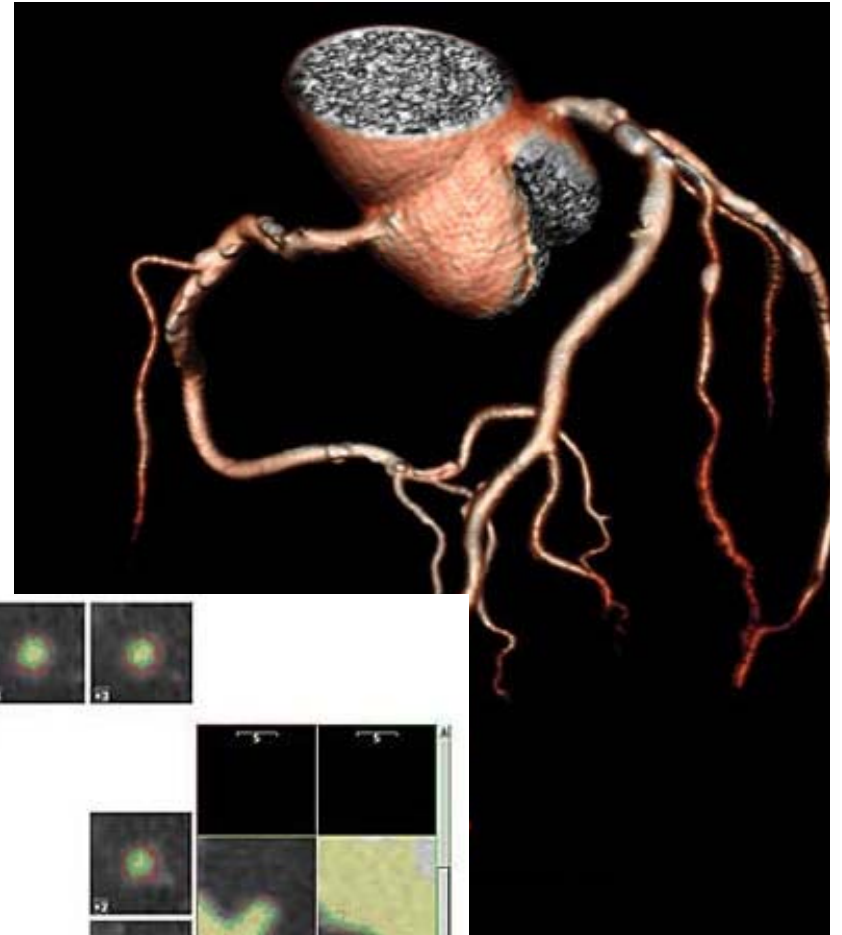
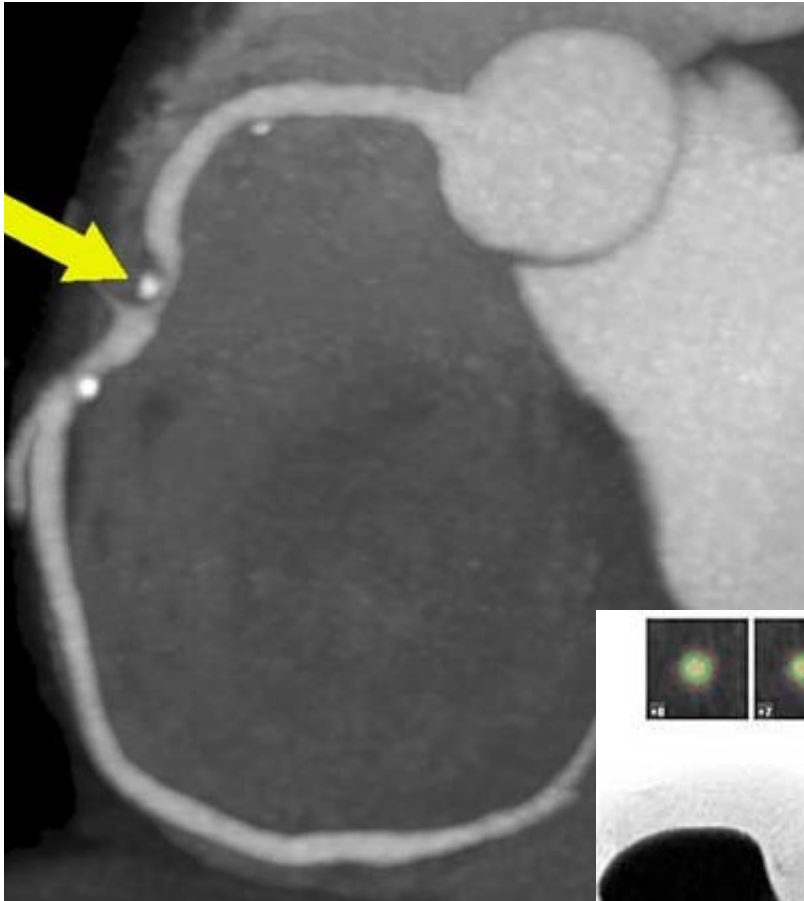
Cardiac CT



Cardiac CT



Cardiac CT



Comparison of Non-invasive Modalities in the Diagnosis of CAD in Women

	Sensitivity %	Specificity %
TMT	61	70
Stress Thallium	78	64
SPECT MIBI	86	80
Stress Echo	86	70
Dobutamine Echo	80 (SVD) 91 (MVD)	79

Meta-analysis of exercise testing to detect coronary artery disease in women Kwok Y. Kim C. et al Am J Cardiol 1999. Mar 1:83(5); 660-6.

Case

Which of the following should be performed?

- No further workup is needed.
- Exercise Stress Test
- MIBI heart scan
- Cath coronary angiography.
- Cardiac CT angio.

Summary

- Evaluation of chest pain in clinic is challenging
- Many diagnostics tests available
- No uniform algorithm
- Usually start with exercise ECG or stress MIBI.
- If symptoms severe and multiple risk factors, may consider proceed to invasive coronary angiography.
- Consider cardiac CT scan for chest pain or for equivocal stress tests.

Thank you