

MANAGEMENT OF STABLE CORONARY ARTERY DISEASE

Aniff YEAROO

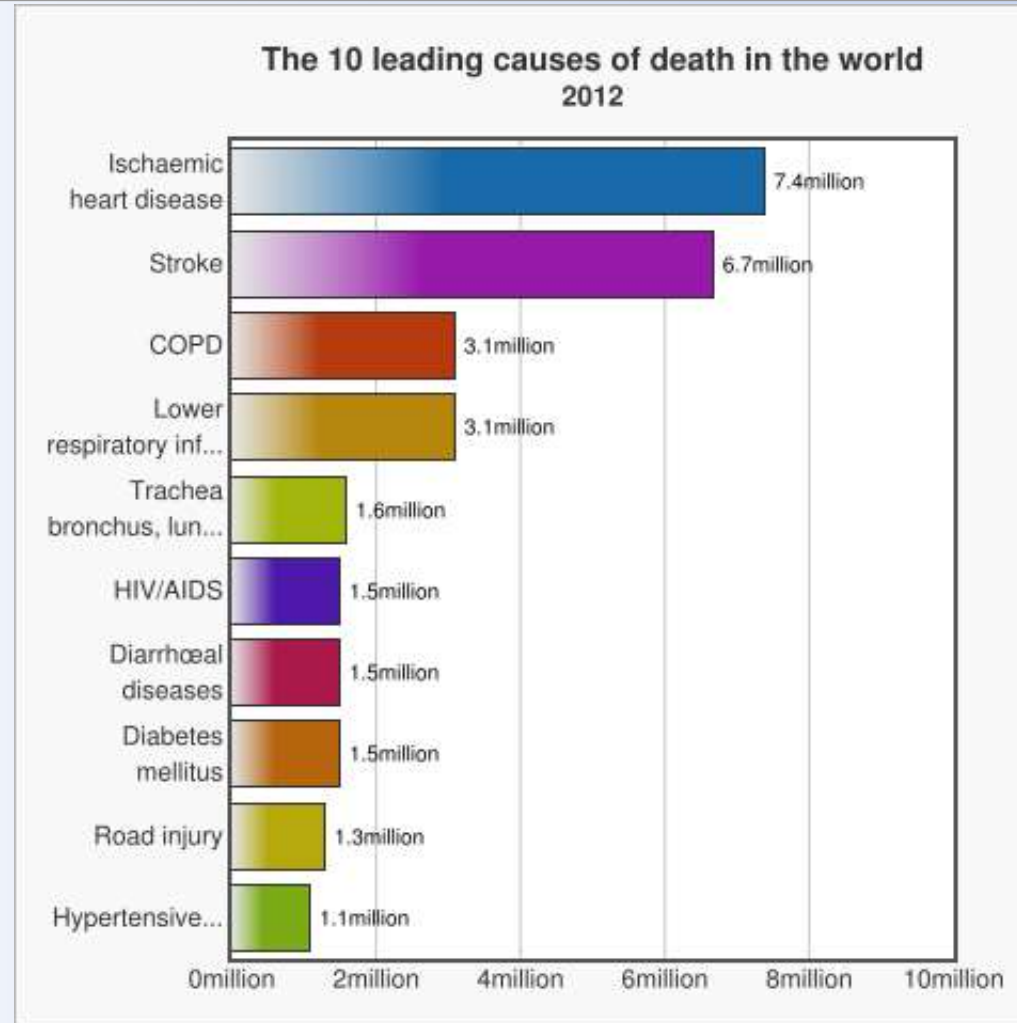
Interventional Cardiologist

10 April 2019

INTRODUCTION

- Ischemic Heart Disease (IHD) manifests as a spectrum of presentations ranging from asymptomatic states to sudden cardiac death.
- Stable Coronary Artery Disease (CAD) is a condition not associated with acute, unstable or progressive cardiac events.
- Presentation: Exertional angina pectoris, atypical chest pain, dyspnea, fatigue, or reduced effort tolerance.
- Can be asymptomatic, abnormal findings on ECG, CT Scan or Exercise ECG.

IHD leading cause of death globally



Symptoms of Ischemic Heart Disease

The diagram illustrates the human torso from the front and back. A red heart is shown in the front view. A red shaded area on the chest indicates the most typical discomfort/pain zones. A pink shaded area on the back indicates other possible discomfort/pain zones. A red exclamation mark icon is placed above the chest area, and a pink exclamation mark icon is placed above the back area. A green 'X' icon is placed on the left side of the chest.

Most typical discomfort/pain zones

Other possible discomfort/pain zones

Heavy pressure, tightness, crushing pain or unusual discomfort in the centre of the chest

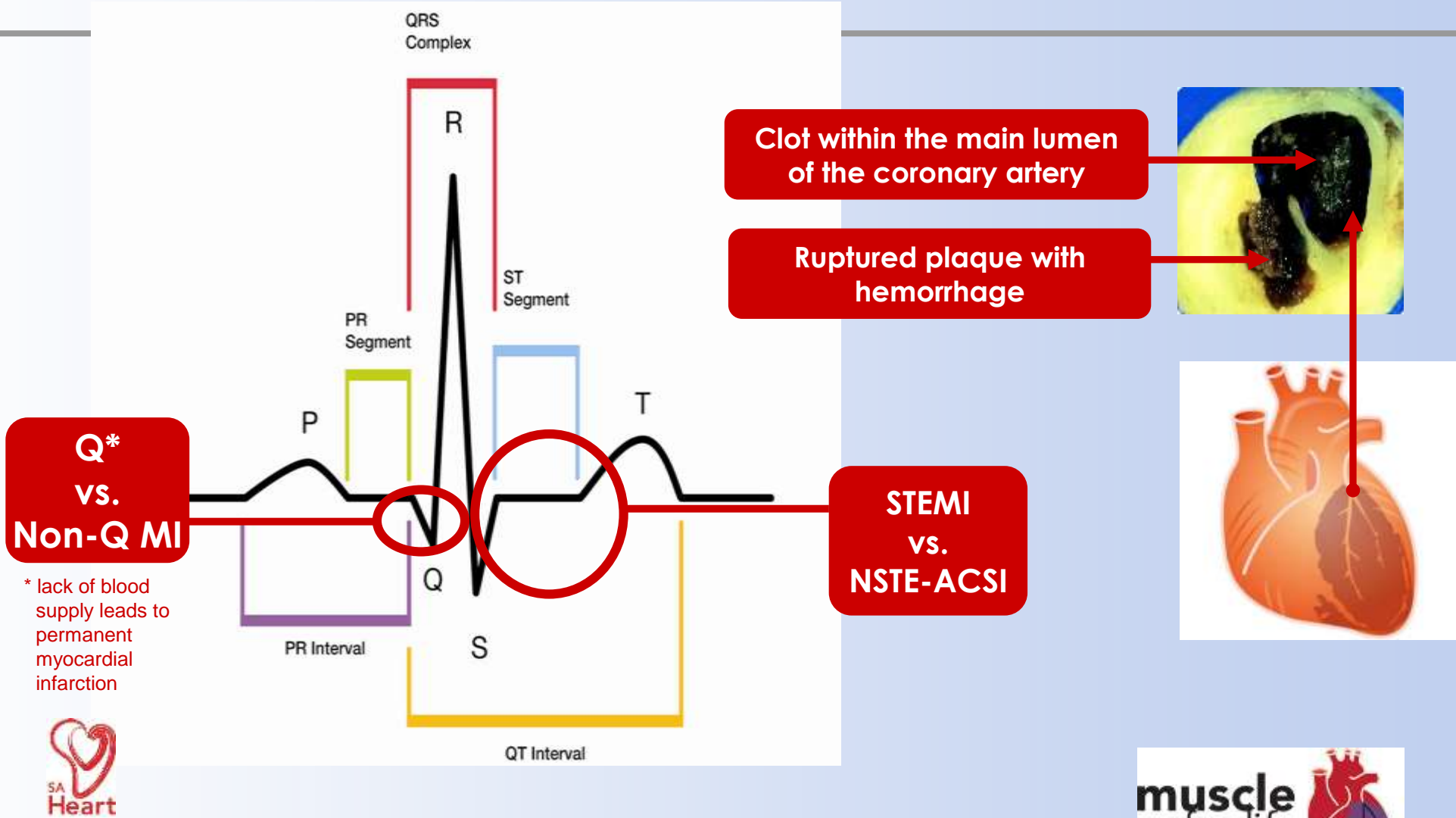
Sweating, sickness, faintness or shortness of breath may be experienced

This may feel like indigestion, spread to shoulders, arms, neck or jaw and/or last for more than 15 minutes. It may stop or weaken and then return

There may be a rapid, weak pulse

Sharp stabbing pain in the left side of the chest is usually NOT heart pain

ECG Diagnosis



ECG

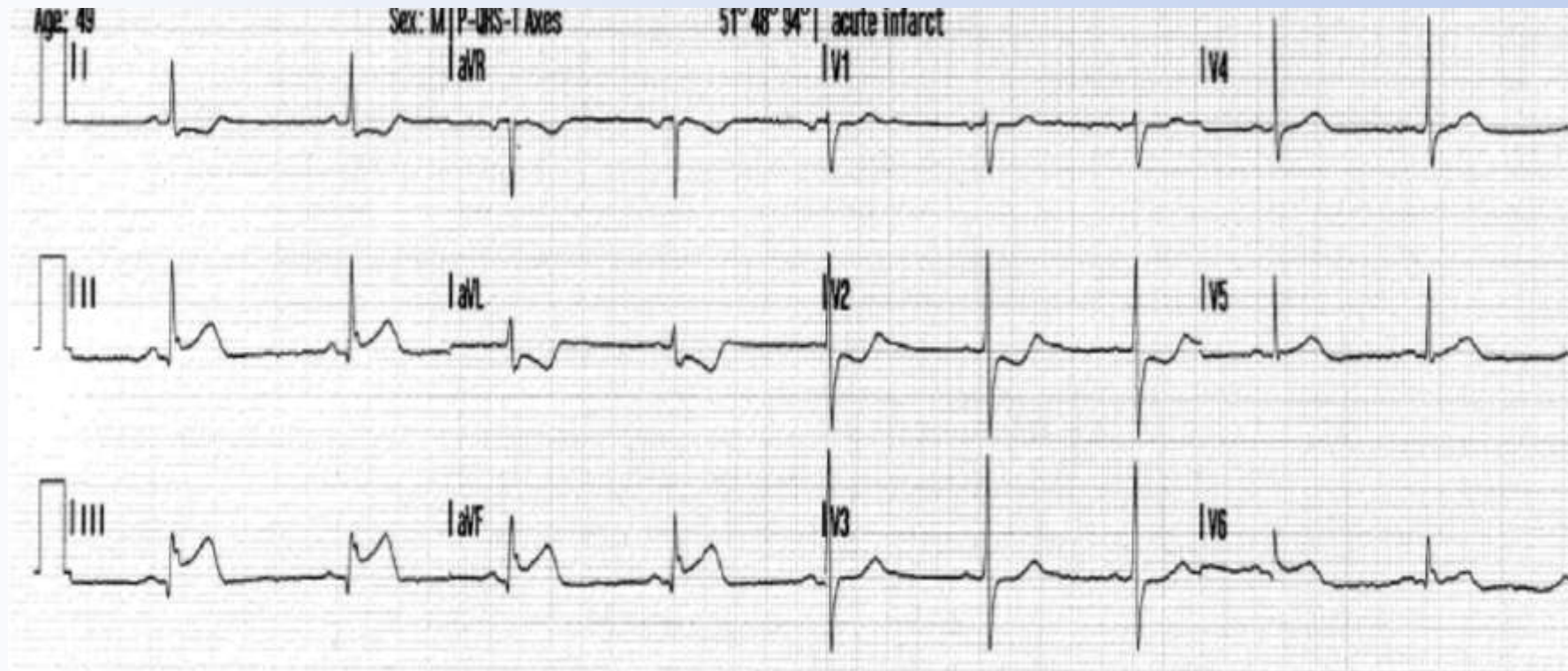


TABLE 1

| | |
|--|---|
| Class I (no limitation of ordinary activity) | Angina reproduced with strenuous exertion |
| Class II (slight limitation of ordinary activity) | Angina reproduced on walking rapidly |
| Class III (marked limitation of ordinary activity) | Angina reproduced on walking 100-200 m |
| Class IV (inability of activity) | Angina reproduced for any activity |

Severity of Angina according to Canadian Cardiovascular Society

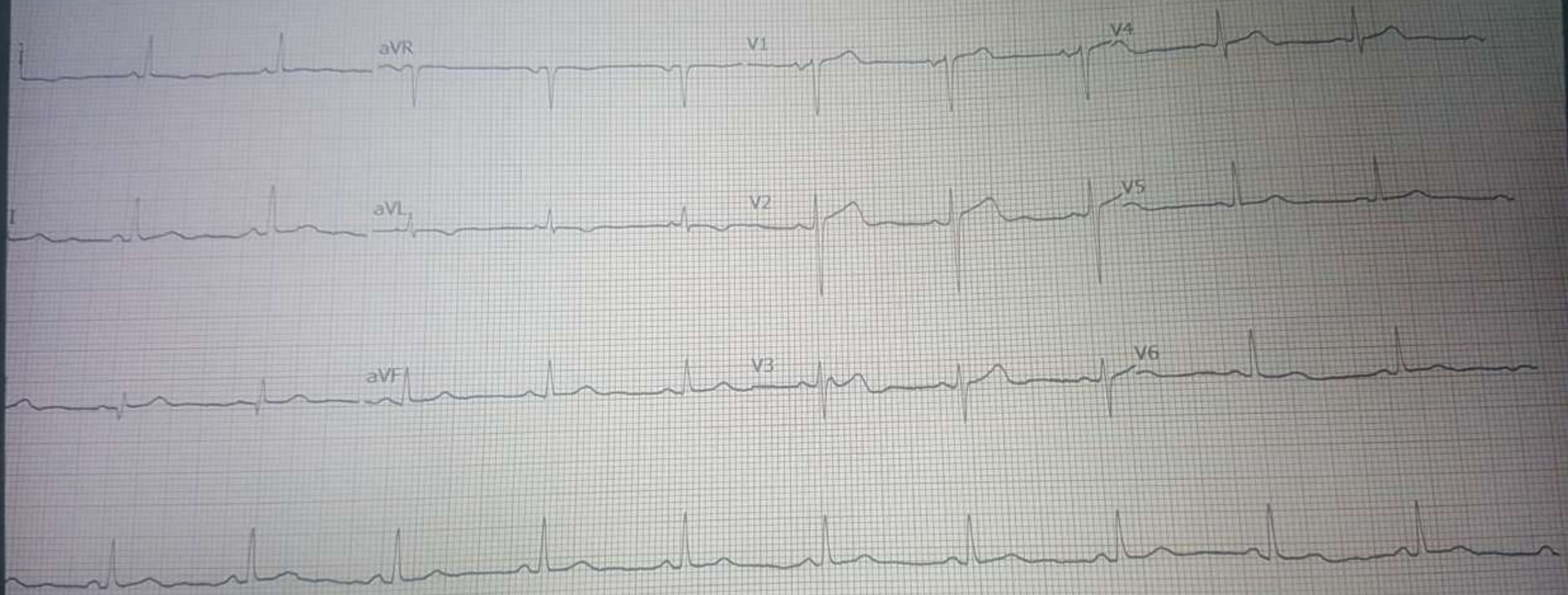
TABLE 4

| Test | Utility | Indication |
|------------------|--|---|
| Blood exams | Control disease progression and ischemia triggers | Every patient, every year |
| ECG | Discover ischemic signs and prognosis | Every patient, every year |
| Echocardiography | Exclude other cardiopathy and evaluate ejection fraction | Every patient |
| Stress test | Diagnosis and stratification | Diagnosis and follow-up of high risk patients |
| Angiography | Revascularization or anatomy investigation | Uncontrolled symptoms or possible complex lesions or high risk patients |

Main tests in stable Ischemic Heart Disease

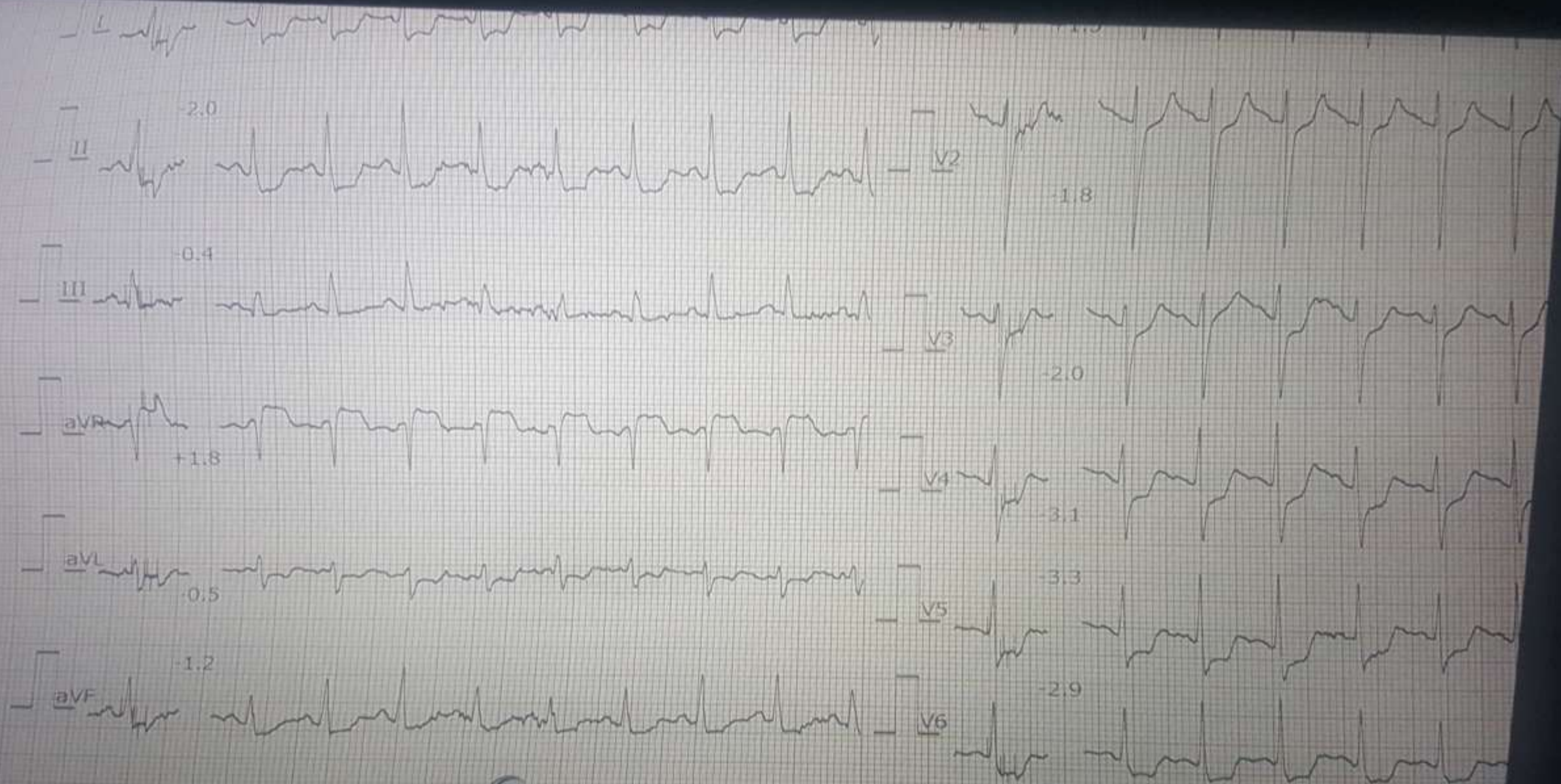
TABLE 5

| Non-invasive test | High-risk outcome |
|---|---|
| Exercise Treadmill | >2 mm of ST depression at low workload |
| | Exercise-induced ST elevation |
| | Exercise-induced ventricular tachycardia/fibrillation |
| | Failure to increase blood pressure >120 mmHg or sustained decrease >10 mmHg during exercise |
| Myocardial perfusion imaging | Resting perfusion abnormalities >10% of the myocardium |
| | Stress-induced perfusion abnormalities >10% of the myocardium or indicating multiple coronary obstruction |
| | Severe stress-induced left ventricular dysfunction |
| Stress echocardiography | Inducible kinetic abnormalities involving >2 coronary beds |
| | Kinetic abnormalities developing at low dose of dobutamine |
| Coronary computed tomographic angiography | Multi-vessel or left main stenosis |

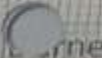


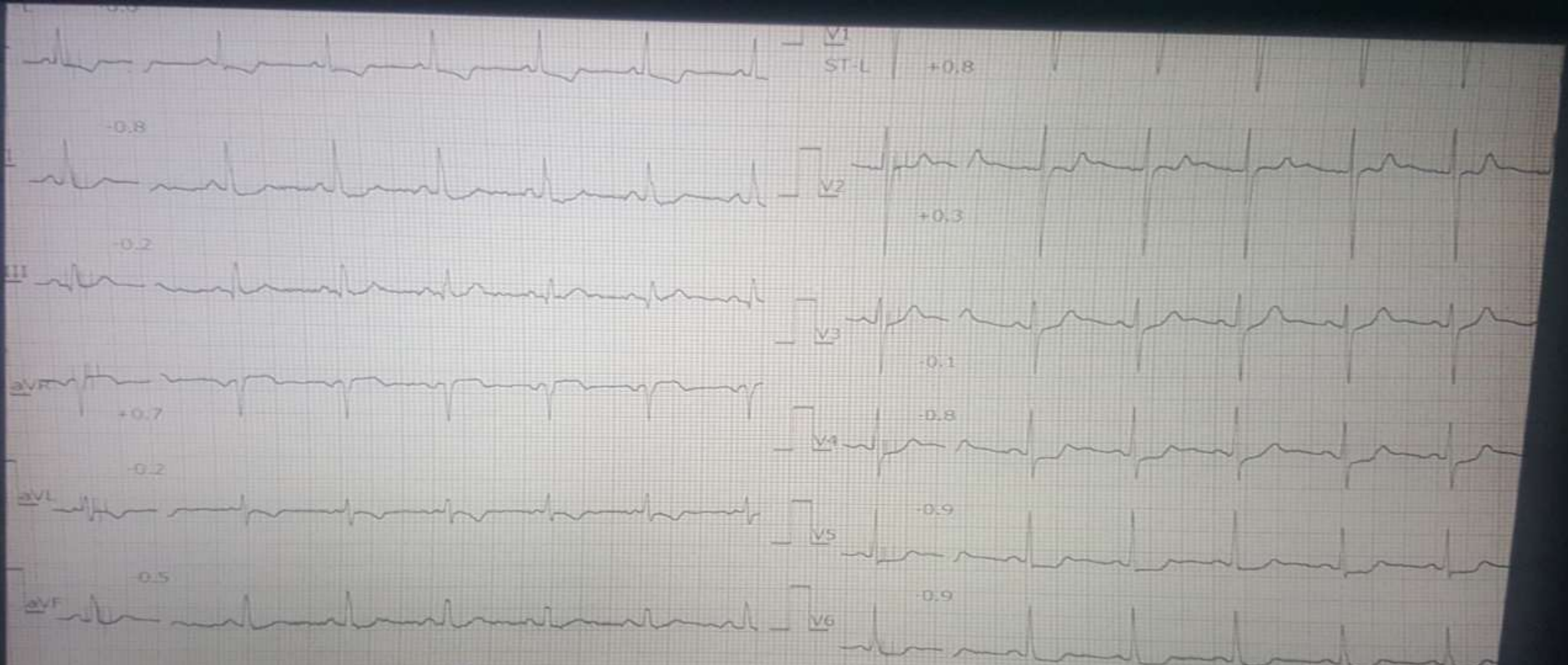
GE MAC2000 1.1 12SL™ v241 25 mm/s 10 mm/mV ADS 0.56-20 Hz 50 Hz Unconfirmed 4x2.5x3_25_R1 1/1

ECG REST



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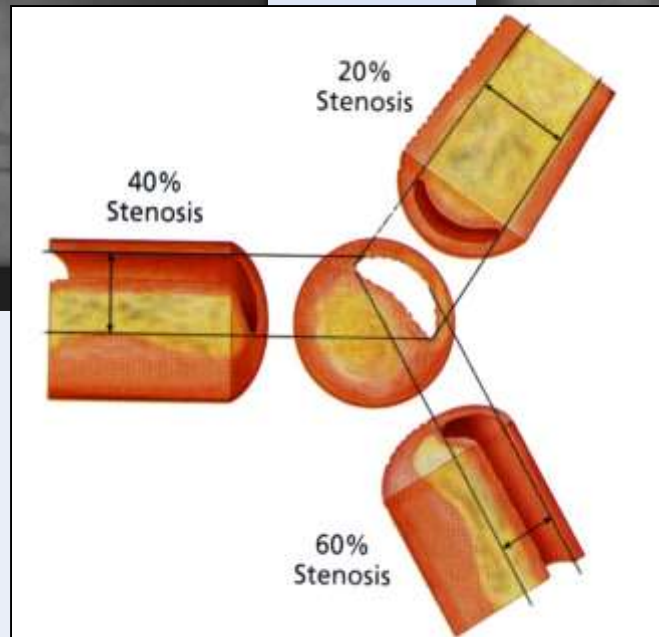
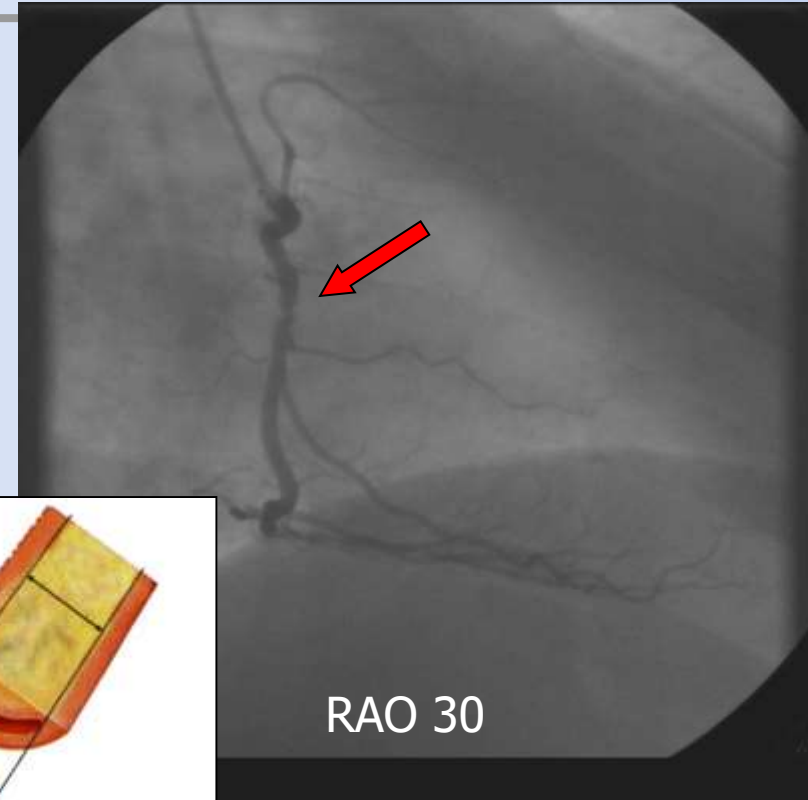
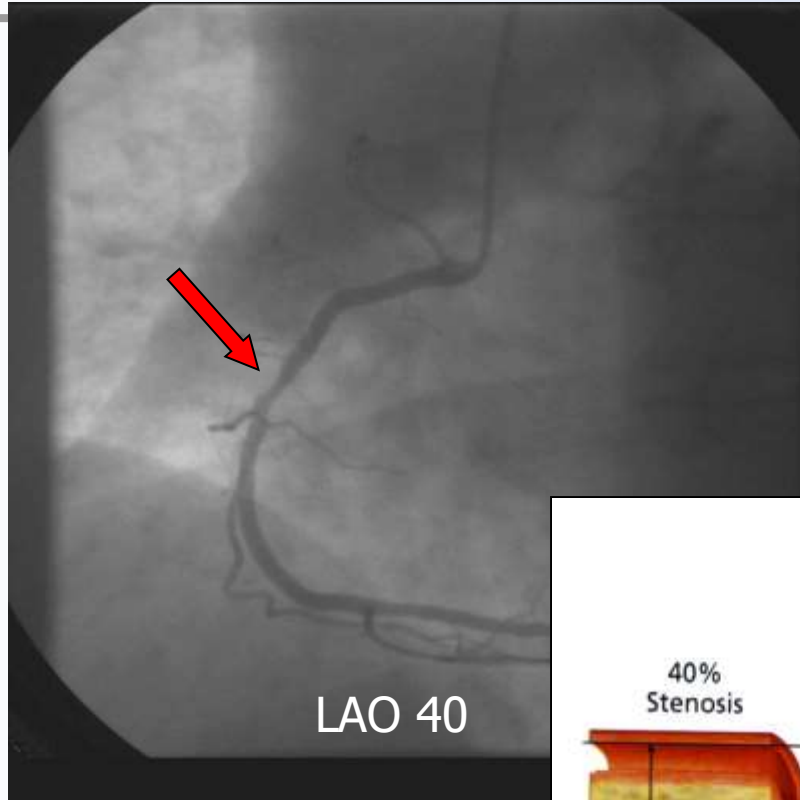
Exam: Fortis Clinique rne



15-08-0128 Exam: Fortis Clinique D

POST-EXERCISE ECG

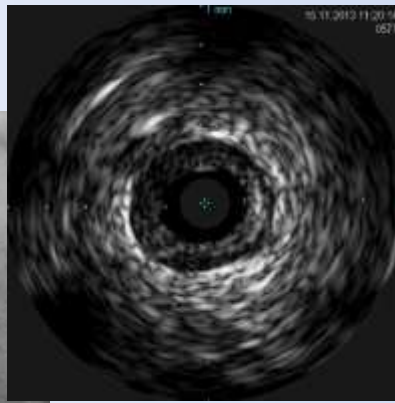
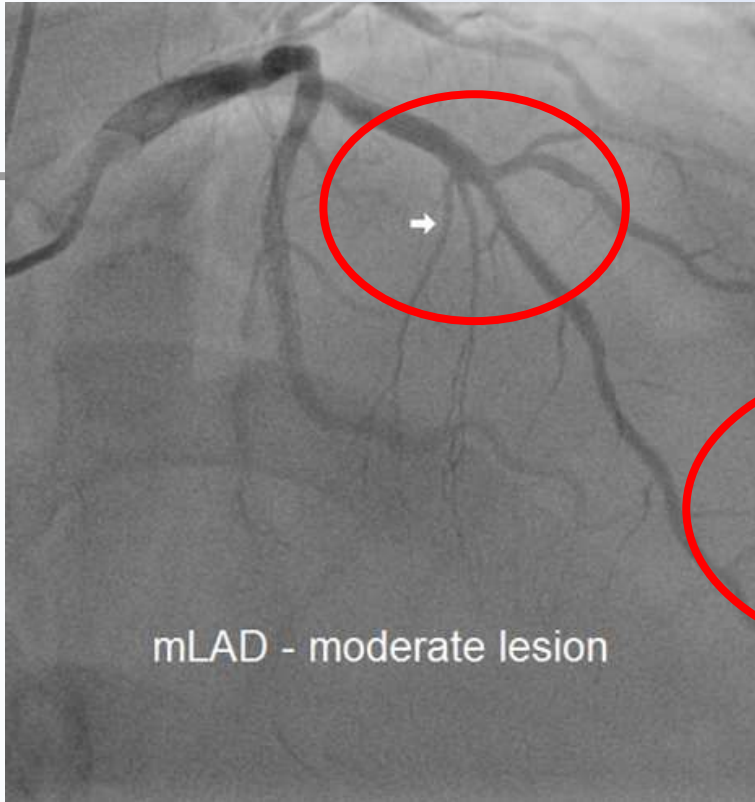
RCA Angiogram





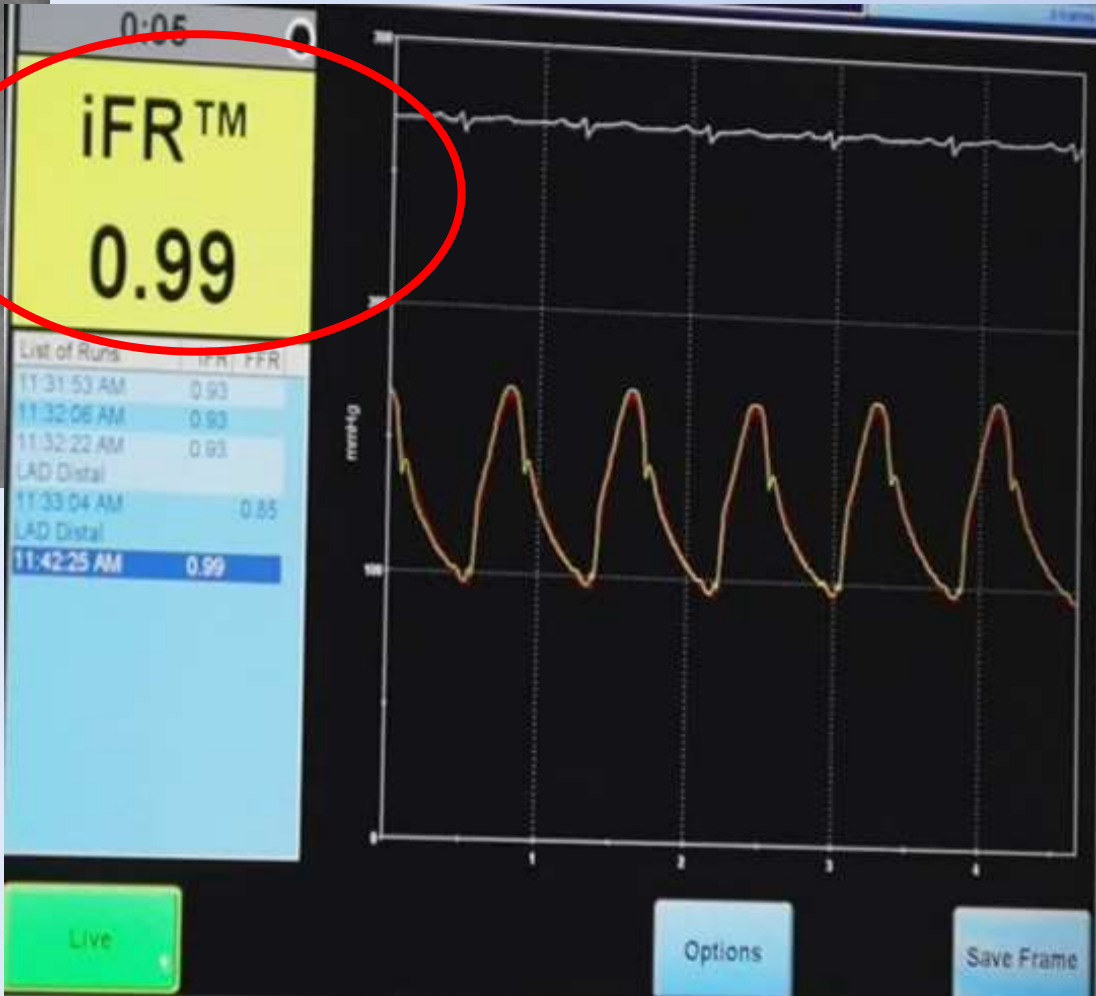
How can we access the lesion?

1. QCA
2. Physiology
3. Imaging (IVUS or OCT)
 - Lumen Diameter and Lumen Area
 - Vessel Diameter and Vessel Area
 - Lesion length



i-FR (Physiology)

Min CSA 3.5 mm sq



**NO MAXIMAL
HYPEREMIA**

Is PCI as good as Medical Therapy in addressing Ischemia?

THE COURAGE TRIAL SHOWED THAT ANGIOGRAPHIC GUIDED PCI WAS COMPARABLE TO OPTIMAL MEDICAL THERAPY (MT) AT PREVENTING MACE¹

LAD: 50–70% Stenosis

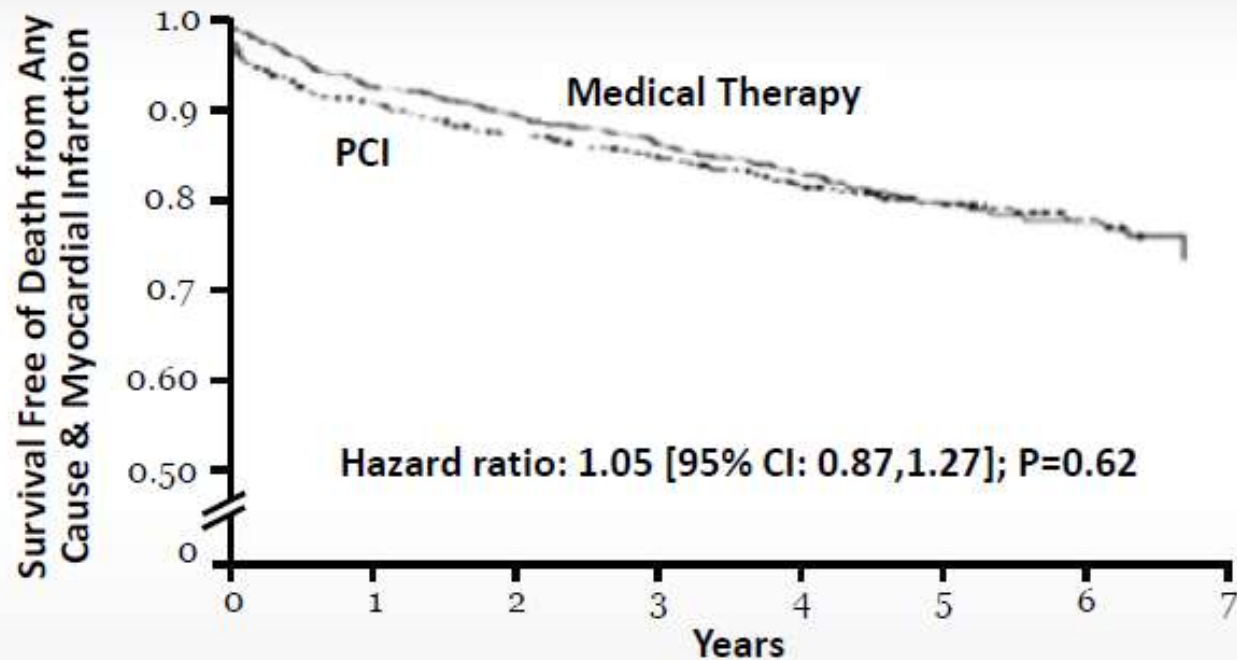
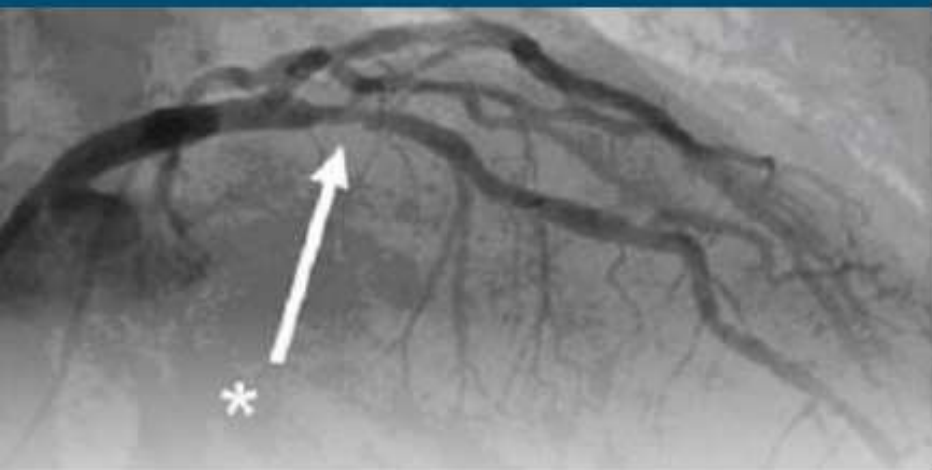


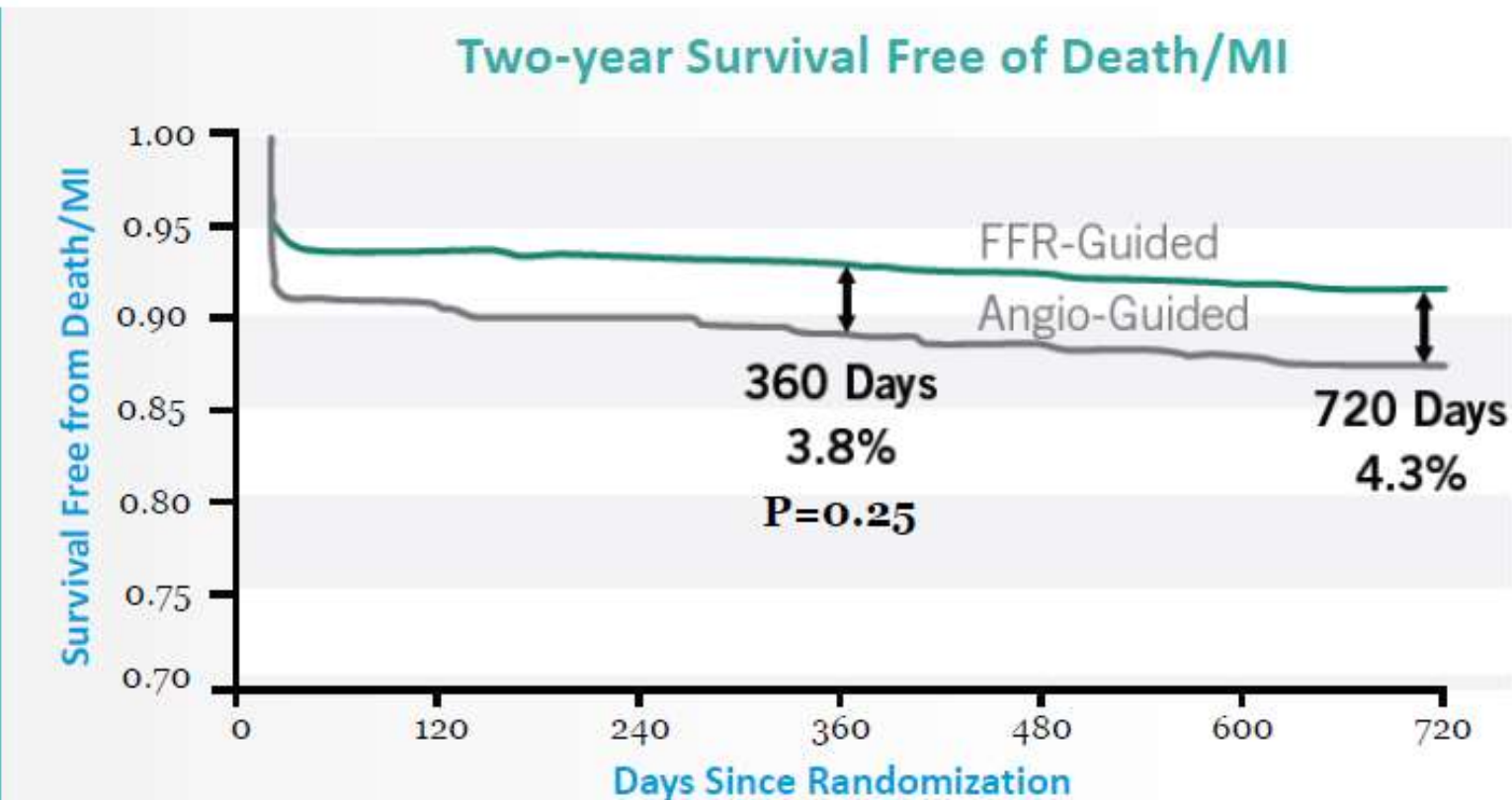
Table 1: Kaplan-Meier Survival Curves. The estimated rate of composite primary outcome of death from any cause & non-fatal infarction was 19% in the PCI group and 18.5% in the medical therapy group. (Numbers in table represent the patients at risk each year.)

| | | | | | | | | |
|-----------------|------|------|-----|-----|-----|-----|-----|----|
| MEDICAL THERAPY | 1138 | 1017 | 959 | 834 | 638 | 408 | 192 | 30 |
| PCI | 1149 | 1013 | 952 | 833 | 637 | 417 | 200 | 35 |

1. Boden, W.E., O'Rourke, R.A., Teo, K.K., Hartigan, P.M., et al. Optimal Medical Therapy with or without PCI for Stable Coronary Disease. N Engl. J Med 2007; 356:1503-1516 [April 12, 2007](#)

FFR-Guided PCI leads to 35% Risk Reduction in Death and MI Compared to Angio Only¹

Routine adoption of FFR in clinical practice allows the physician to make the **RIGHT DECISION** for the **RIGHT PATIENT**, at the **RIGHT TIME**



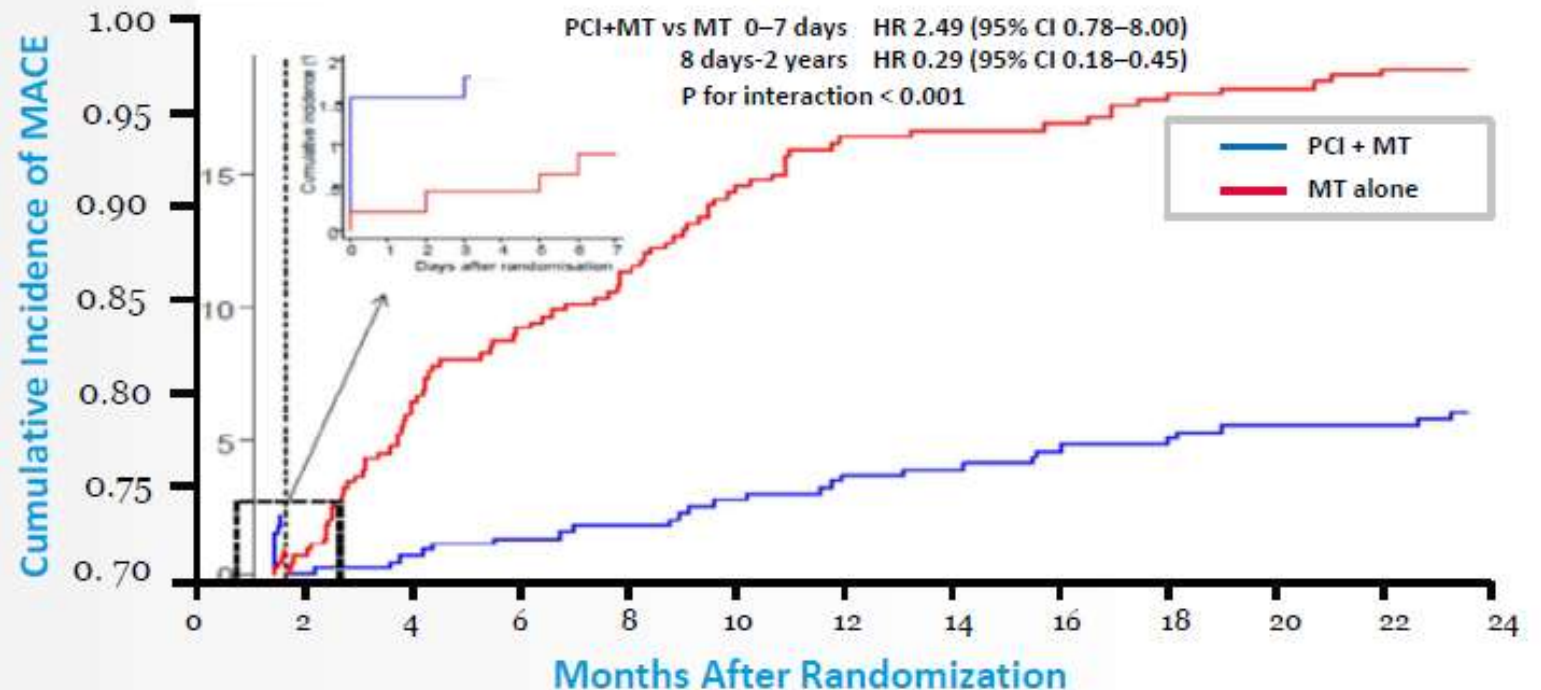
1. Pijls ,N.H., Fearon, W.F., Tonino, P. Siebert, u., et al. 2-Year Follow-Up Results of FAME Study. Journal of the American College of Cardiology Vol. 56, No. 3, 2010

PressureWire Guided PCI is Superior to Medical Therapy Alone¹

The rate of MACE (any death, non-fatal MI and/or urgent revascularization) at 2 years was significantly lower with FFR-guided PCI + MT than MT alone (8.1% vs 19.5%) $p < 0.001$

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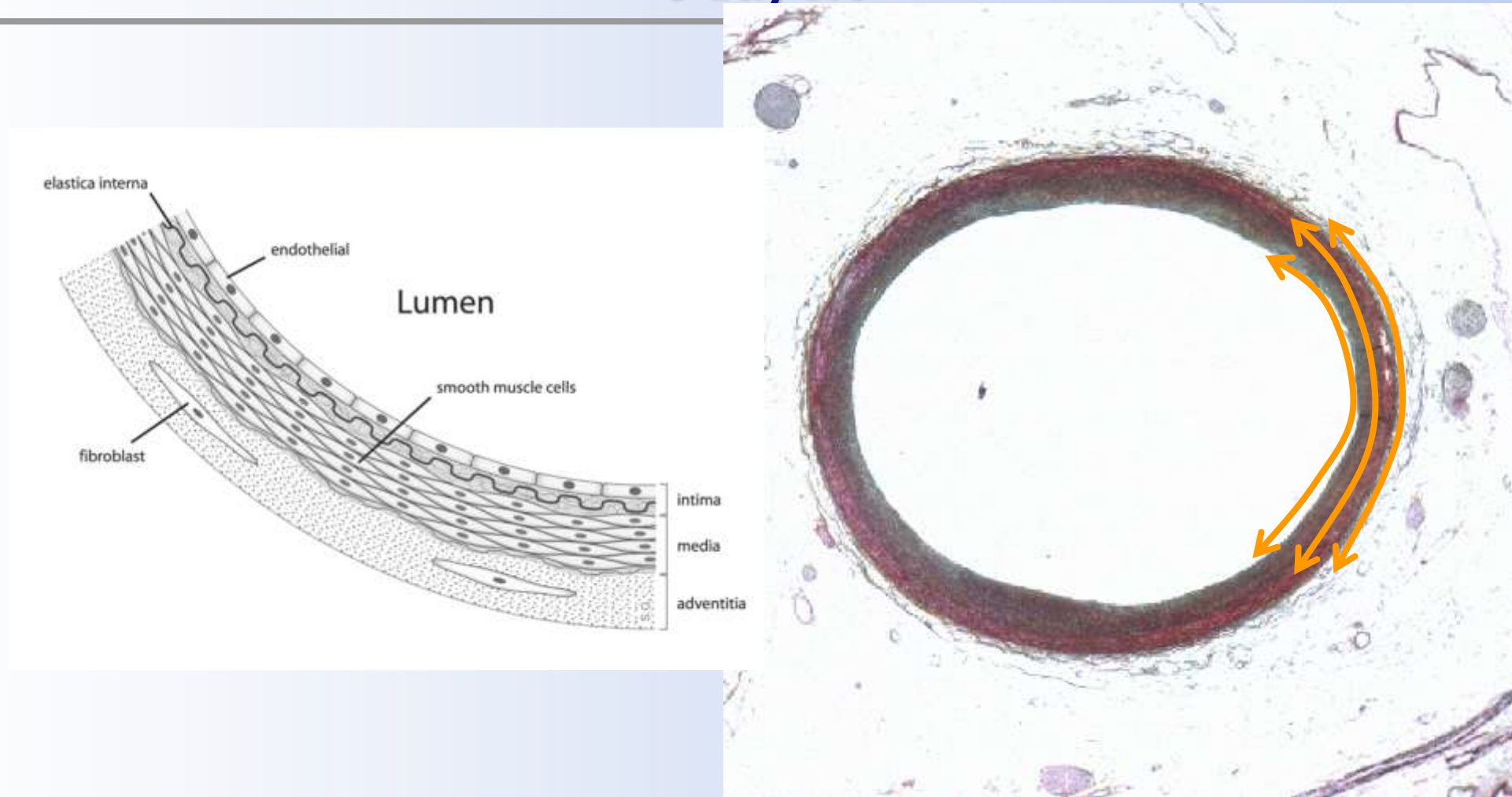
Two-year Survival Free of MACE



1. De Bruyne B, Fearon, W.F., Pijls, N.H.J., Barbato, E. et al. Fractional Flow Reserve-Guided PCI for Stable Coronary Artery Disease. N Engl J Med 2014. DOI: 10.1056/NEJMoa1408758

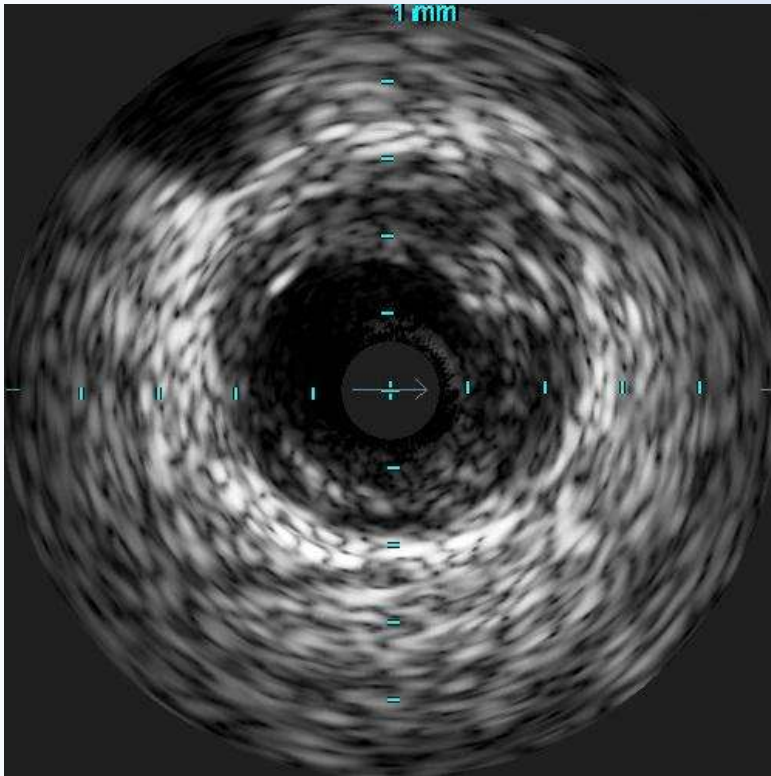
Normal Artery Wall

3 Layers

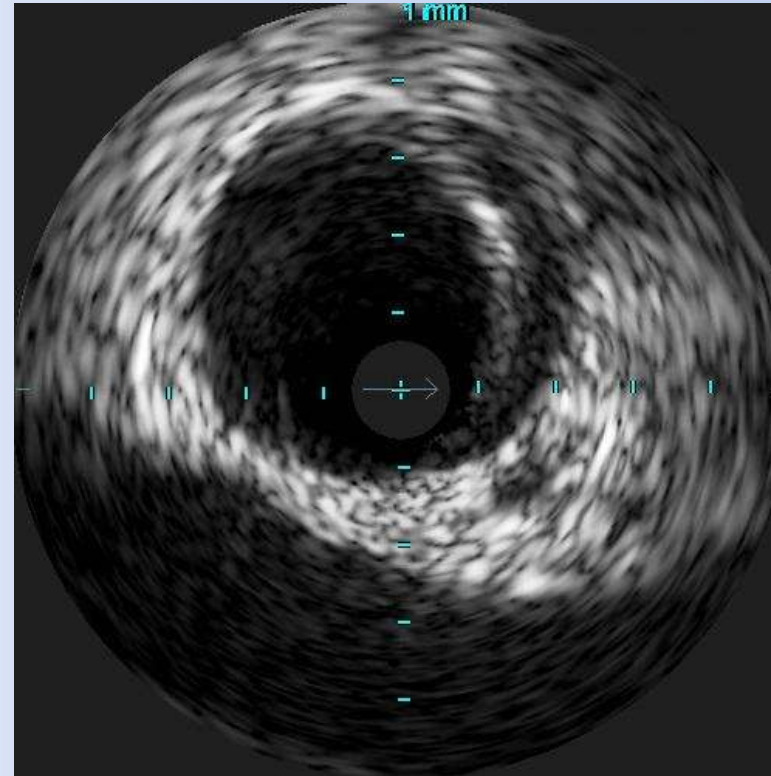


(IVUS)

Diseased vessel: Plaque Geometry

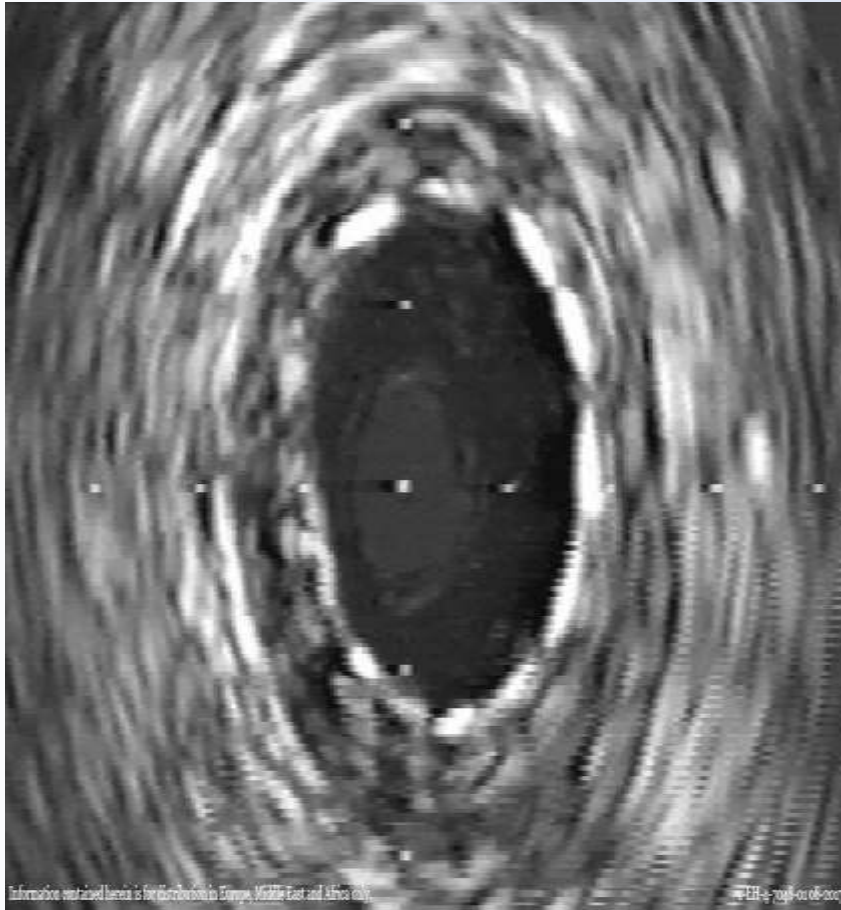


Concentric Plaque

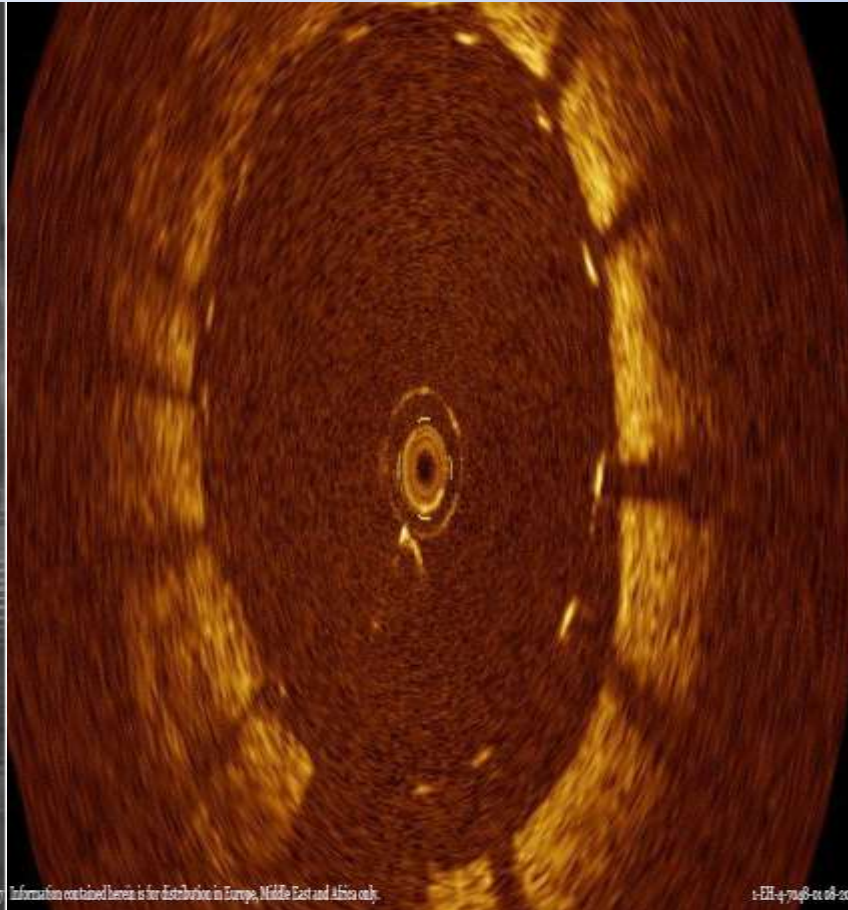


Eccentric Plaque

IVUS

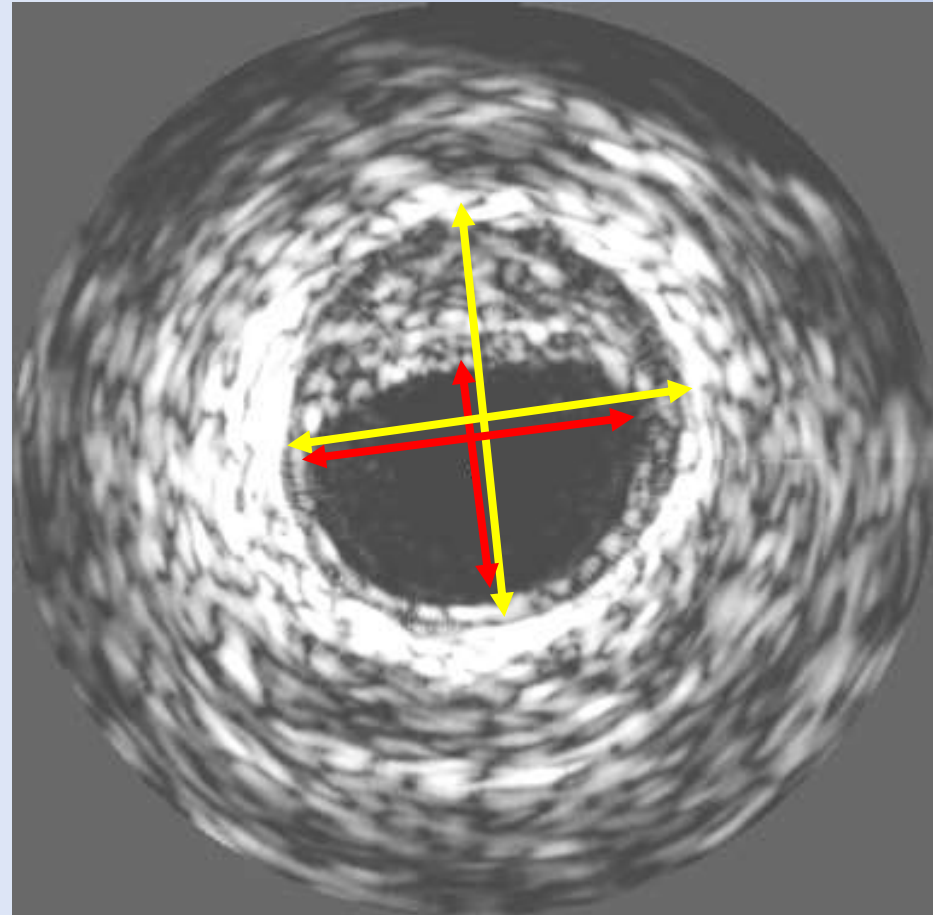


OCT



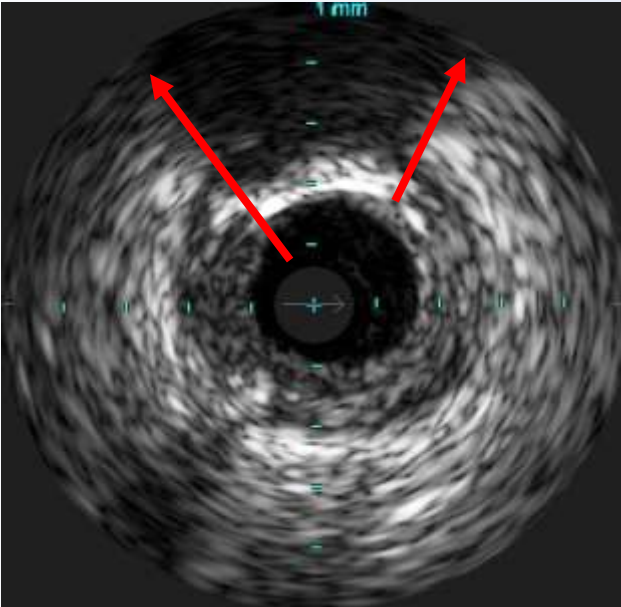
Diameter measurement

- **Vessel diameter adventitia to adventitia**
- **Lumen diameter intima to intima**

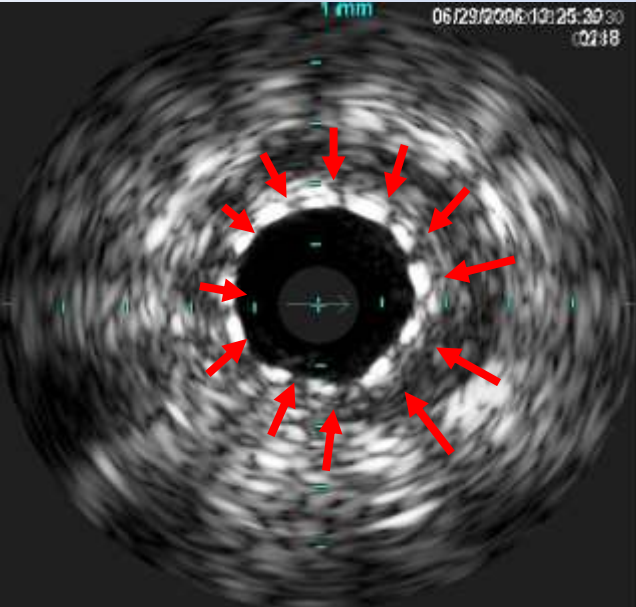


IVUS Images

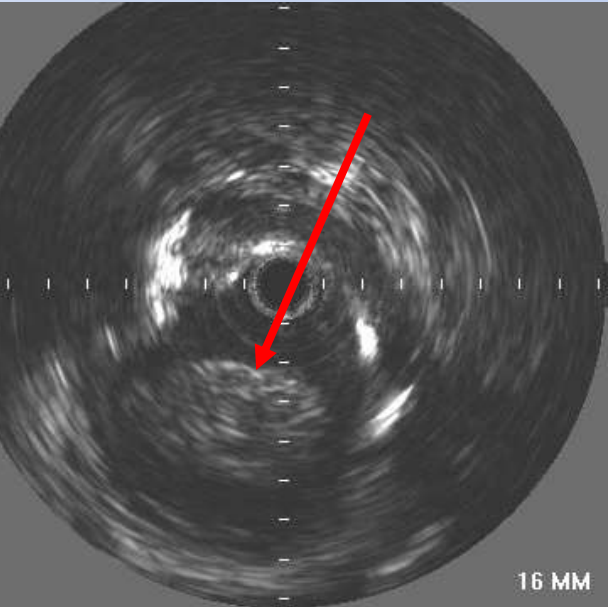
**Calcium
with shadow**



Stent



Thrombus



MEDICAL MANAGEMENT OF STABLE CAD

- (COURAGE TRIAL)
→ OMT for stable CAD results in similar rates of survival and myocardial infarction compared to Percutaneous Coronary Interventions(PCI)
- Relieved angina symptoms, reduce death myocardial infarction and stroke rates.
- More intervention at 5 years in medical group.

- Anti anginal drugs

Beta blockers, calcium channel blockers, nitrates, Ivabradine etc.

(Triple anti angina therapy considered in very symptomatic patient)

- Antiplatelet and lipids lowering drugs

- Risk factors management

High Blood Pressure, Dyslipidemia, Diabetes, Smoking, Weight Reduction, Regular Physical Activities

REVASCULARISATION CABG OR PCI

- Patients with refractory symptoms to OMT.
- Revascularization in addition to OMT achieves a greater reduction in ischemic burden compared to OMT alone, better left ventricular function.

- CABG is preferable to PCI for multi vessels disease and left main Coronary Artery Disease, in diabetic patient, high and anatomical complexity or high syntax scores.
- Survival benefit with CABG has been found in high risk patients at long term (after 5 years).
- PCI in less complex CAD, less diffuse disease low syntax score and low burden of disease.

- Neither PCI nor CABG alone can provide a solution for the entire spectrum of CHD who needs revascularization.
- In many situations the choice will remain debatable. Recent trials and ongoing trials with newer generations of DES indicate that both modalities are equivalent in most cases in terms of survival, MI or Angina.

- Optimizing coronary interventions with invasive functional assessment by iFR/FFR and Coronary Imaging by IVUS/OCT
- Fluoroscopy alone is often insufficient for decision making and treatment.
- iFR/FFR provides functional evaluation of serial stenoses, IVUS and OCT allows assessment of plaque, strategy for PCI and Post PCI treatment optimization.

IN SUMMARY

- Optimal Medical Therapy is necessary in all patients with stable CAD, whether or not they receive revascularization of any type Percutaneous Coronary Interventions(PCI) or Coronary Artery Bypass grafting (CABG.
- In all cases of choosing revascularization strategies, a patient centered approach with informed consent about all reasonable options should be taken.
- Randomized trials and controlled observations have defined many of the subset of patients who will benefit from PCI and others who may be better managed with medical therapy or bypass surgery.

THANK YOU