FAMILY MEDICINE EDUCATION DAY

ACUTE CORONARY SYNDROME (ACS)

OVERVIEW

- THE CASE
- PATHOPHYSIOLOGY OF ACS
- PATIENT PRESENTATION
- PATIENT EVALUATION
- ECG FINDINGS: A CRITICAL STEP
- THE UNIVERSAL DEFINITION OF MYOCARDIAL INFARCTION
- ACUTE TREATMENT
- COMPLICATIONS
- QUESTIONS AT DISCHARGE
- LONG-TERM MANAGEMENT

THE CASE

- 49 year old man
  - 2 hours of chest heaviness across the upper chest
  - Improved with resting and worsened with walking about
  - No radiation, SOB, diaphoresis, nausea
- PMH: Hypertension
- PSH: None
- Social History
  - Lifetime non-smoker
  - Works as a gas station attendant
  - Immigrant from Pakistan
- Family History: No Premature CAD

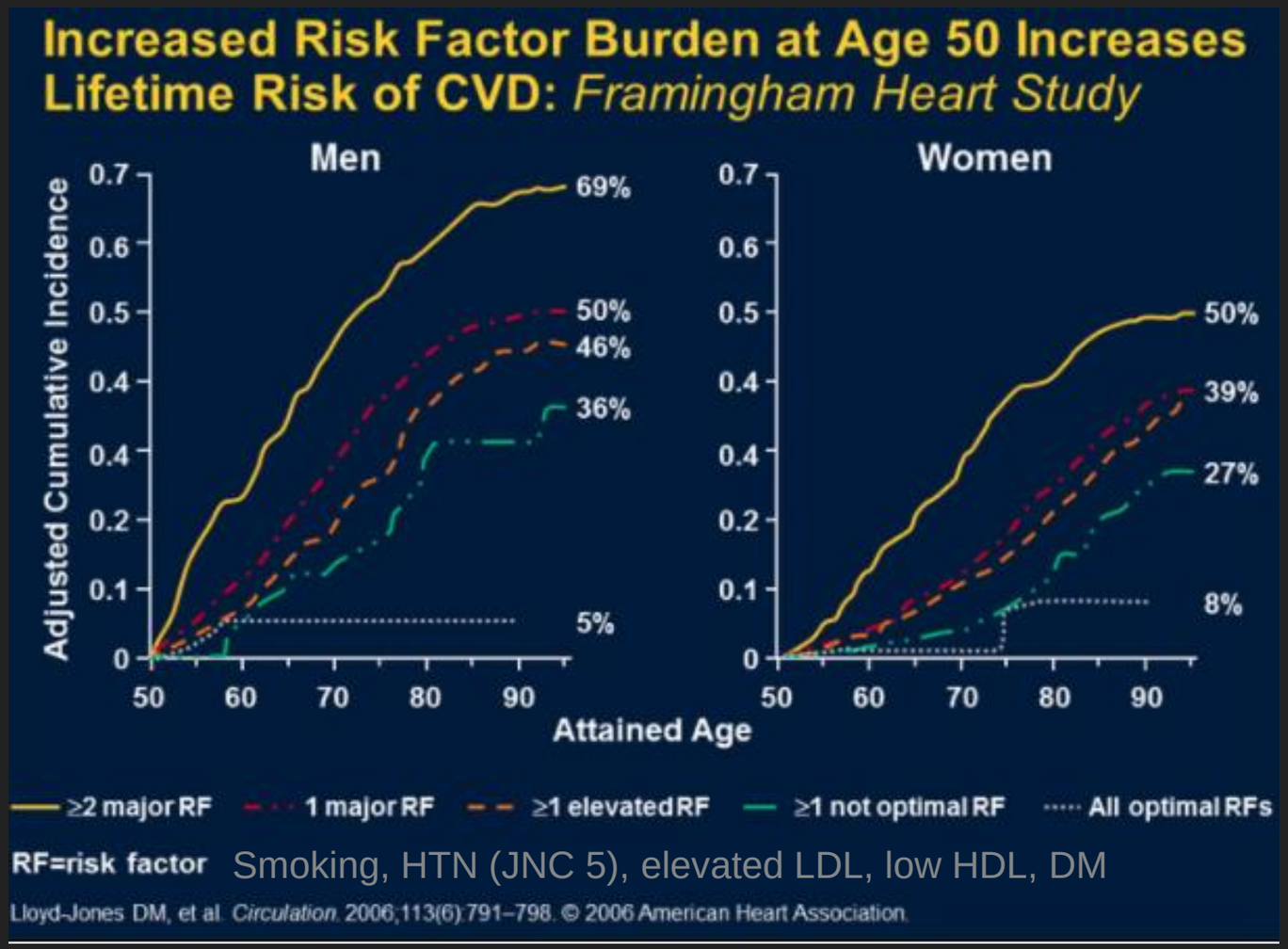
PATHOPHYSIOLOGY OF ACS

- Stable vs Vulnerable Plaque
- Acute Thrombosis
  - Erosion
  - Plaque Disruption
- Other Causes
  - Spontaneous Coronary Artery Dissection (SCAD)
  - Arteritis or Vasculitis
  - Coronary Spasm
  - Coronary Embolism

Davies, M. Heart 2000;83:361-366

PATHOPHYSIOLOGY OF ACS: RISK FACTORS

- Hypertension
- Dyslipidemia
  - Lp(a)
- Diabetes Mellitus
- Tobacco Use
- Family History of Premature CAD
- Obesity
- Sedentary Lifestyle
- Post-menopausal Women



PATIENT PRESENTATION

- What is Angina?
  - Symptoms caused by cardiac ischemia
    - Chest pain/tightness/discomfort
    - Jaw, throat or arm pain/tightness/discomfort
    - Shortness of breath
    - Epigastric discomfort
  - Pericarditis
    - Pleuritic
    - Worse with lying back and better with leaning forward
    - Radiates to trap muscles
  - Aortic dissection or Intramural Hematoma
    - May present with syncope
    - Radiates to the back.

PATIENT PRESENTATION

- Spectrum of Presentation
  - Chronic Stable Angina
    - Anginal symptoms stable over a period of at least 6 weeks
    - Usually brought on by exertion and relieved by rest or NTG
  - Acute Coronary Syndrome
    - Encompasses Spectrum of Disease from Unstable Angina to STEMI and NSTEMI in between
    - Acute onset of angina or worsening of stable anginal symptoms
    - Worsening means onset at rest or easier onset, more frequent, more intense, longer lasting, less relief with NTG

PATIENT EVALUATION

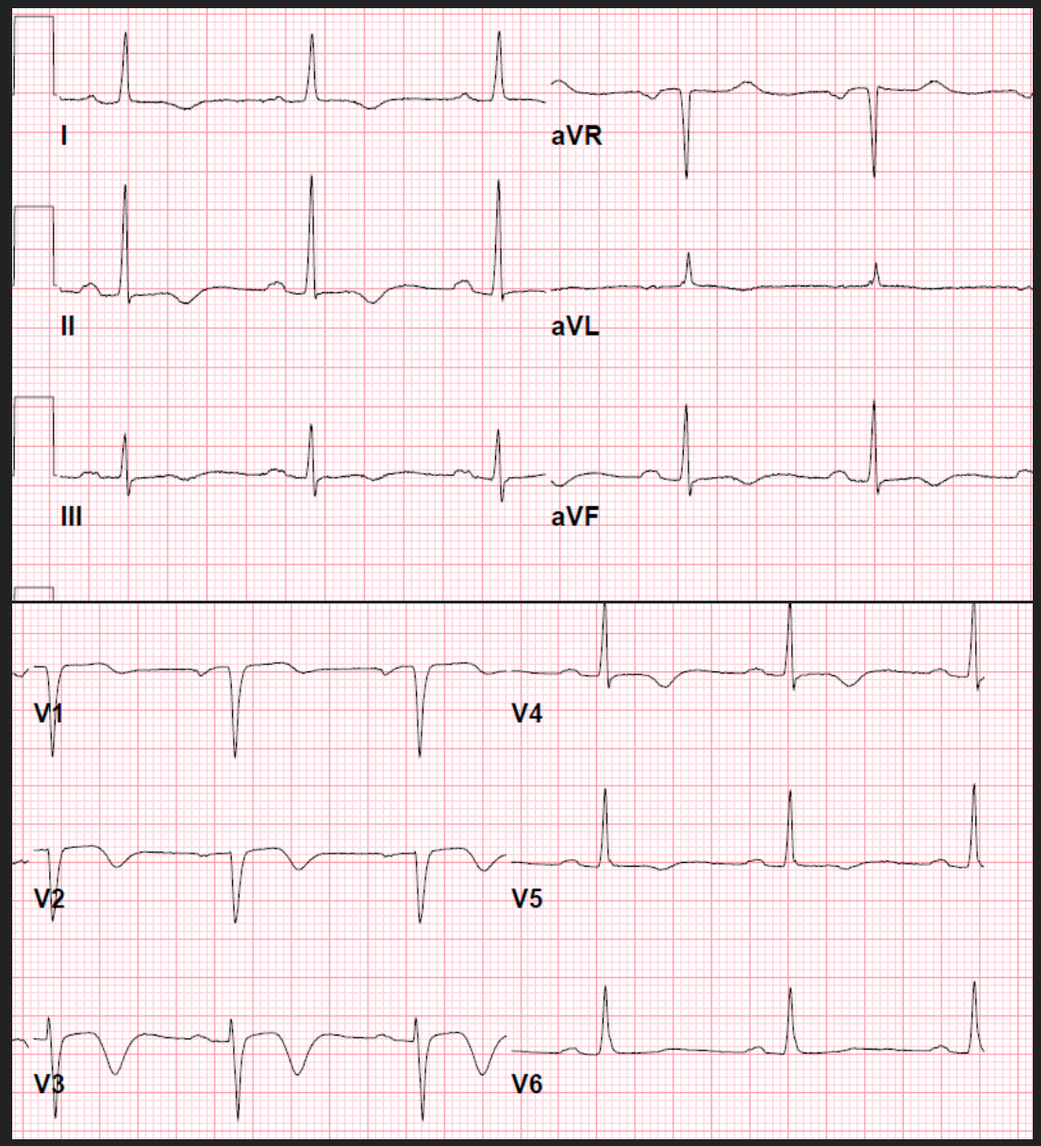
- First Priority: Does this patient require emergent revascularization?!?
  - History and Physical
    - Ongoing ischemia
    - Heart Failure
  - ECG
    - ST-Elevation MI
    - Ischemic ECG changes
  - Chest X-Ray

ECG FINDINGS: A CRITICAL STEP

- ECG: Allows for Rapid Determination of STEMI vs other ACS
  - STEMI: A True Medical Emergency
    - New ST elevation in of 1 mm in two continuous leads except V2-3
    - For leads V2-3:
      - 0.2 mV in men 40 years old or older
      - 0.25 mV in men less than 40 years old
      - 0.15 mV in women
  - Posterior MI: Large R-waves with associated ST depressions in V1-2
  - New LBBB
  - Look for Reciprocal Changes

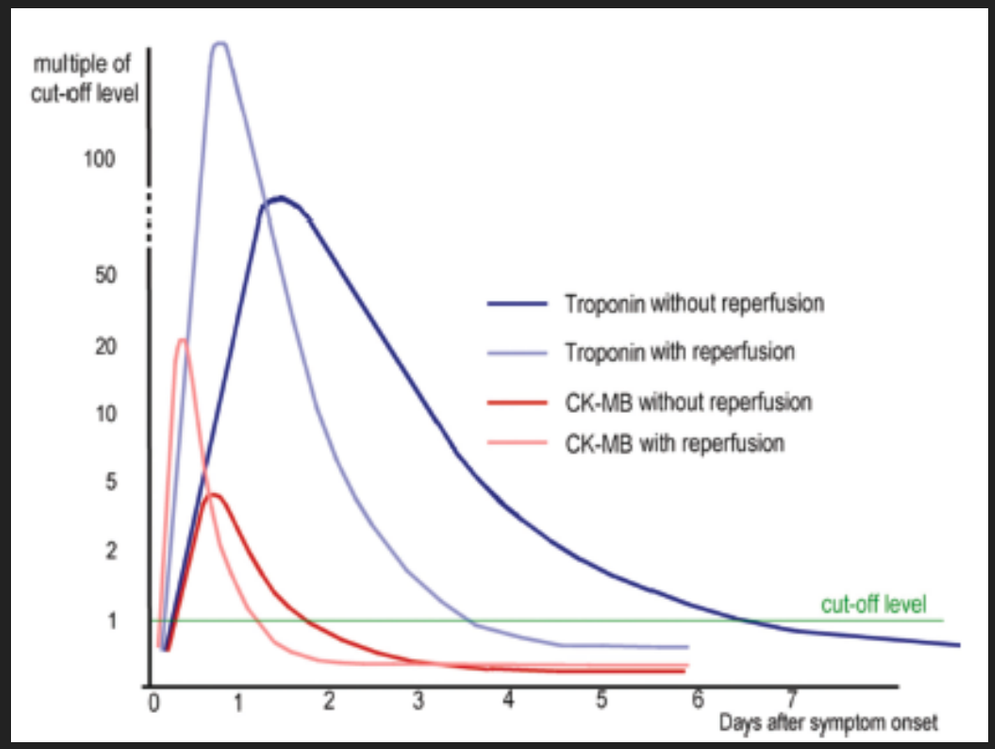
ECG: A CRITICAL STEP

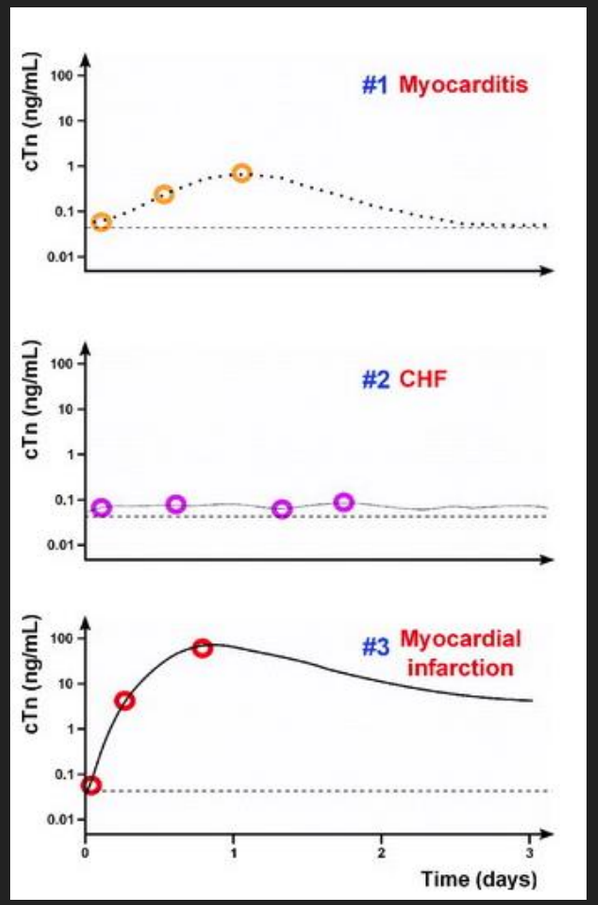
- Signs of Ischemia
  - ST depressions
  - Deep T-wave inversions
- Pitfalls
  - Repolarization abnormality from LVH
  - Circumflex territory ischemia is often electrically silent
  - RV infarct
  - Old LBBB



PATIENT EVALUATION

- Biomarkers
  - Troponin, serial measurements
  - CK-MB, CK
  - BNP
- Evaluation of Cardiac Risk Factors
  - Lipid panel
  - HgA1C
- Imaging
  - TTE
  - Stress test with imaging (nuclear, echo)





Cath Lab Digest. Volume 17 - Issue 5 - May, 2009

Circulation. 2011;124:2350–2354

THE UNIVERSAL DEFINITION OF MYOCARDIAL INFARCTION

- Rise and fall of the troponin with one value above the 99th percentile of normal
- One of the following signs of ischemia
  - Anginal symptoms
  - New ischemic ECG changes
  - New pathologic Q-waves
  - New abnormalities on perfusion imaging consistent with IHD
  - New wall motion abnormalities on echo consistent with IHD
  - Coronary thrombosis on angiography or autopsy

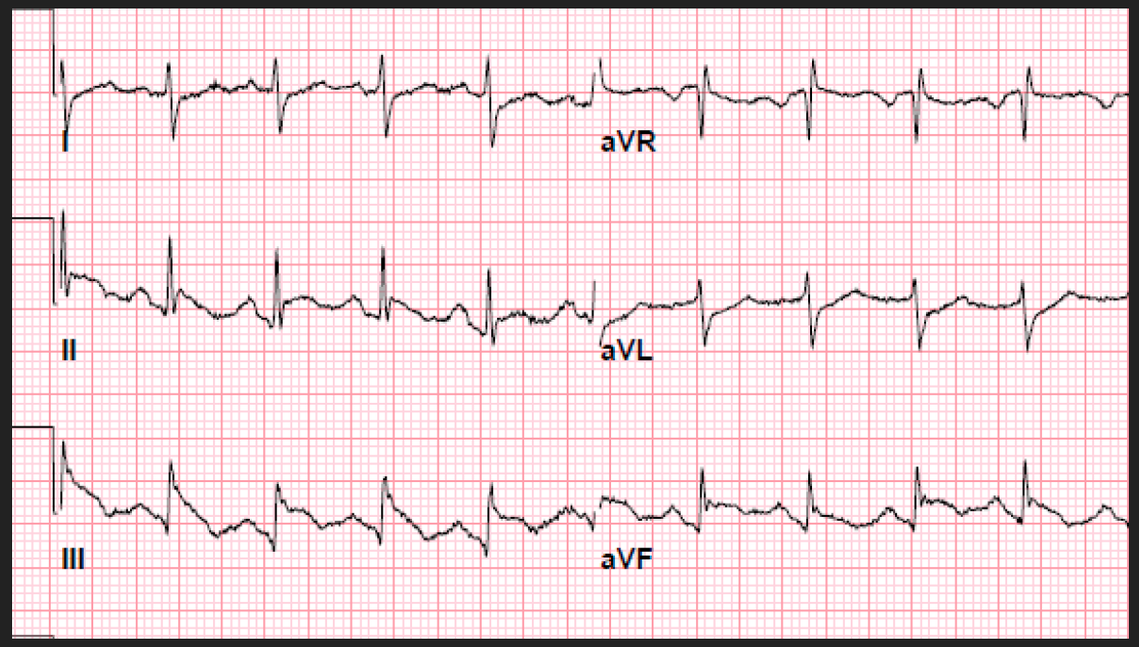
BACK TO THE CASE

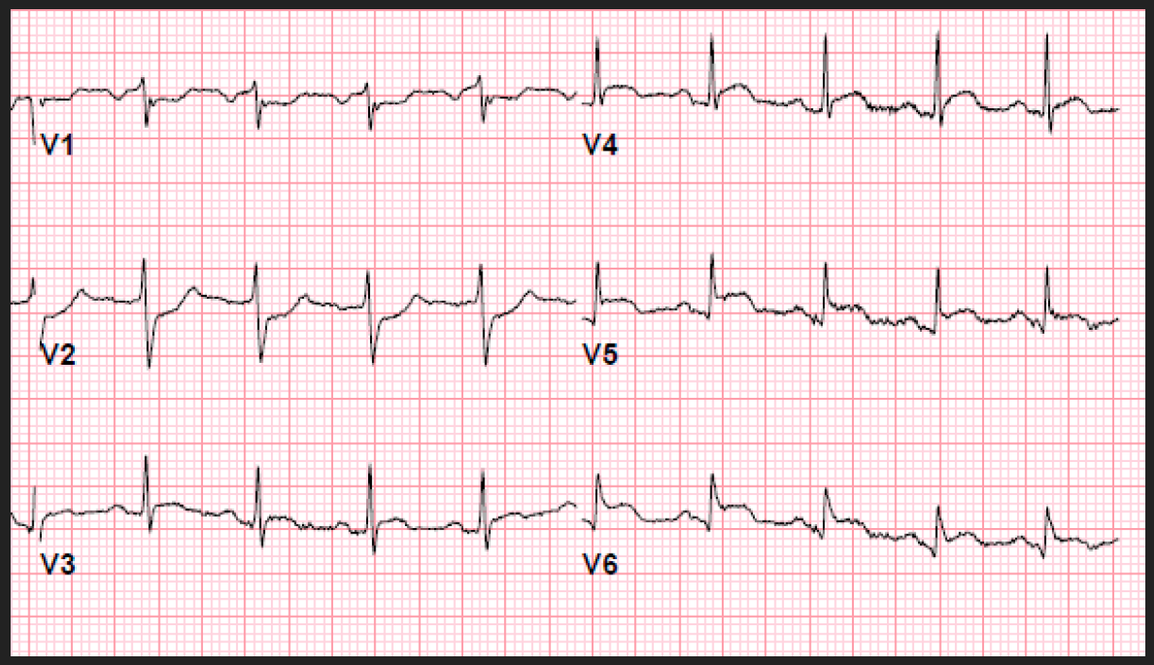
- VS

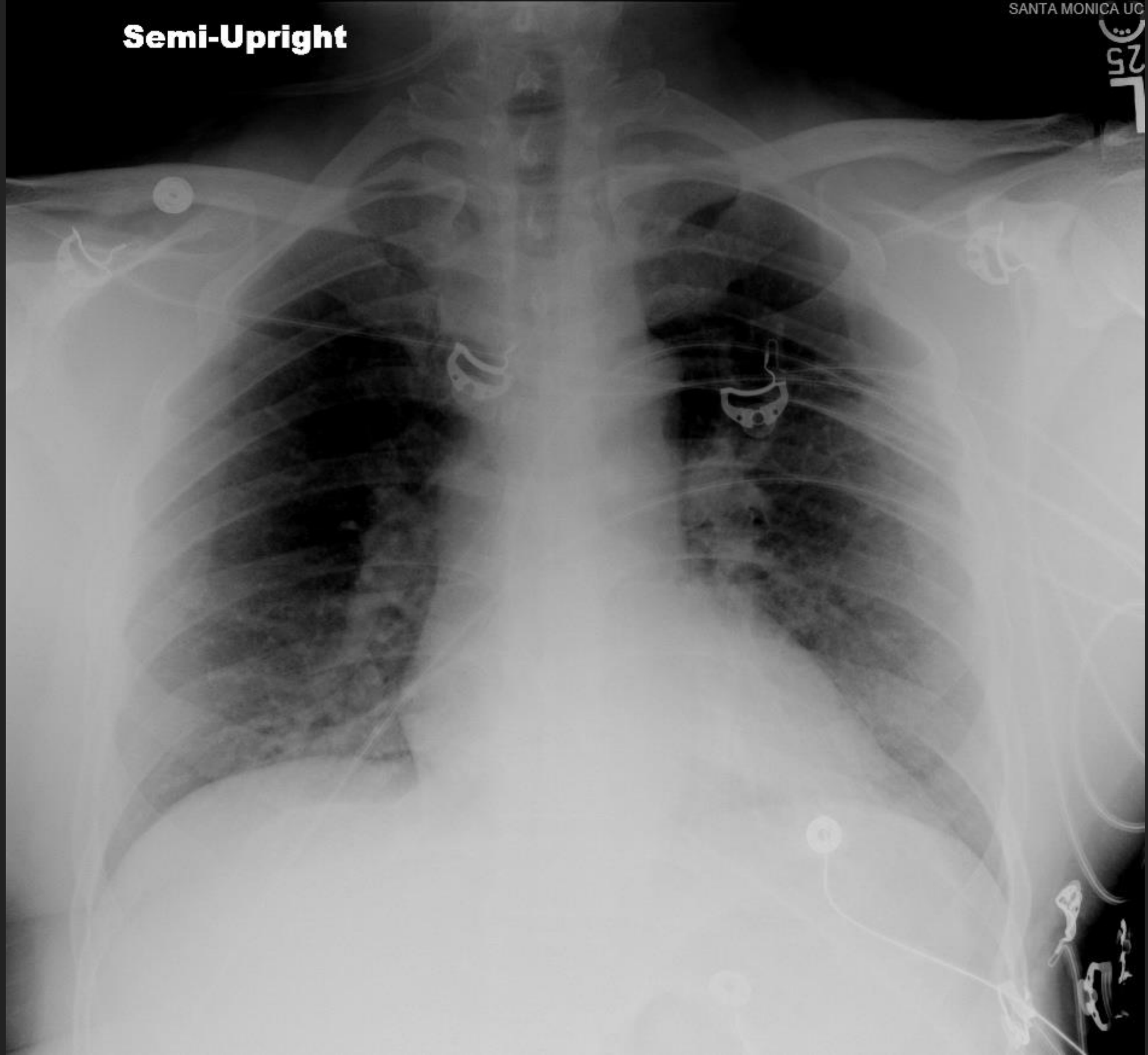
  BP 159/100 mmHg
  P 116 bpm
  Sat 98% on RA
  Pain 1/10
  Wt 83 kg (BMI 30 kg/m2)

- Physical Exam

  Gen: Appears distressed
  CV: RRR. Normal S1S2. No murmurs, rubs, gallops
  Resp: Clear to auscultation
  Abd: Benign
  Ext: Normal pulses. No cyanosis or edema.

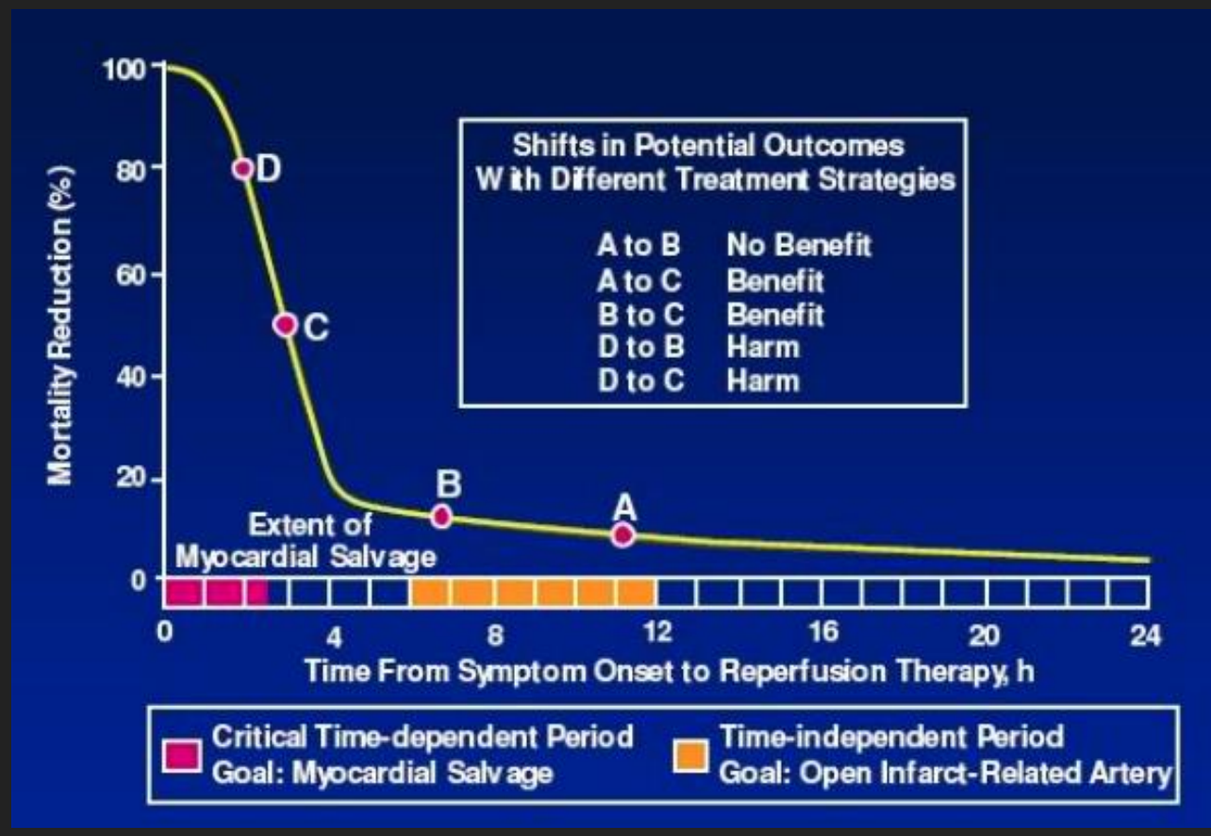





Semi-Upright
SANTA MONICA UC
25

ACUTE TREATMENT

- Reperfusion Strategies
  - For STEMI, time is myocardium and life
- Unstable Angina/NSTEMI
  - Early invasive vs “Conservative” approach based on risk
  - Presence of ongoing ischemia, heart failure, ischemic arrhythmias despite medical management
  - TIMI, GRACE scores



JAMA. 2005;293(8):979-986. doi:10.1001/jama.293.8.979

ACUTE TREATMENT

- Anticoagulation
  - Heparin preferred over Lovenox if going to Cath
- Anti-platelet Therapy: In general DAPT recommended for 12 months post-MI.
  - Aspirin
  - P2Y12 inhibitors
    - PLATO Trial: Ticagrelor vs Clopidgorel
      - Decreased death with ticagrelor
      - Less bleeding with clopidogrel
    - Prasugrel (for patients undergoing Cath)
      - Head-to-head may be better than ticagrelor
      - Caution in age >75, less than 60 kg or prior stroke

ACUTE TREATMENT

- Beta-Blocker
  - Decreasing ischemic and arrhythmic thresholds.
  - Benefit stronger in those not undergoing reperfusion, low EF
  - Concern is that it may cause hypotension, shock
  - Contraindicated in Brady or Tachy, BP less than 120, prolonged PR
- ACE Inhibitor/ARB/ARNI
  - Strong indication in EF less than 40%
- Mineralocorticoid Receptor Antagonist
  - Strong indication for those with EF less than 40%

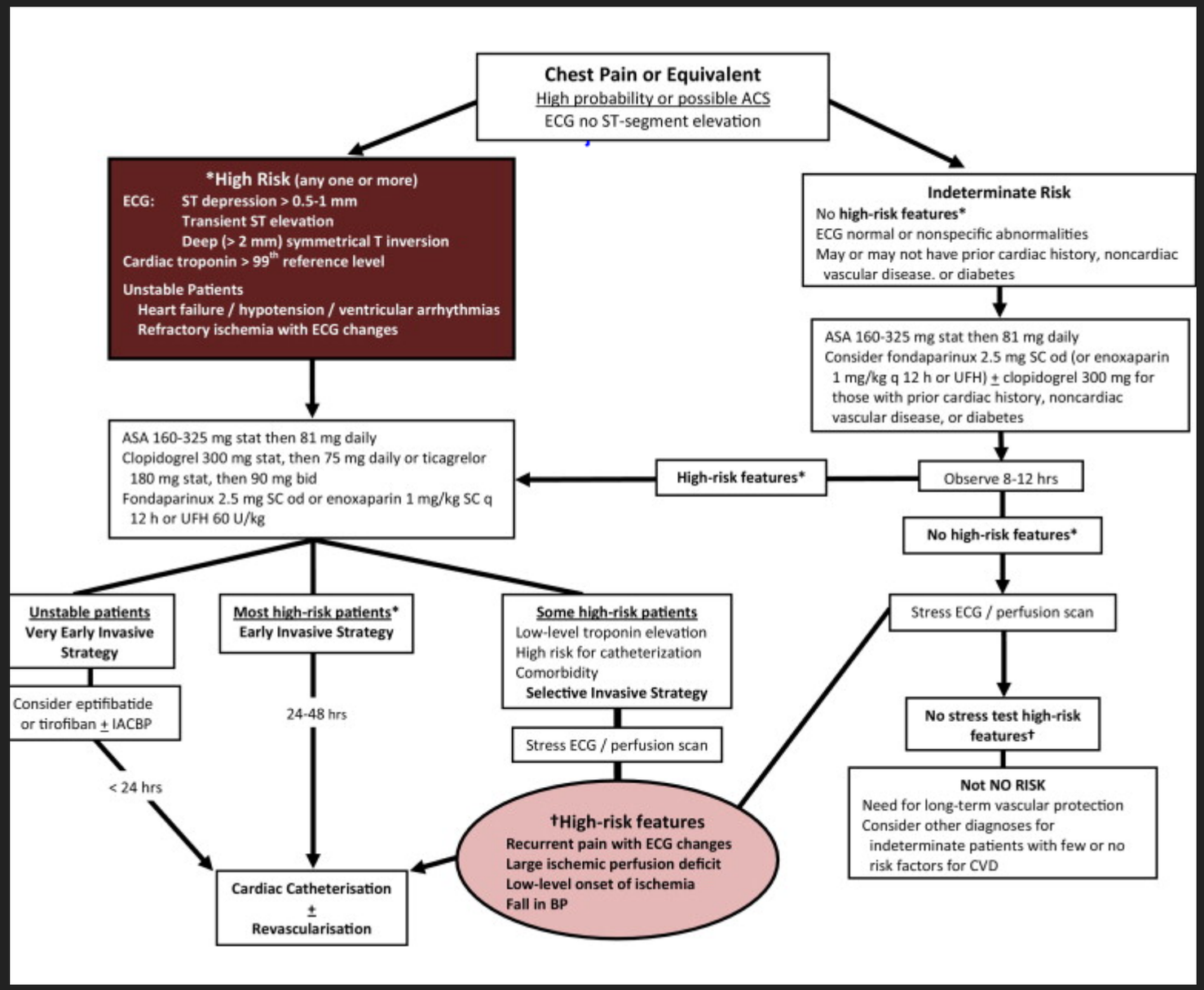
N Engl J Med 2004; 350:1495-1504

ACUTE TREATMENT

- Statin
  - 16% risk reduction in death/MACE at 3 years with Atorva 80 vs Prava 40
  - Goal LDL less than 70 mg/dl
- Oxygen
  - Probably not necessary unless hypoxic
- Nitrates
  - No improvement in mortality
  - May buy time to Cath at night

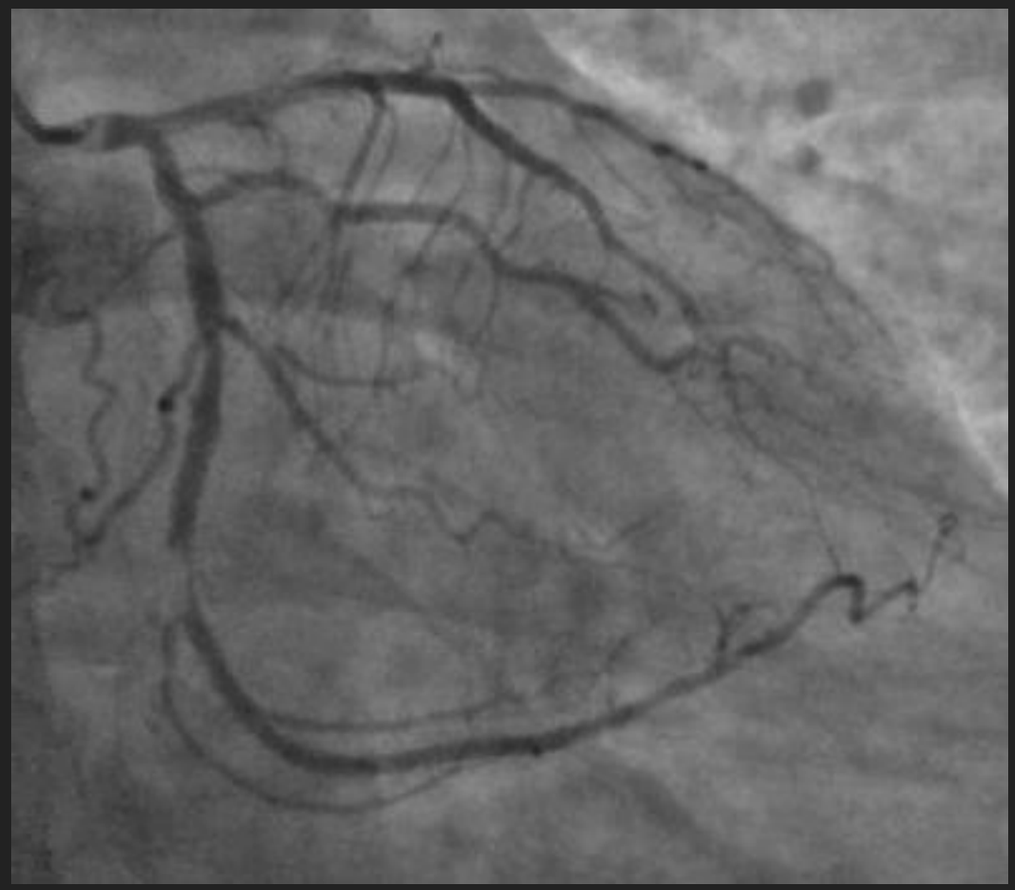
N Engl J Med 2004; 350:1495-1504

ACUTE TREATMENT



THE CASE

- Loaded with ASA, ticagrelor in the ED
- Taken emergently to the Cath lab
  - Found to have severe OM lesion and underwent PCI
  - Found to have a proximal LAD lesion that was treated with PCI the following day
- Other Med Management
  - Atorvastatin 80 mg daily
  - Metoprolol 12.5 mg PO BID
  - Started on metformin for A1C 6.6%.
- Echo
  - EF 55-60% with inferior hyperkinesis



COMPLICATIONS

- Reduced complication rate in the reperfusion era
- Structural complications:
  - More common with STEMI. Usually 48-72 hours after acute event.
  - Present as acute heart failure
  - Medical/Surgical Emergency
    - High mortality ~50%
      - Papillary muscle rupture leading to acute MR
      - Ventricular Septal Defect (VSD)
      - Myocardial Rupture
- Dresser’s syndrome
- Ventricular arrhythmia
  - Idioventricular rhythm is benign
  - Ventricular tachycardia

COMPLICATIONS OF ACS

- Cath Complications
  - Retroperitoneal Bleeding
    - Presents as unexplained hypotension
    - Fluid resuscitation
    - Diagnosed by CT. Contrast extravasation denotes ongoing hemorrhage.
    - Avoid reversing anticoagulation or holding DAPT
    - Rarely requires surgery
  - AV fistula or Pseudoaneurysm
  - Contrast Nephropathy

QUESTIONS AT DISCHARGE

- How did this happen out of nowhere?
- Level of activity
- Sexual Activity
- NSAID use
- Wound Care
- Diet
  - Plant-based
  - Mediterranean

LONG-TERM MANAGEMENT

- Secondary Prevention
  - Aimed at risk factor modification
    - Target LDL less than 70 mg/dl
    - BP target of less than 130/80
    - Consider dulaglutide for DM patients
  - SMOKING CESSATION!
  - Exercise
  - Diet
- Psychosocial Management
- Enlist the Partners
- Cardiac Rehab: Traditional vs Intensive

THE CASE

- Recurrent chest pain.
  - Stress test negative for ischemia
  - Diagnosed with costochondritis
- Adherent with medication regimen
- Declined cardiac rehab
- Delayed return to exercise
- Prolonged concern by wife about sexual activity
- Did initially lose weight but has been increasing