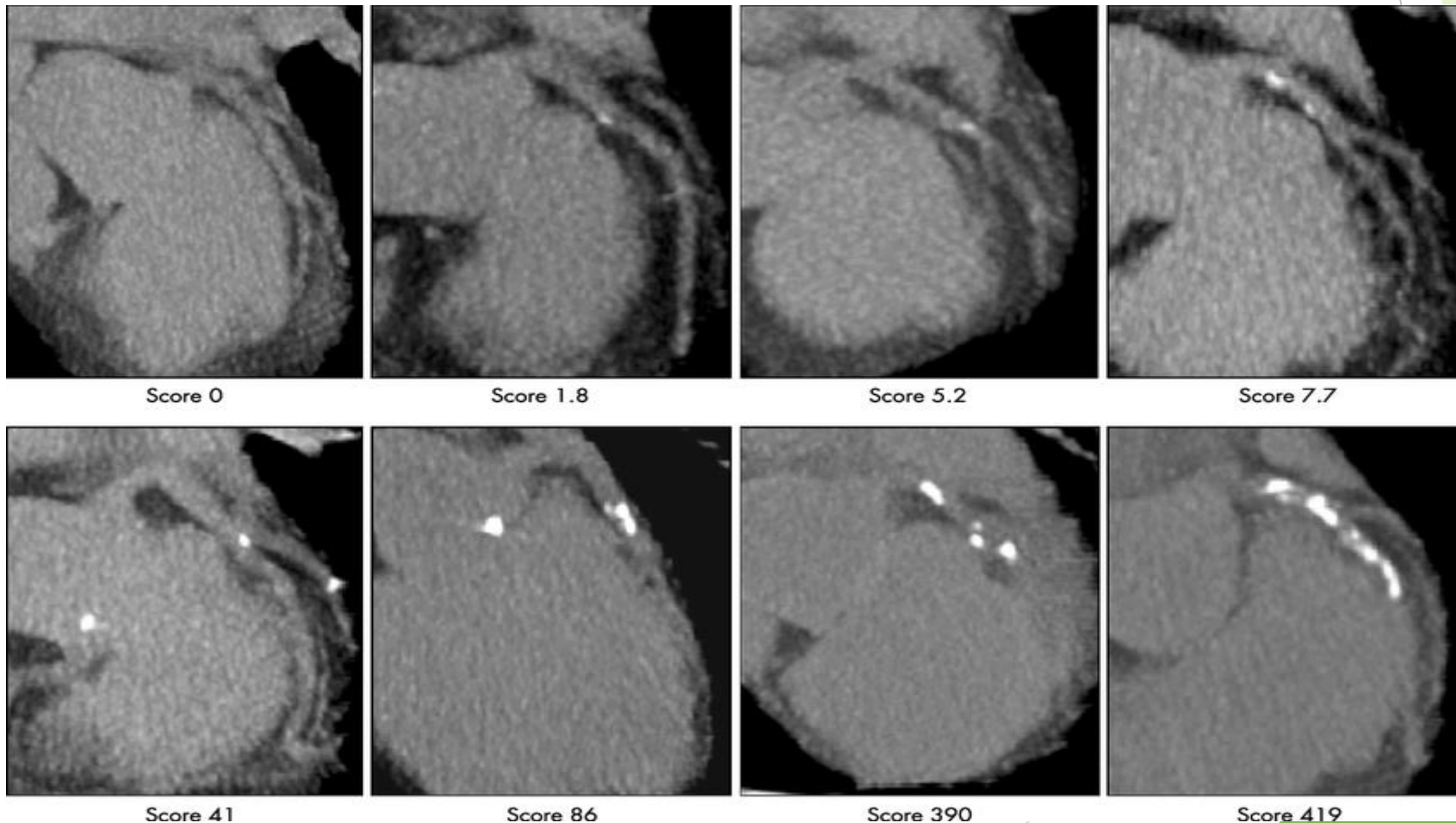


# Coronary Artery Calcium Score

Arash Karnama, DO, FACC



# Case:

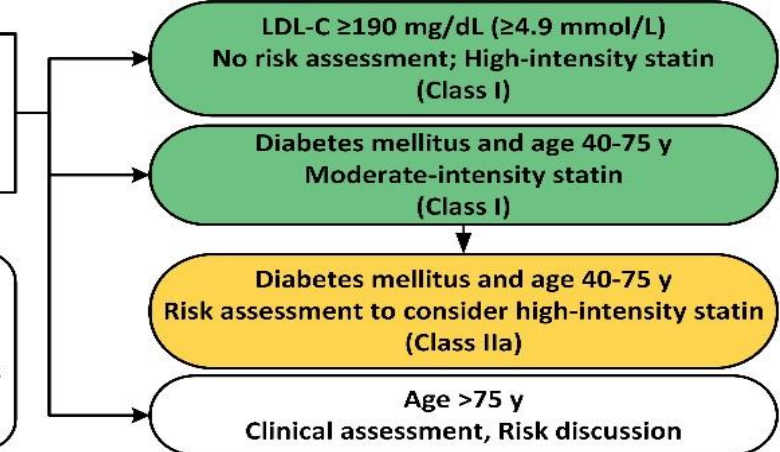
- ▶ 45 y/o male with no previous cardiac history. Presents for preventative cardiology visit. Asymptomatic. Exercises daily.
- ▶ PMH: None
- ▶ PSH: Tonsillectomy
- ▶ FH: Father: MI/CABG at the age of 50. Mother: MI/stent at the age of 65. Brother: CAD/stent at age 52.
- ▶ SH: Non smoker
- ▶ Physical Exam: 120/70, 60, 16, BMI:23. HEENT: no jvd/bruit, no xanthelasma palpebrarum, no arcus senilis CV: reg s1s2, no m/r/g, Lungs: cta b/l, Abd: soft, nt/nd, no bruit, no r/r/g, Ext: no edema, dp/pt 2+ bilateral, no xanthomata of the tendons
- ▶ ECG: NSR, no significant abnormalities noted.
- ▶ Lipids: TC:213, LDL:145, HDL:40, TG:140

**Primary Prevention:  
Assess ASCVD Risk in Each Age Group  
Emphasize Adherence to Healthy Lifestyle**

**Age 0-19 y**  
Lifestyle to prevent or reduce ASCVD risk  
Diagnosis of Familial Hypercholesterolemia → statin

**Age 20-39 y**  
Estimate lifetime risk to encourage lifestyle to reduce ASCVD risk  
Consider statin if family history premature ASCVD and LDL-C ≥160 mg/dL (≥4.1 mmol/L)

**Age 40-75 y and LDL-C ≥70- <190 mg/dL (≥1.8- <4.9 mmol/L) without diabetes mellitus**  
10-year ASCVD risk percent begins risk discussion



**ASCVD Risk Enhancers:**

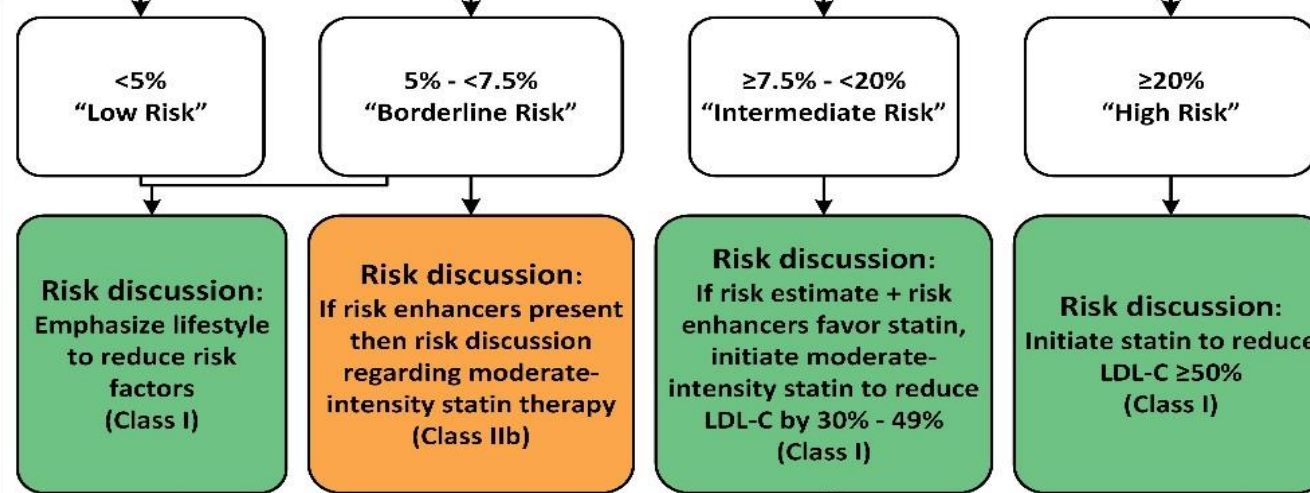
- Family history of premature ASCVD
- Persistently elevated LDL-C ≥160 mg/dL (≥4.1 mmol/L)
- Chronic kidney disease
- Metabolic syndrome
- Conditions specific to women (e.g., preeclampsia, premature menopause)
- Inflammatory diseases (especially rheumatoid arthritis, psoriasis, HIV)
- Ethnicity (e.g., South Asian ancestry)

**Lipid/Biomarkers:**

- Persistently elevated triglycerides (≥175 mg/dL, (≥2.0 mmol/L))

**In selected individuals if measured:**

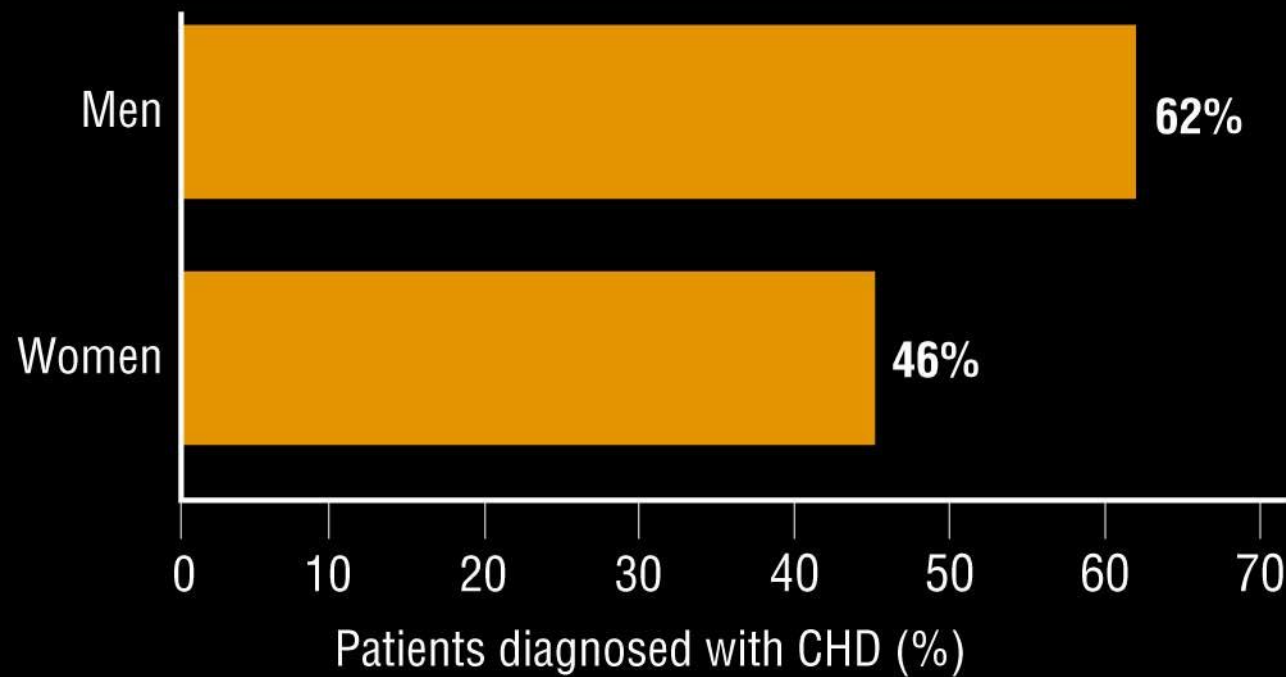
- hs-CRP ≥2.0 mg/L
- Lp(a) levels >50 mg/dL or >125 nmol/L
- apoB ≥130 mg/dL
- Ankle-brachial index (ABI) <0.9



**If risk decision is uncertain:  
Consider measuring CAC in selected adults:**  
CAC = zero (lowers risk; consider no statin, unless diabetes, family history of premature CHD, or cigarette smoking are present)  
CAC = 1-99 favors statin (especially after age 55)  
CAC = 100+ and/or ≥75th percentile, initiate statin therapy

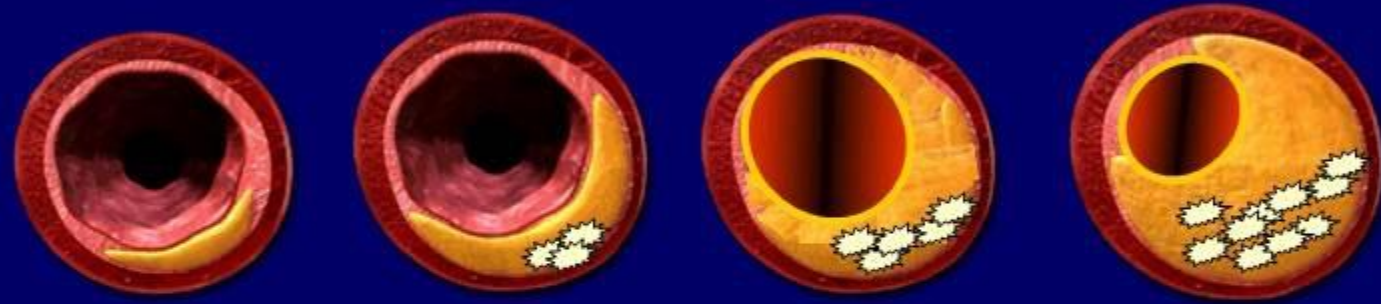
# CORONARY HEART DISEASE (CHD): DIAGNOSIS OFTEN COMES TOO LATE

## Myocardial infarction (MI) or death as initial presentation of CHD



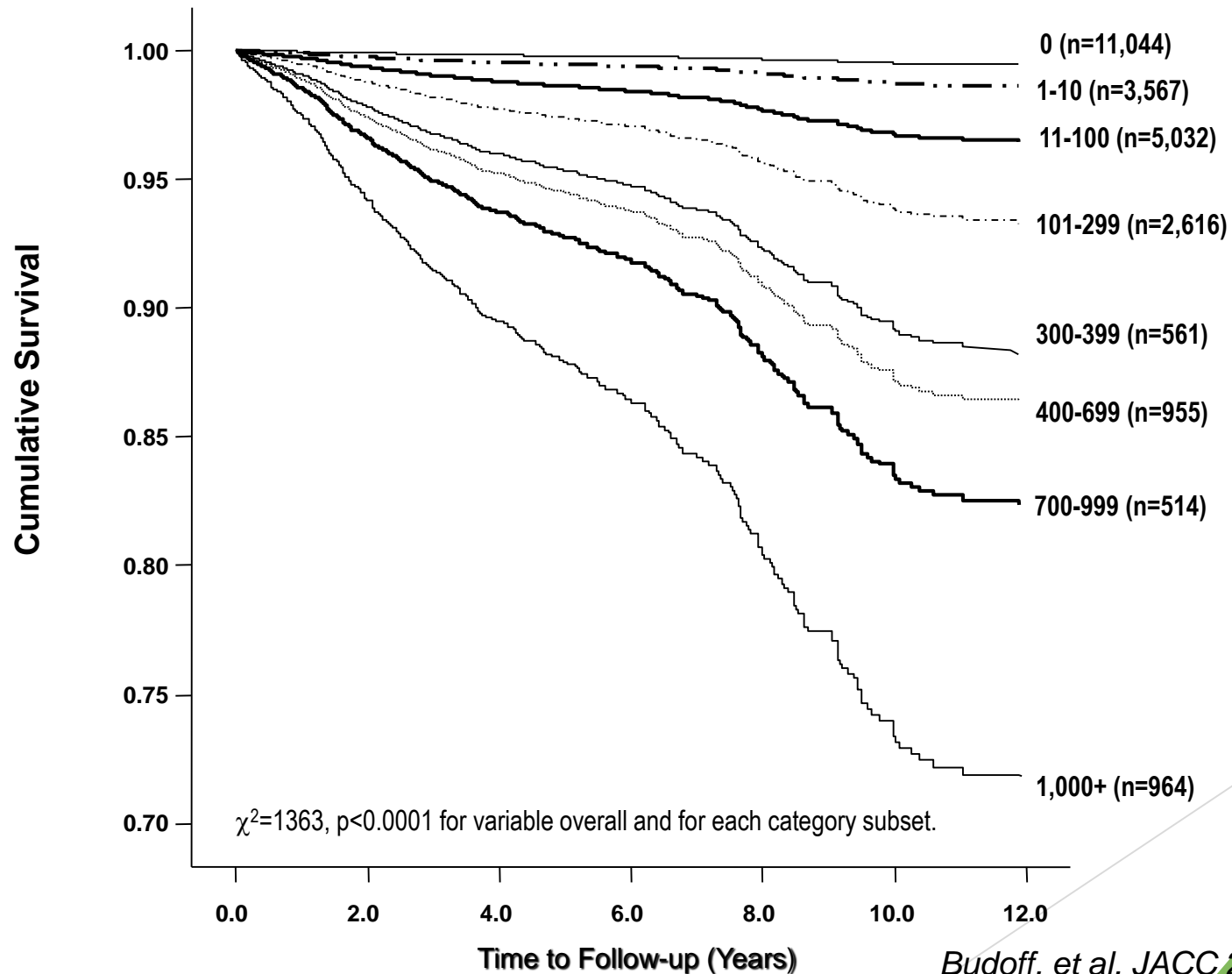
# Detect Your Plaques Earlier

## Comparing Detection by Positive Cardiac CT and Positive Nuclear Stress Test



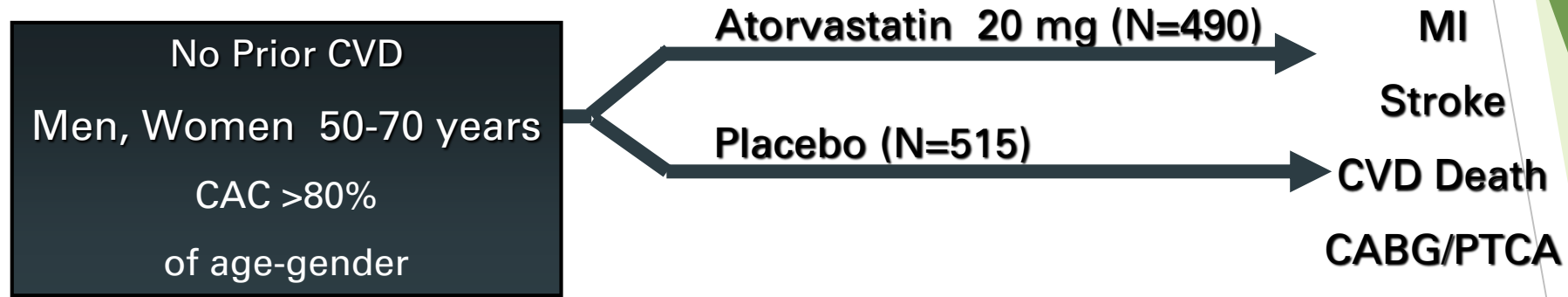
Stages >>	Early	Moderate	Advanced	Late
Obstruction	none	20%	50%	70%
Symptoms	none	none	none	yes
Stress test	normal	normal	normal	abnormal
Cardiac CT	none	abnormal	abnormal	abnormal

# All Cause Mortality and CAC Scores: Long Term Prognosis in 25,253 patients



# ST FRANCIS RANDOMIZED TRIAL

*Randomized Double Blind Placebo Controlled Trial of Atorvastatin in the Prevention of Cardiovascular Events Among Individuals With Elevated CAC Score*



- Mean duration of treatment was 4.3 years.
- Treatment with atorvastatin reduced clinical endpoints by 30% (6.9% vs. 9.9%), and MI/ Death by 44% (NNT 30)
- Event rates were more significantly reduced in participants with baseline calcium score >400 (8.7% vs. 15.0%,  $p=0.046$  [42% reduction]). (NNT 16)

# 2018 ACC/AHA Guidelines

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**In adults 40 to 75 years of age without diabetes mellitus and with LDL-C levels  $\geq 70$  mg/dL- 189 mg/dL ( $\geq 1.8$ -4.9 mmol/L), at a 10-year ASCVD risk of  $\geq 7.5\%$  to 19.9%, if a decision about statin therapy is uncertain, consider measuring CAC.**

- If CAC is zero, treatment with statin therapy may be withheld or delayed, except in cigarette smokers, those with diabetes mellitus, and those with a strong family history of premature ASCVD.
- A CAC score of 1 to 99 favors statin therapy, especially in those  $\geq 55$  years of age.
- For any patient, if the CAC score is  $\geq 100$  Agatston units or  $\geq 75$ th percentile, statin therapy is indicated unless otherwise deferred by the outcome of clinician-patient risk discussion.