CAOM 56th Annual January Conference

Judicious Use of the Coronary Calcium Score for Primary Care Physicians

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Marc Schrode, DO, FACOI, FACC

Coronary Artery Calcium(CAC) Score Presentation Objectives

- Discuss highlights of AHA/ACC 2018 guidelines for ASCVD risk management and statin use
- Overview of CAC score predictive value and limitations to improve patient cardiac outcomes and statin usage
- Identify appropriate patients for CAC score screening

40,000 years ago, primitive humans were wanderers/gatherers and some eventually (13,000 BCE) evolved to hunters and farmers

Immune system inflammation to fight infection, metabolism efficiently converting excess calories to fat to prevent starvation.

Human Predicament in 21st Century Affluent Societies:
How Do We Reduce Our Cardiovascular Risk and Slow the Aging Process?

Excessive calories, sugars and processed carbs, with epidemic weight excess, diabetes, hyperlipidemia, cardiovascular disease.

The immune inflammatory processes and metabolic pathways that efficiently manufacture and store lipoproteins are now survival disadvantages

2018 AHA/ACC multisociety guideline on management of blood cholesterol

- Key Point-Coronary Artery Calcium (CAC) Score (Agatston units) is useful in the ASYMPTOMATIC patient without known CAD and INTERMEDIATE risk scores from risk assessment tools and biomarkers

- More aggressive approach with statin therapy already recommended for “high risk” group from controlled trials and expert consensus

- Risk assessment tools useful with primary prevention decisions in “intermediate” and “low risk” groups, and CAC scores useful to assess “power of zero” CAC score

Therapeutic Lifestyle Changes(TLCs)

- For all individuals, emphasize TLCs, the foundation of cardiovascular risk reduction
- Exercise: 30min walk 5X/week (50% reduction in adverse events), or more vigorous exercise reduces risk further
- Mediterranean diets or vegetarian options:(ovo or lacto variants, vegan, pescentarian). All emphasize vegetables and fruits,olive oil(Medit), reduced saturated fats (more unsaturated/ monounsaturated), nuts, legumes, unrefined carbs. What varies is fish, meat(types), dairy(yogurt), egg consumption, alcohol.

Typical Mediterranean diet

When shopping in the grocery store, “purchase from the periphery” and live longer and healthier

AHA/ACC High Risk group with known clinical ASCVD

- Use high dose statin therapy for high risk patients, or maximum tolerated dose
- Goal LDL-C reduction = 50%

ACC/AHA Very High Risk: Known cardiovascular/vascular disease and12 month window of ACS, ischemic CVA, coronary or peripheral revascularization, familial hyperlipidemia

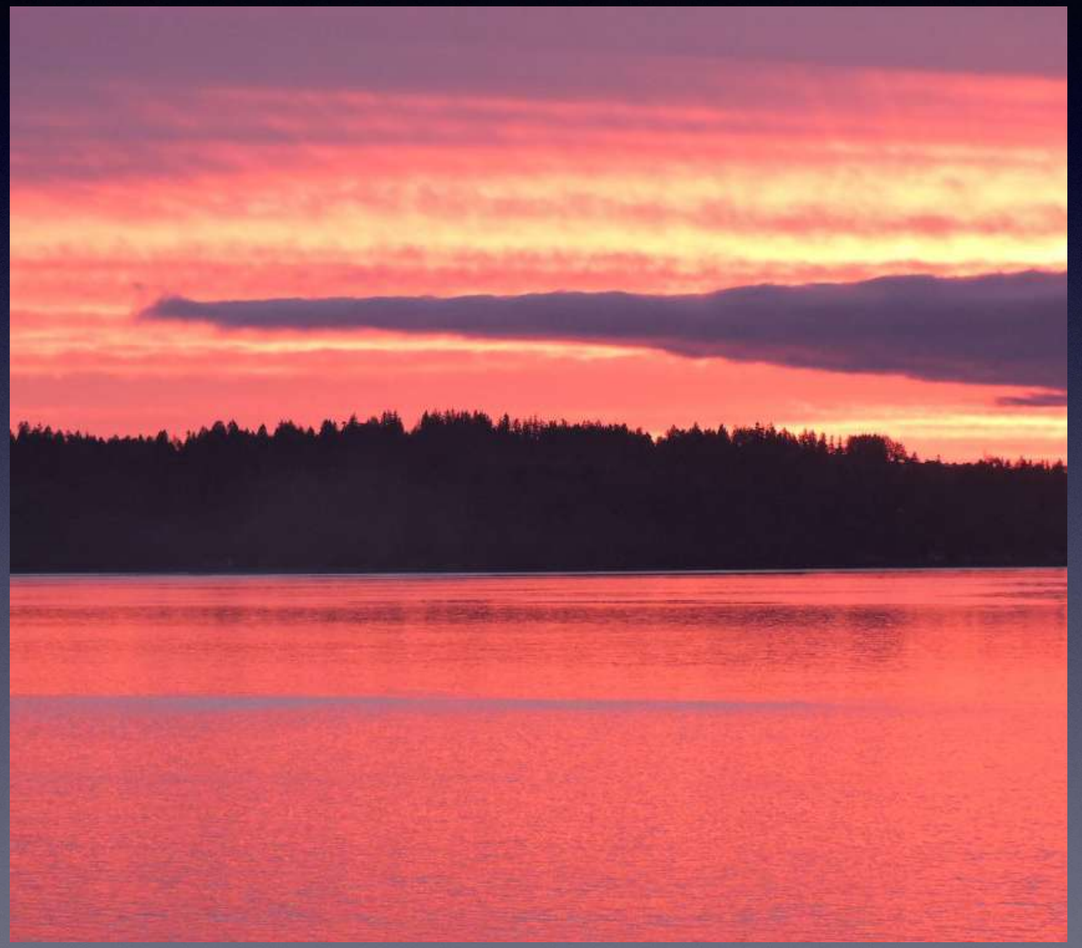
- High dose statin therapy, and LDL-C goal of 70mg/dl
- Consider ezetimibe (Zetia)
- Consider PCSK9 inhibitor (Repatha)

Severe Primary (Familial) Hypercholesterolemia (LDL-C 190>)

- 20X increased risk for adverse ASCVD event compared with low risk group
- Start high risk statin
- LDL-C goal <100
- Add ezetimibe and PCSK9 inhibitor if needed

Diabetes aged 40-75 without other high risk features

- If LDL-C >70, start moderate dose statin
- If multiple risk factors, start high dose statin



Remember for primary prevention of ASCVD in low and intermediate risk patients, discuss TLCs , discuss patient concerns regarding statin drug therapy for strategy of comprehensive risk reduction

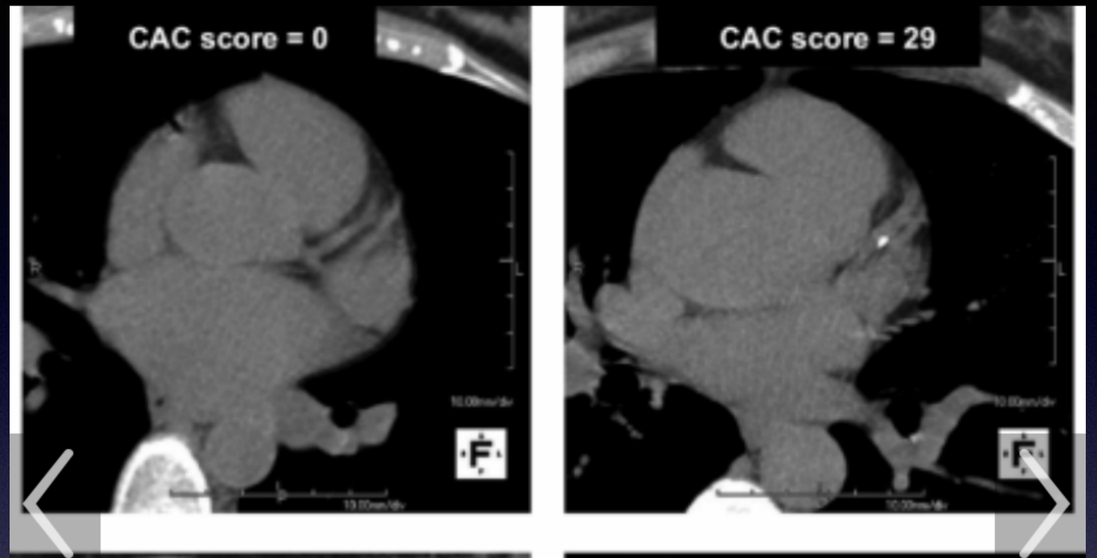
Consider the limitations of risk factors and risk calculator tool accuracy.

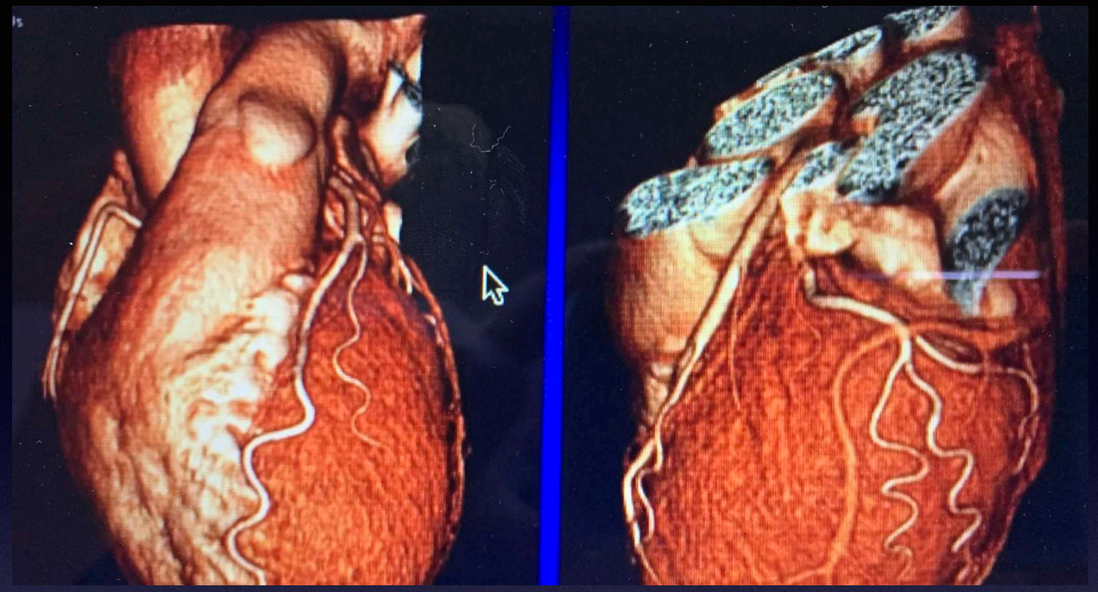
Absence of risk factors does not guarantee absence of disease.

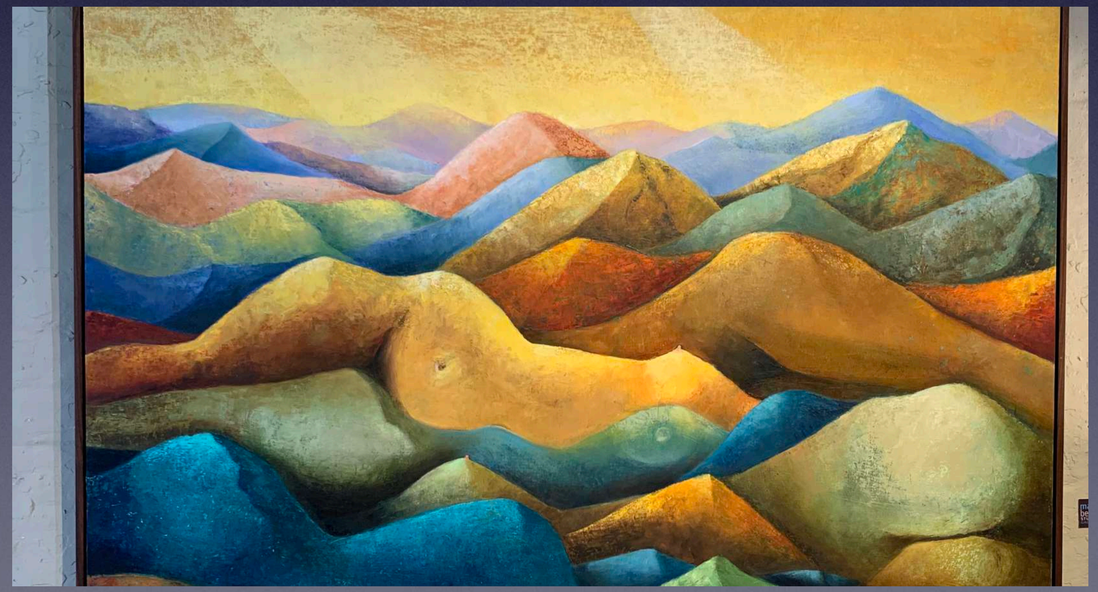
Statin therapy has cost, some risks and possible side effects with chronic use.

Coronary Artery Calcium(CAC) Score versus Cardiac Computed Tomography Angiogram(CTA)

- Cardiac CTA 3D-images possible due to advancements in engineering and ultrafast powerful computer image reprocessing (iterative reconstruction algorithms).
- Typical institutional high resolution CT scanners are multi row detector (128, 256, 320+ slice) or dual source scanners.
- Slice refers to number of cross sectional images in multiple planes acquired for each gantry rotation
- CTA study requires IV contrast, beta blockers, 5minute imaging
- CAC score is a 5sec breath hold without IV contrast


CAC score = 0
CAC score = 29
CAC score = 250
CAC score = 1200





CAC Score vs Cardiac CTA as primary prevention tools in Asymptomatic Patients

- Preventive cardiologists are debating the value of Cardiac CTA vs CAC scores as the best prevention tools
- Several studies confirmed that adding sophisticated Cardiac CTA screening tests extensively in ASYMPTOMATIC patients without chest pain being aggressively managed has marginal clinical utility
- Studies show CAC scores can define risk better than biomarkers alone, and can better define low risk patients with CAC zero.

Long Term Prognostic Value of CAC Scoring. Mittal TK, et al. Eur Heart J Cardiovasc Imaging. 2017; doi:10.1093/ehjci/jex037.

- 3000 patients referred for CTA and CAC scoring, 13 year follow up.
- 52% of patients had a CAC score of zero, and 0.5% with missed CAD.
- No patients with CAC score of zero died of an adverse coronary event over the 13 year follow up …the power of zero.

When to Use CAC Score Assessment of the Intermediate risk patients

- Age 40-75 non diabetics
- LDL-C above 70
- Risk assessment tools calculate a 10year risk of adverse events >7.5%
- Family history of premature CAD/CVA but no other personal risk enhancing factors
- CAC scoring helpful, especially the “power of zero”, with extremely low risk of fatal coronary event, and can withhold statins

CorCal Vanguard Study finds CAC Score more persuasive to patients than risk scores

Intermediate risk patients that had no statin use history

CAC patients more likely to begin and maintain statin therapy at 1 year

Good communication of CAC score results improves compliance with meds and TLCs

Recommendations for Statin Therapy: Using the CAC Score (Agatston Units)

CAC=0.	No Statin
CAC 1-100	use TLCs and risk score
CAC >100.	Use statin

Realize that ASCVD is a continuum of risk, and the recommendation for use of statin with a score 1-100 is arbitrary

Support for more systematic use of CAC scores in the Intermediate Risk Patient

- The CAC Score used to identify subclinical atherosclerosis is superior to any serum biomarker, based on an extensive body of evidence, for predicting future risk of adverse ASCVD events (ACS, progressive CAD, ischemic CVA)
- Provides an opportunity to avoid statins and focus on TLCs and risk reduction when score is zero
- Provides an option for adding statins more aggressively to those who have elevated scores despite symptom free status

Destiny is not a matter of chance, it is a matter of choice; it is not a thing to be waited for, it is a thing to be achieved.

William Jennings Bryan