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Foundations of Cardiometabolic Health Certification Course

Certified Cardiometabolic Health Professional (CCHP)

Non-Invasive Imaging Discussion Cases:

- *Risk Assessment*
- *Anatomic vs. Functional approach*

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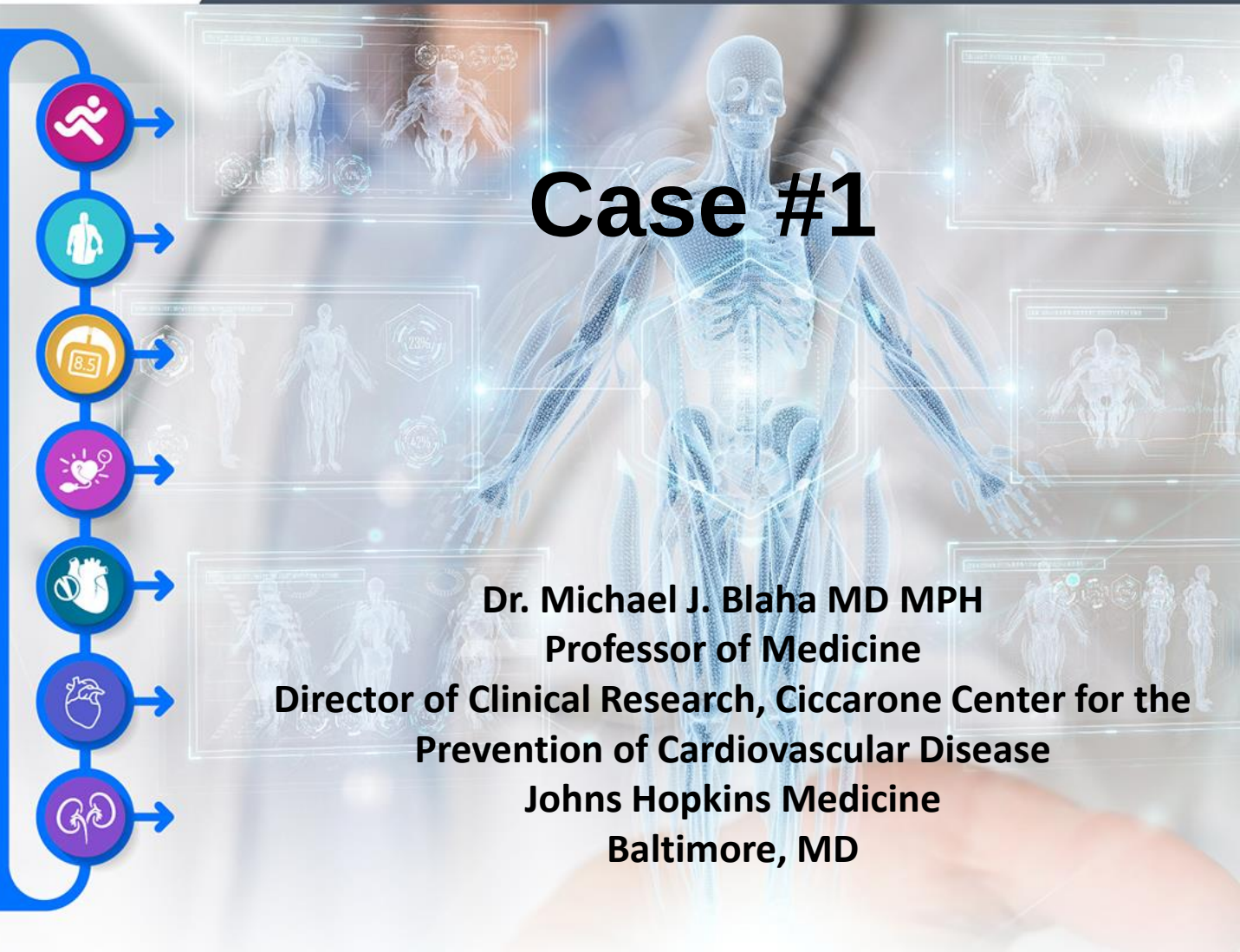

Case #1

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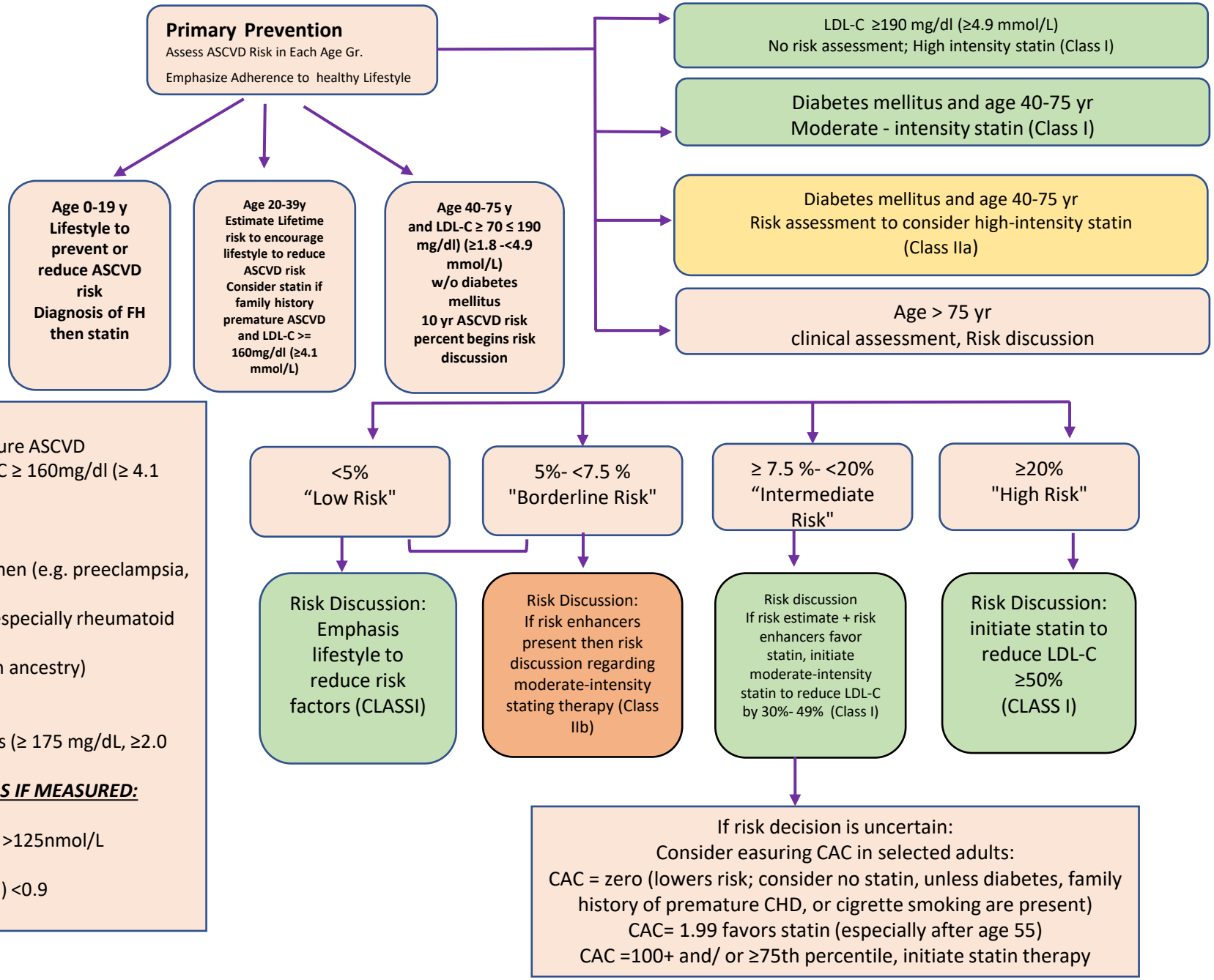
Case Vignette #1

- 49-year-old man with a family history of premature coronary artery disease and borderline hyperlipidemia (LDL-C = 135 mg/dL)
- Not currently on any preventive pharmacotherapy

2018 Cholesterol Guidelines - Role of CAC



ASCVD RISK Enhancers

- Family history of premature ASCVD
Persistently elevated LDL-C ≥ 160mg/dl (≥ 4.1 nmol/L)
-CKD
-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 TGLs (≥ 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 >125nmol/L
-apoB ≥130mg/dL
- Ankle-brachial index (ABI) <0.9

Grundy, Scott M., et al. Journal of the American College of Cardiology 73.24 (2019): e285-e350.

Case Vignette #1

- 49-year-old man with a family history of premature coronary artery disease and borderline hyperlipidemia (LDL-C = 135 mg/dL)
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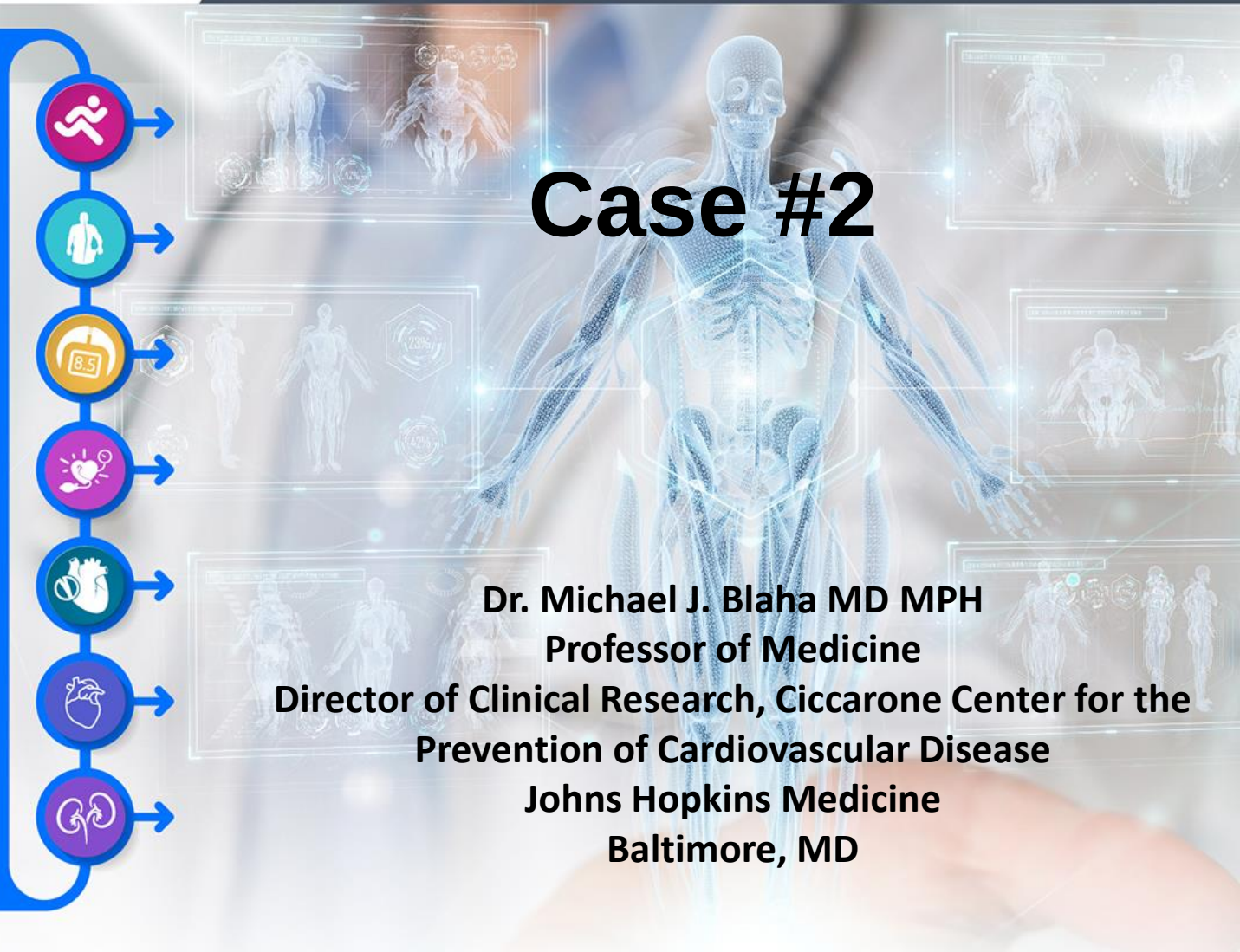

Case #2

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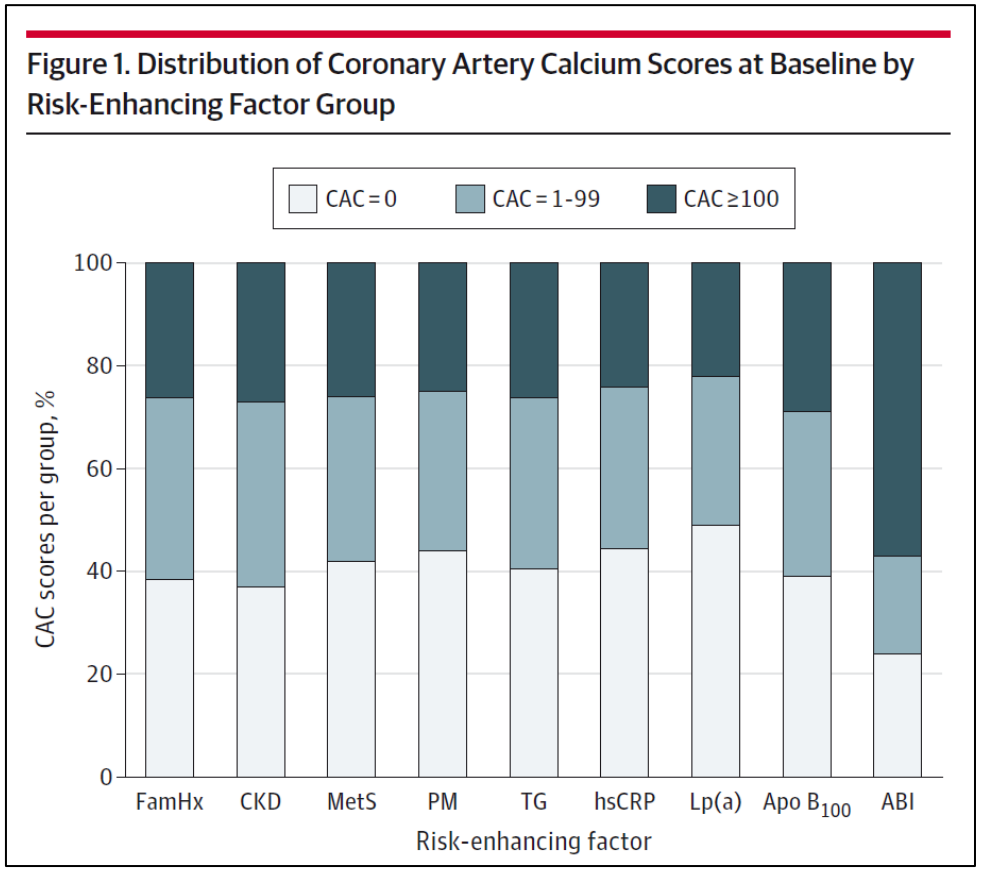
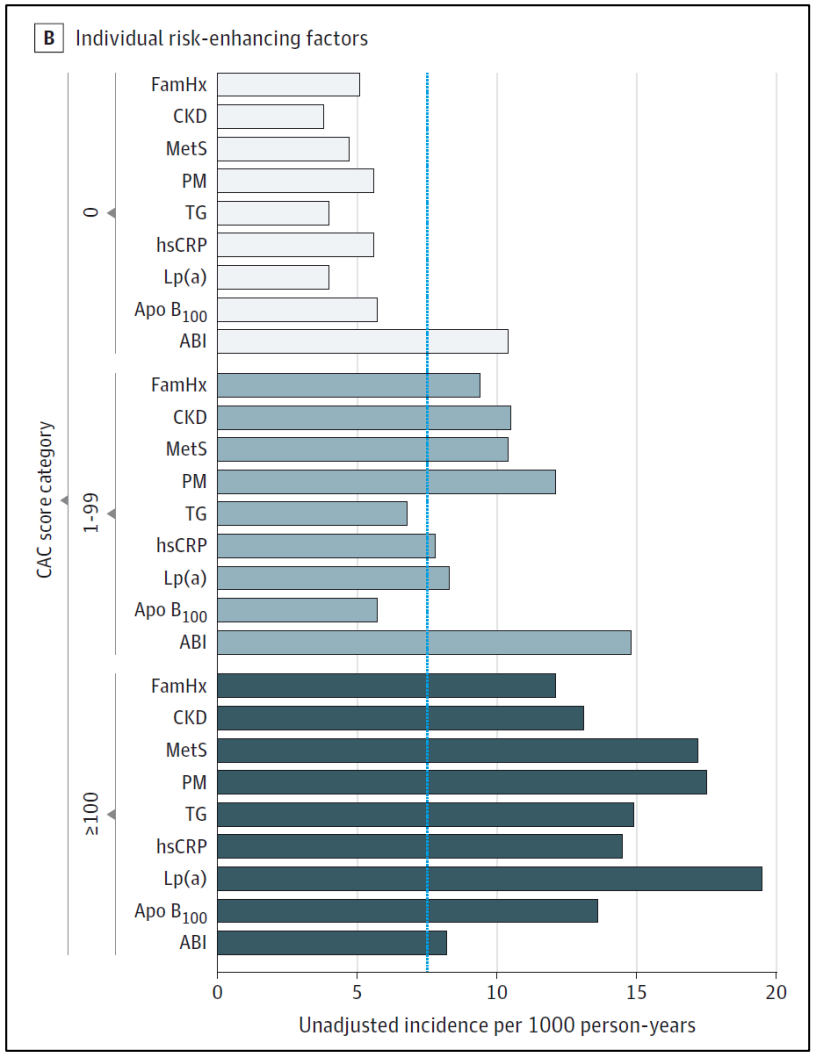
Case Vignette #2

- 54-year-old woman with a family history of premature coronary artery disease, yet LDL = 101 mg/dL
- Only risk factor is elevated lipoprotein(a) of 175 nmol/L
- Not currently on any preventive pharmacotherapy

Assessment of Coronary Artery Calcium Scoring to Guide Statin Therapy Allocation According to Risk-Enhancing Factors: The Multi-Ethnic Study of Atherosclerosis





Patel, Jaideep, et al *JAMA Cardiology* 6.10 (2021): 1161-1170.

2020 Endocrine Society Recommendations

In patients with additional risk-enhancing factors, including elevated lipoprotein(a), as described below, risk assessment should consider traditional 10-year atherosclerotic cardiovascular disease risk assessment and the presence of risk-enhancing factors. The coronary artery calcium score should be considered when risk assessment and treatment decisions remain uncertain.

Newman et al *JCEM* 105.12 (2020): 3613-3682.

Case Vignette #2

- 54-year-old woman with a family history of premature coronary artery disease, yet LDL = 101 mg/dL
- Only risk factor is elevated lipoprotein(a) of 175 nmol/L
- Not currently on any preventive pharmacotherapy
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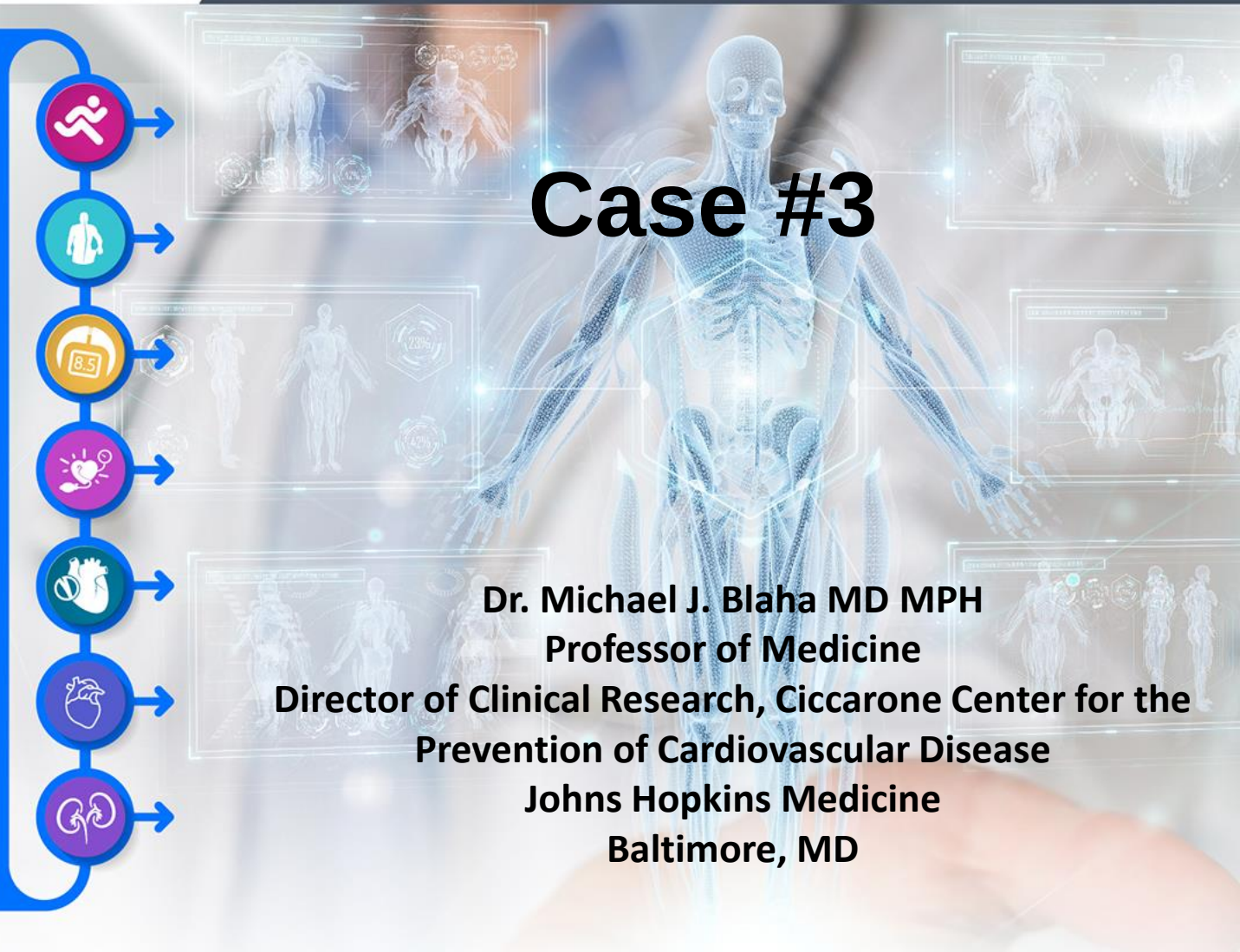

Case #3

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Case #3

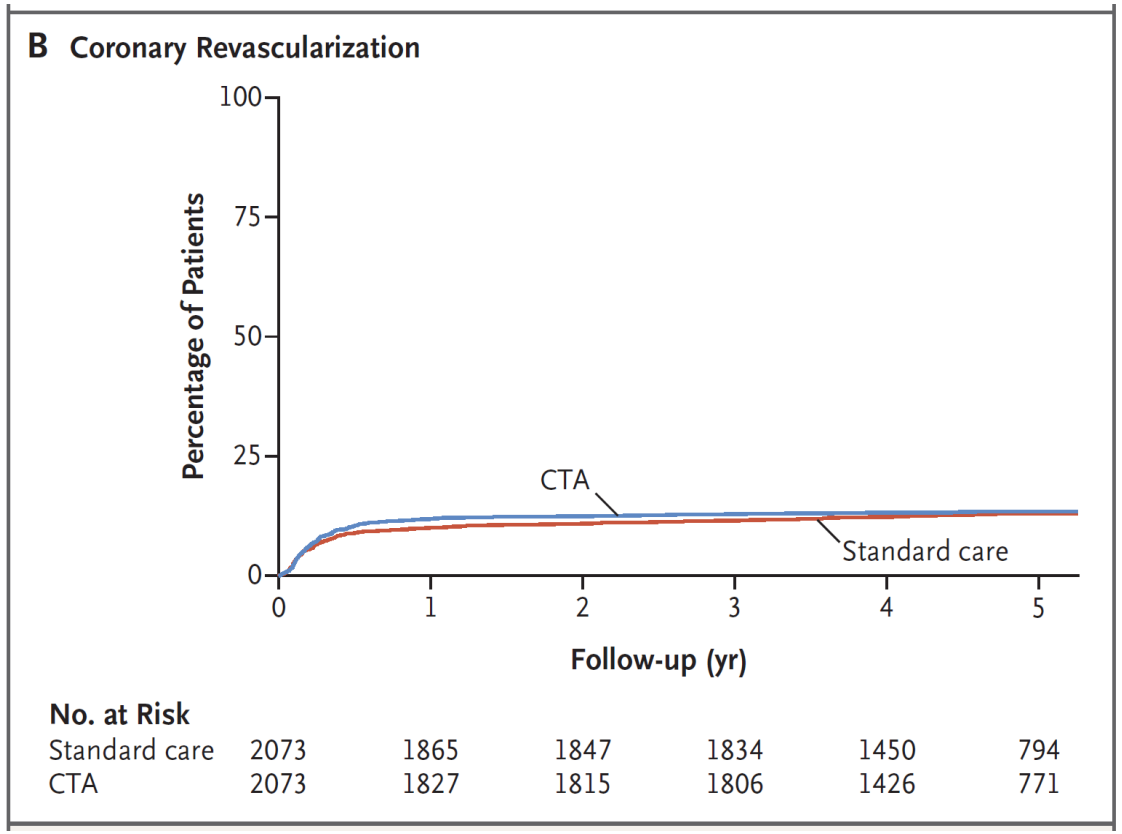
- 56-year-old man with moderate exertional chest pain, hyperlipidemia (LDL = 141 mg/dL), and late-onset CHD in father
- Not currently on aspirin or statin

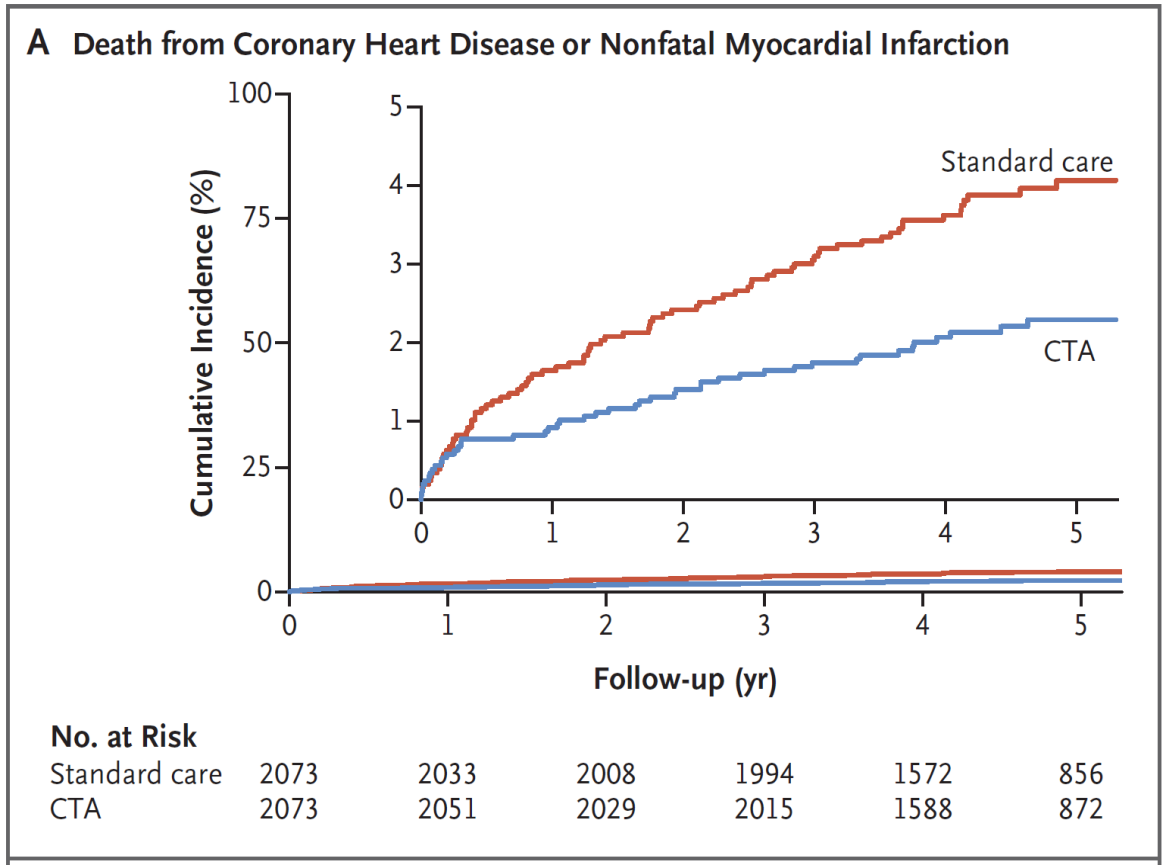
SCOT-HEART Trial

Coronary CT Angiography and 5-year Risk of Myocardial Infarction

The SCOT-HEART Investigators

In an open-label, multicenter, parallel-group trial, we randomly assigned 4146 patients with stable chest pain who had been referred to a cardiology clinic for evaluation to standard care plus CTA (2073 patients) or to standard care alone(2073 patients). Investigations, treatments, and clinical outcomes were assessed over 3 to 7 years of follow-up.





SCOT-Heart Investigators, *NEJM* 2018

Case #3

- 56-year-old man with moderate exertional chest pain, hyperlipidemia (LDL = 141 mg/dL), and late-onset CHD in father
- Not currently on aspirin or statin
- Coronary CT Angiography

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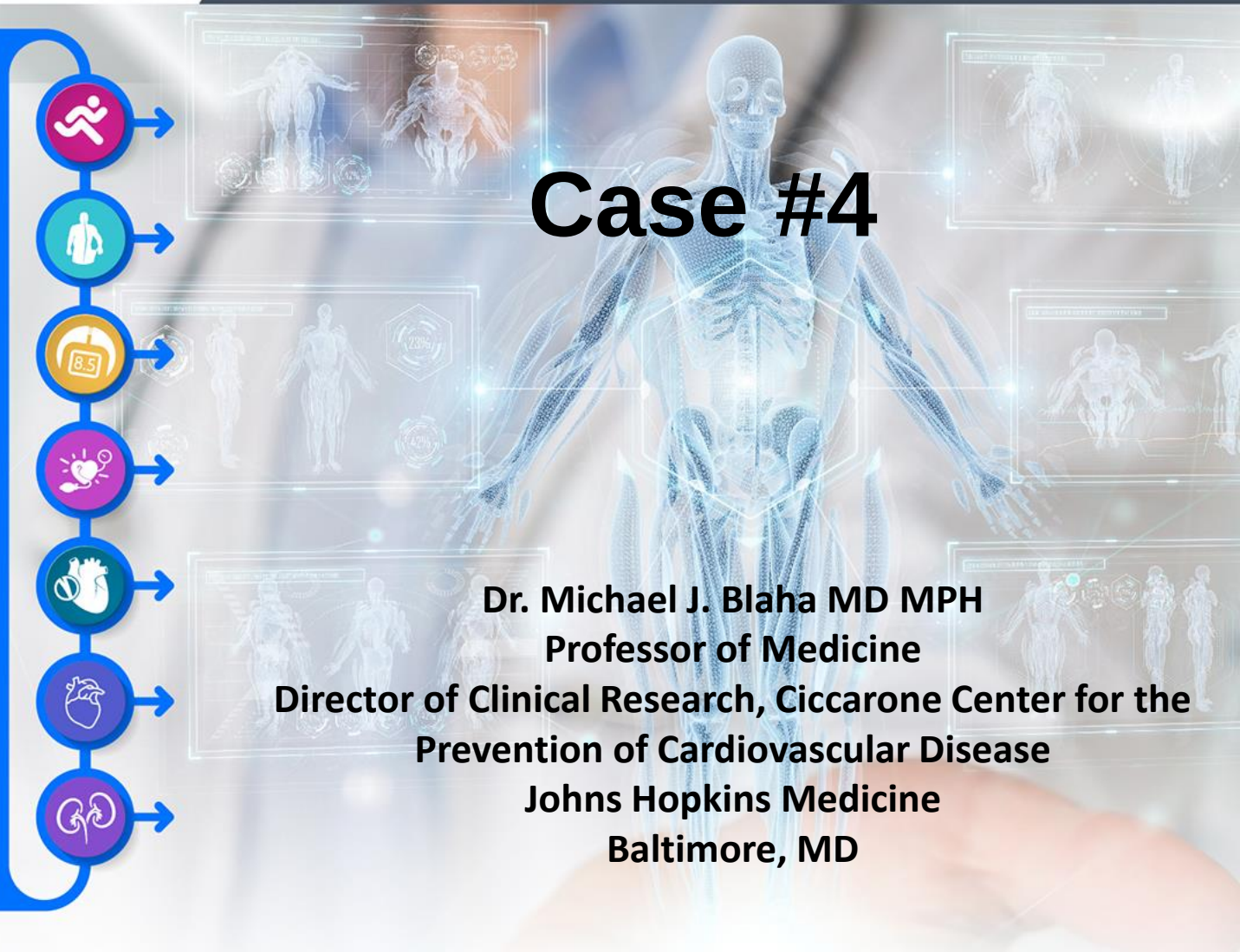

Case #4

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Case #4

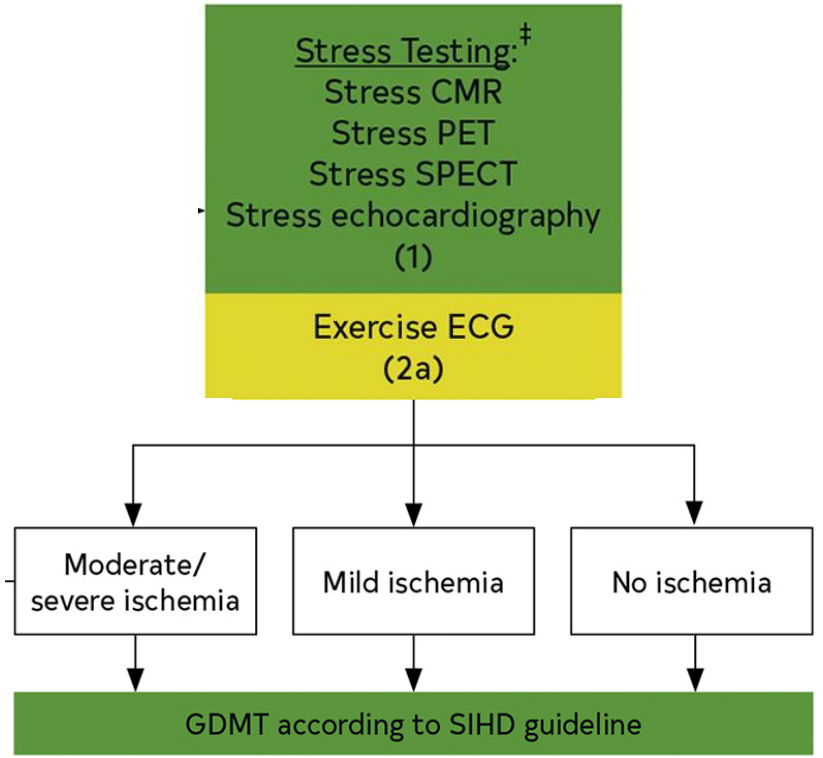
- 69-year-old woman with consistent, exertional chest pain and shortness of breath walking up stairs
- History of CAD – she had 2 stents 2 years ago, another one last year
- LVEF 40%

Coronary CT Angiography vs Stress Testing

Favors use of CCTA
• Rule out obstructive CAD • Detect Nonobstructive CAD
• High quality imaging and exert interpretation routinely available
• Age <65
• Prior functional study inconclusive
• Anomalous coronary arteries • Require evaluation of aorta or pulmonary arteries

Favors use of stress imaging
• Ischemia guided management
• High quality imaging and expert interpretation routinely available
• Age ≥65
• Prior CCTA inconclusive
• Suspect scar (especially if PET or stress CMR available) • Suspect coronary microvascular dysfunction (when PET or CMR available)

Evaluation of known obstructive CAD



Gulati et al, *Circulation* 2021

Case #4

- 69-year-old woman with consistent, exertional chest pain and shortness of breath walking up stairs
- History of CAD – she had 2 stents 2 years ago, another one last year
- LVEF 40%
- Stress Test

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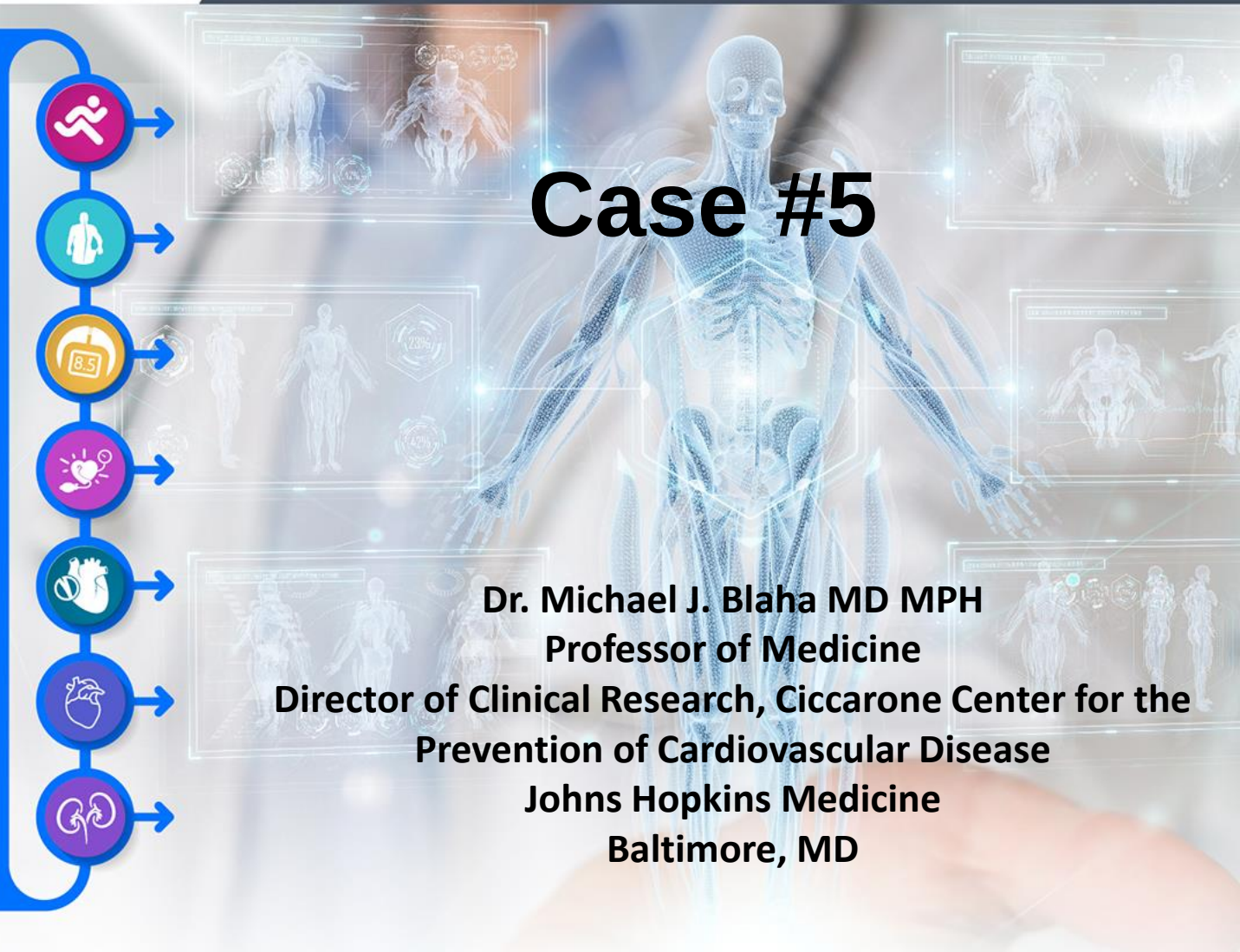

Case #5

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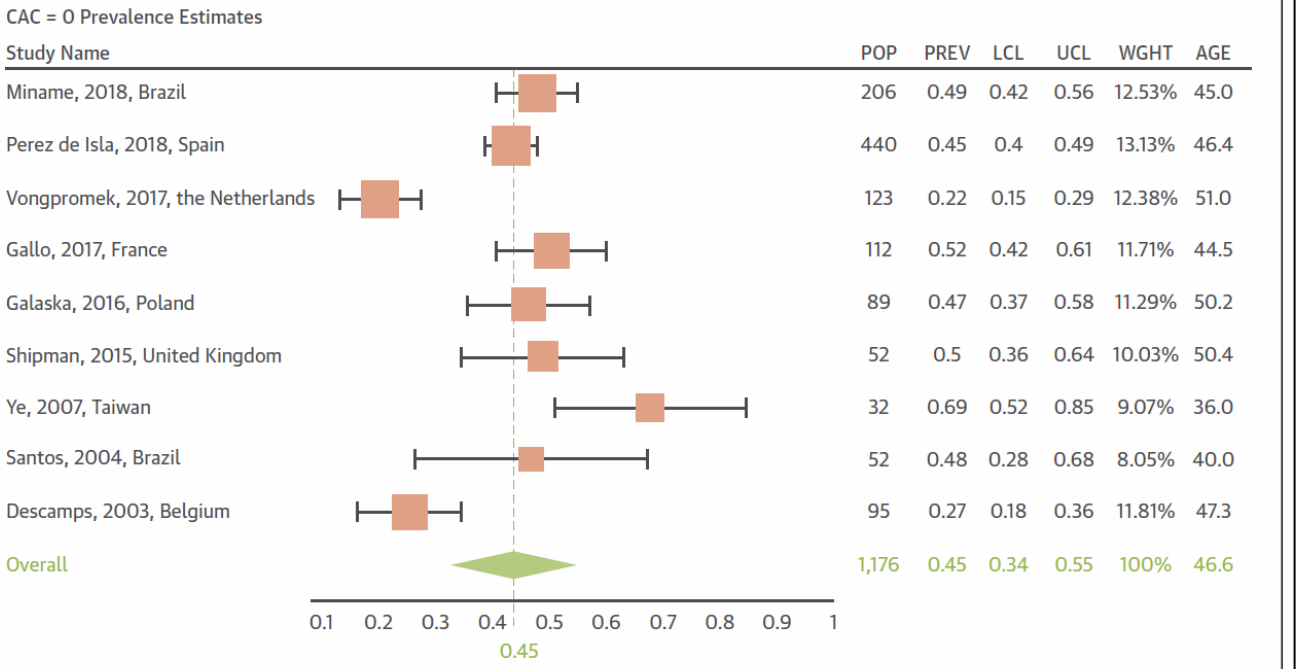
Case #5

- 47-year-old woman with familial hypercholesterolemia and chronic mild chest discomfort mostly at rest and sometimes with light exertion
- LDL=92 on high intensity statin and ezetimibe
- Not currently taking aspirin

Absence of coronary artery calcification in middle-aged familial hypercholesterolemia patients without atherosclerotic cardiovascular disease

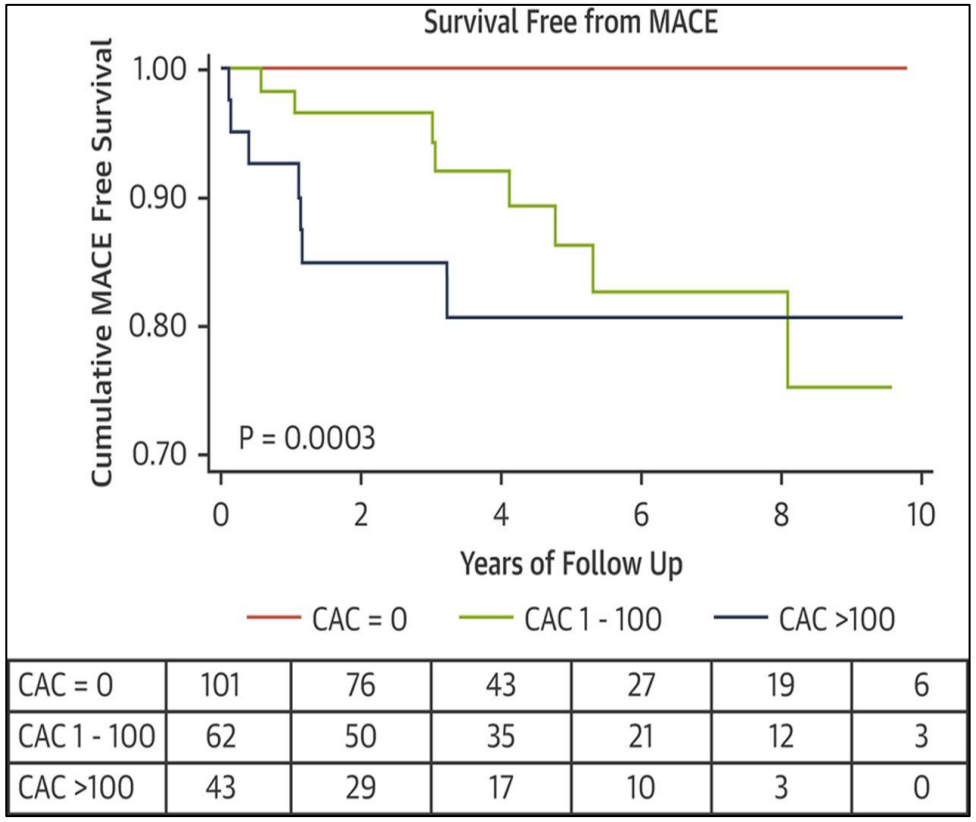
FIGURE 1 Forest Plot of Overall Pooled Prevalence of CAC = 0 in HeFH



CAC = coronary artery calcium; HeFH = heterozygous familial hypercholesterolemia; LCL = lower confidence limit; POP = population; PREV = prevalence; UCL = upper confidence limit; WGHT = weight.

Mszar, Reed, et al. Cardiovascular Imaging 13.4 (2020): 1090-1092.

Coronary artery calcium and cardiovascular events in patients with familial hypercholesterolemia receiving standard lipid-lowering therapy



CAC = 0	101	76	43	27	19	6
CAC 1 - 100	62	50	35	21	12	3
CAC >100	43	29	17	10	3	0

Miname, Marcio H., et al. JACC: Cardiovascular Imaging 12.9 (2019): 1797-1804.

Using CAC to modify pretest probability: CAC as a gatekeeper to CTA/Stress testing

Gulati et al, *Circulation* 2021

Case #5

- 47-year-old woman with familial hypercholesterolemia and chronic mild chest discomfort at rest and with light exertion
- LDL=92 on high intensity statin and ezetimibe
- Not currently taking aspirin
- CAC vs Coronary CT Angiography

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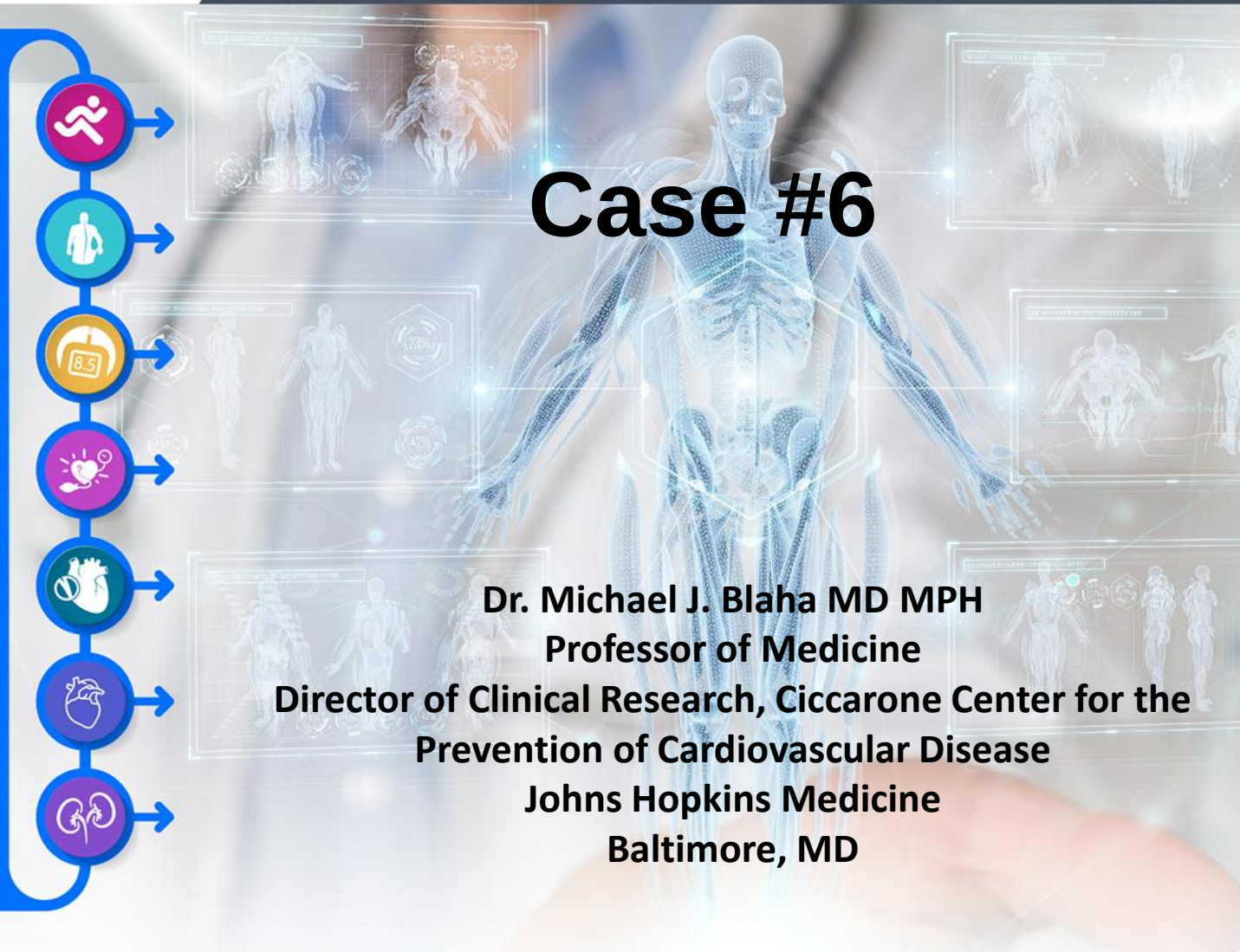

Case #6

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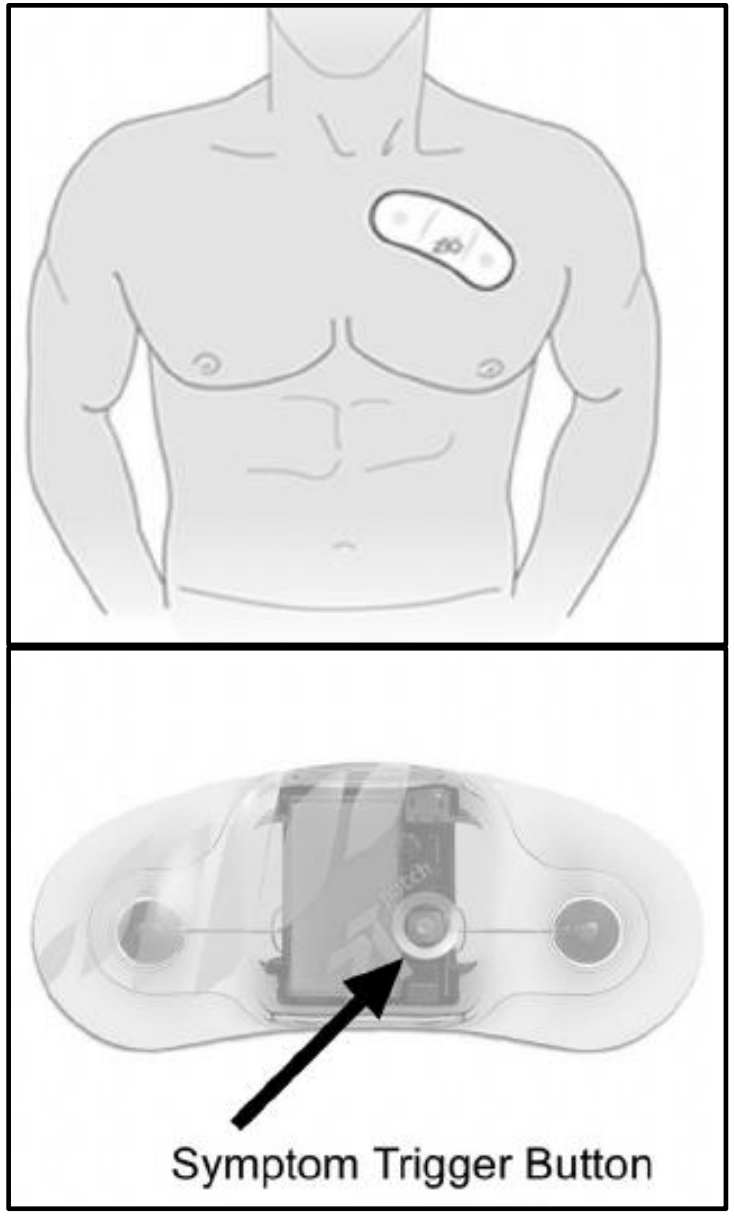
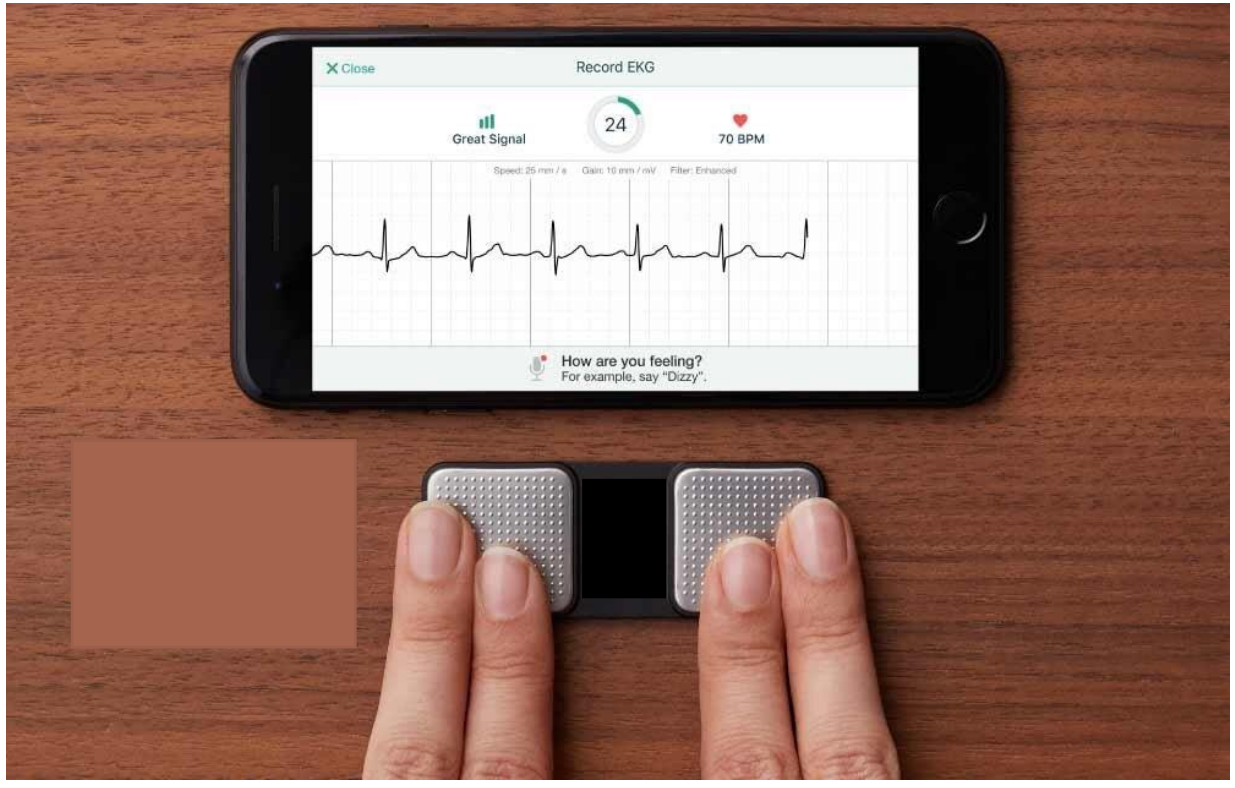
Case Vignette #6

- 58-year-old woman with palpitations
- Occur weekly, last 30-60 minutes at a time, feel like very rapid regular heart “racing”
- Possible soft murmur at left upper sternal border

Portable EKG monitor





Case Vignette #6

- 58-year-old woman with palpitations
- Occur weekly, last 30-60 minutes at a time, feel like very rapid regular heart “racing”
- Possible soft murmur at left upper sternal border
- Ambulatory EKG Monitoring + Echocardiogram