Urgent Cardiac Situations: What Not to Miss!

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Session Description

- This session will address urgent cardiac situations that should not be missed in a primary care setting.
- Discussion will focus on high-risk low-volume events:
  - ACS
  - SCAD
  - Aneurysms
  - Hypertensive emergencies
- The focus will be on the subtle and not so subtle signs and symptoms that may indicate potential for decompensation.

Objectives

1) Recognize signs and symptoms of a patient presenting with an acute cardiac event including acute coronary syndrome, spontaneous coronary artery dissection, aneurysm, and hypertensive emergencies.

2) Describe components of a cardiovascular focused patient assessment and health history; considering high risk cardiac features.

3) Prioritize the management of care of an acutely ill cardiovascular patient presenting to primary care based on assessment and test analysis findings.

The WHY

- Cardiovascular disease is leading cause of mortality in the US.
- 1% of primary care visits with a chief complaint of chest pain
- 2-4% of these visits have acute coronary syndrome
- Low incidence but high risk-

DO NOT MISS!

Cardiac associated conditions in primary care

High risk

- Acute Coronary syndrome
  - Spontaneous Coronary Artery Dissection
- Dissecting aortic aneurysm
- Hypertensive emergency
- Atrial fibrillation with RVR
- Acute decompensated HF
- Ventricular arrhythmias
- Stroke
- Pulmonary embolism

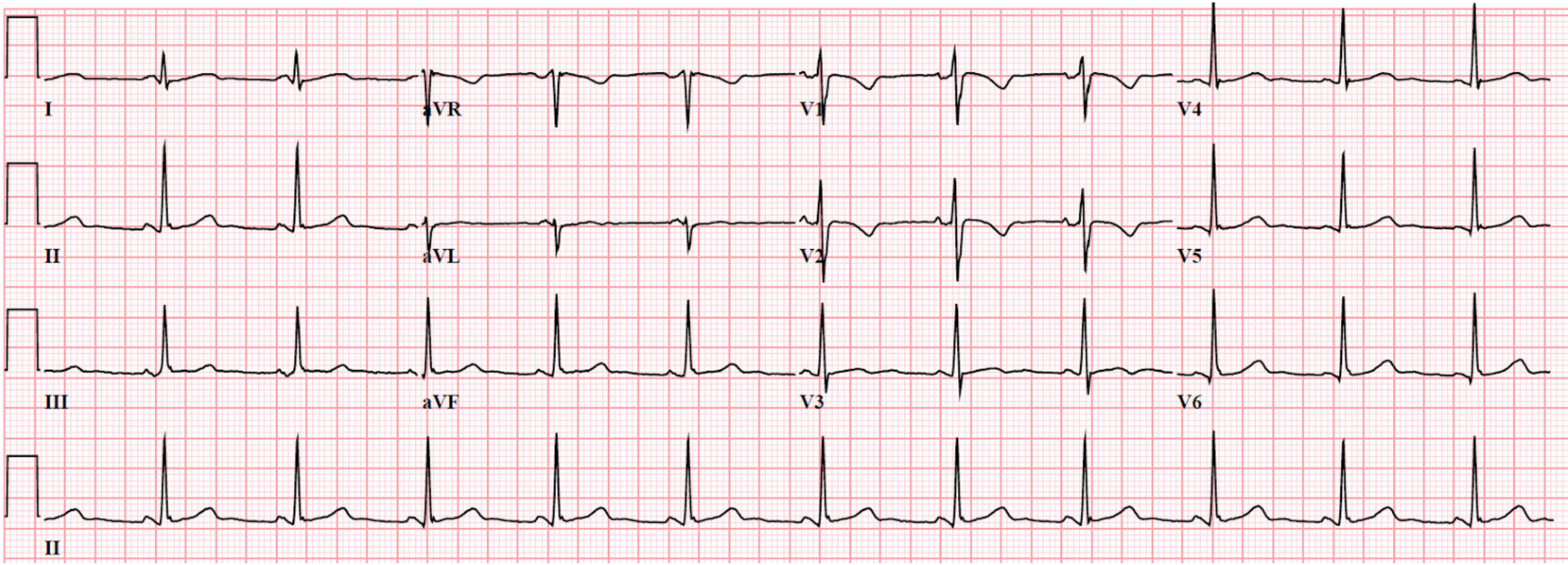
Lower risk

- Hypertension
- Hyperlipidemia
- Peripheral arterial disease
- Valve disease
- Obesity
- Diabetes Mellitus
- Sleep disordered breathing
- Tobacco use disorder
- Cocaine use

Case

- 55 yo male walks in for a sick visit.
- CC: Intermittent midsternal chest discomfort for 12 hrs. associated with SOB and nausea
- PMH: HTN, hyperlipidemia
- Family history: Both parents alive and in mid-80s. Mom-DMT2, Dad-HTN
- Meds: HCTZ 25 mg daily, pravastatin 20 mg daily.

12 lead EKG in clinic

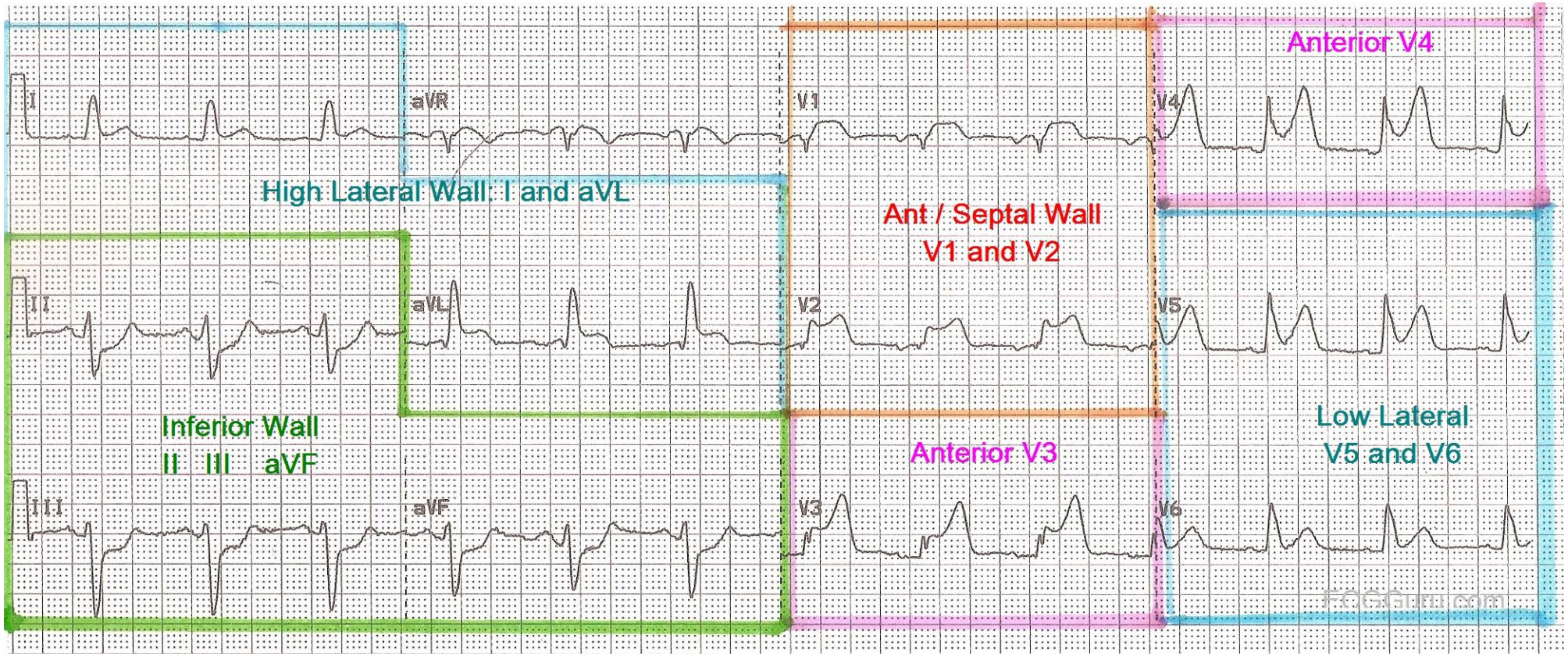


Acute Coronary Artery Syndrome (ACS)

Is it ischemia or infarct?

Acute or chronic?

Review of EKG locations for MI



Determining Risk

- Low risk= 0-3
- Intermediate risk = 4-6
- High risk = 7-10
- High sensitivity for low risk pt in short term for MACE

HEART Score		
History	Slightly suspicious	0
	Moderately suspicious	1
	Highly suspicious	2
EKG	Normal	0
	Non-specific repolarization disturbance	1
	Significant ST deviation	2
Age	< 45	0
	45-64	1
	≥ 65	2
Risk Factors	No known risk factors	0
	1-2 risk factors	1
	≥ 3 risk factors OR atherosclerotic disease	2
Initial troponin	Less than upper limit of normal	0
	1 to 3x normal limit	1
	> 3x normal limit	2
	TOTAL:	

Marburg Heart Score

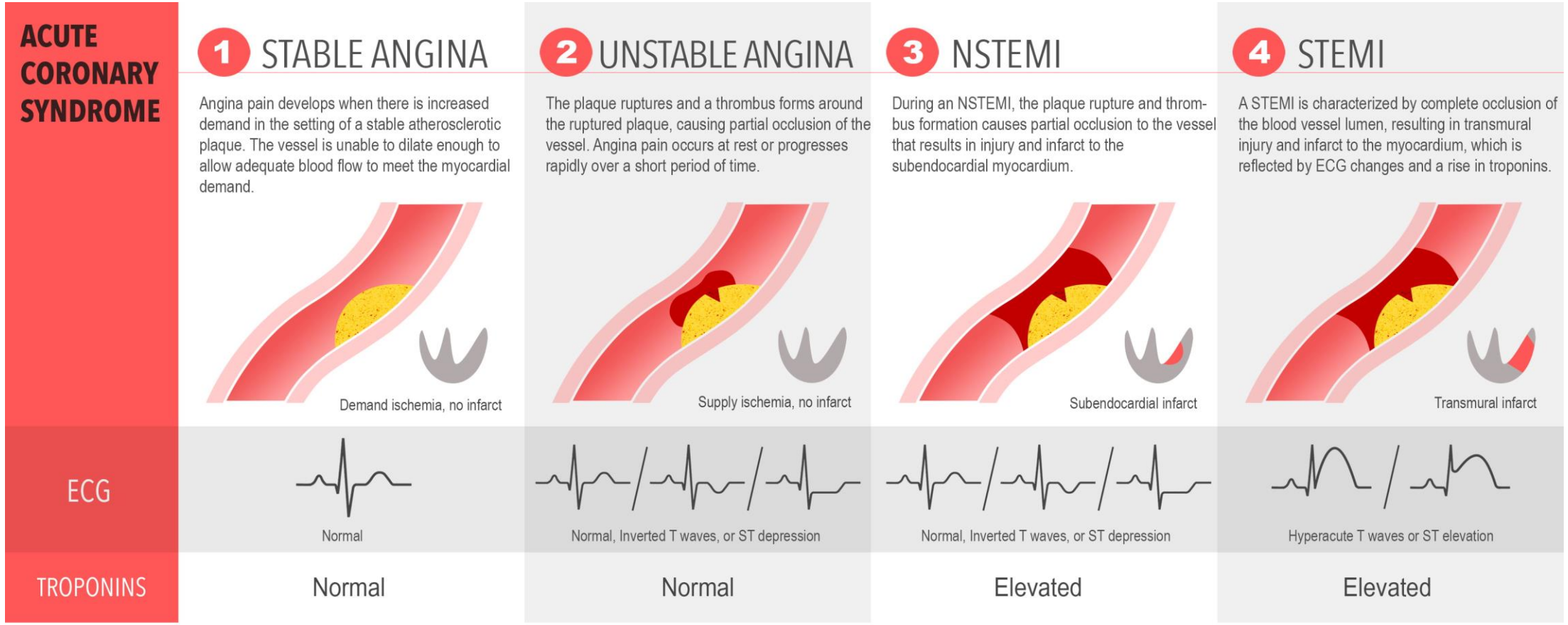
Component	Points
Sex/age (women ≥ 65 yr; men ≥ 55 yr	1
Known CAD, occlusive vascular disease or cerebrovascular disease	1
Increased pain with exercise	1
Pain not elicited with chest wall palpation	1
Patient assumes pain is cardiac in origin	1

Prevalence of CAD as cause of chest pain given overall population risk of:

Score	Likelihood ratio	2%	10%	20%
0 to 1 point	0.04	0.1	0.4	0.9
2 to 3 points	0.92	1.8	9.3	18.8
4 to 5 points	11.2	18.6	55.5	73.7

McConaghy, J. et al, Acute chest pain in Adults: Outpatient evaluation. Amercian Family Physician. 2020; 102(12): 721-727.

Acute Coronary Syndrome



This infographic was created by Paula Sneath and Leah Zhao for the Sirens to Scrubs series of CanadiEM.org.

Acute Coronary Syndromes- History

What

- Pain/pressure/discomfort
- Stabbing/sharp/heaviness

Where

- Arm/jaw/teeth/neck/arm

Associated symptoms

- Shortness of breath/breathlessness
- Nausea/Vomiting
- Fatigue

Acute Coronary Syndromes- Physical Exam

APPEARANCE- PALE, DIAPHORETIC, CYANOTIC

NECK- ELEVATED NECK VEINS, + CAROTID BRUITS

CARDIO- S3, S4, NEW MURMUR OR RUB

RESP- CRACKLES, WHEEZES, INCREASED WORK OF BREATHING

ABDOMEN- HEPATOMEGALY

EXTREMITIES- COOL, DECREASED DISTAL PULSES, PERIPHERAL EDEMA

Acute Coronary Syndromes- Initial treatment

Chewable aspirin 150-300 mg dose

Only use Oxygen to if O2 saturation is <90

Can you draw Troponins in your clinic? Should you?

Cardiology resources

Know the level of EMS provider in your county

Location of the closest hospital with an invasive cardiology unit able to perform percutaneous coronary intervention and or bypass surgery.

ACS- Followup Care

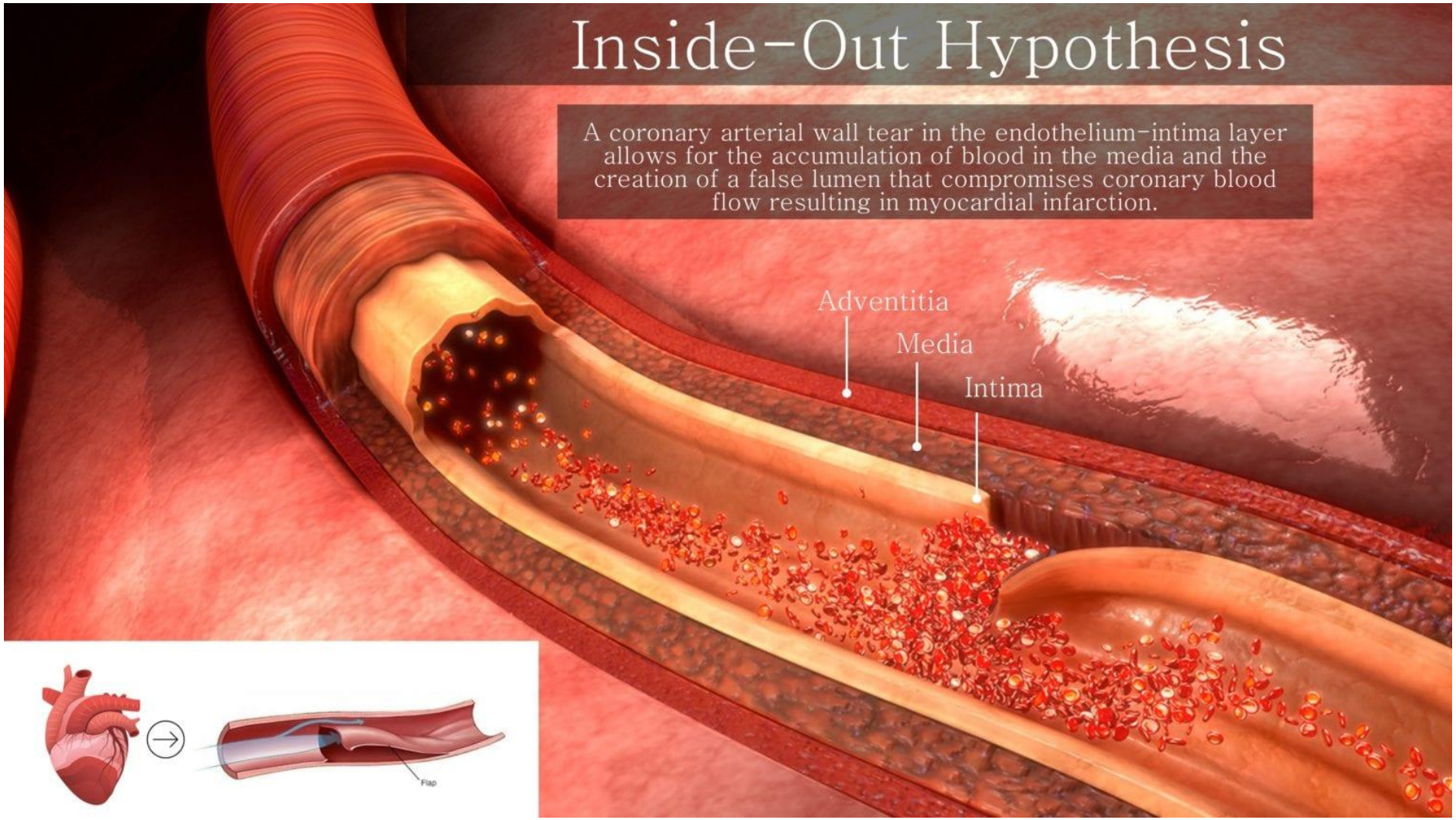
Medications- Post MI with stents

- ASA 81 mg daily
- Clopidogrel 75 mg or Ticagrelor 90 mg bid or Prasugrel 10 mg daily
  (DAPT 6 to 12 months - risk for bleeding)
- Beta blocker
- ACE inhibitor
- Statin
- Nitrate spray or sublingual

Summary of ACS

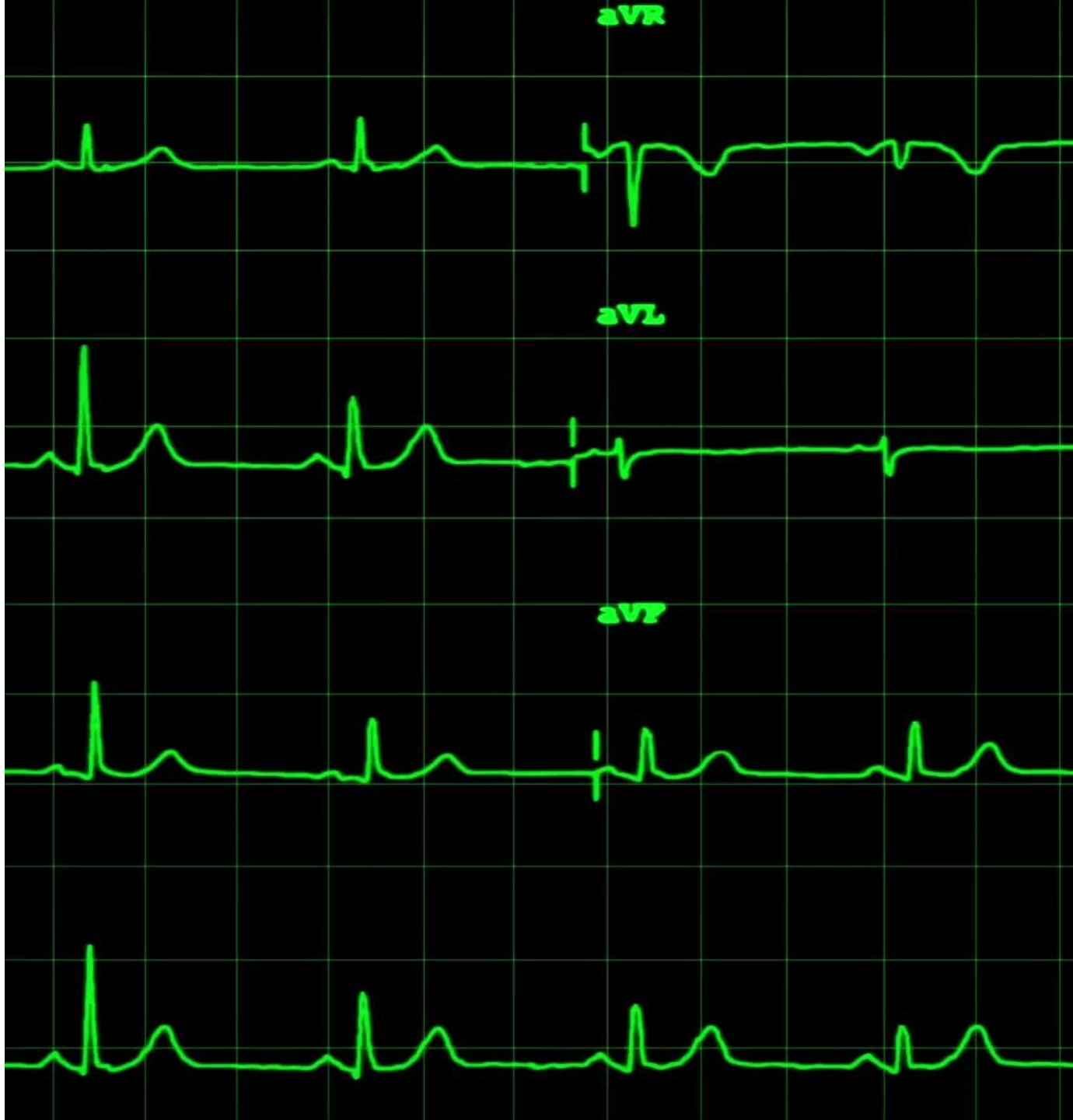
- Early recognition of symptoms
- EKG in office
- Know the level of EMS provider
- Know local hospital with PCI center
- Followup care post MI- 5 key medications
  - Statin
  - ASA
  - Beta blocker
  - ACE inhibitor
  - Antiplatelet

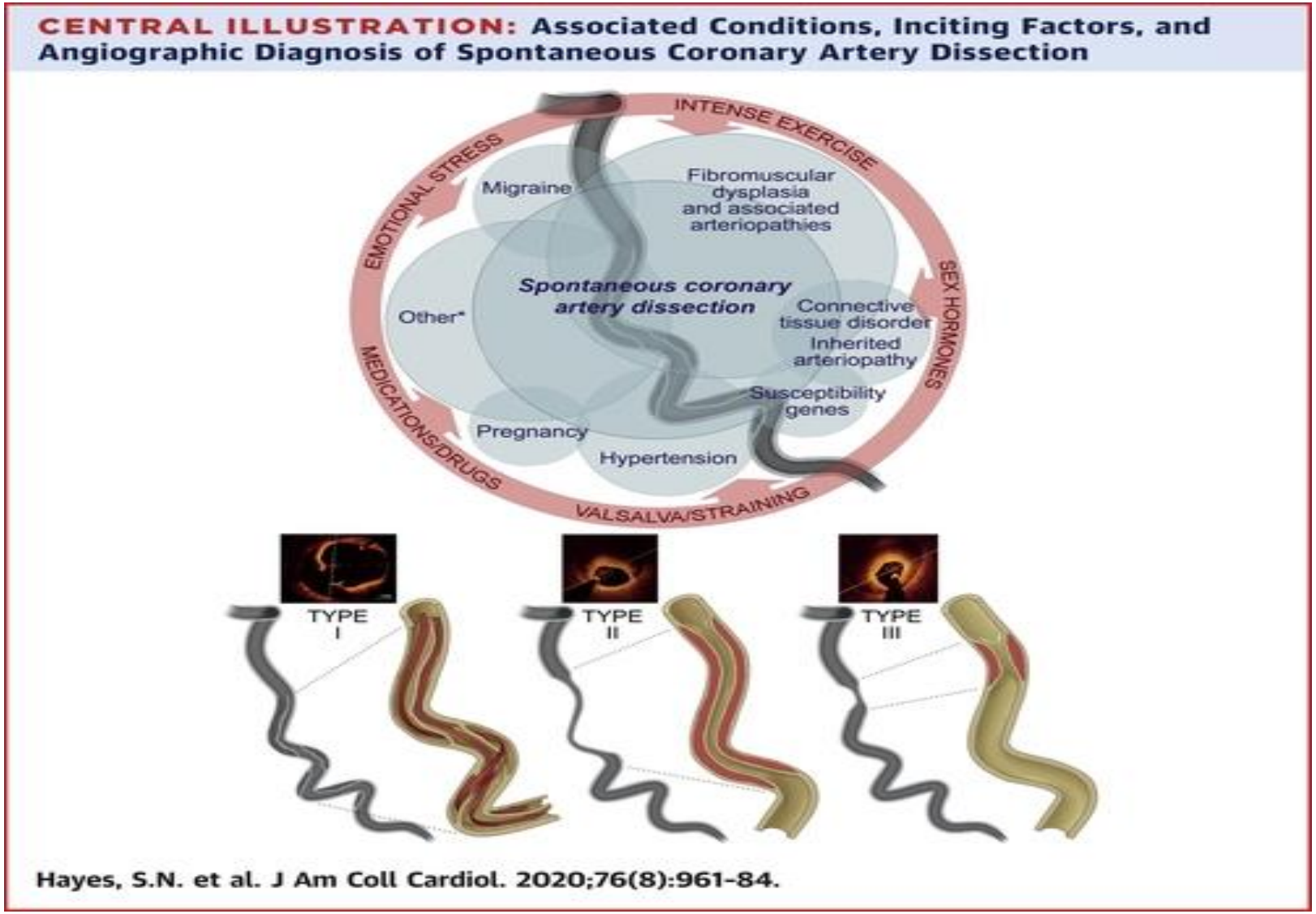
Spontaneous Coronary Artery Dissection (SCAD)



Presenting symptoms

- Sudden tear in the coronary artery resulting in intramural thrombus or hematoma.
- May cause an MI, sudden cardiac death or arrhythmia





Sharonne N. Hayes et al. *J Am Coll Cardiol* 2020; 76:961-984.

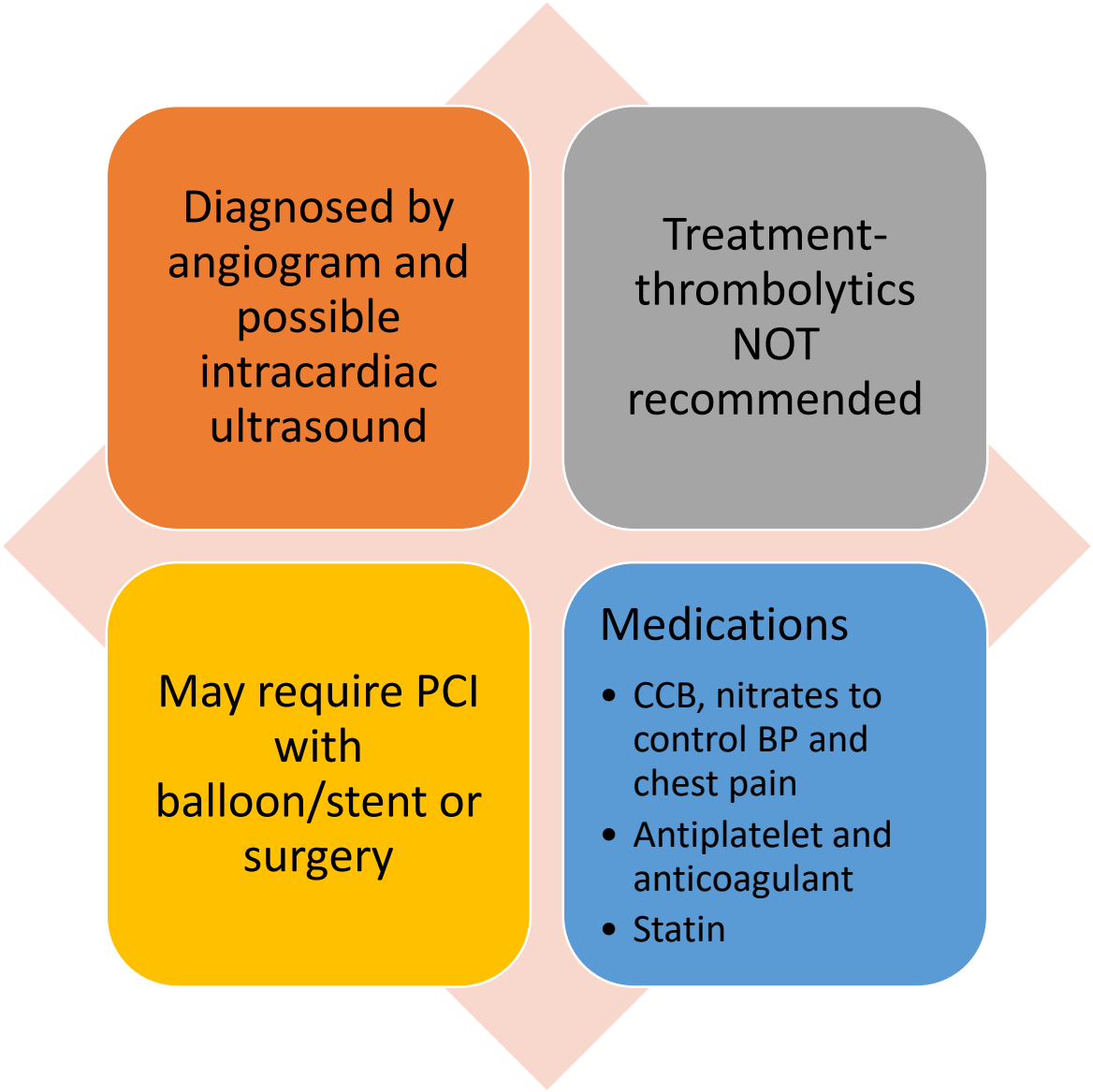
JACC JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

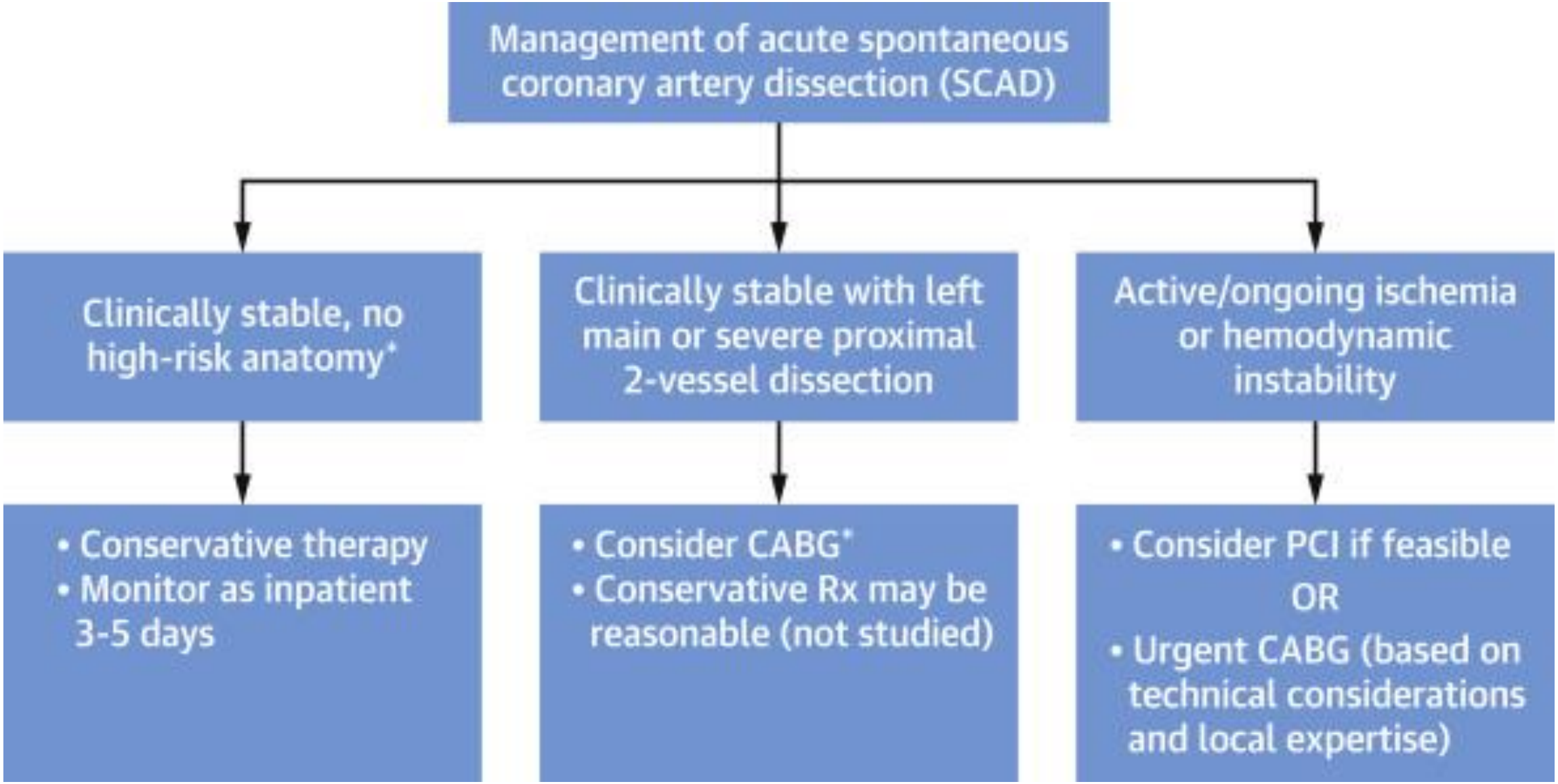
Spontaneous Coronary Artery Dissection (SCAD)

Risk factors

- Most often seen in women aged 40-50
- May not have cardiovascular risk factors.
- A few weeks postpartum
- Hormone therapy- oral contraceptives, fertility treatment
- Fibromuscular dysplasia
- Inherited connective tissue disease
- Severe hypertension
- Cocaine

SCAD


Diagnosed by angiogram and possible intracardiac ultrasound
Treatment- thrombolytics NOT recommended
May require PCI with balloon/stent or surgery
Medications
• CCB, nitrates to control BP and chest pain
• Antiplatelet and anticoagulant
• Statin



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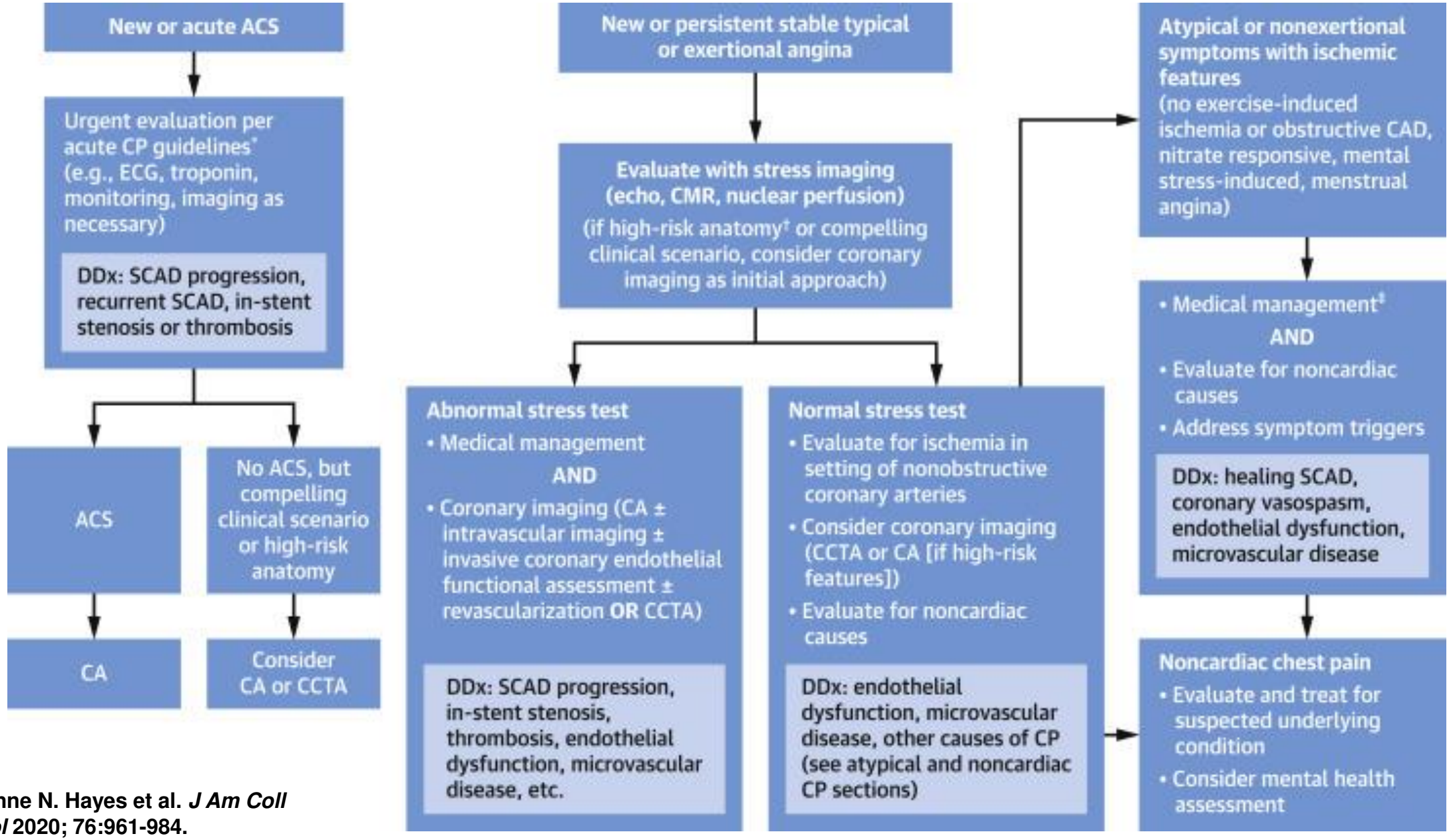

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Spontaneous Coronary Artery Dissection (SCAD)

- You are considering SCAD as a differential diagnosis in a young female with a recent history of childbirth who presents with chest pain. Which of the following findings might you anticipate seeing on an EKG?

- A. Prolonged QT interval
- B. Left axis deviation
- C. Wide QRS complex
- D. Diffuse ST segment elevation and depression

Post SCAD treatment

- DAPT for 2-4 weeks and low dose ASA for 3-12 months*
- LV dysfunction- ARNi/ACE/ARB, Beta Blocker, Mineralocorticoid receptor antagonist
- Statin- not indicated unless hyperlipidemia present
- Identifying potential precipitants-meds, illness, illicit substances, stress, physical activity

Post SCAD treatment

Physical activity

- Cardiac rehab and moderate exercise.
- Avoid endurance training, prolonged Valsalva

Mental health

- Anxiety
- Depression
- Post traumatic stress disorder

Contraception

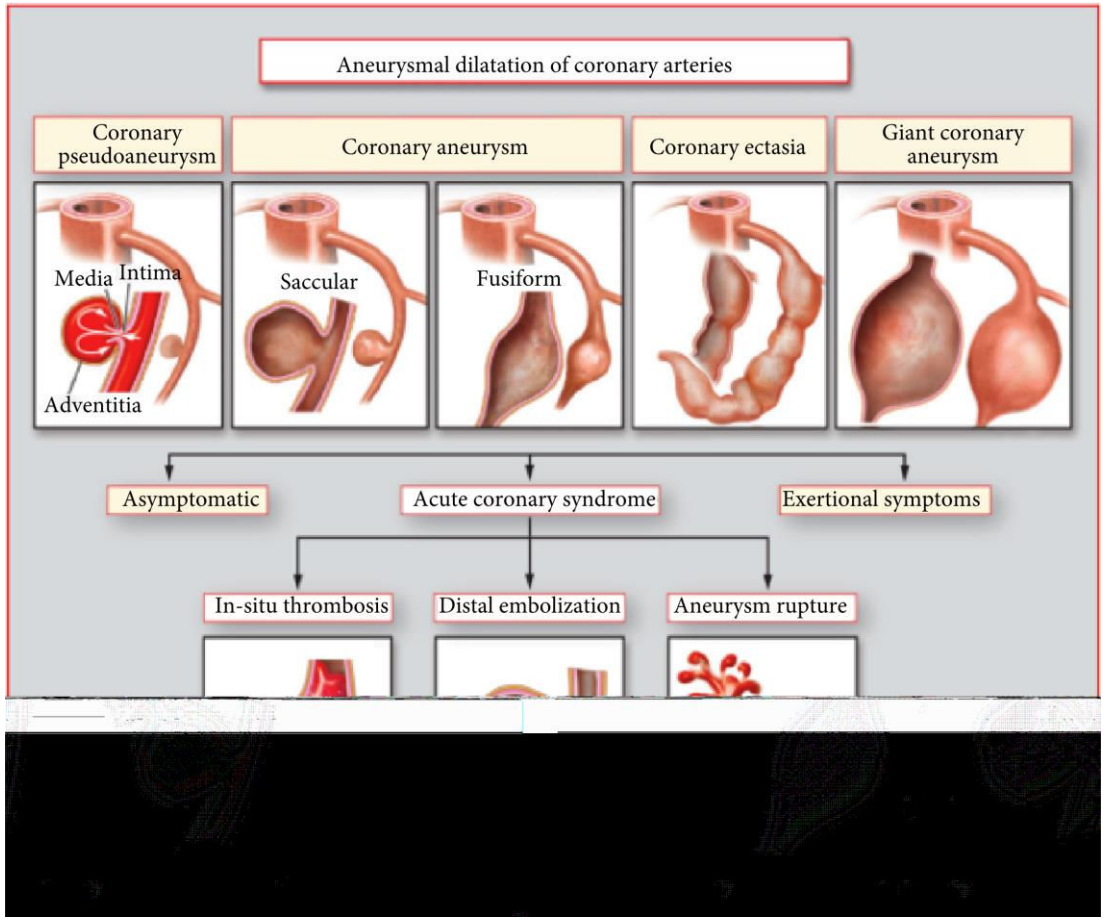
- Long-acting progesterone only methods (levornorgestrel implant or IUD)
- Avoid pregnancy

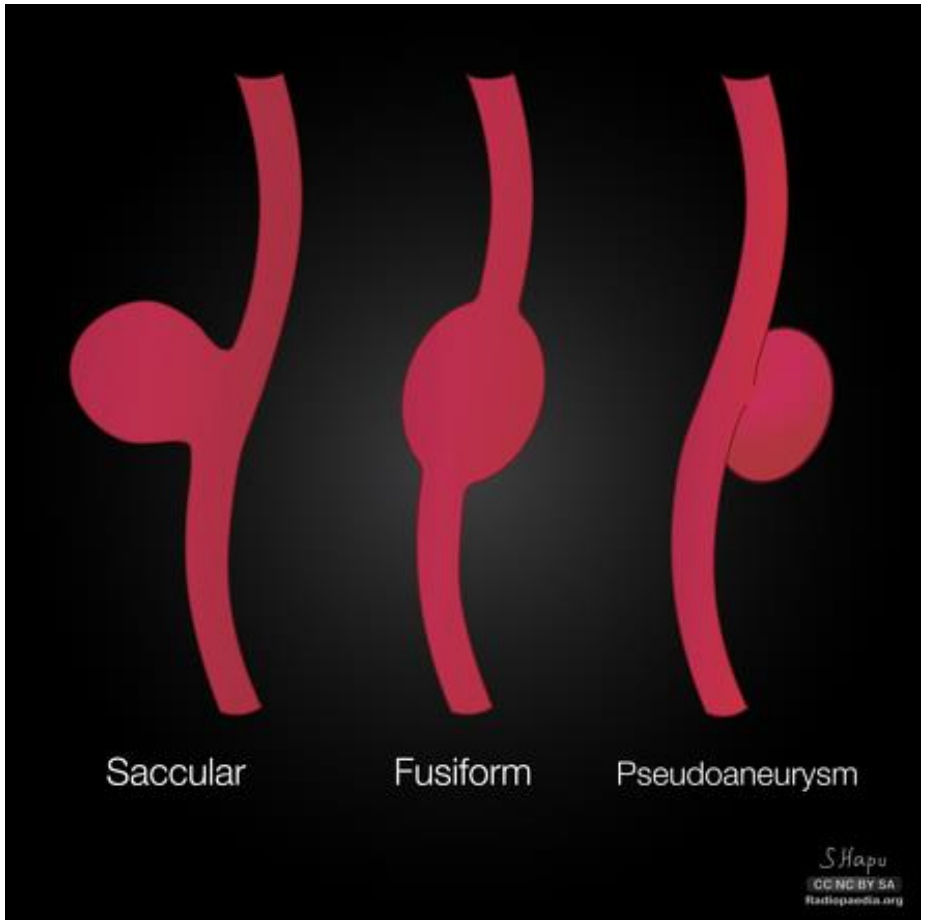
Risk of recurrence 10-30% and not clearly defined

Summary of SCAD

- Consideration of individual risk factors and potential mediators
- Referral to cardiology for potential revascularization
- Post procedure pharmacotherapy based on individual risks
- Contraception

Aneurysms-Coronary and Aortic





Aortic Aneurysms- The Why

Acute aortic dissection is a medical emergency

- Incidence is 5 to 30 million cases annually
- Most often in men
- Age 50-70

Dissections are categorized by location

- Inclusive of aortic arch
- Above or below diaphragm

Thoracic Aortic Aneurysm

- Risk Factors
  - Age >65 yrs
  - Tobacco use
  - Stimulant use
  - Hypertension
  - Male
  - Family history-
    - 1st degree relatives
    - Connective tissue disease-ie Marfan or Ehlers-Danlos syndrome

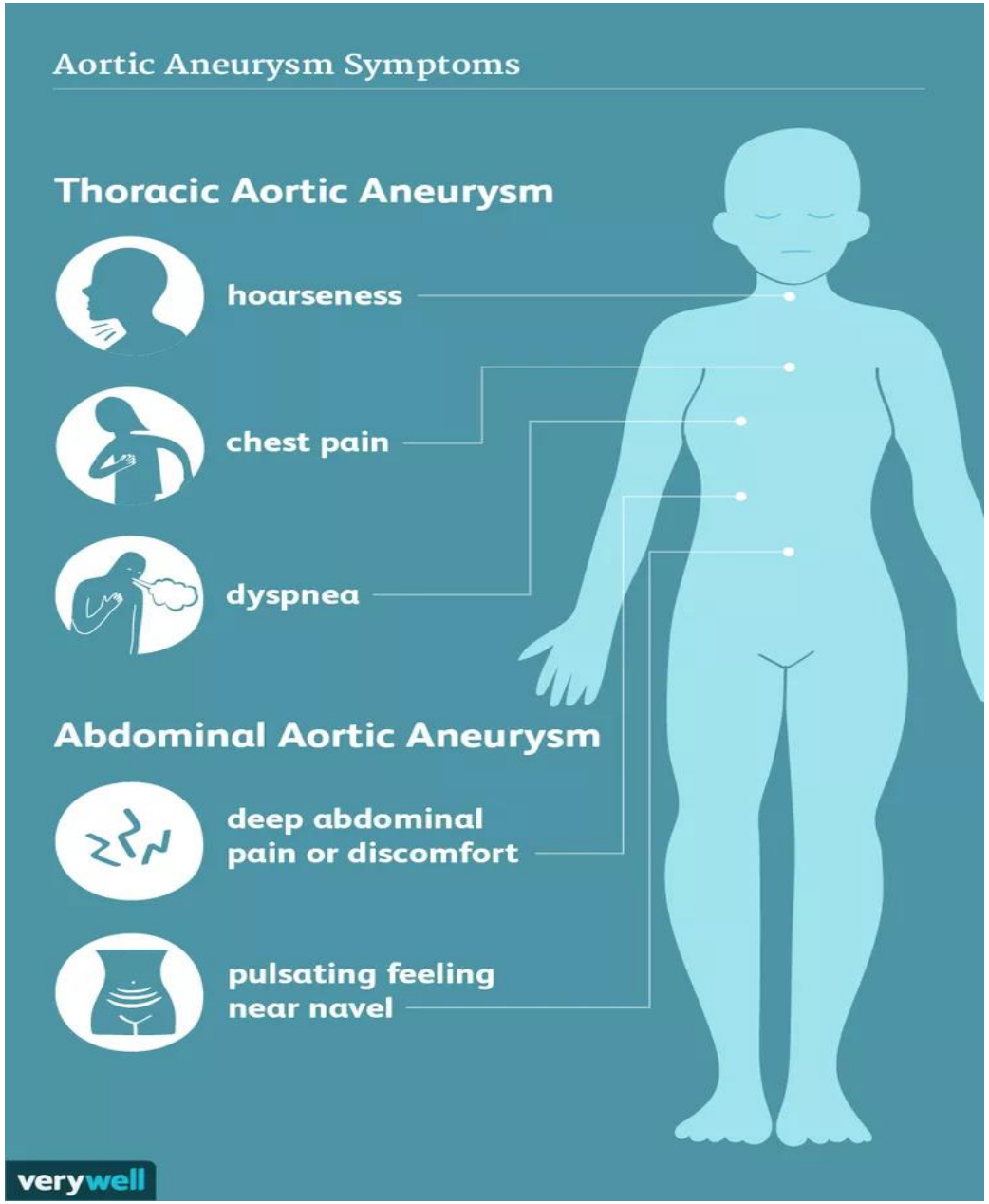
https://www.nhlbi.nih.gov/health/aortic-aneurysm/causes

Abdominal Aortic Aneurysm

- Risk Factors
  - Age >60 yrs
  - Tobacco use
  - Hypertension
  - Male
  - Family history-
    - 1st degree relatives
    - Connective tissue disease

https://www.nhlbi.nih.gov/health/aortic-aneurysm/causes

What to watch for



https://www.verywellhealth.com/aortic-aneurysm-symptoms-and-complications-4160769

Aneurysms
2022 Guidelines for Managing Aortic disease

- Imaging considerations
  - Availability
  - CT
  - MRI
  - TTE
  - TEE
  - Ultrasound
  - Contrast allergy
  - Kidney function
  - Hemodynamic stability

Aortic Aneurysm Imaging

CT

- Fast and can be done without contrast
- High sensitivity and specificity

MRI

- Can visualize changes due to inflammation
- No ionizing radiation
- Longer duration and challenges with immediate access to patient if unstable

Aortic Aneurysm Imaging

TTE (Transthoracic Echo)

- Use in nonemergent situations to evaluate thoracic aorta
- Portable and good for longitudinal evaluation of aortic root and aortic dilation

TEE (Transesophageal Echo)

- High resolution images of thoracic aorta
- Useful for intra-operative imaging

Ultrasound

- Intravascular- high resolution images
- Abdominal- sensitivity close to 100%

Thoracic Aortic Aneurysm Medical Management

When to repair a descending TAA

- If intact repair when diameter is ≥ 5.5 cm

BP management

- Beta blockers and ARB
- Target BP <130/80

Statin therapy if aortic atherosclerotic disease

Tobacco cessation

Thoracic aneurysm imaging

Transthoracic Echo (TTE)

Preferred imaging modality

Transthoracic Echo (TTE)

CT or MRI

- 3.0-3.9 cm every 3 years
- 4.0-4.9 cm annually
- Greater than 5.0 cm in men and 4.5 cm in women every 6 months

Thoracic Aneurysm Imaging

Transthoracic Echocardiogram (TTE)

- At time of diagnosis to identify anatomy

CT or MRI

- Assess thoracic aortic anatomy and diameters

Surveillance imaging

- Every 6 to 24 months

Abdominal ultrasound imaging

In addition to aneurysm it can detect

- Thrombus
- Plaque
- Stenosis

Criteria for AAA

- Diameter >3.0 cm, using primarily the outer-edge to outer-edge measurement convention in the anterior-posterior or transverse view.

Surveillance for AAA varies based on size

- 3.0-3.9 cm every 3 years
- 4.0-4.9 cm annually
- Greater than 5.0 cm in men and 4.5 cm in women every 6 months

Abdominal Aortic Aneurysm Medical Management

BP management

- Beta blockers and ARB
- Target BP <130/80

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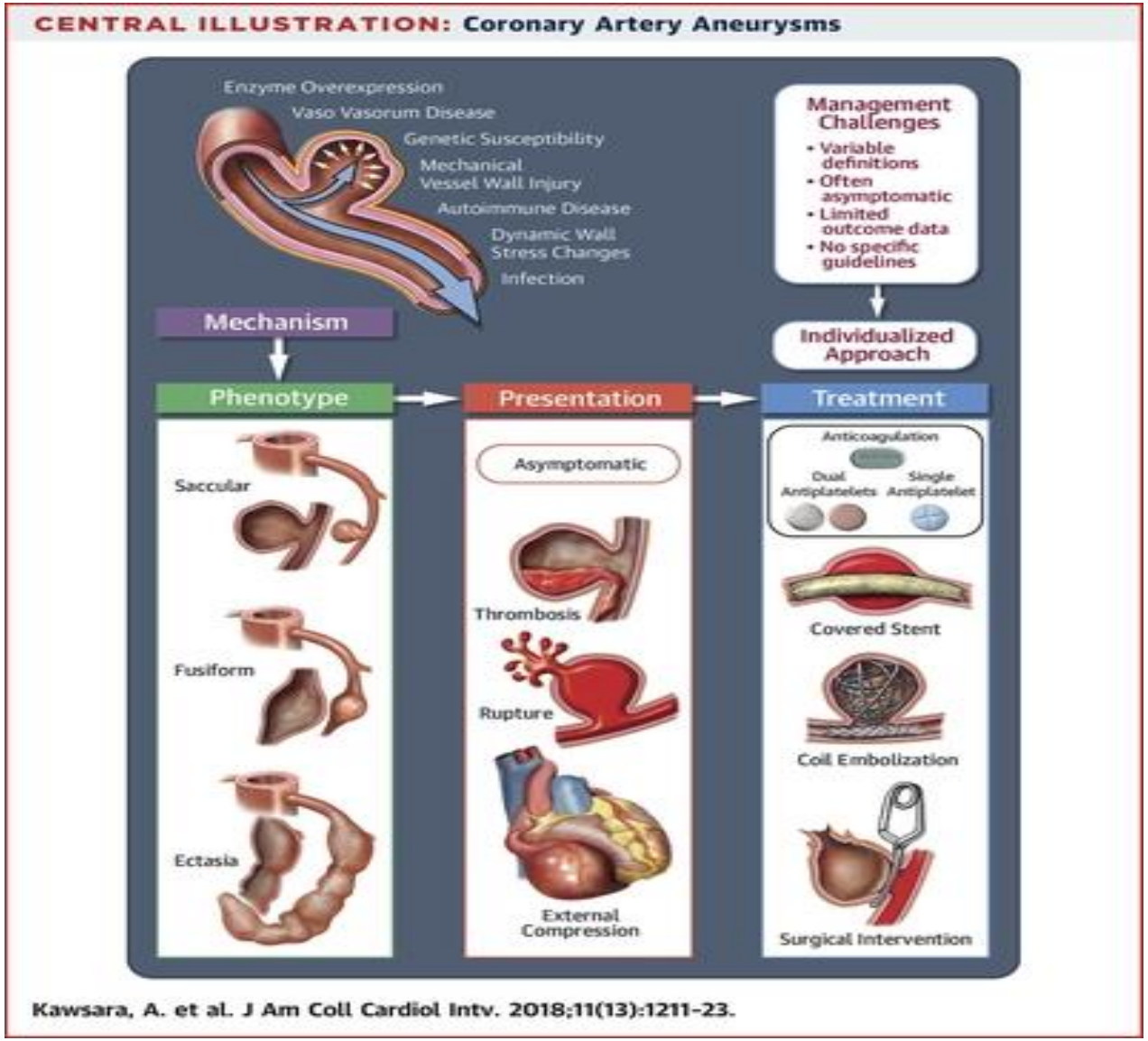


Akram Kawsara et al. *J Am Coll Cardiol Intv* 2018; 11:1211-1223.

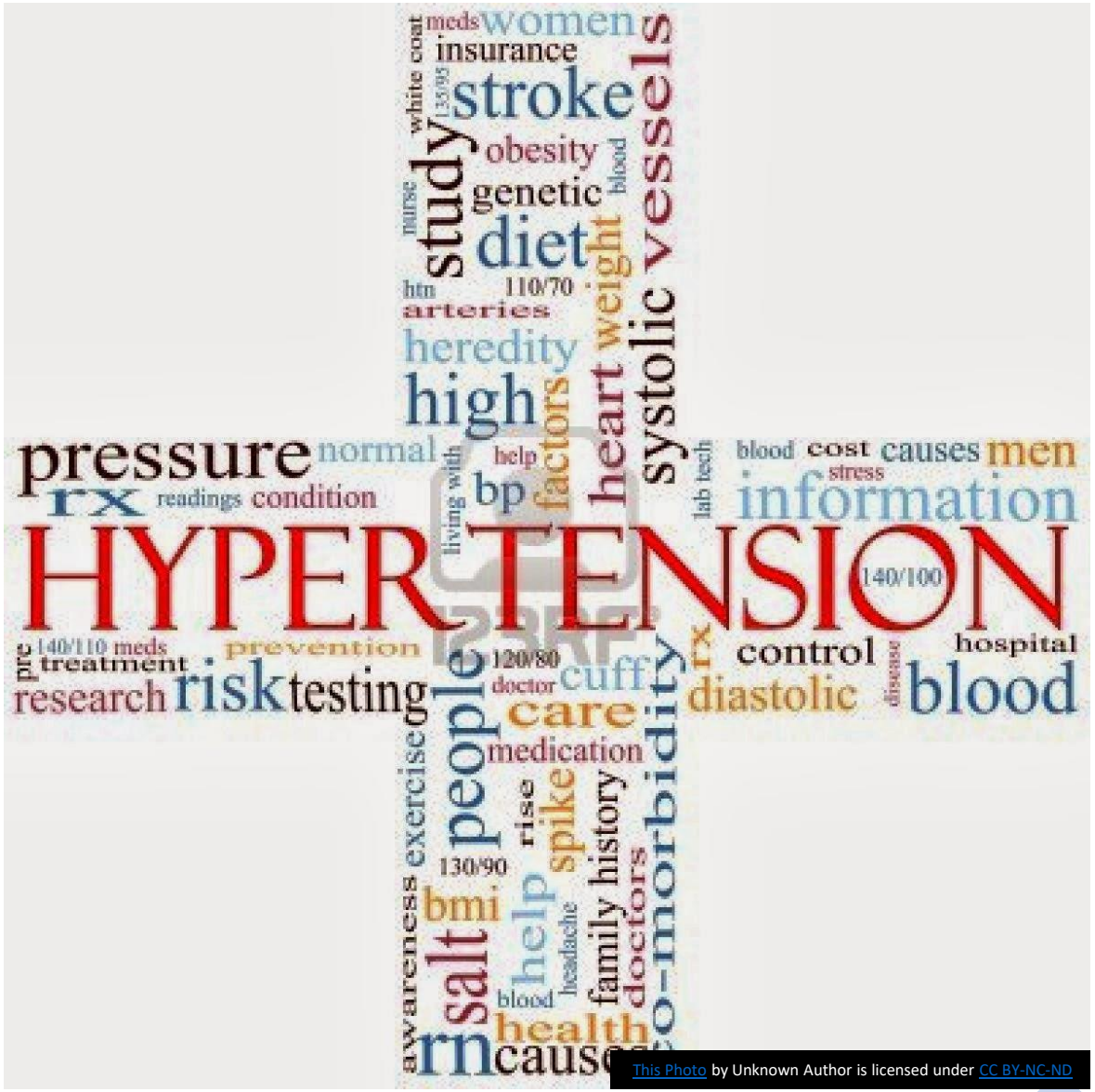
JACC Cardiovascular Interventions

Summary of Aneurysm

Consider genetic testing if etiology is connective tissue or early onset in family (<age 50) or unexpected death at young age.

In asymptomatic pt with thoracic aortic aneurysm surgery is indicated when aortic diameter ≥ 5.0 cm

AAA ultrasound screening should take place in males ≥ 65 yrs who have ever smoked and consider in females ≥ 65 yr.



Hypertensive Emergencies

New or progressive end-organ dysfunction associated with severely elevated blood pressure.

Systolic BP usually >180 mm HG and diastolic BP >120 mm HG

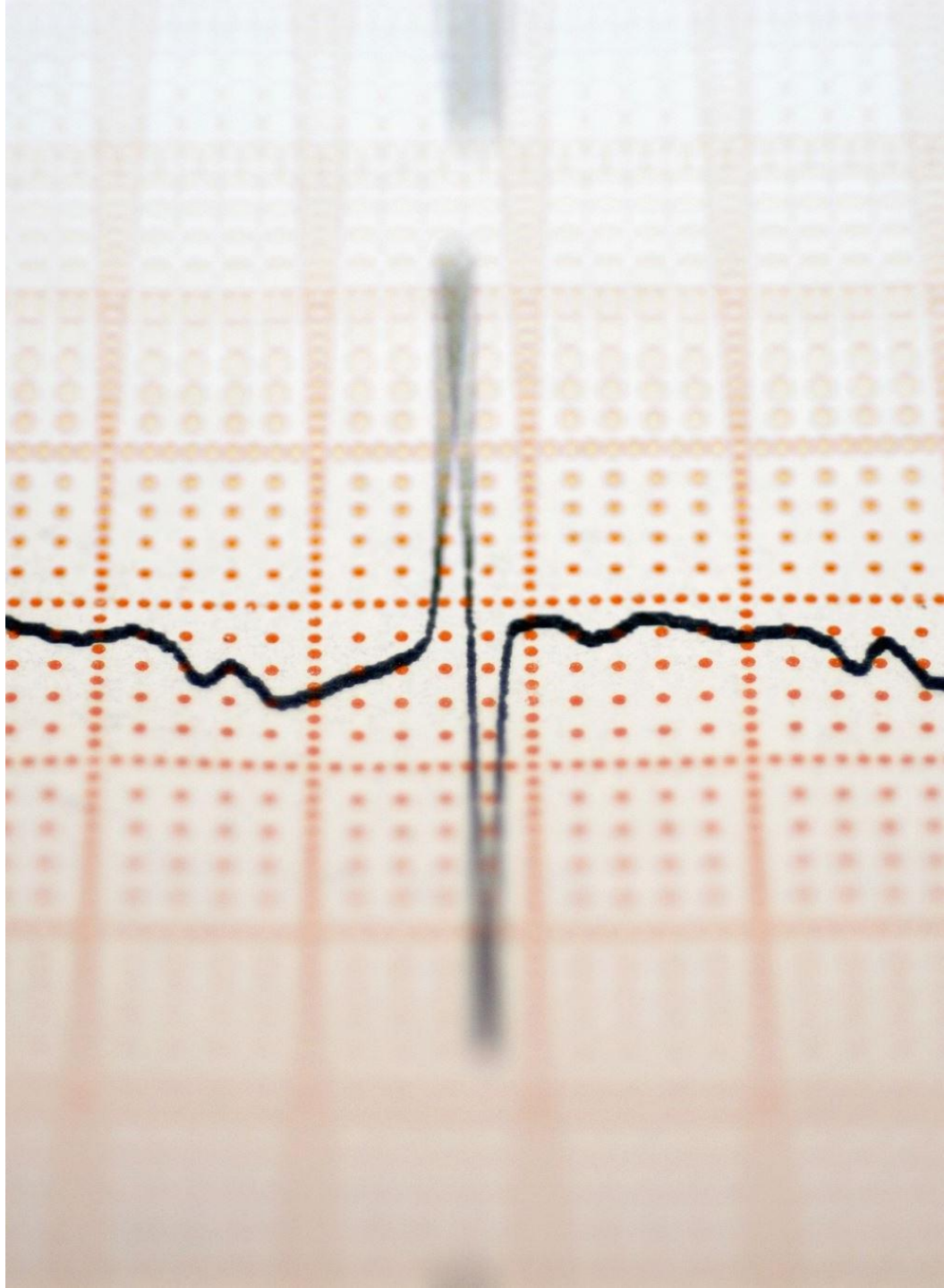
Or MAP >135 mm HG

Hypertensive Emergencies

- Target organ damage
  - AKI- check for microscopic hematuria
  - Pulmonary edema
  - Myocardial ischemia- check EKG
  - Hypertensive encephalopathy- delirium, visual changes, seizure)

- Differentiate from uncontrolled HTN with severe BP elevation but

  NO target organ damage. No need for hospital or emergency department.



Hypertensive Emergencies

- Symptoms
  - Neuro-Altered mental status, headache, visual changes
  - CV-Chest pain, SOB, dizziness
  - GI- vomiting
  - GU-reduced urine output

- Treatment goal
  - Gradual reduction- no more than 25% over minutes to 1 hour
  - Target to 160/100 over next 2-6 hrs
  - Target reduction over 24-48 hrs

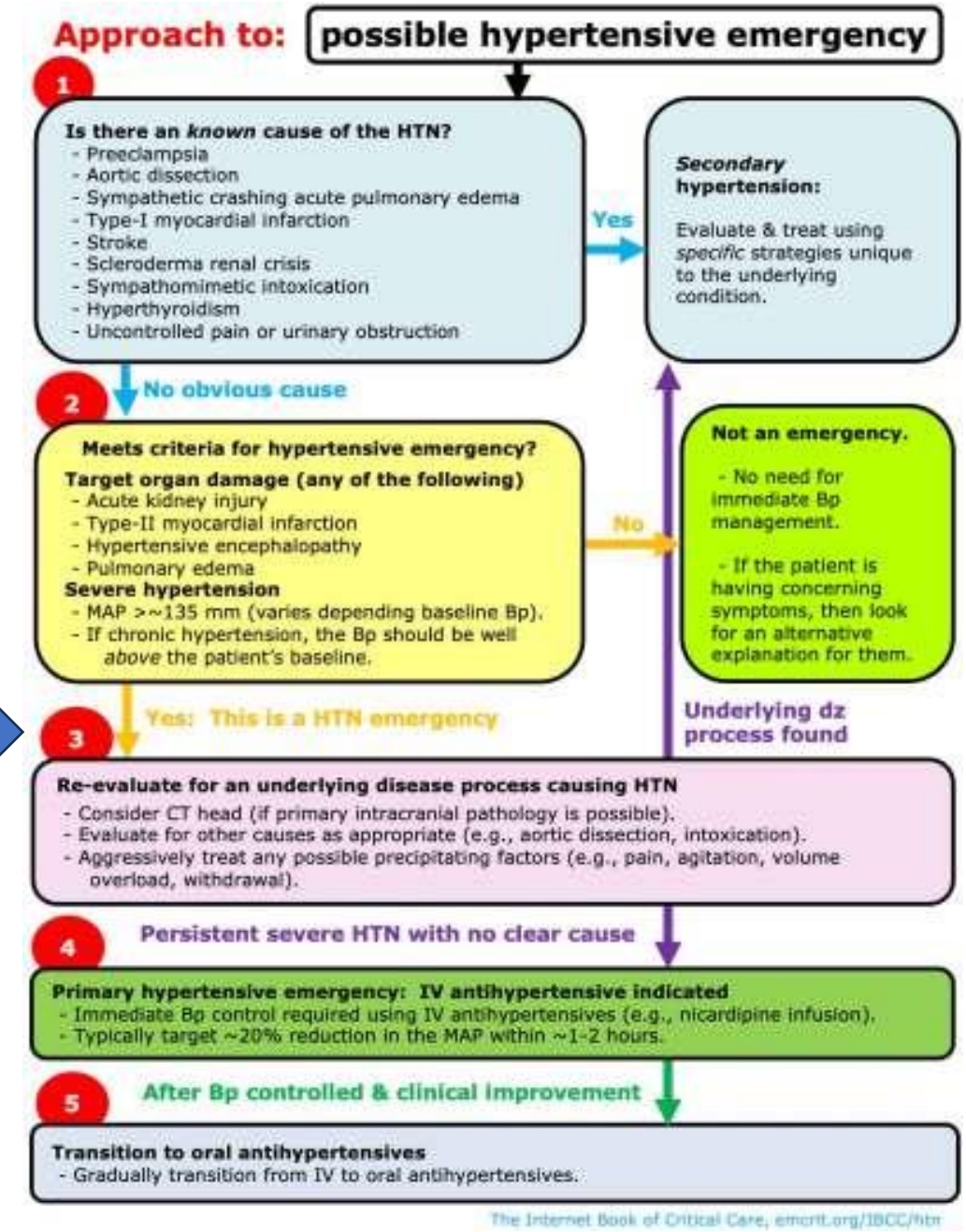
Hypertensive Emergencies

- Exceptions to lowering BP
  - Ischemic stroke-
    - Unless BP >185/100 if going to receive reperfusion therapy
    - Unless BP>220/120 if not going to receive reperfusion therapy
  - Aortic dissection
    - Rapid reduction should occur to reduce shearing forces
  - Intracerebral hemorrhage
    - Variable recommendations for BP reduction

Hypertensive Emergencies

Call 911

Hospital treatment



https://emcrit.org/ibcc/htn/#(2)_Is_this_actually_a_hypertensive_emergency?

Hypertension Resources

- Online resources
  - American Heart Association Target:BP
    - https://targetbp.org
  - Million Hearts
    - https://millionhearts.hhs.gov/tools-protocols/smbp.html

Resistant Hypertension

- BP above goal despite 3 antihypertensives of different classes
- One of the medications is a diuretic and all at maximally tolerated doses
- Includes patients with controlled HTN who require 4 antihypertensives

Resistant Hypertension

- Can be associated with:
  - Interfering substances
  - Volume overload
  - Contributing factors
  - Secondary factors

Interfering substances

- Oral contraceptives
- NSAIDs
- Stimulants
- Sympathomimetics
- Alcohol
- Some antidepressants
- Corticosteroids
- Cyclosporine
- Tacrolimus
- Erythropoeitin
- MAO inhibitors
- Dietary supplements

Contributing Factors

- Older age
- Heavy alcohol intake
- Obesity

Secondary Hypertension

Obstructive Sleep Apnea

Primary Hyperaldosteronism

Cushing’s disease

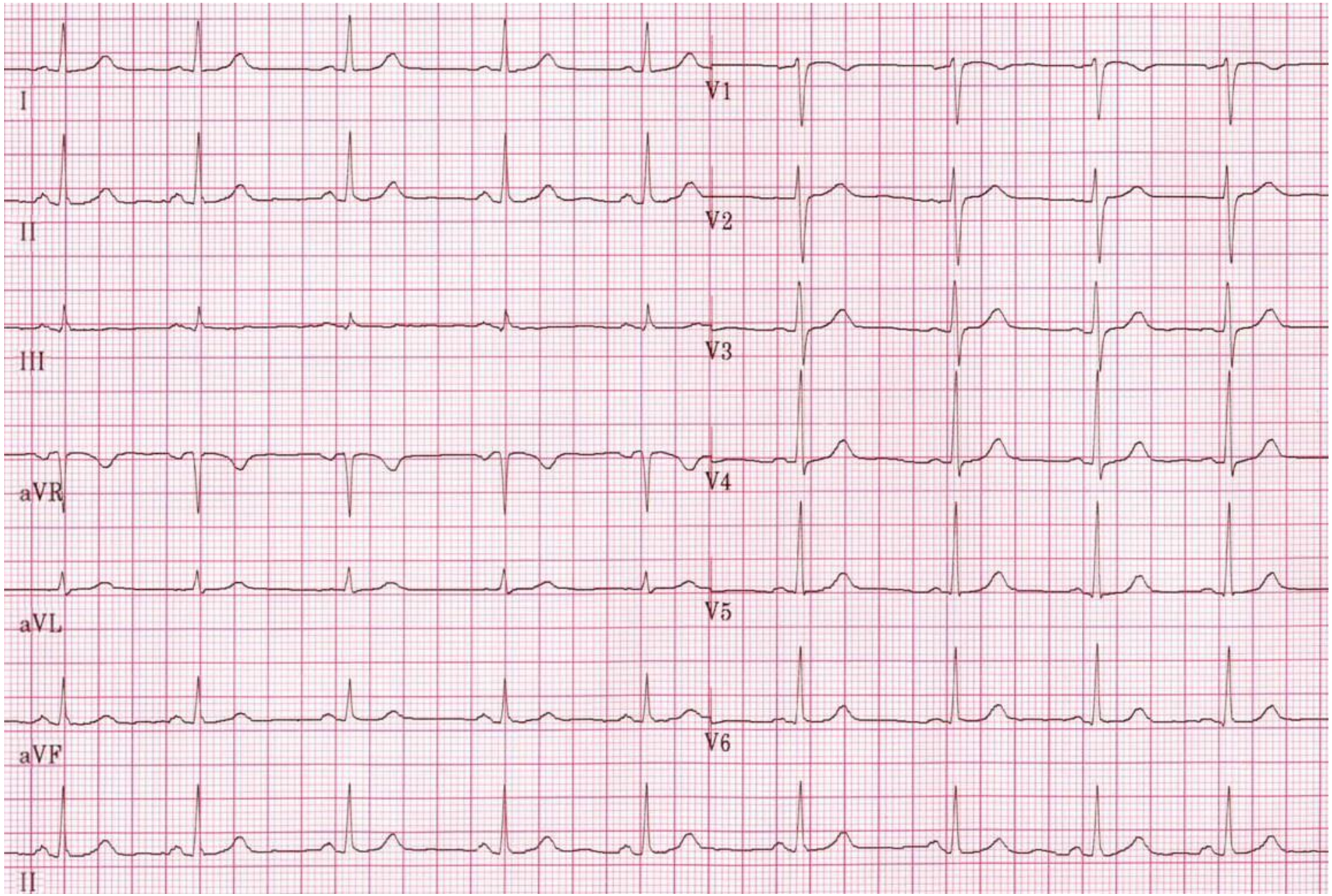
Thyroid disease

- Coarctation of the Aorta
- Renal artery stenosis
- Hyperparathyroidism
- Pheochromocytoma

EKG basics review

Small box=.04 msec
Large box=.20 msec

Small box = 1 mm
Large box = 5 mm



CC: NC

Case 1

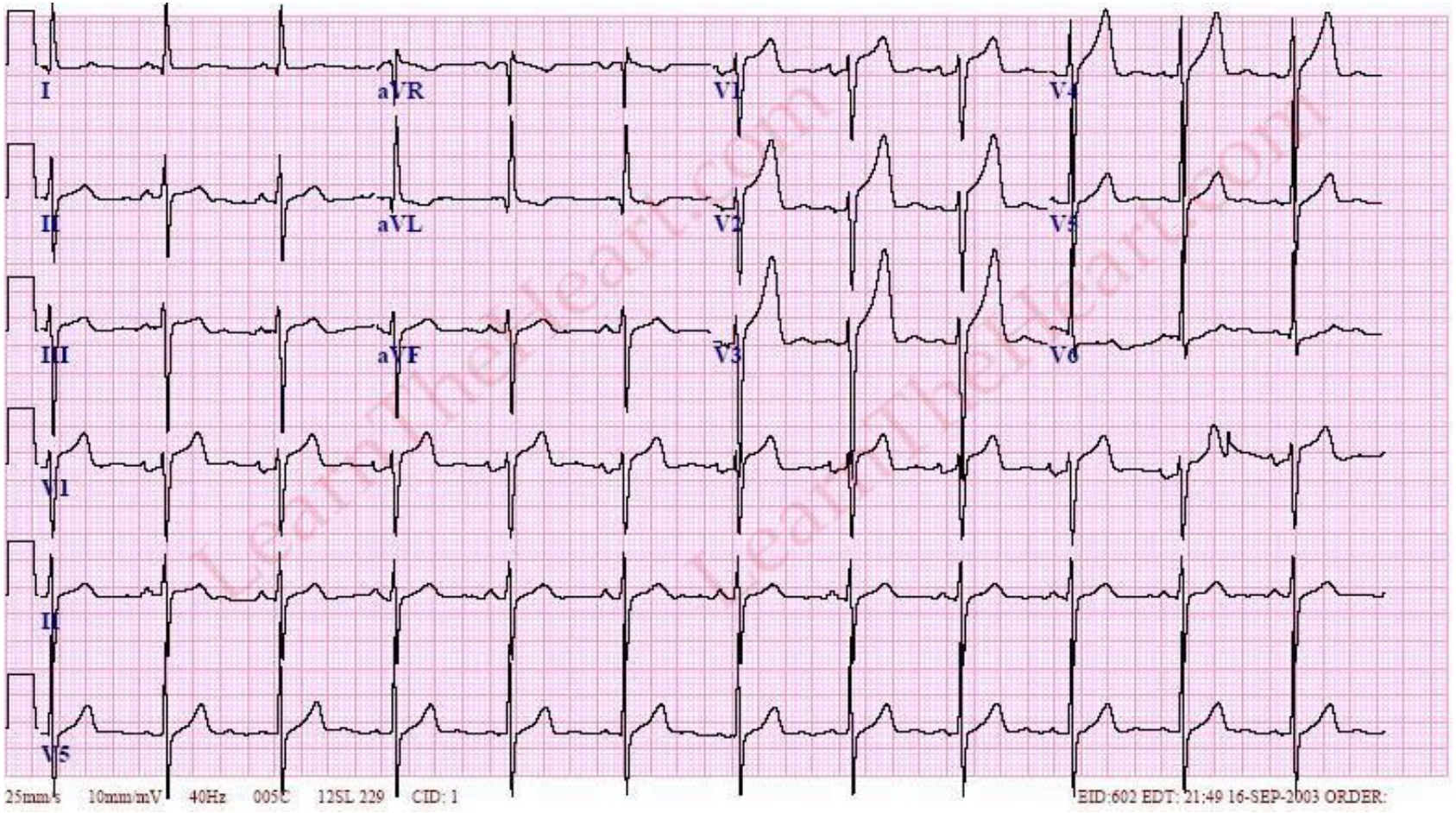
37 yo male diagnosed with HTN 2 years ago presents to the office with headache and new onset blurry vision x 2 days.

Medications:

- HCTZ 25 mg daily
- Amlodipine 10 mg daily
- Ramipril 5 mg daily

Last labs 6 months ago with normal kidney function

Case 1



Modified Cornell Criteria:
Examine the R wave in aVL.
R wave > 12 mm in amplitude = LVH

Small box = 1 mm
Large box = 5 mm

https://www.healio.com/cardiology/learn-the-heart/ecg-review/ecg-archive/left-ventricular-hypertrophy-ecg-example-1

Differential Diagnosis

- Hypertensive Emergency
- Cerebral Aneurysm
- Brain Tumor
- Anxiety disorder
- Sympathomimetic drug/substance use

Case 1

- Additional questions
- Next steps

Case 2

44 yo female with no significant PMH presents to your office with c/o chest pain associated with diaphoresis. Negative FH of cardiovascular disease.

BP 140/83 HR 68 RR 18

O2 Sat 99% on RA

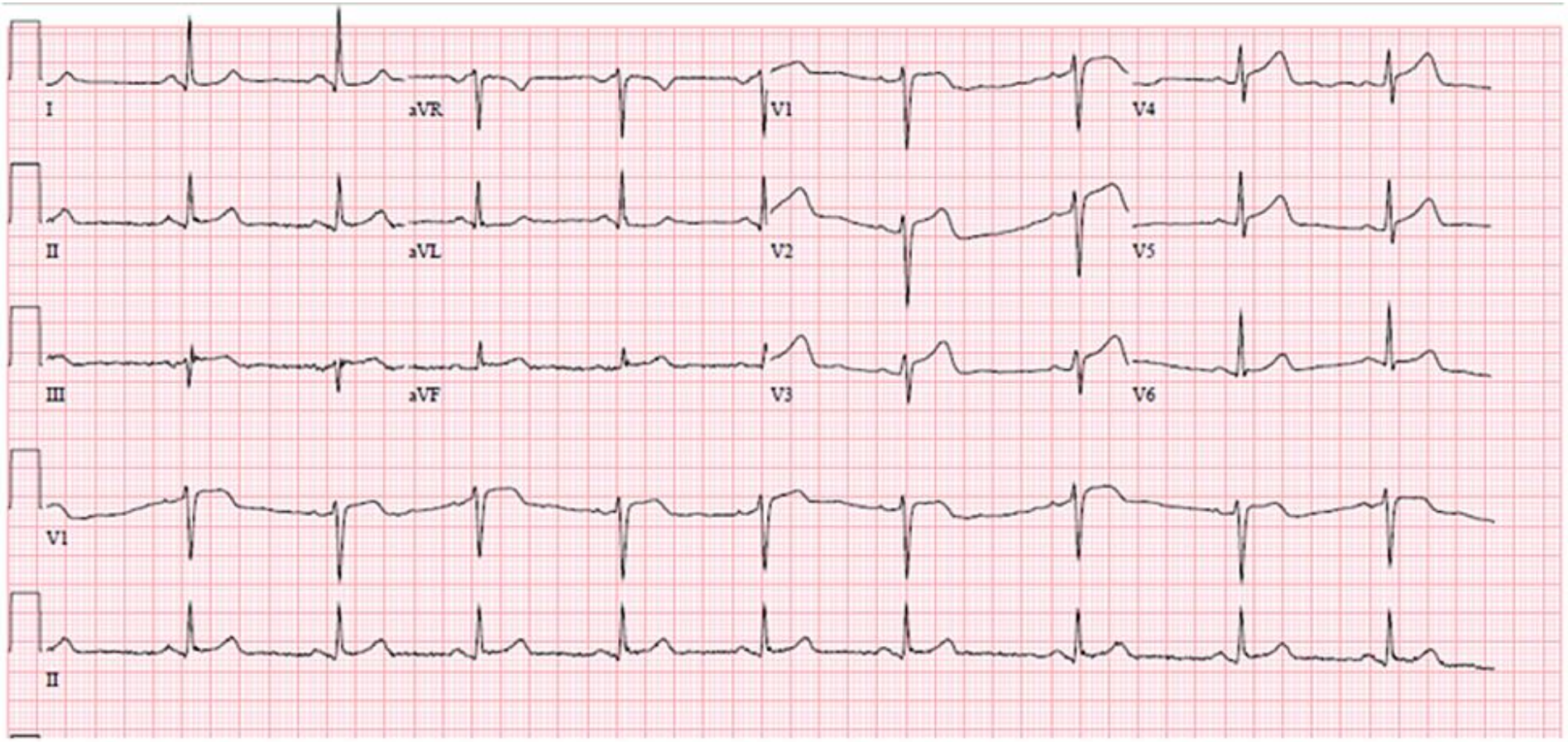
PE: Unremarkable

Not currently taking any medications, OTC, herbs or other substances.

Differential Diagnoses

- Acute Coronary Syndrome
- SCAD
- Viral Myocarditis
- Pericarditis
- Pulmonary Embolism
- Aortic Dissection

Case 2



https://www.cureus.com/articles/56411-the-young-heart-tears-easily-apart-a-case-report-of-spontaneous-coronary-artery-dissection#!/

Case 2

Next steps- EMS transport to local ED

Angiogram indicated 95% mid LAD occlusion.

Pt. became hemodynamically unstable and SCAD identified and successful stent placement

Followup post hospitalization

Meds: DAPT x 2-3 months, ASA for life, statin and beta blocker

Spontaneous Coronary Artery Dissection (SCAD)

Risk factors

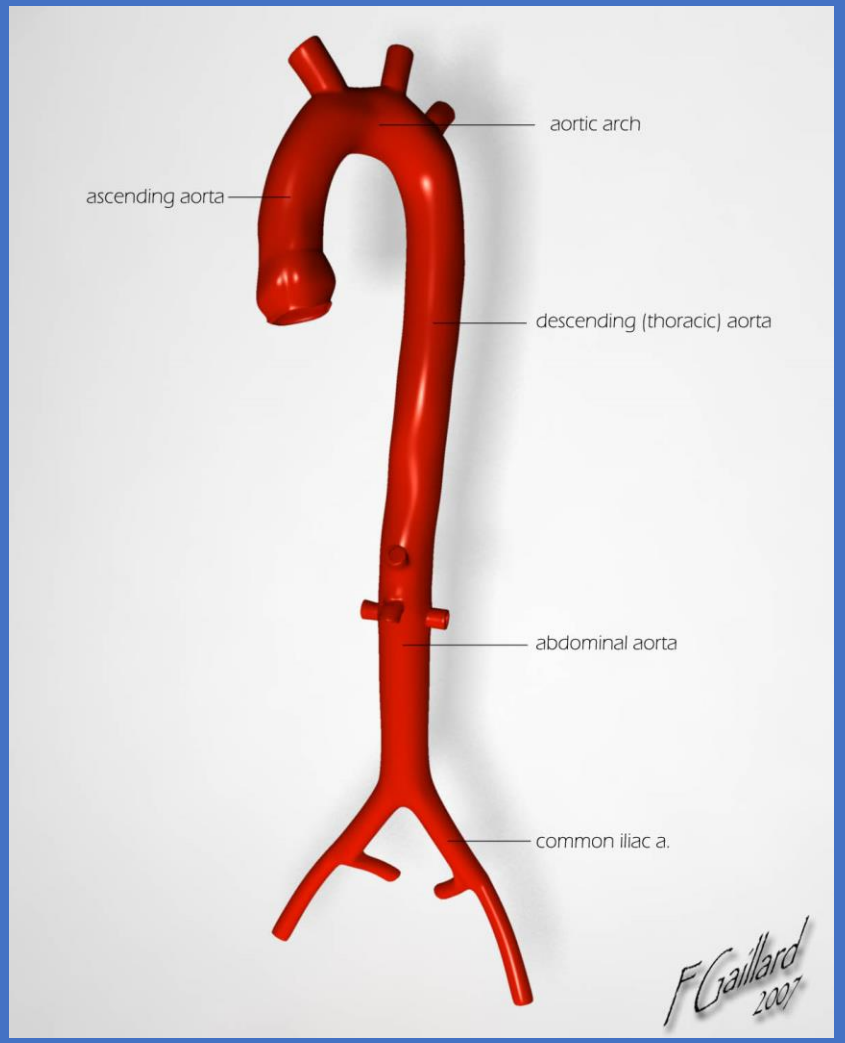
- Most often seen in women aged 40-50
- May not have cardiovascular risk factors.
- A few weeks postpartum
- Hormone therapy- oral contraceptives, fertility treatment
- Fibromuscular dysplasia
- Inherited connective tissue disease
- Severe hypertension
- Cocaine

Case 3

- 67 yo male with PMH of 40 pk/yr smoker, HTN, OSA and kidney stones. Presents with c/o diffuse abdominal pain since early am with radiation to right flank.
- BP 138/80 HR 88 RR 14 O2 Sat 100% on RA BMI 23
- Current Meds: Chlorthalidone 25 mg daily.
- PE: Abdomen tender, no rebound, palpable pulsation midline, +bruit, no CVA tenderness

Abdominal Aortic Aneurysm

- Risk Factors
  - Age >60 yrs
  - Tobacco use
  - Hypertension
  - Male
  - Family history-
    - 1st degree relatives
    - Connective tissue disease



https://www.nhlbi.nih.gov/health/aortic-aneurysm/causes

Differential Diagnosis

- Abdominal aortic aneurysm
- Acute Coronary syndrome
- Mesenteric ischemia
- Acute gastritis
- Perforated ulcer
- Appendicitis
- Pyelonephritis

Case 3

- Additional questions
- Next steps

Case 4

53 yo female, postmenopausal, with obesity, DMT2, former smoker 20 pk/yrs- quit 6 weeks ago who presents with a 2 hr h/o fatigue and associated nausea without vomiting.

Meds: Metformin 1000 mg bid, Ozempic 1 mg subcutaneously weekly

PE: BP 108/64 HR 76 RR 20 O2 Sat 93% on RA

Remainder of exam unremarkable

Differential Diagnosis

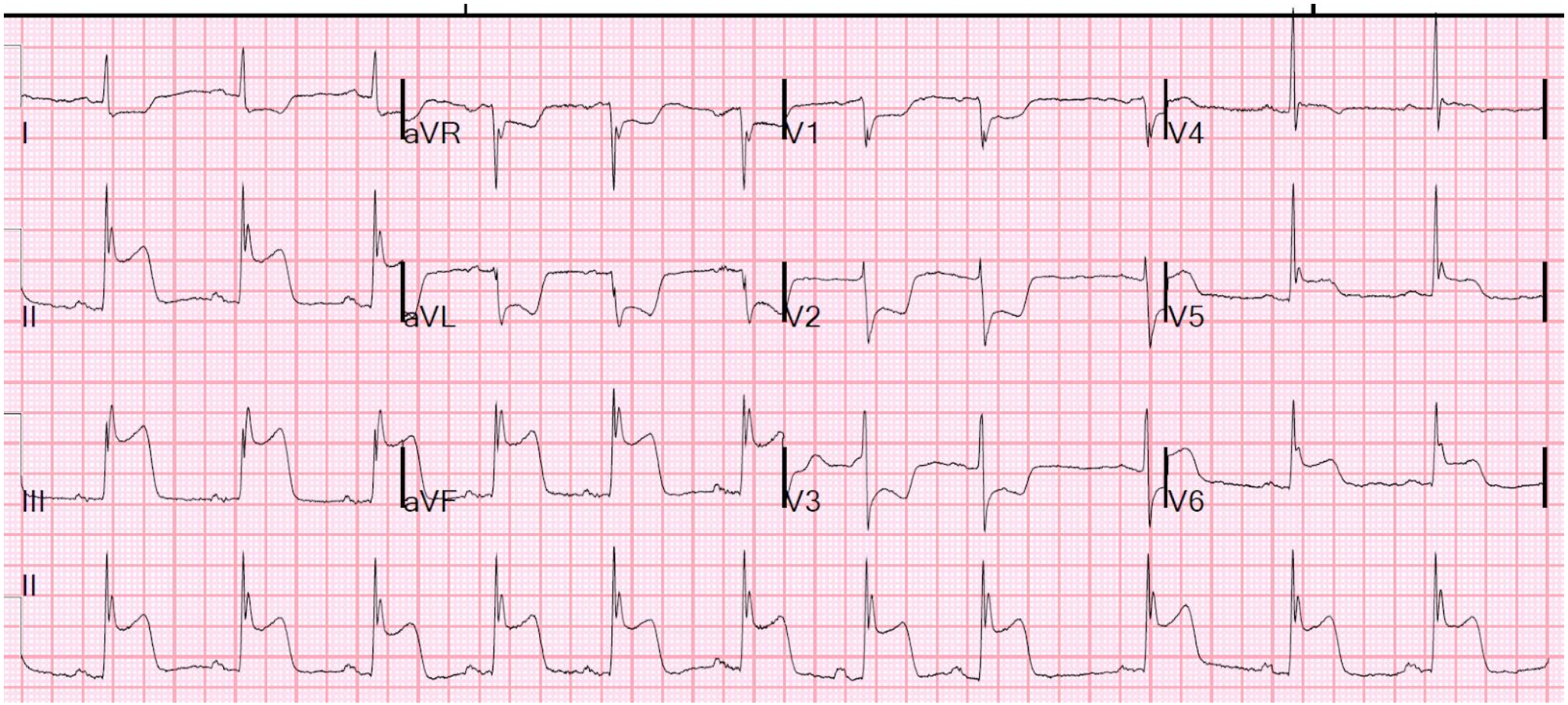
- ACS
- DKA
- Cholelithiasis
- Esophageal spasm

Determining Risk

- Low risk= 0-3
- Intermediate risk = 4-6
- High risk = 7-10
- High sensitivity for low risk pt in short term for MACE

HEART Score		
History	Slightly suspicious	0
	Moderately suspicious	1
	Highly suspicious	2
EKG	Normal	0
	Non-specific repolarization disturbance	1
	Significant ST deviation	2
Age	< 45	0
	45-64	1
	≥ 65	2
Risk Factors	No known risk factors	0
	1-2 risk factors	1
	≥ 3 risk factors OR atherosclerotic disease	2
Initial troponin	Less than upper limit of normal	0
	1 to 3x normal limit	1
	> 3x normal limit	2
	TOTAL:	

Case 4



Case 4

Next steps- EMS transport to local ED

Angiogram indicated 90% proximal RCA occlusion and distal 75% Circumflex .

Multivessel Coronary Artery Bypass Graft surgery

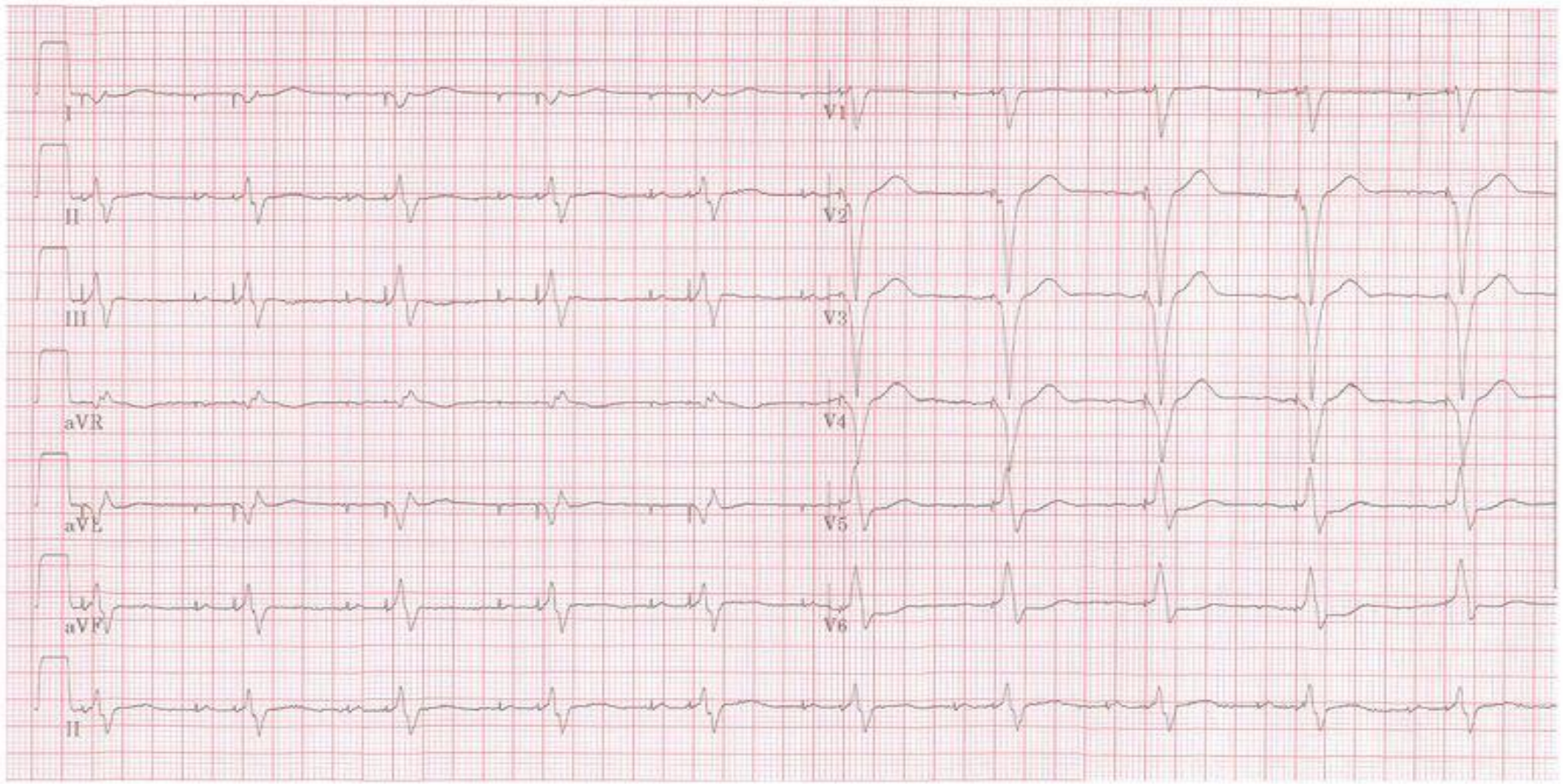
Followup post hospitalization

Meds: ASA, statin, ACEi, beta blocker continue on other meds

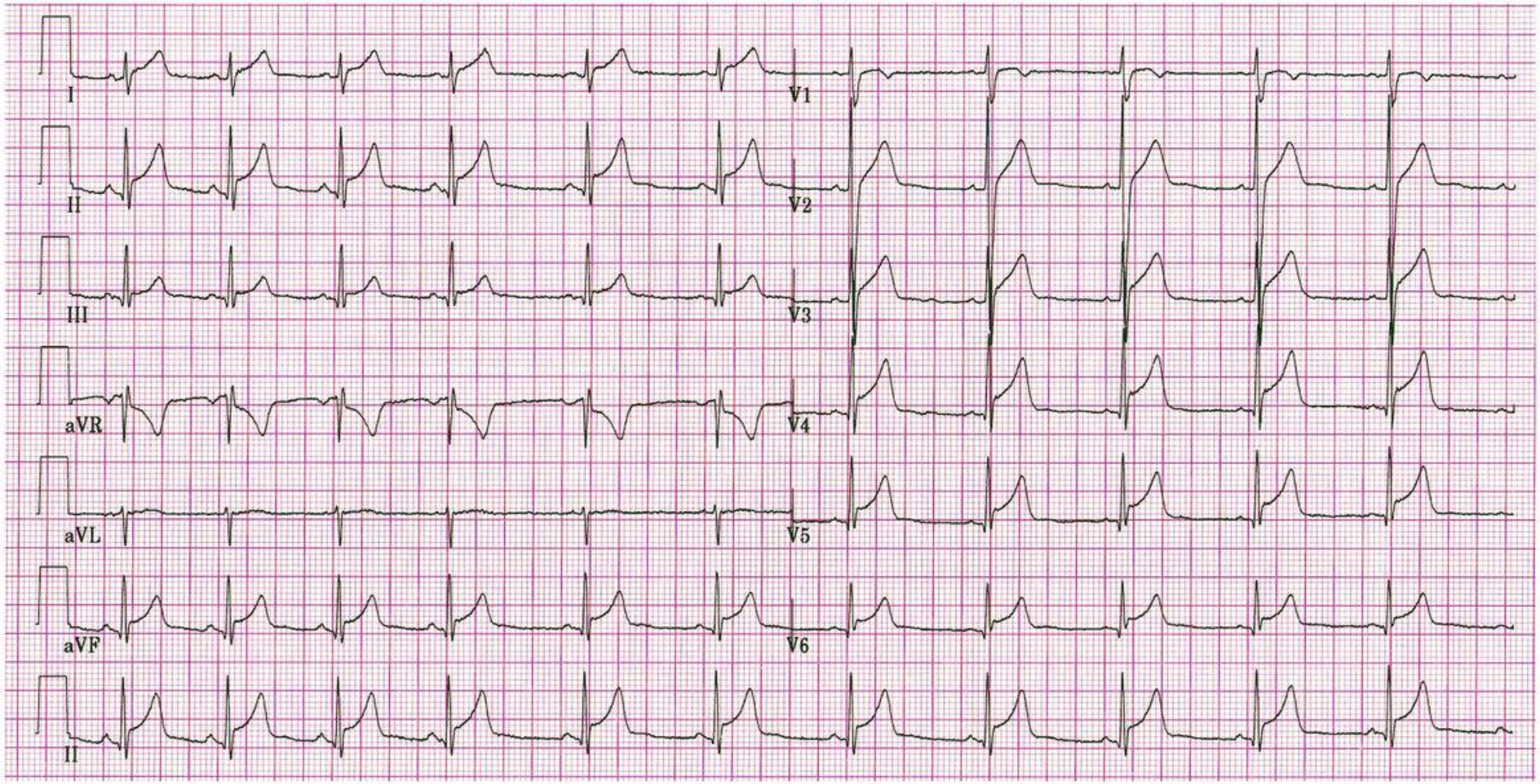
Cardiac rehabilitation

CC; NC

Bonus EKG



Bonus EKG



Courtesy of C. Rebel, Ter Gooi Hospital, The Netherlands

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Questions?