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# Spontaneous Coronary Artery Dissection (SCAD)

Agnes Koczo, MD

# Learning Objectives

- Describe the current understanding of the pathophysiology of SCAD
- Form “illness script” for SCAD
  - Risk factors, clinical features
- Diagnose SCAD
- Manage a patient with SCAD in hospital and outpatient

# Case

- 41-year-old female
- ED with 4 hours of acute left arm pain radiating to her right arm
- High sensitivity troponin 10,000
- Warm and well perfused on physical exam

# Past Histories

## PMH

- None

## Ob history

- G4P4
- No hypertensive disorder of pregnancy
- No symptoms of perimenopause

## PSH

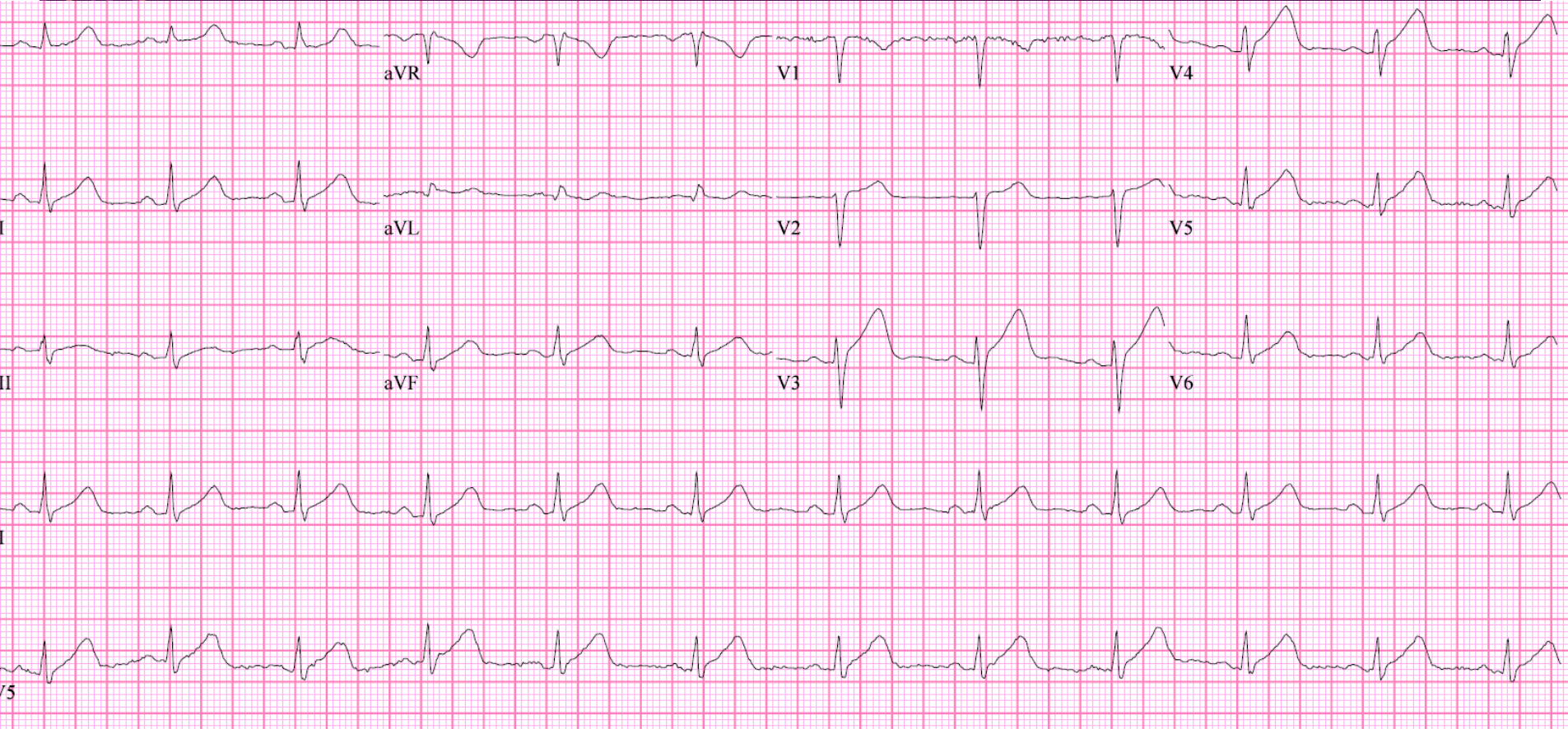
- Orthopedic procedures post MVA

## FH

- No early CAD or sudden cardiac death
- No SCAD, FMD, aortopathy, or connective tissue disease

## Social

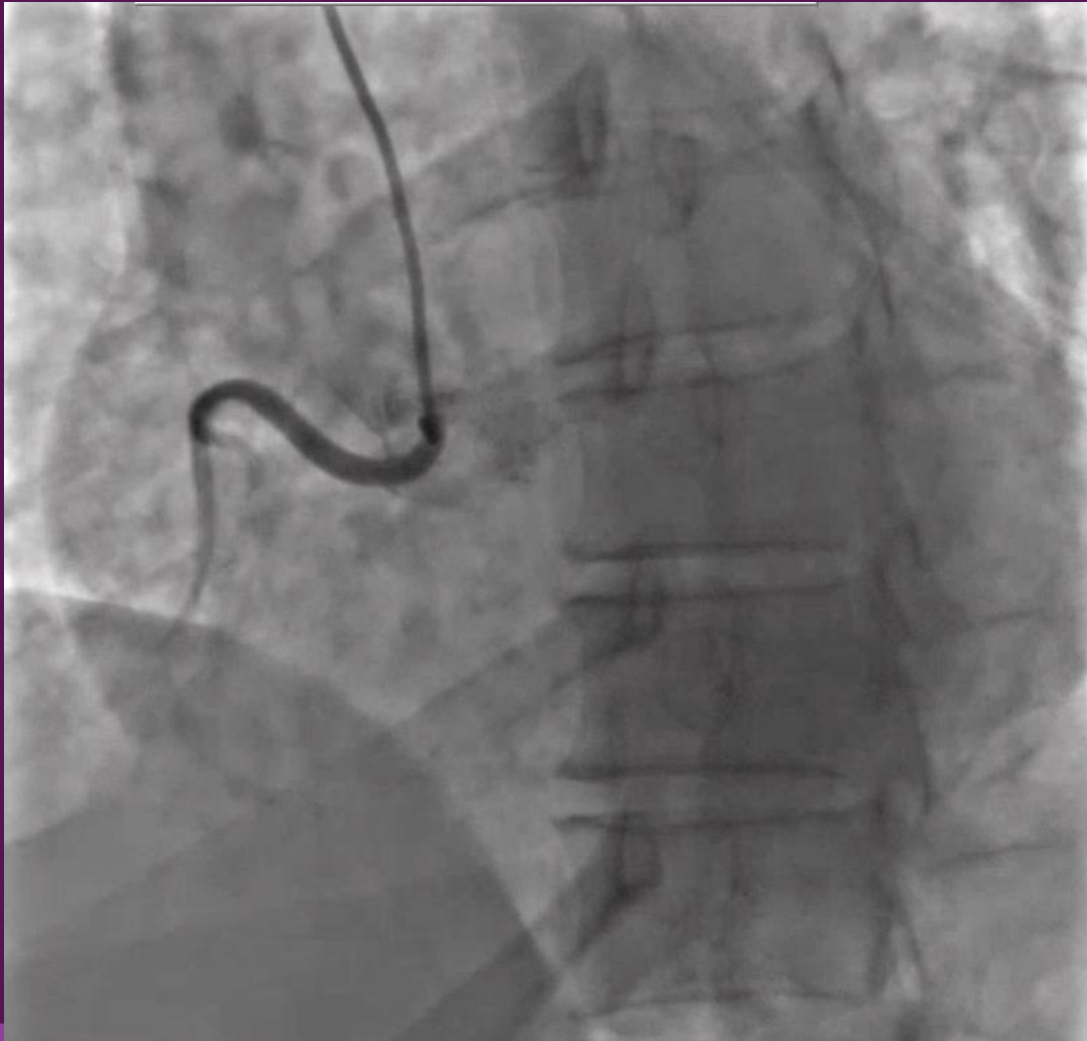
- Lives with husband and children
- No Etoh, smoking, illicit







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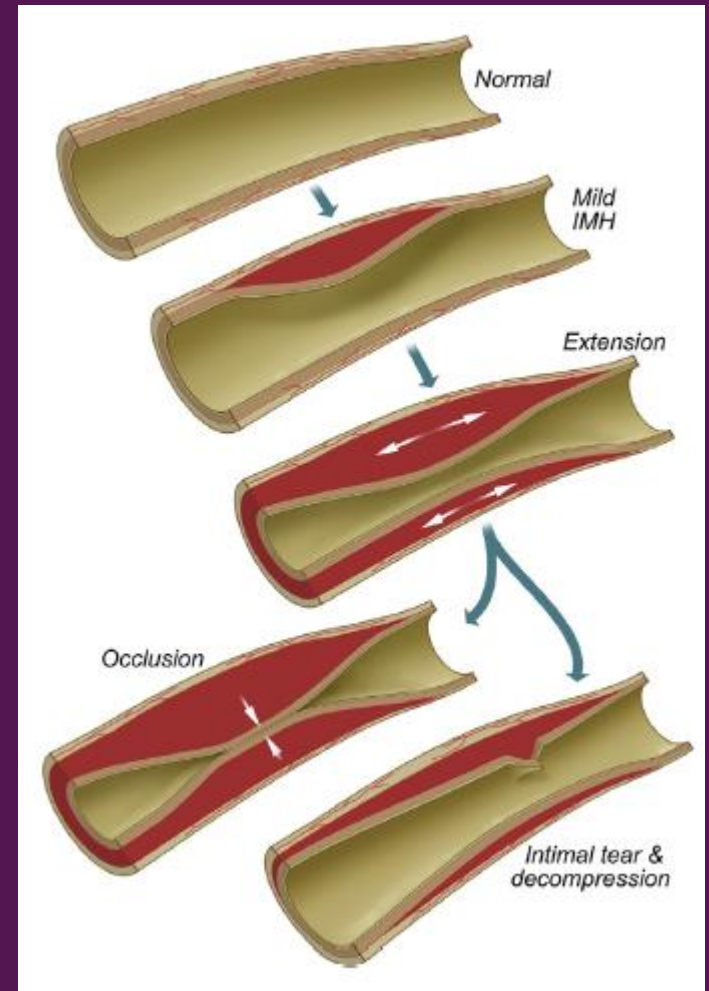


# LHC

- Left anterior descending (LAD) narrowed from the mid to distal segment
- Spontaneous coronary artery dissection (type II)

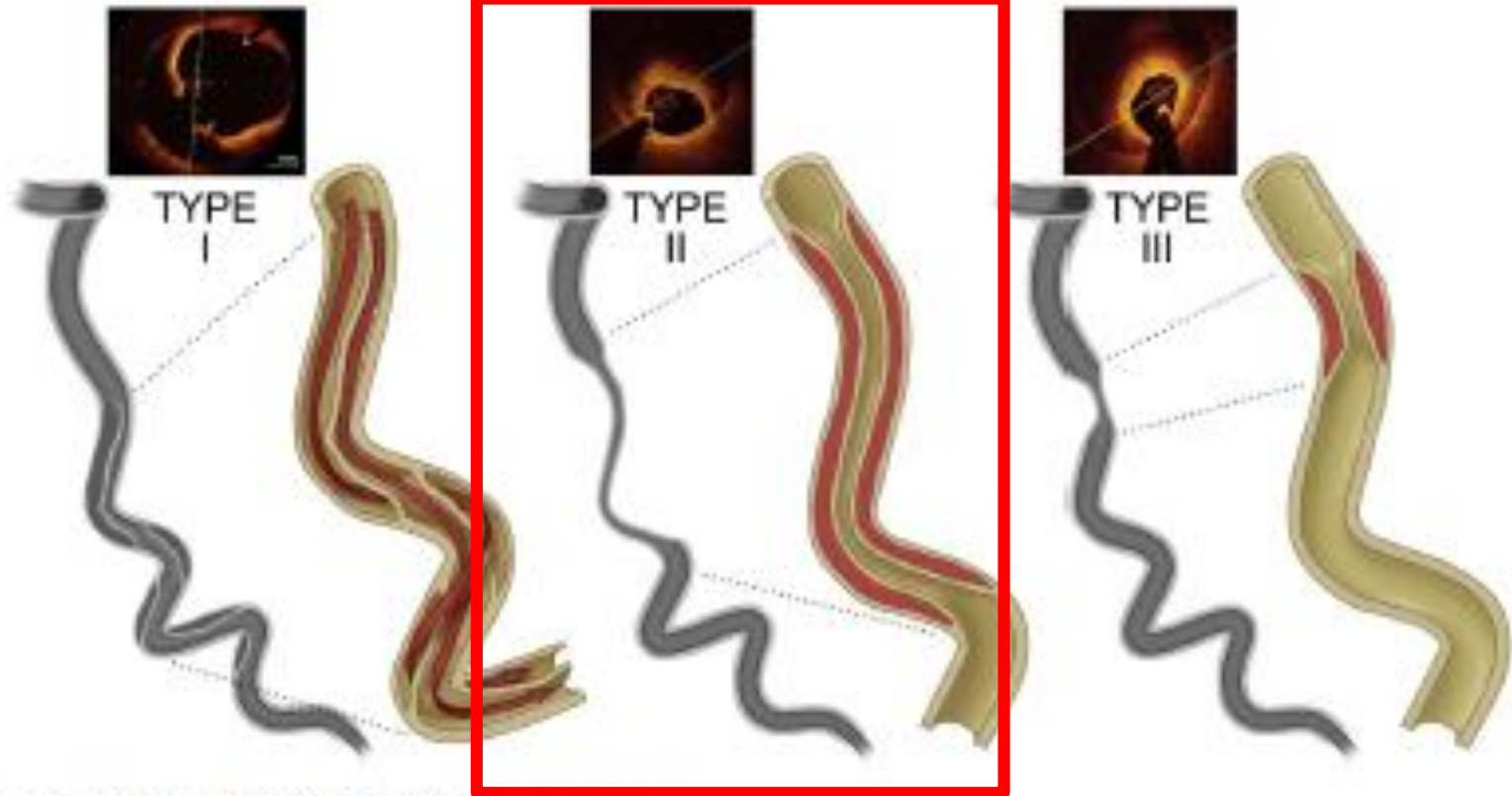
# Pathophysiology

- Hematoma within the tunica media
- Inside out (dissection flap)
- Outside in (de novo)



Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug

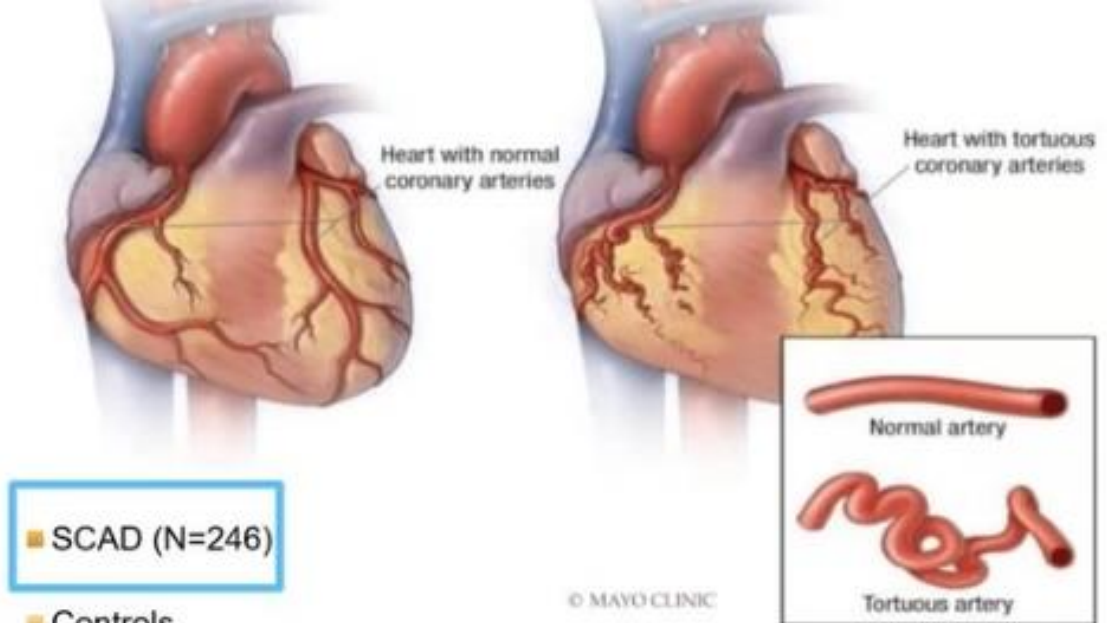
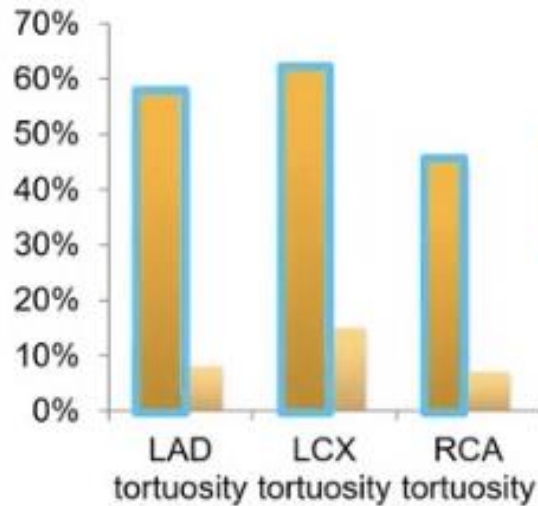
# SCAD Types



Hayes, S.N. et al. J Am Coll Cardiol. 2020;76(8):961-84.

# Coronary Tortuosity

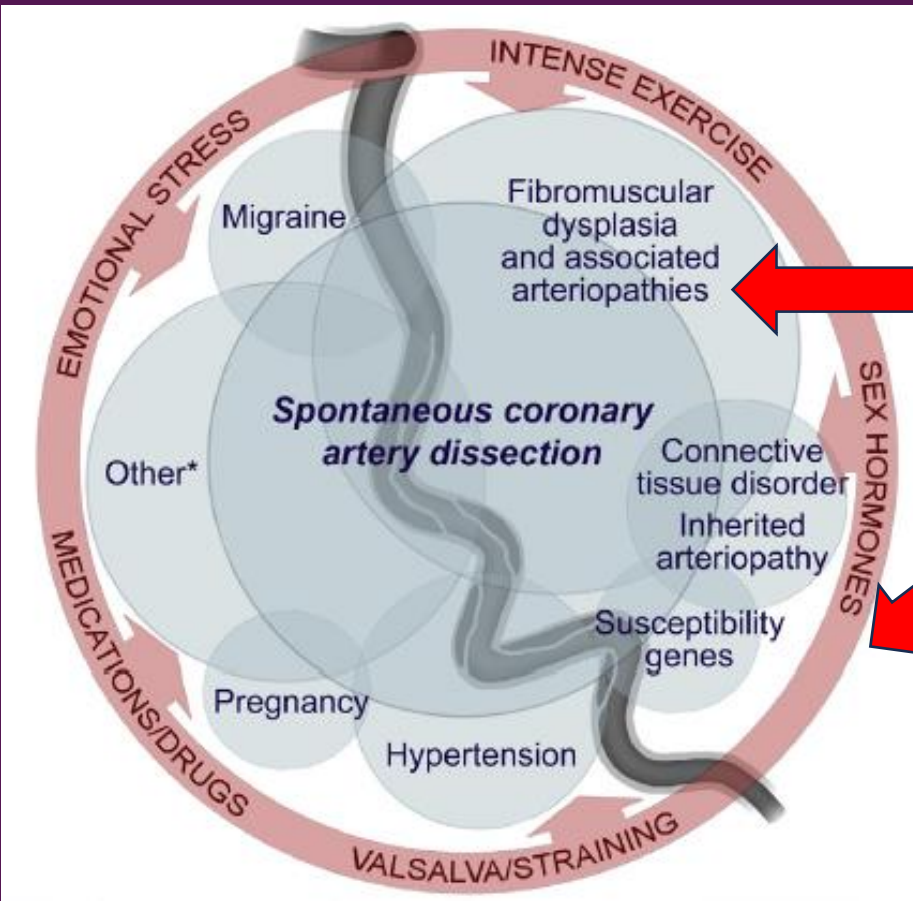
## ARTERY TORTUOSITY



Eleid et al., Circ Cardiovasc Interv 2014

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# SCAD Causes



Two Hit Hypothesis:

1- Vascular abnormality

2- Trigger

Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug

# Epidemiology



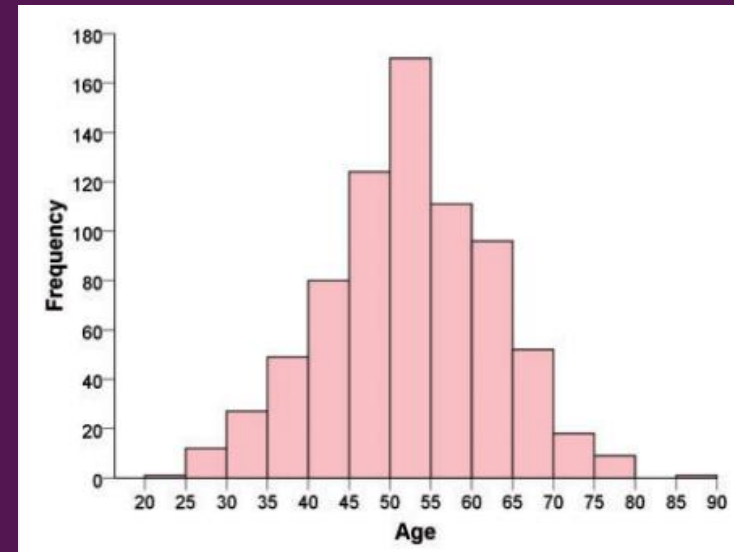
Illness script:  
ACS in postpartum  
or perimenopausal

## Female

- Fourth-fifth decade (perimenopausal)
- Pregnancy (postpartum)

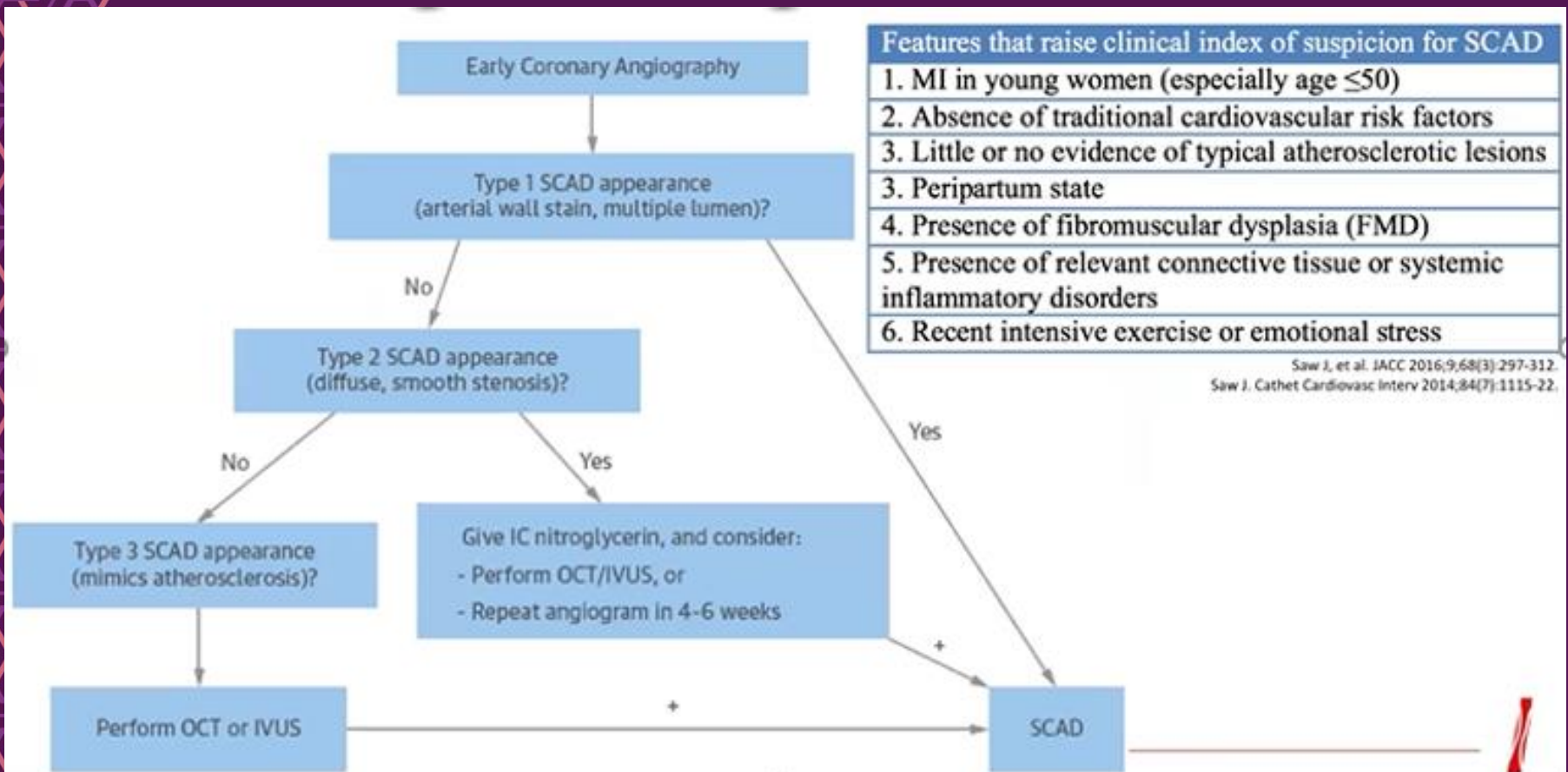
## Non-atherosclerotic

- HTN (30%)
- HLD (25%)



Saw, J. Canadian Spontaneous Coronary Artery Dissection Cohort Study. EHJ. 2019

# Proposed Diagnostic Algorithm



Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug

# Case continued

## Post-cath recommendations:

- No intervention
- TTE in AM
- “Standard therapy for SCAD”



# Case continued

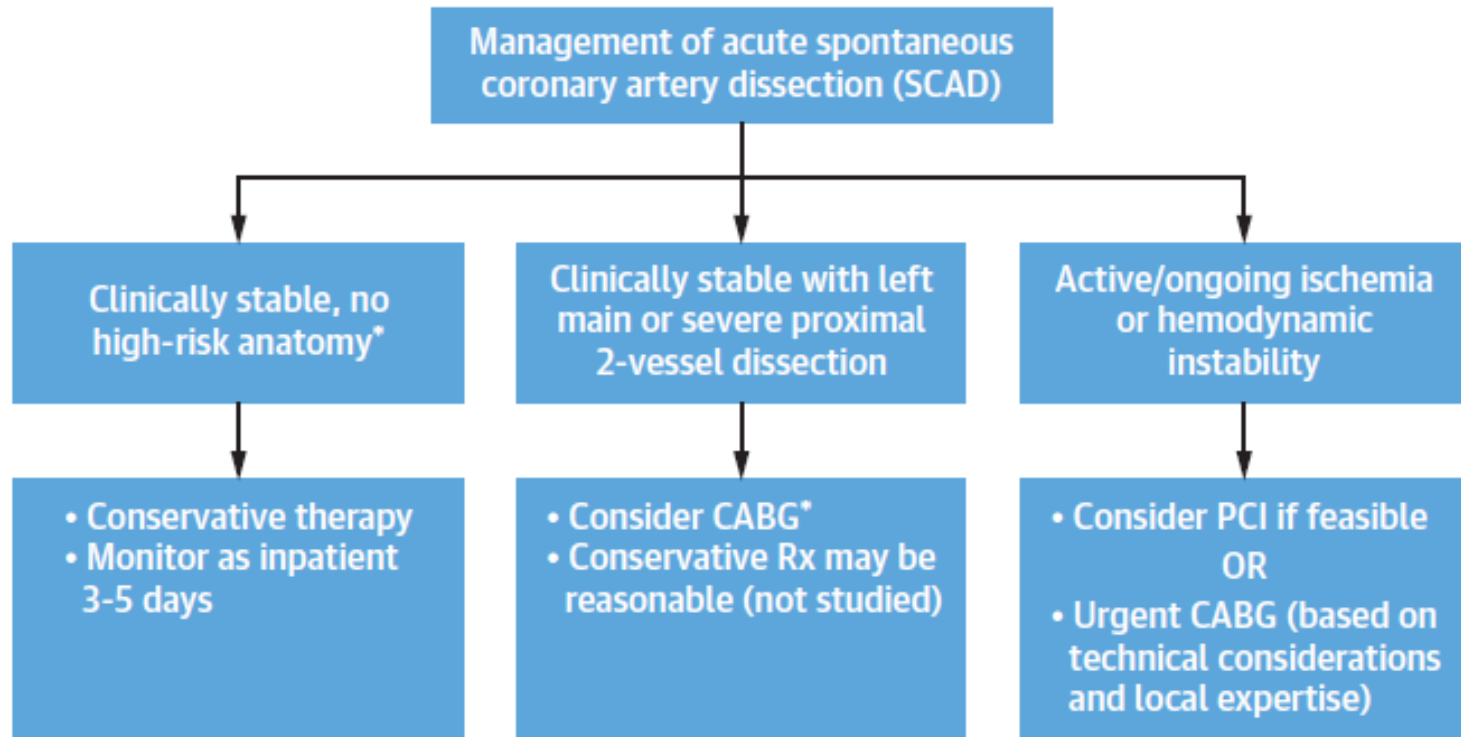
- TTE: EF 40-45%, severely hypokinetic apex and anterior wall
- Chol 156, LDL 88, HDL 52, VLDL 16, TAG 78
- HgA1c was 5.4



Therapies to start for this patient?

What if her EF was normal?

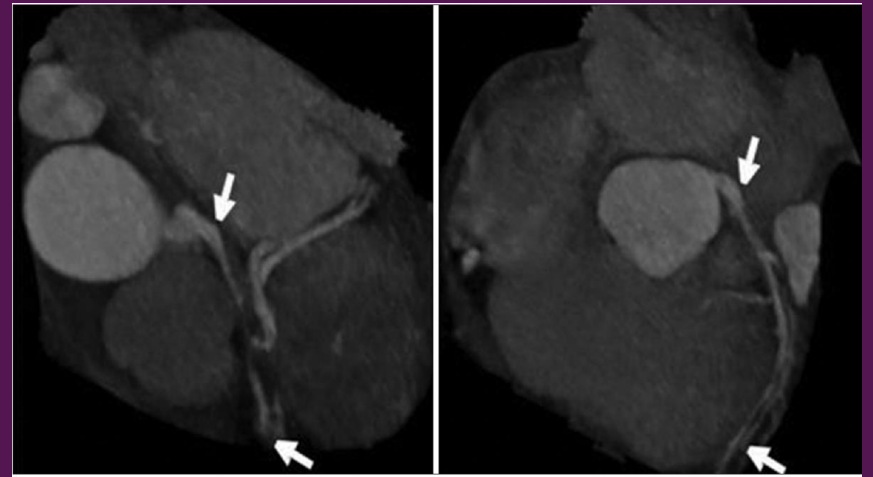
**FIGURE 14** Algorithm for Management of Acute SCAD



Although a "conservative as possible" approach is generally preferred in acute SCAD, more severe presentation, ongoing symptoms, and other high-risk feature may warrant revascularization. \*Left main or proximal 2-vessel coronary artery dissection. CABG = coronary artery bypass grafting; PCI = percutaneous coronary intervention; Rx = management. Adapted with permission from Hayes et al. (1).

Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug

# Coronary CTA



Pulivarthi S et al. SCAD and acute myocardial infarction after cesarean section in a postpartum woman with untreated dyslipidemia. Heart Views. 2014 Jul

# SCAD Medical Therapy

- HTN- comorbid, associated with recurrence
- Beta-blocker - reduces recurrence
- Statin- only if by lipid profile (not atherosclerosis driven)
- DAPT- lack of consensus (rare to have intraluminal thrombus)
  - Recent trial showing increased MACE with DAPT
  - 2-4 weeks post ACS, ASA 3-12 months

Saw J, Spontaneous coronary artery dissection: clinical outcomes and risk of recurrence. JACC 2017

# Case continued

## Discharge Meds

- DAPT: ASA and Brillinta
- Coreg 6.25mg BID
- Lisinopril 5mg daily
- Atorvastatin 40mg daily



What is your post-discharge anticipatory guidance?

# Recurrent SCAD

- 1/6 patients acute worsening < 7 days index event
- Recurrent SCAD:
  - De novo coronary dissection (<1 month of initial event may be a continuation)
  - Risk 10-30%

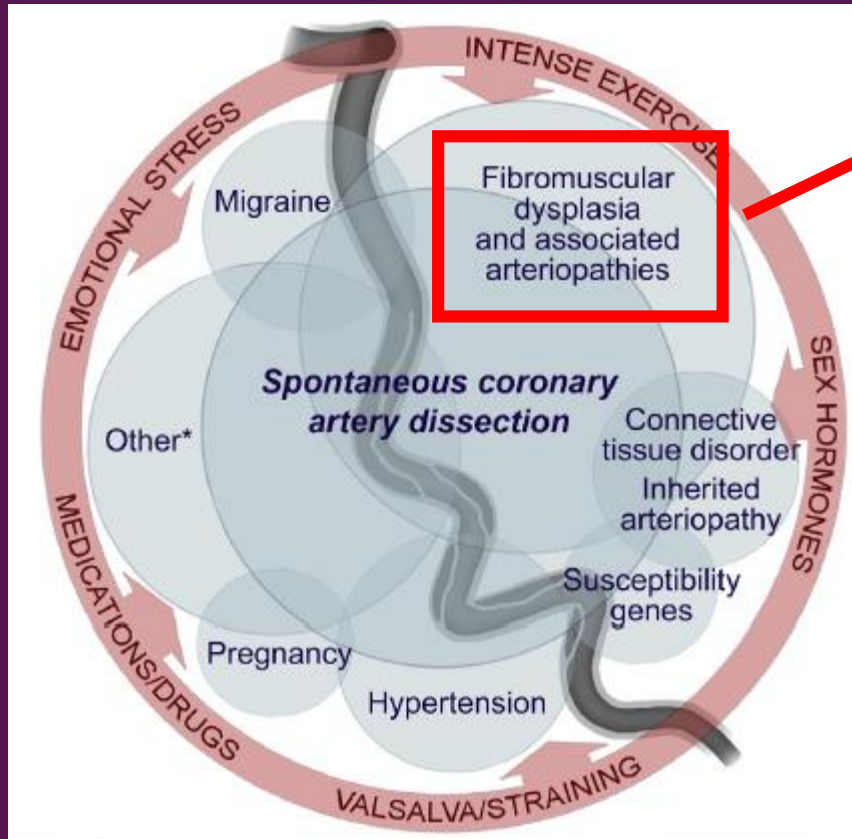
(Hassan, S. JACC Cardiovasc Interven)





Recommendations for long-term follow-up?

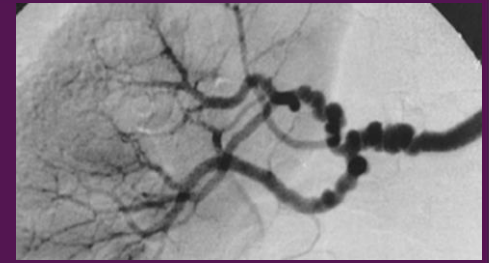
# Associated Conditions



40-80% FMD  
overlap

Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug

# FMD and SCAD



- Angiographic diagnosis

  - Unifocal: circumferential or tubular stenosis

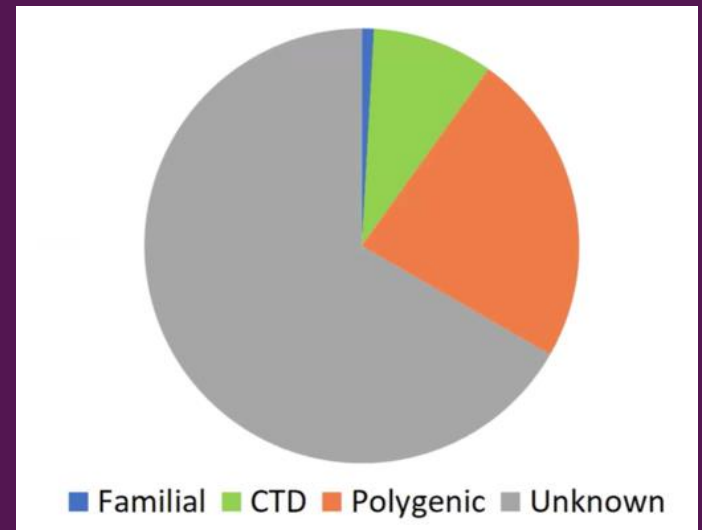
  - Multifocal: angiographic appearance of a "string of beads"

- Major consensus documents: brain to pelvis imaging via noninvasive ie. CTA or MRA

Gornik HL, First International Consensus on the diagnosis and management of fibromuscular dysplasia. Vasc Med. 2019 Apr.

# Genetics of SCAD

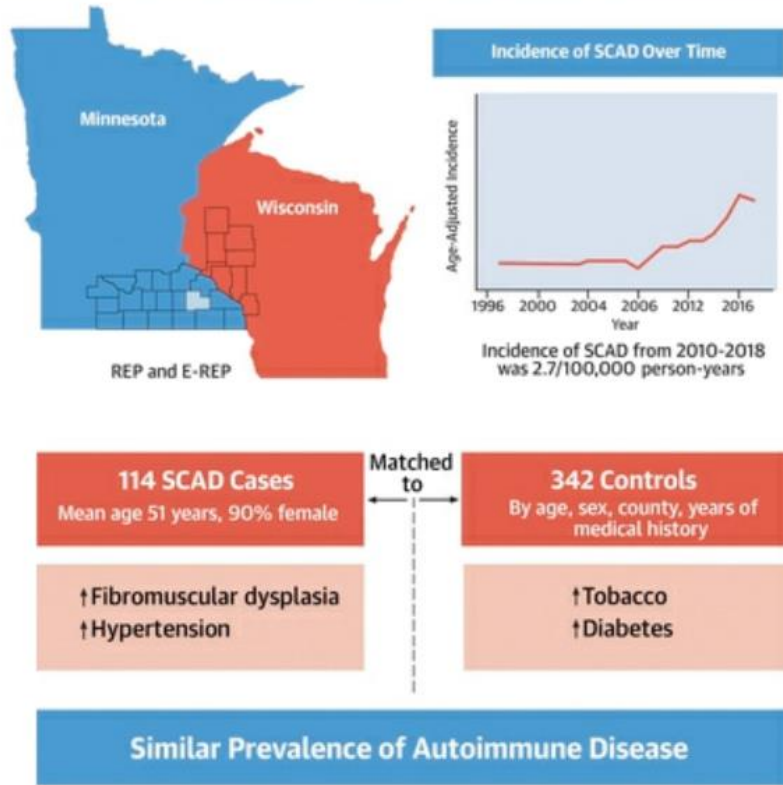
- Polygenic risk markers not ready for clinical application
- Specific known genes for inherited arteriopathies have applications
- Take home: **Involve genetic counselors for patients with clinical features concerning for arteriopathy or strong family history**



Saw et al. Nature Communications. 2020

# Autoimmune disease and SCAD

## CENTRAL ILLUSTRATION: Summary of Study Findings



- Rochester Epidemiology Project
- NOT associated with SCAD
- OR 0.81 (95% CI 0.5-1.66)

Kronzer, VL. Lack of Association of Spontaneous Coronary Artery Dissection With Autoimmune Disease. J Am Coll Cardiol. 2020 Nov

# Pregnancy Associated SCAD (P-SCAD)

- Majority (>70%) postpartum, within first week
- **More severe**  
(STEMI, low EF, left main/multivessel, shock, in-hospital MACE)
- Prior infertility treatment, pre-eclampsia
- FMD less common

Hayes, S. Spontaneous Coronary Artery Dissection. JACC. 2020 Aug  
Tweet et al. Pregnancy Associated SCAD. JACC 2017

# Long-term management of SCAD

## Therapies

### Avoid

- Stimulants
- Triptans for migraines
- Hormones

### Contraception

- Long-acting reversible contraceptive devices (LARCs) ie. IUD, subcutaneous implants

# Long-term management of SCAD

## Lifestyle

- Cardiac rehab
- Low weight resistance training (avoid strenuous isometric/extreme endurance)
- Mental health
- No dietary associations

\*\* Consider referring patient to SCAD or Women's Heart specialist and center \*\*



# SCAD Center: Magee Women's Heart Clinic



Dr. Catalin Toma, MD Dr. Ricky Hansra, MD



Dr. Agnes Koczo, MD

Dr. Katie Berlacher, MS MD

Dr. Malamo Countouris, MS MD

## Take Home Points

- Illness script: ACS in postpartum or perimenopausal
  - little/no CAD risk factors
- Gold standard for diagnosis: cath
  - Abnormal echo and “clean cath” -> coronary CTA
- Beta blocker, control hypertension -> recurrence
- Screen all for FMD (head-pelvis CTA)