My Patient Has
Claudication

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Nicholas Petruzzi, MD
Interventional Radiologist
Atlantic Medical Imaging

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What is Claudication?

- Intermittent Claudication
  - Derived from latin word for “limp”
    - A reproducible discomfort of a group of muscles that is induced by exercise and relieved with rest.

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Types of Claudication

- Intermittent Vascular Claudication
  - Typically due to PAD
- Venous Claudication
  - Typically due to venous insufficiency
- Neurogenic Claudication
  - Typically due to LSS (Lumbar Spinal Stenosis)

Differentiating between types

	Vascular Claudication	Venous Claudication	Neurogenic Claudication
Quality of pain	Cramping	"Bursting"	Electric shock-like
Onset	Gradual, consistent	Gradual, can be immediate	Can be immediate, inconsistent
Relieved by	Standing still	Elevation of leg	Sitting down, bending forward
Location	Buttock, thigh, calf	Whole leg	Poorly localized, can affect whole leg
Legs affected	Usually one	One or both	Often Bilateral

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Overall this is not easy…

But Noninvasive testing can help!

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Vascular Claudication and PAD

- PAD occurs in approximately 1/3 of all patients
  - Risk increases over age 70
  - Higher risk at age 50 in smokers or DM
- Strong association with CAD
  - Increased risk of stroke, MI, cardiovascular death
- Progressive disease in 25% with intermittent claudication and ultimately limb threatening ischemia
- Results in impaired quality of Life, Limb Loss, and early mortality

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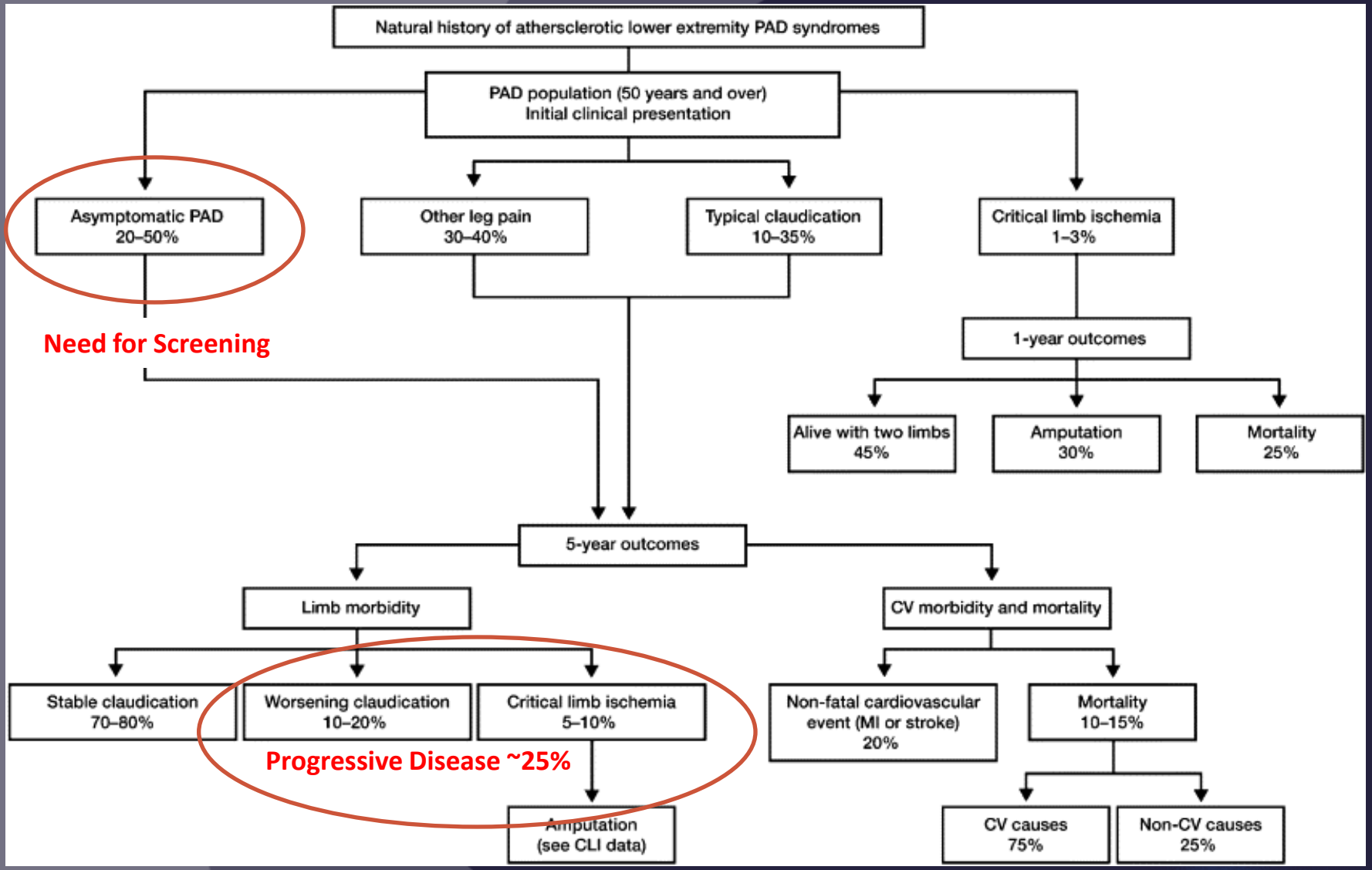

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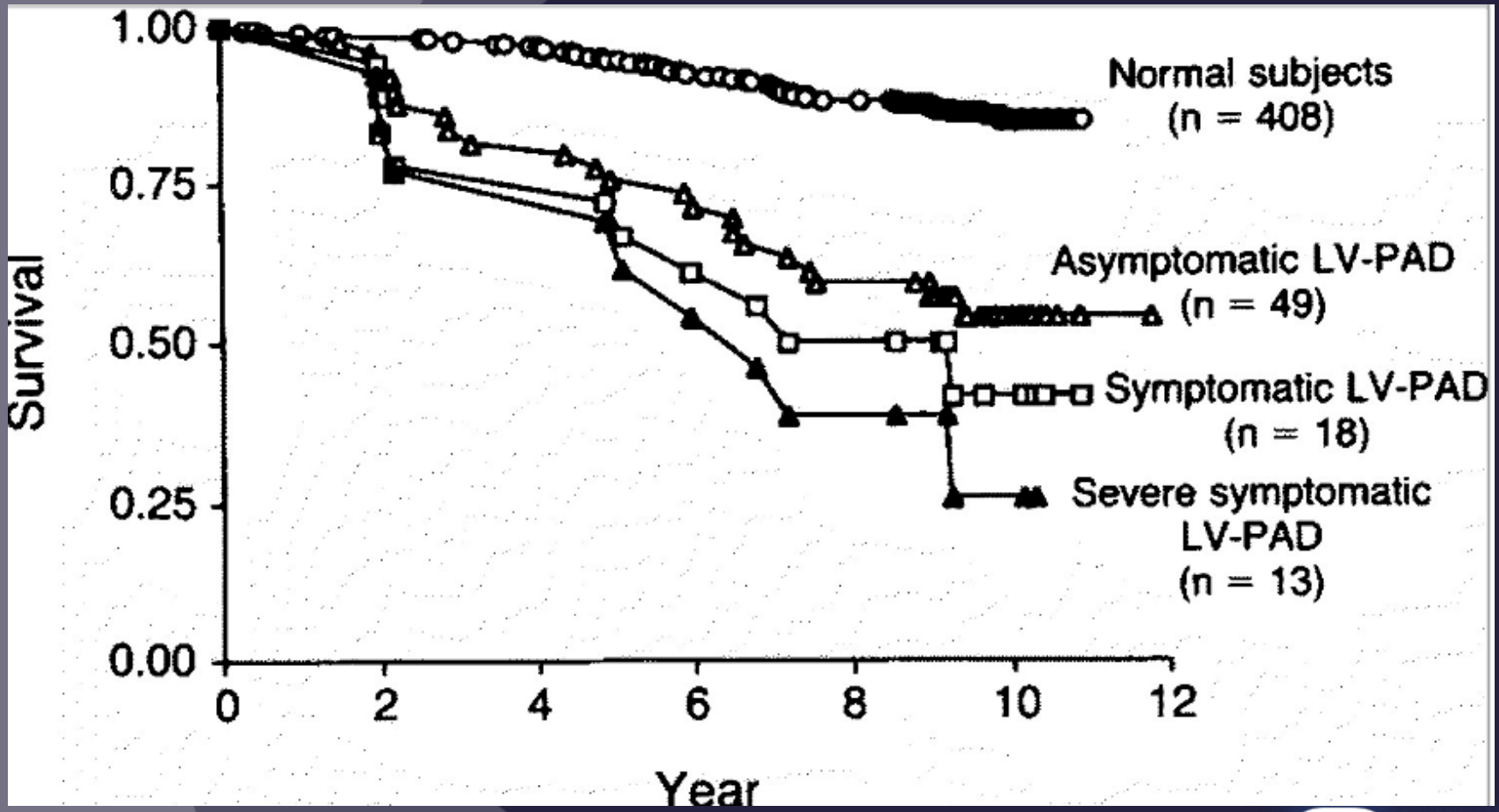
Outcomes in PAD



Criqui MH et al. N Engl J Med. 1992;326:381-386

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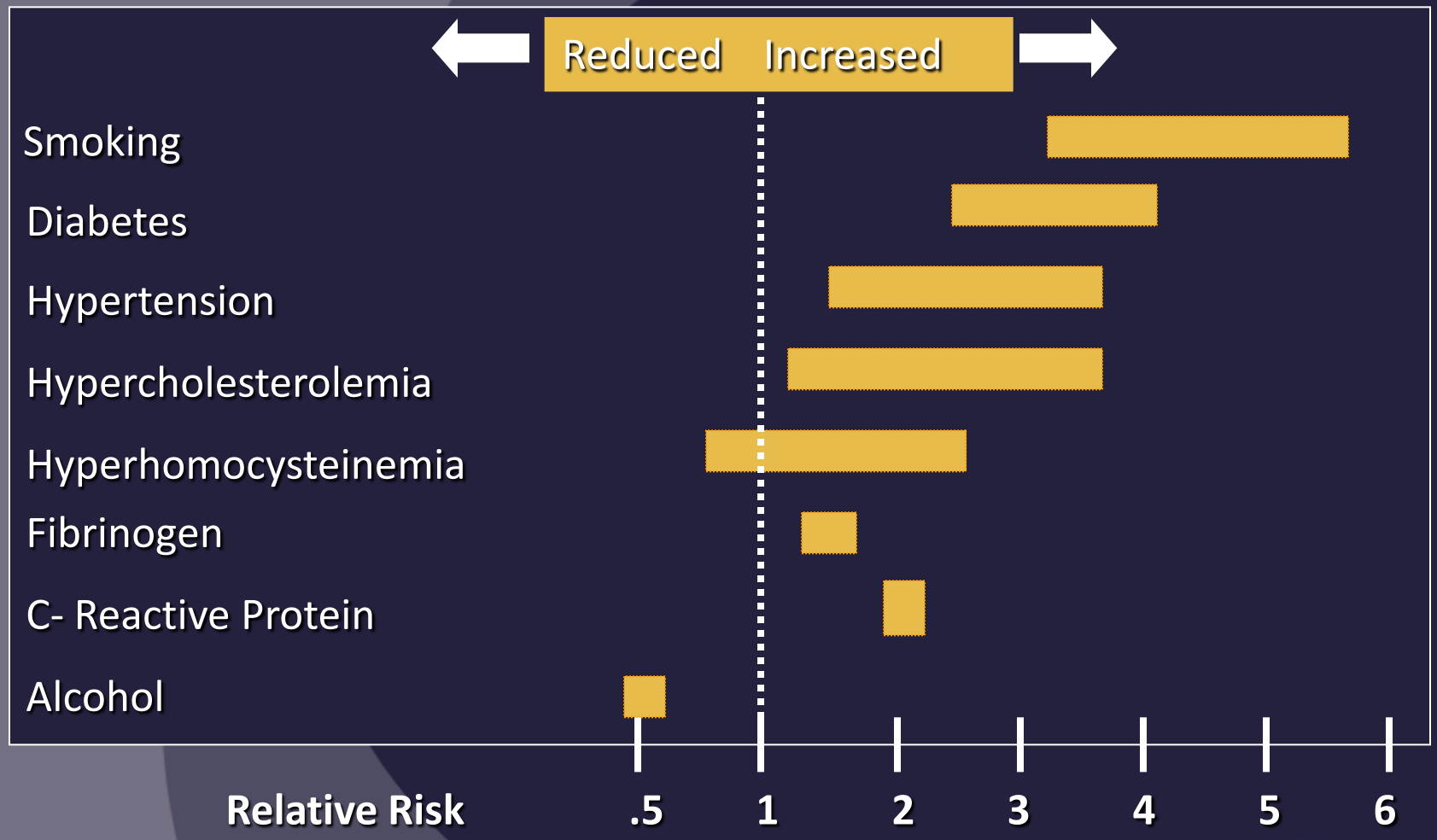
H&P distinguishers

- History of known PAD or significant PAD risk factors
- Symptoms triggered with standing, relieved by sitting, thigh pain, and shopping cart sign suggests Neurogenic [1]
- Symptoms triggered with walking, relieved with standing, and below knee pain suggests Vascular
- Trophic Signs can help
  - Skin atrophy, thickened nails, hair loss, dependent rubor, ulceration, gangrene

Classification Systems

Fontaine		Rutherford		
Stage	**Clinical**	**Grade**	**Category**	**Clinical**
I	Asymptomatic	0	0	Asymptomatic
IIa	Mild claudication	I	1	Mild claudication
IIb	Moderate to severe claudication	I	2	Moderate claudication
		I	3	Severe claudication
III	Ischemic rest pain	II	4	Ischemic rest pain
IV	Ulceration or gangrene	III	5	Minor tissue loss
		III	6	Major tissue loss

Risk Factors



Data from the Framingham Heart showing the odds ratio for developing intermittent claudication

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How reliable is H&P for diagnosing PAD?

- Use of the history alone to detect peripheral arterial disease will result in missing up to 90 percent of cases.
- Asymptomatic patients with abnormal ABI have 50% increased risk of cardiovascular complications
- Therefore, American Heart Association recommends screening certain high-risk populations

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Who should undergo testing?

- Symptomatic Patients
  - Vascular claudication, ischemic rest pain, ulceration, trophic changes
- High Risk Patients
  - Age <50 years, with diabetes plus additional RF
  - (smoking, dyslipidemia, hypertension, or hyperhomocysteinemia)
  - Age 50 to 69 and a history of smoking and diabetes
  - Age 70 or older
  - Leg symptoms with exertion (suggestive of claudication) or ishemic rest pain
  - Abnormal lower extremity pulse examination
  - Known atherosclerotic coronary, carotid, or renal disease

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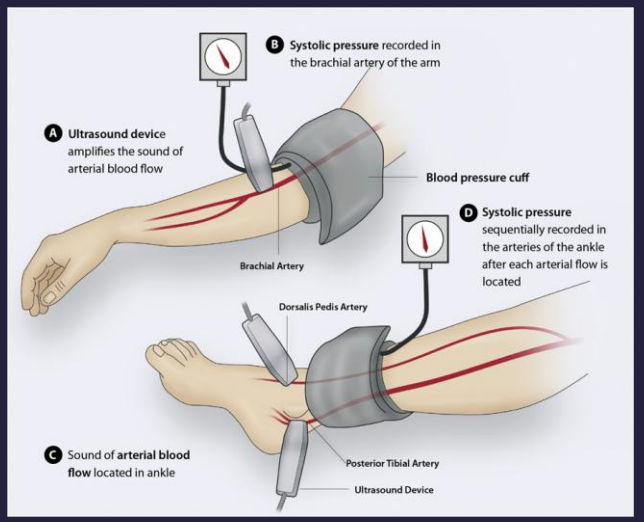
Ankle Brachial Index

- Workhorse of the lower extremity vascular evaluation
- Easy to perform
  - Blood pressure cuffs, Doppler
  - Ankle to brachial artery pressure
  - Sensitivity ~ 75%, Specificity ~ 90% Depending on cutoff value (0.90 - 0.95)



Normal	0.96
Claudication	0.50-0.95
Rest Pain	0.30-0.49
Tissue loss	<0.30
Significant change	0.15 or more

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ABI

- If claudication symptoms but normal rest ABI, exercise ABI should be performed [4]
- False negatives
  - Non-compressible vessels
    - Typically diabetics or renal patients
    - May lead to higher than normal ABI (>1.3)
    - Toe pressures may help (>0.7 normal)
  - Concomitant subclavian or brachiocephalic disease

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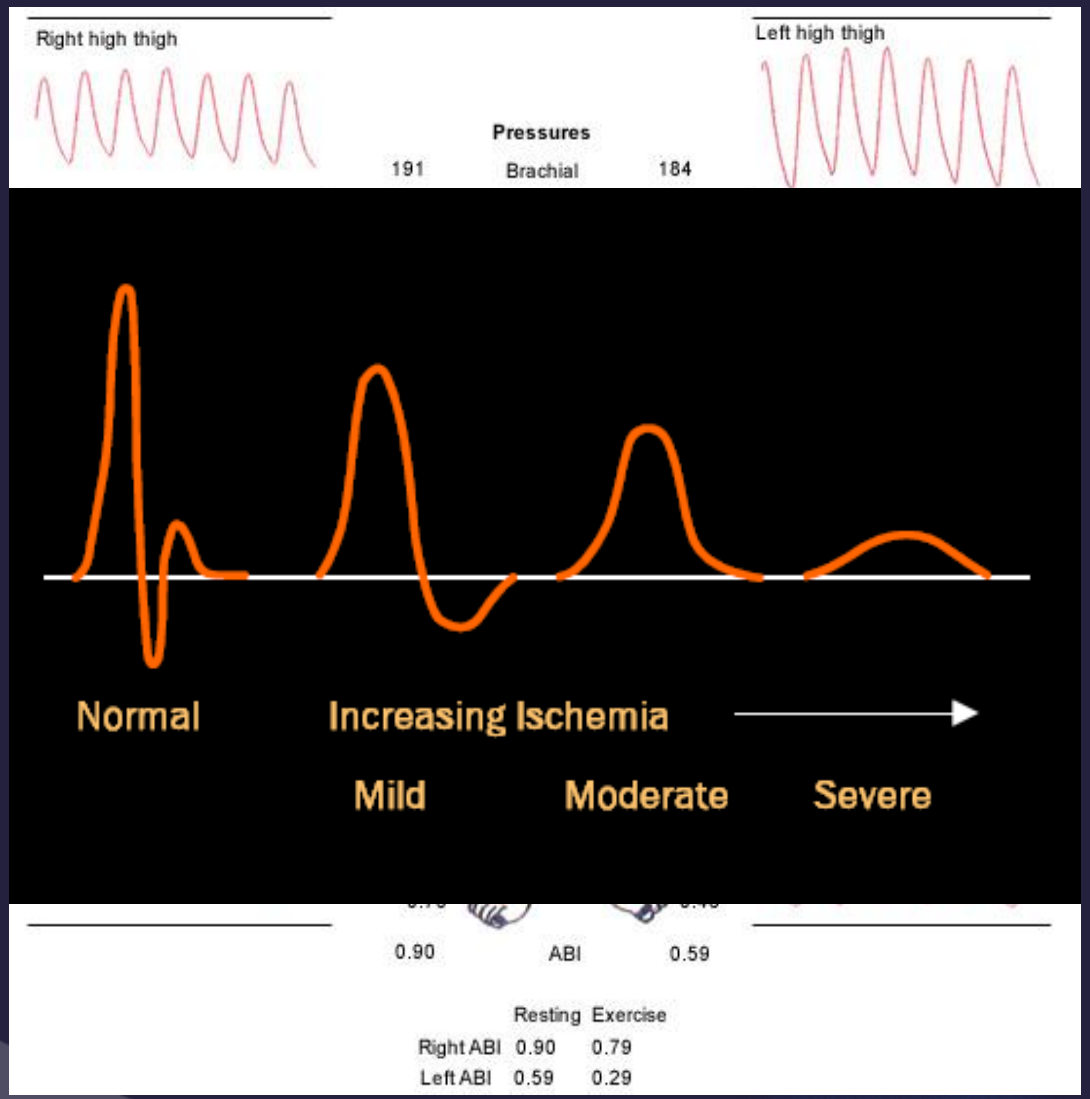
Pulse Volume Recordings

- Consider in high-risk individuals or abnormally elevated ABI
- Combines segmental pressures with waveforms
- Technique:
  - Pneumatic Cuff inflated at multiple Levels
  - Inflated to 65 mm Hg



Pulse Volume Recordings

- Advantages:
  - Not Impacted by Calcification
  - More sensitive than ABI
  - Allows for waveform analysis
- Disadvantages:
  - Lacks very specific anatomic information
  - More time consuming than ABI

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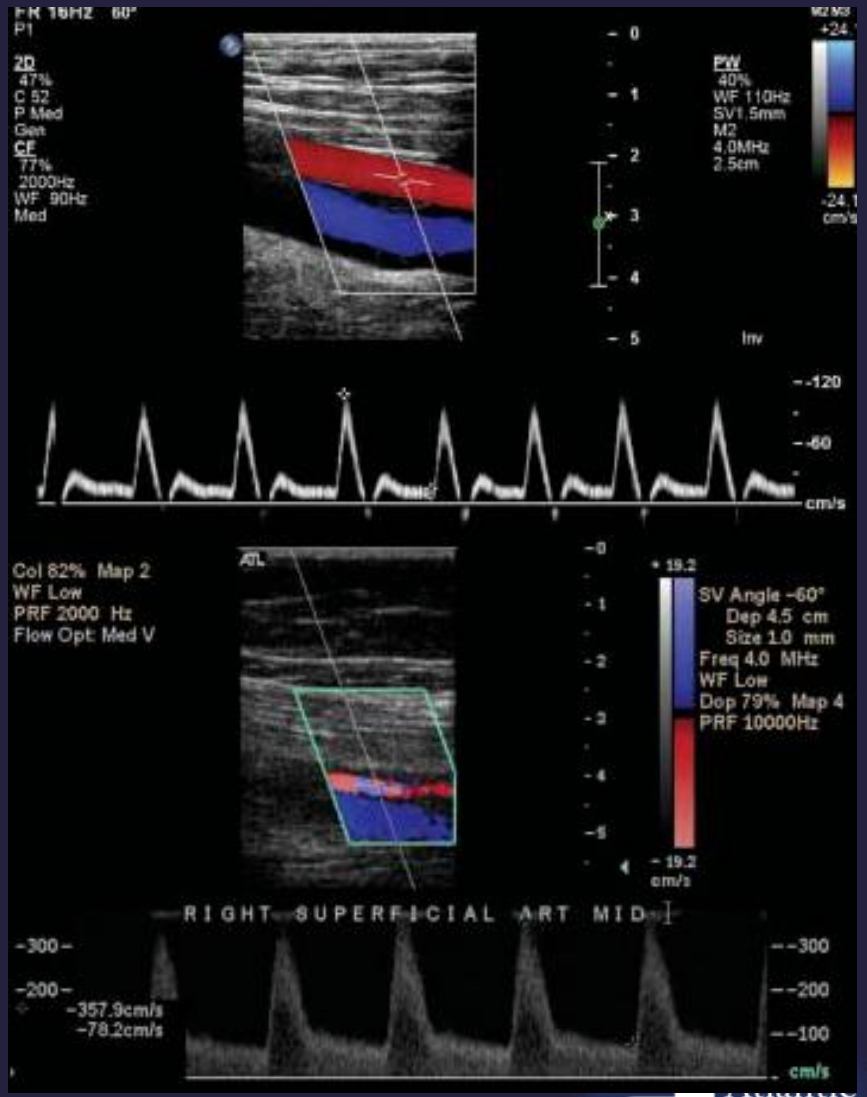
Duplex Doppler

- More specific in location of stenosis
- Also screen for AAA
- Great for surveillance of bypass grafts
- Can semi-quantify degree of stenosis
- Overall about 80% sensitivity and 90% specific



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Advanced Testing - CTA

- Advantages
  - Provides good anatomic localization
  - Can give temporal information on delayed imaging
  - Good evaluation of aorto-iliac vessels
  - Speed
  - Ability to evaluate stented arteries
  - Pacer safe

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Advanced Testing - CTA

- Disadvantages
  - Dense calcification difficult to assess patency
  - Radiation
  - Distal vessel limited
  - Renal failure/contrast allergy

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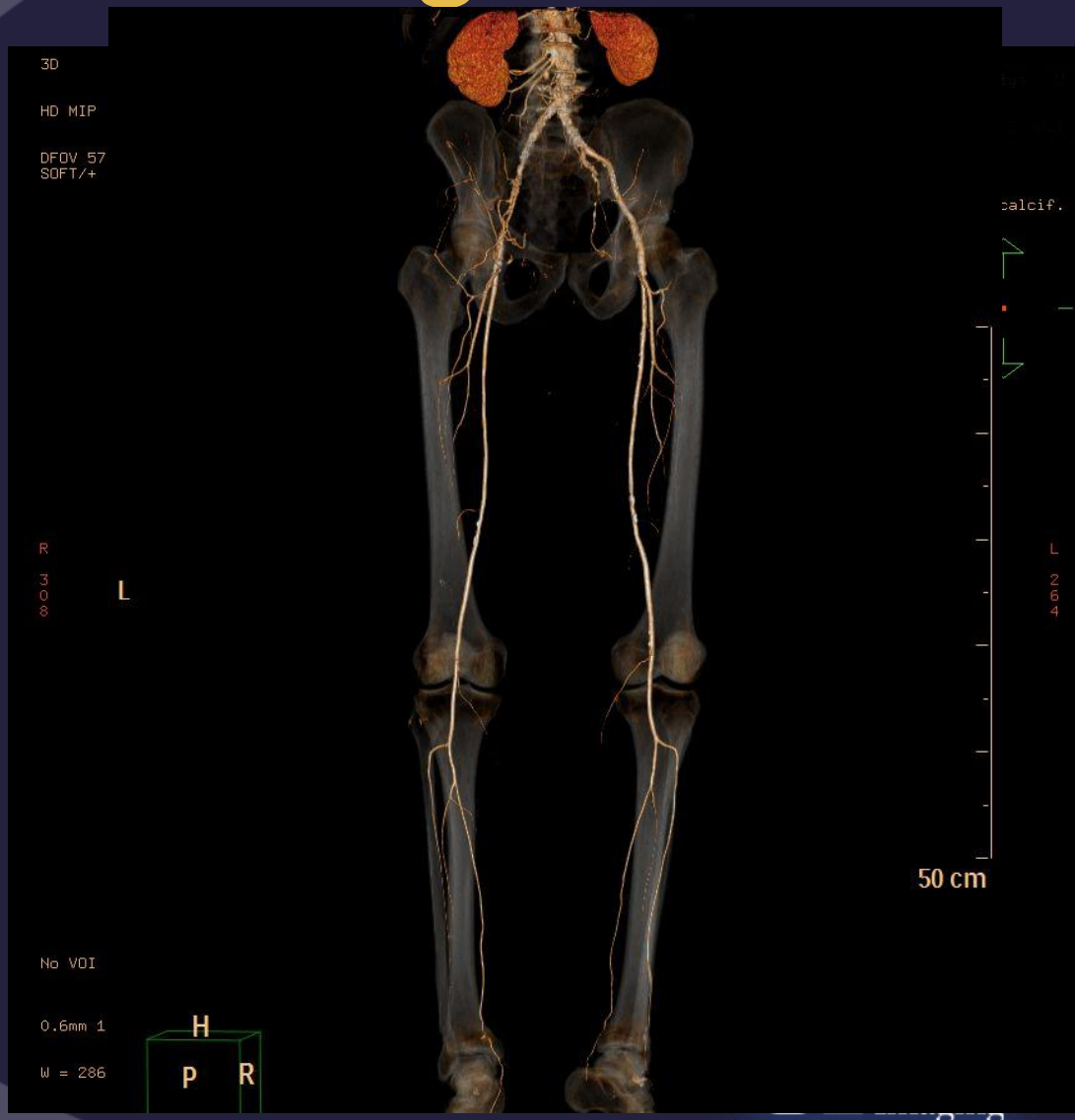
Advanced Testing CTA

- Axial imaging
- Maximal Intensity Projection
- Shaded Surface Display



Advanced Testing - MRA

- Advantages
  - Renal Impairment
    - Gad vs. Time of Flight
  - Good anatomic Localization
  - Also gives temporal information

- Disadvantages
  - Uncooperative patient
  - Claustrophobia
  - Metal artifact
  - Pacemakers/ICDs
  - Lack of visualization of calcium

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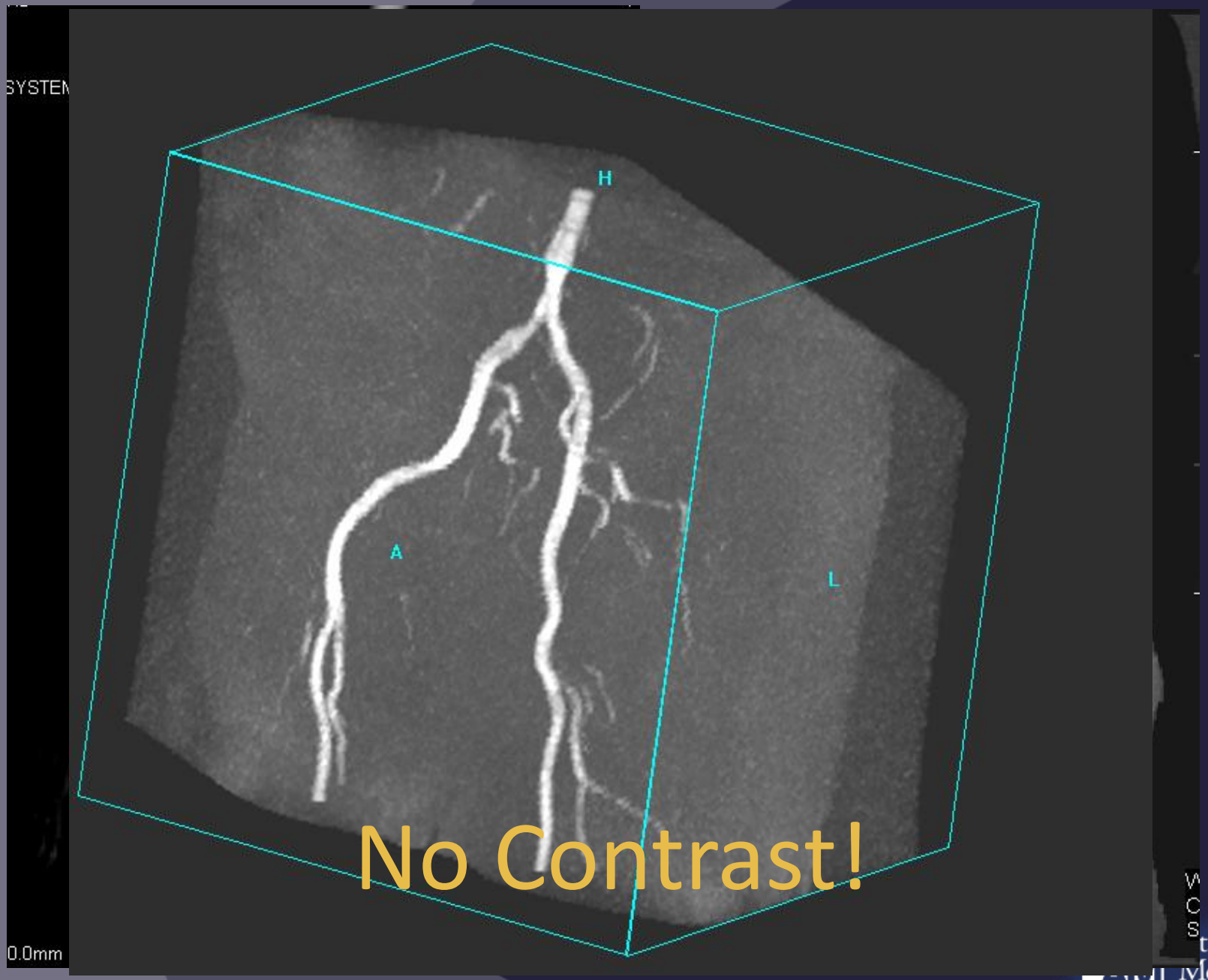
H
A
L
No Contrast!

Medical Management

- All Patients with PAD
  - Immediate Smoking Cessation (Most beneficial modifiable risk factor)
  - Antiplatelet Agents
  - Diabetes Control
  - Blood Pressure Reduction
  - Consider Ace Inhibitor usage
  - Lipid Control
- Symptomatic Patients
  - Consider Cilostazol (Pletal) - 100 mg PO BID
  - Exercise program!

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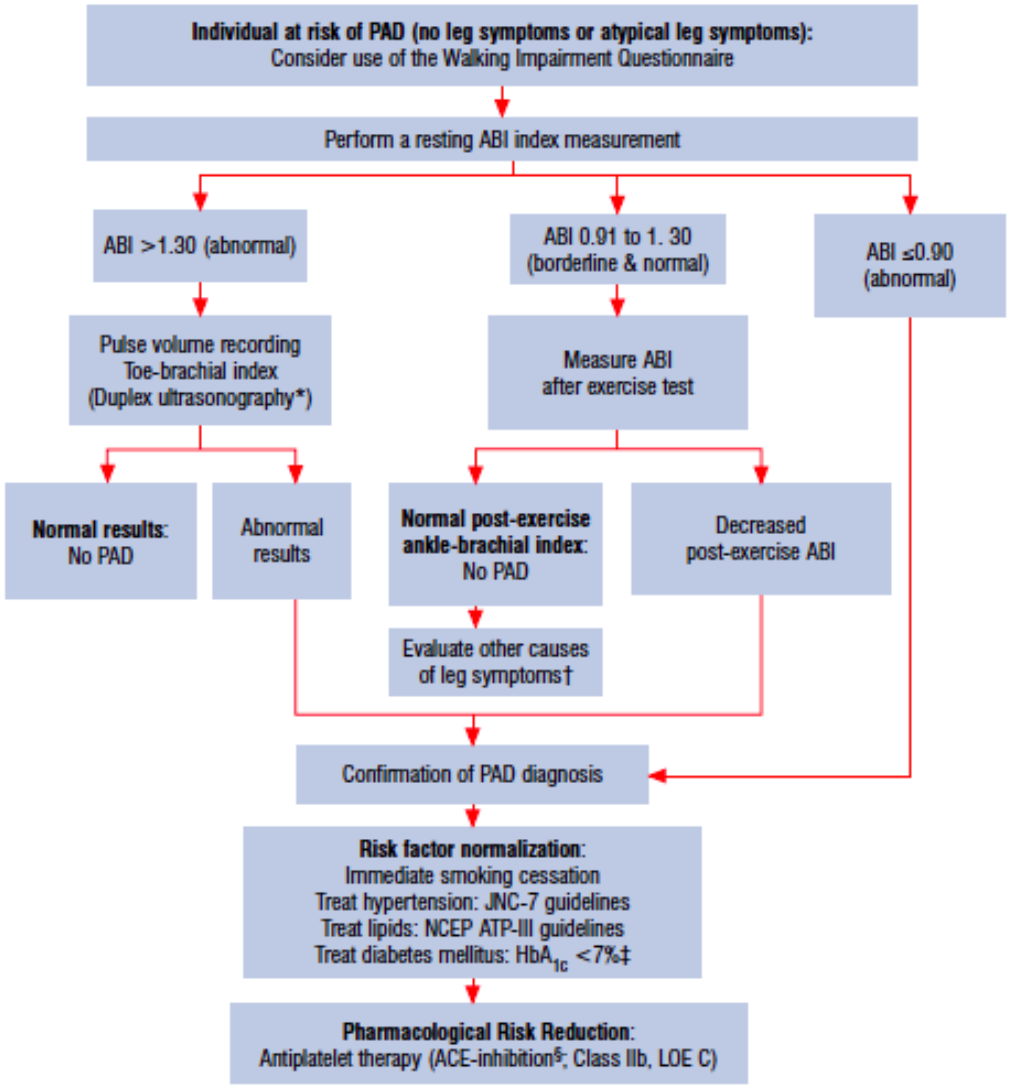
Management Cont.

- Intermittent Claudication pts should undergo a 3 Month trial of risk factor modification and exercise program

- Critical Limb Ischemia (rest pain or tissue loss) should be worked up for possible revascularization

Management - Asymptomatic

Figure 2. Diagnosis and Treatment of Asymptomatic PAD and Atypical Leg Pain



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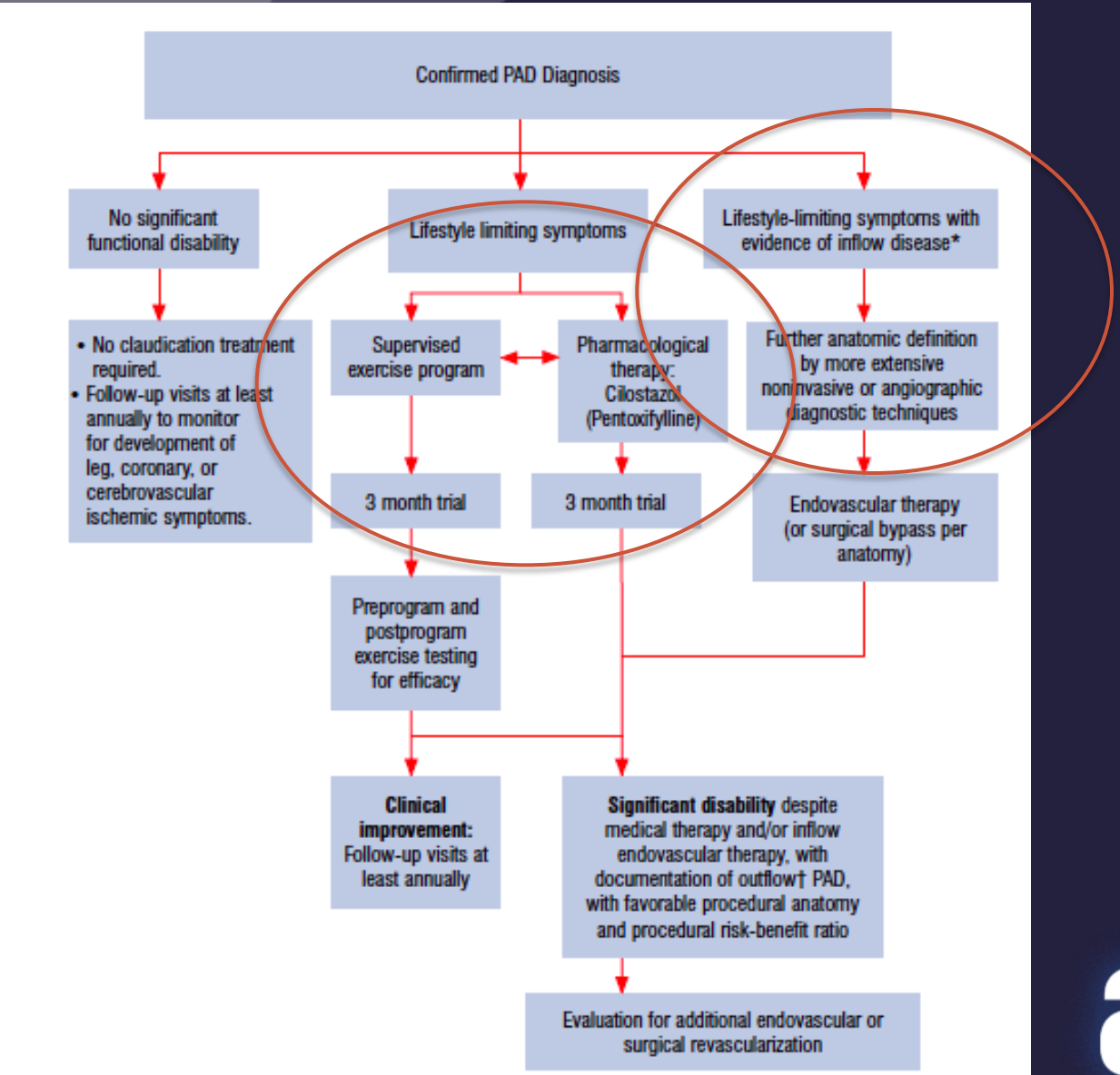
Management – Claudication



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Revascularization

- Endovascular tx is indicated for individuals with PAD and vocational/lifestyle disability where clinical features suggest **reasonable** likelihood of improvement from intervention and there is inadequate response to exercise/medical therapy or inflow disease.
- Indicated in all cases of critical limb ischemia (CLI), defined as Rutherford 4-6.
- AHA Level IA recommendation

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TASC II Guidelines

- What defines reasonable likelihood?
  - Trans Atlantic Inter-Society Consensus (TASC) Guidelines attempt to define this

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Endovascular

Endovascular

Surgery

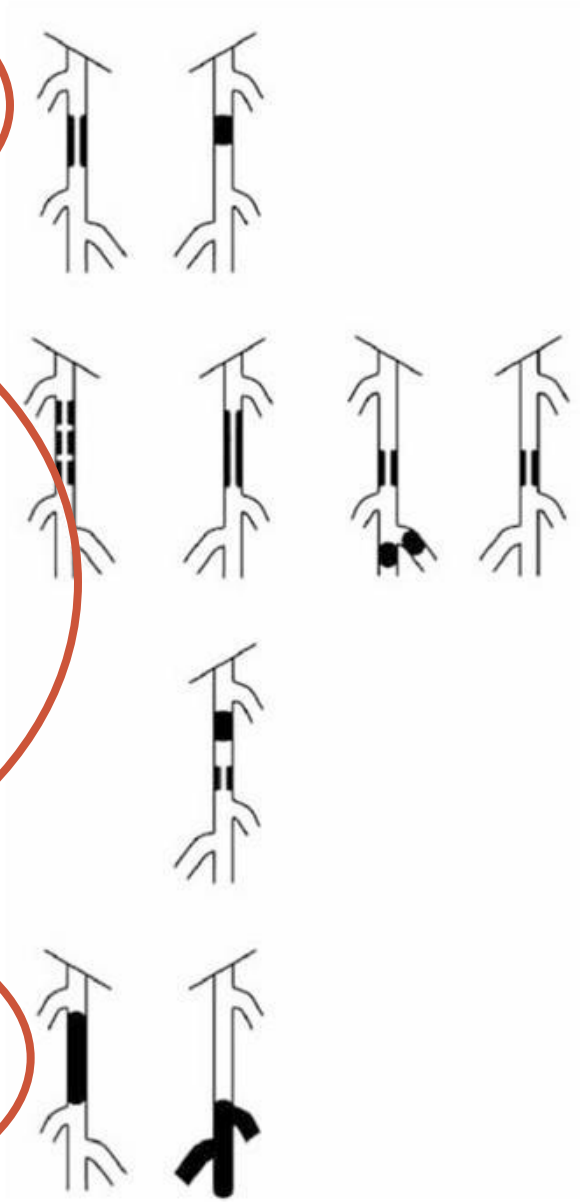
Surgery

Type A Lesions
- Single Stenosis ≤10 cm in Length
- Single Oclusion ≤5 cm in Length

Type B Lesions
- Multiple Lesions (Stenoses or Occlusions), Each ≤5 cm
- Single Stenosis or Occlusions ≤15 cm Not Involving the Infrageniculate Popliteal Artery
- Single or Multiple Lesions in the Absence of continuous Tibial Vessels to Improve Inflow for a Distal Bypass
- Heavily Calcified Occlusion ≤5 cm in Length
- Single Popliteal Stenosis

Type C Lesions
- Multiple Stenoses or Occlusions Totaling >15 cm With or Without Heavy Calcification
- Recurrent Stenoses or Occlusions That Need Treatment After 2 Endovascular Interventions

Type D Lesions
- Chronic Total Occlusions of CFA or SFA (>20 cm, Involving the Popliteal Artery)
- Chronic Total Occlusion of Popliteal Artery and Proximal Trifurcation Vessels



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Techniques

- Basic
  - POBA – Plain Old Balloon Angioplasty
  - Stenting
    - Bare Metal, covered, drug eluting
- Advanced
  - Typically required in chronic occlusions
    - Subintimal recanalization and angioplasty
    - Retrograde Transpedal Approach
    - Re-Entry Devices
    - Atherectomy

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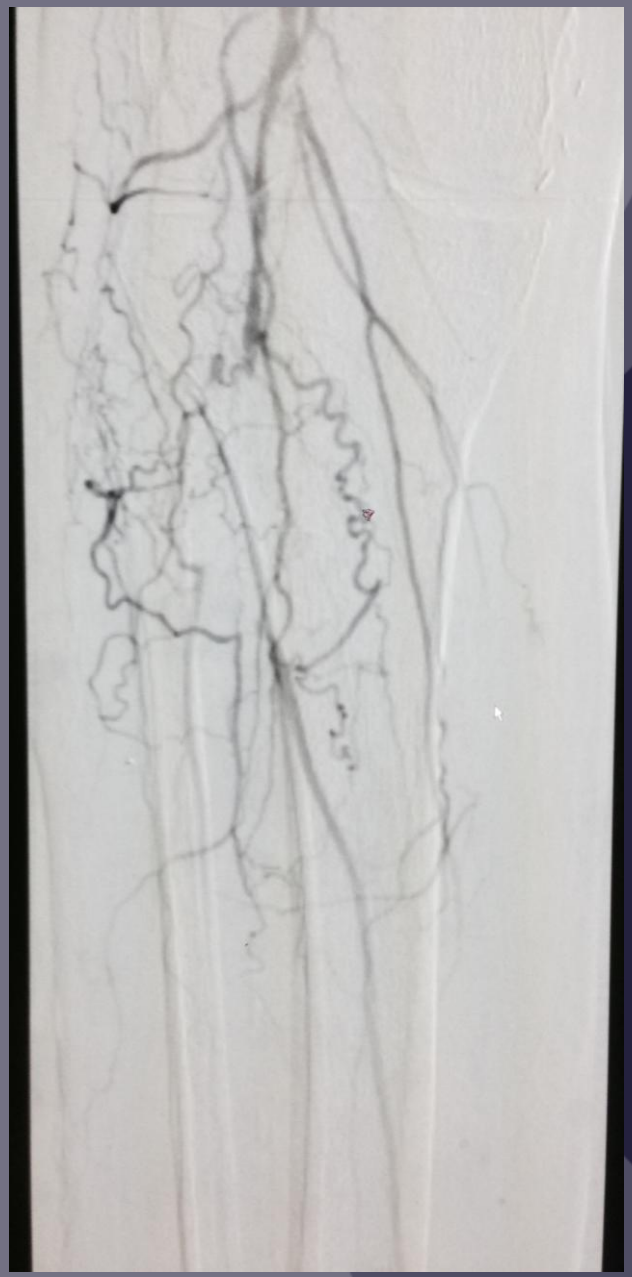

Case

- 49 yo male with critical limb ischemia
- Rest pain and nonhealing wounds 1st and 5th toes (Rutherford 5)
- ABI 0.2 on right; 0.4 on left
- CTA showed focal occlusion of right common/ext iliac. Also occlusion left common/ext iliac
- Revascularization indicated for CLI

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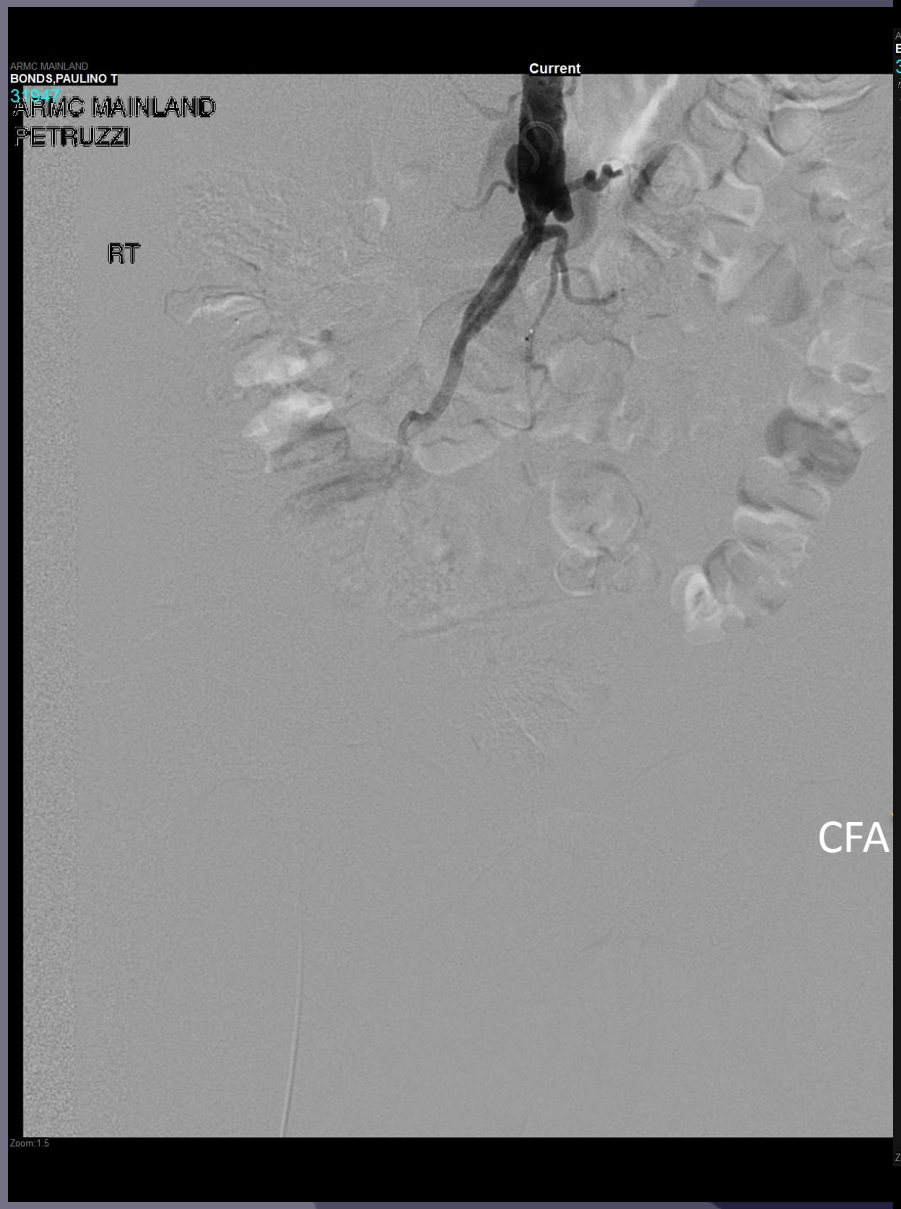

BEFORE

AFTER

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Case

- 65 yo F, bilateral resting leg pain, no tissue loss (Rutherford 4)
- PMH: CAD, Carotid stenosis, Aortic Stenosis
- ABI <0.3 bilateral
- Revascularization for CLI
- CTA runoff performed to evaluate disease burden and plan approach

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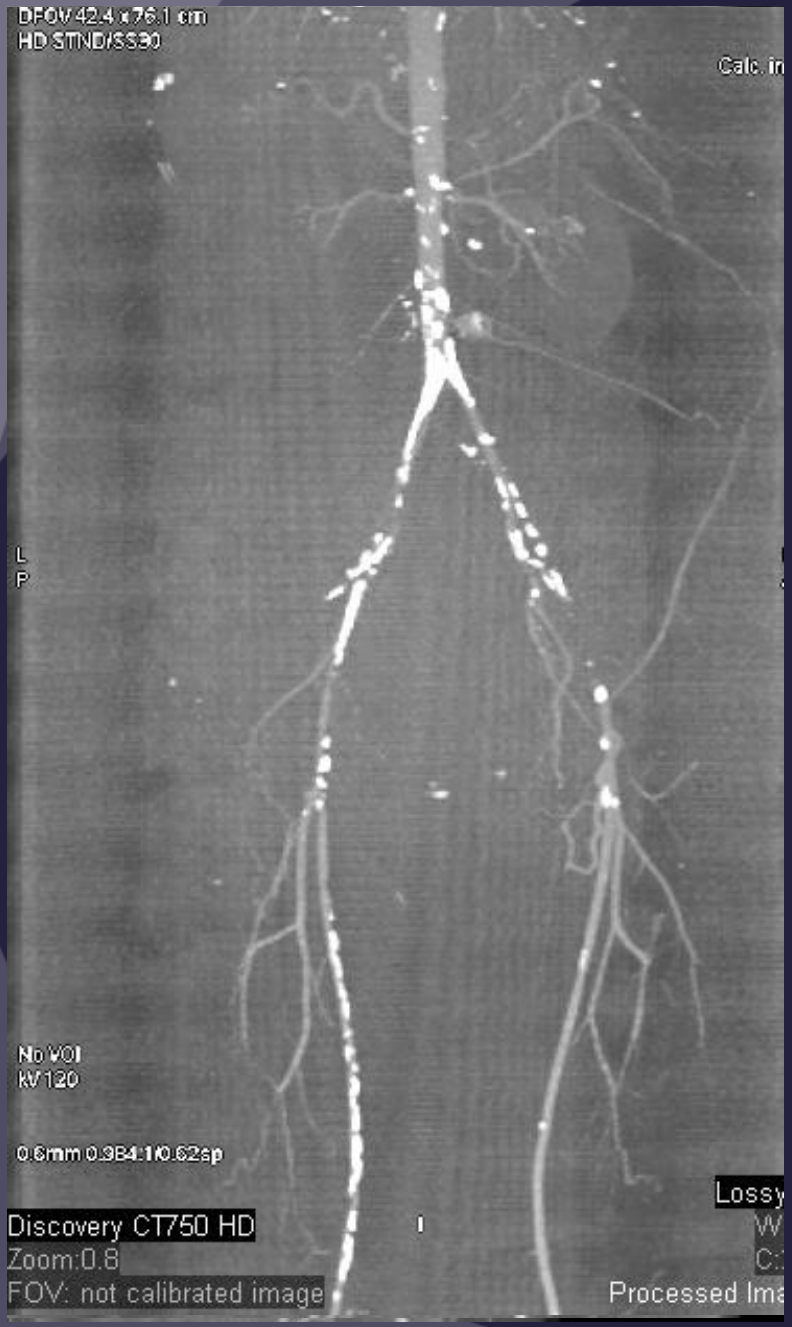

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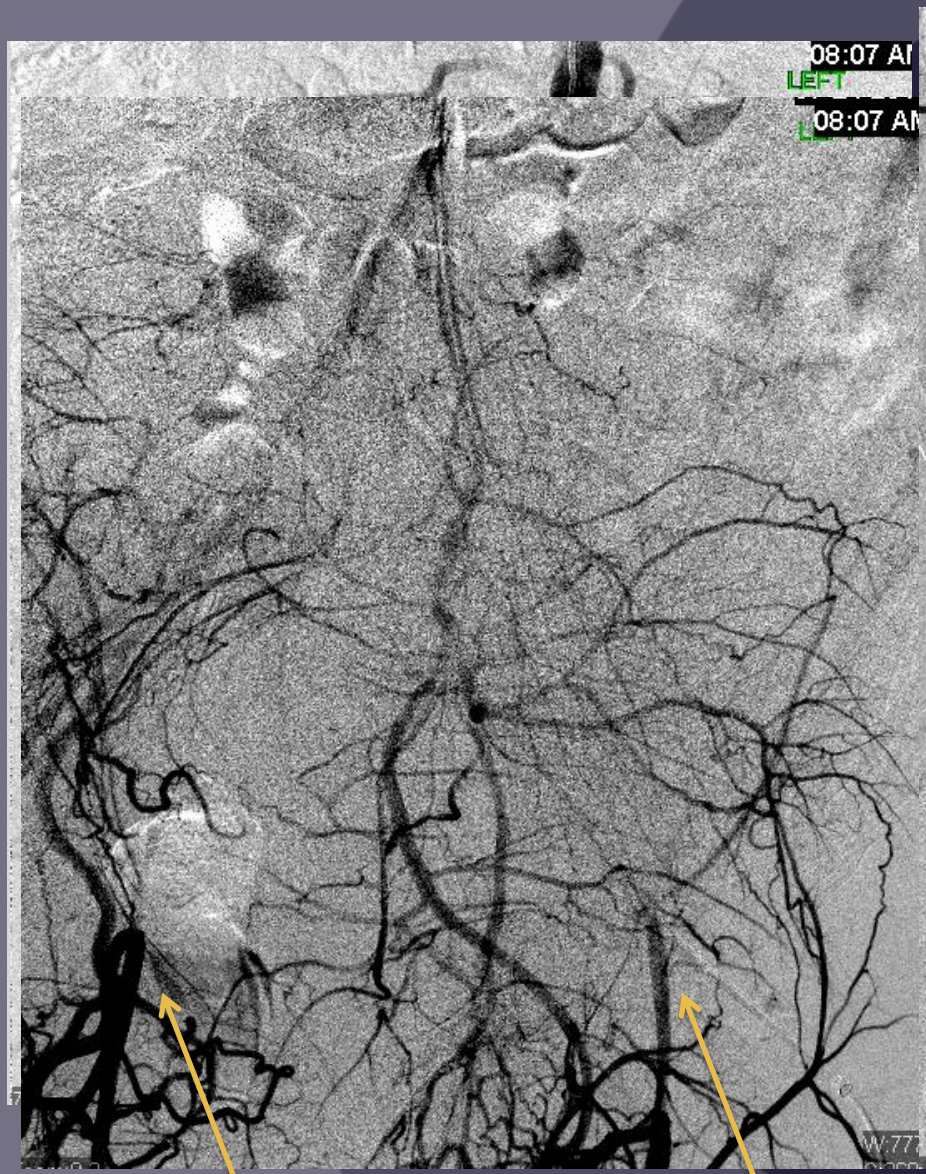
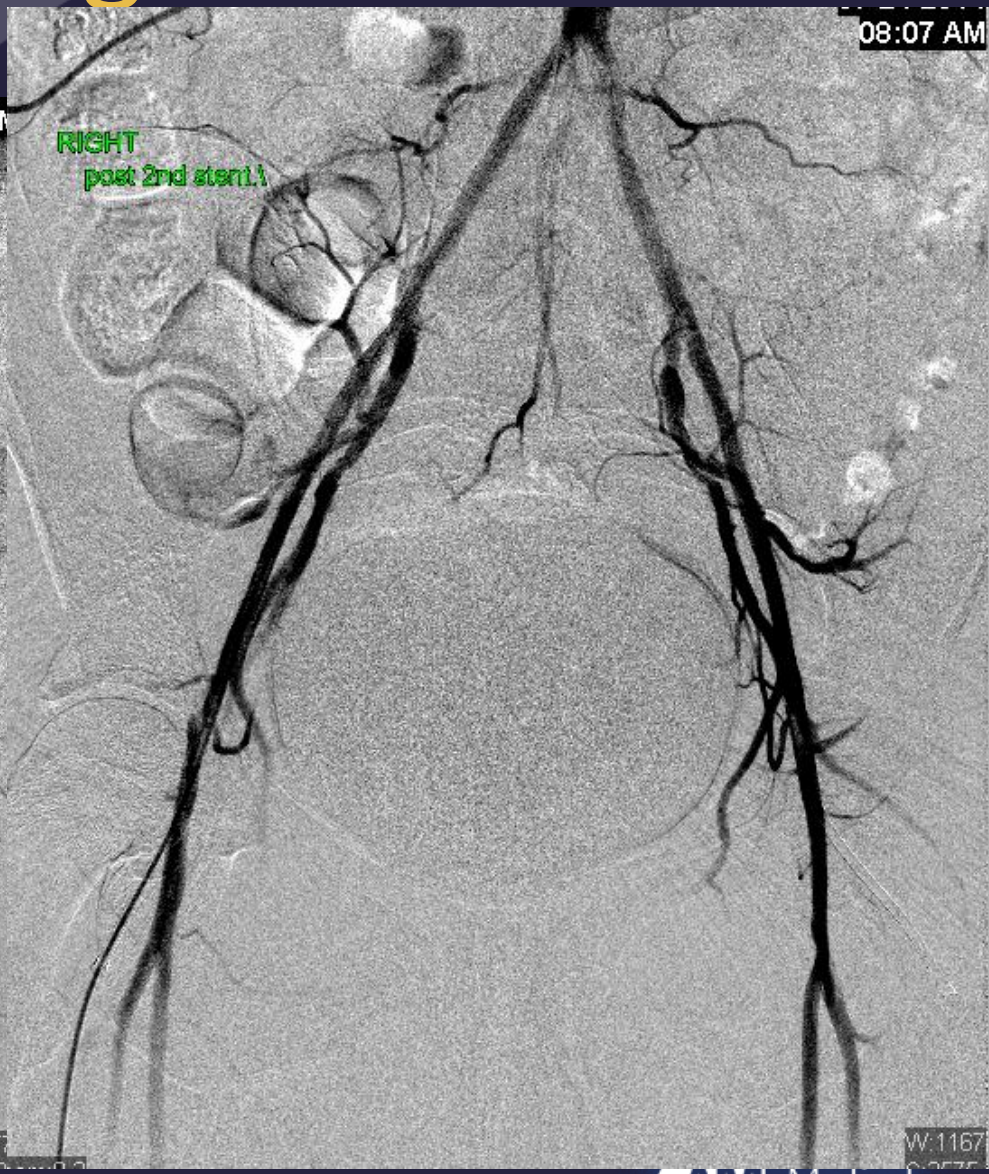
Arteriogram





BEFORE

AFTER

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Follow-up

- Discharged home same day
- Near immediate improvement in rest pain
- ABI's 0.9 bilateral 1 month follow up
- Resting pain completely resolved

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Outcomes and Data

- Focal iliac and femoral lesions have clear cut benefit from either PTA and/or stenting
- Treatment of occlusive femoropopliteal disease continues to show prolonged patency with newer technology
- Treatment of SFA occlusions with heparin bonded stent grafts exhibits similar primary patency at 4 year (48 month) compared with conventional fem-pop bypass grafting with synthetic conduit [7]

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Take Home Points

- History alone can miss up to 90% of peripheral arterial disease cases
- PAD is a progressive disease in 25%, including asymptomatic presentations
- Early detection can reduce cardiovascular related morbidity/mortality

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Take Home Points

- ABI screening study of choice but consider advanced modalities in high clinical suspicion cases
- Patients with critical limb ischemia (rest pain or tissue loss) should be offered revascularization
- Endovascular techniques continue to evolve with promising outcomes that improve QOL and reduce risk of amputation

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AMI Vein Center & Vascular Clinic

- Free ABI screenings
- Free venous duplex
- Free consults if abnormal
- Expertise in diagnosing and treating vascular and venous claudication

- Patients or Physicians can schedule the free testing/consult online at www.AMI-IR.com

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