Keeping your Patients (and their Feet) in Circulation- A Collaborative Approach to Diagnosing and Managing PAD

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Disclosures Relevant to This Presentation

Nancy Ogor- None

Levon Khojayan- None

Sanjay Gandhi- None

What to Expect

- Diagnostic Evaluation of PAD
- Medical Management
- Considerations for Endovascular and Surgical Revascularization

What is Peripheral Artery Disease (PAD)?

- Lower extremity PAD is a arterial occlusive disease due to atherosclerosis of blood vessels in the lower limbs.
- Affects >8.5 M adults in US over the age of 40 years

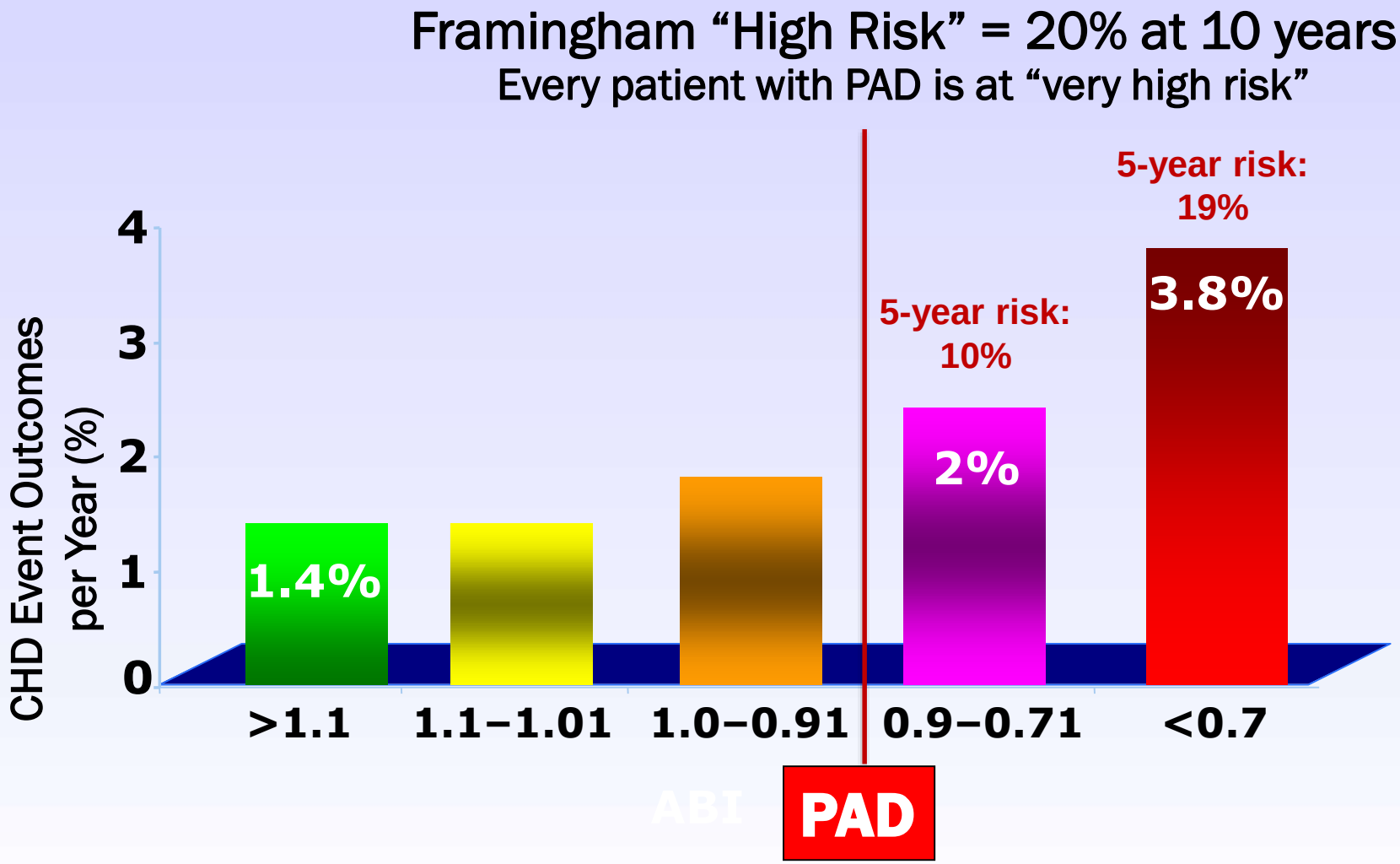
Lets Get The Terminology Out of the Way

- **Claudication**- fatigue, discomfort, pain induced by exercise and relieved with rest
- **Acute limb ischemia**- <2 weeks of limb hypoperfusion with 5 Ps (pain, pallor, pulselessness, poikilothermia and paralysis)
- **Tissue Loss**-
  - Minor- ulcer, focal gangrene
  - Major- damage above mid foot
- **Critical Limb Ischemia-** chronic (≥2 wks.) of ischemic rest pain, non healing wound/ulcers or gangrene of 1 or both legs due to objective arterial occlusive disease

Who is at Risk for PAD ?

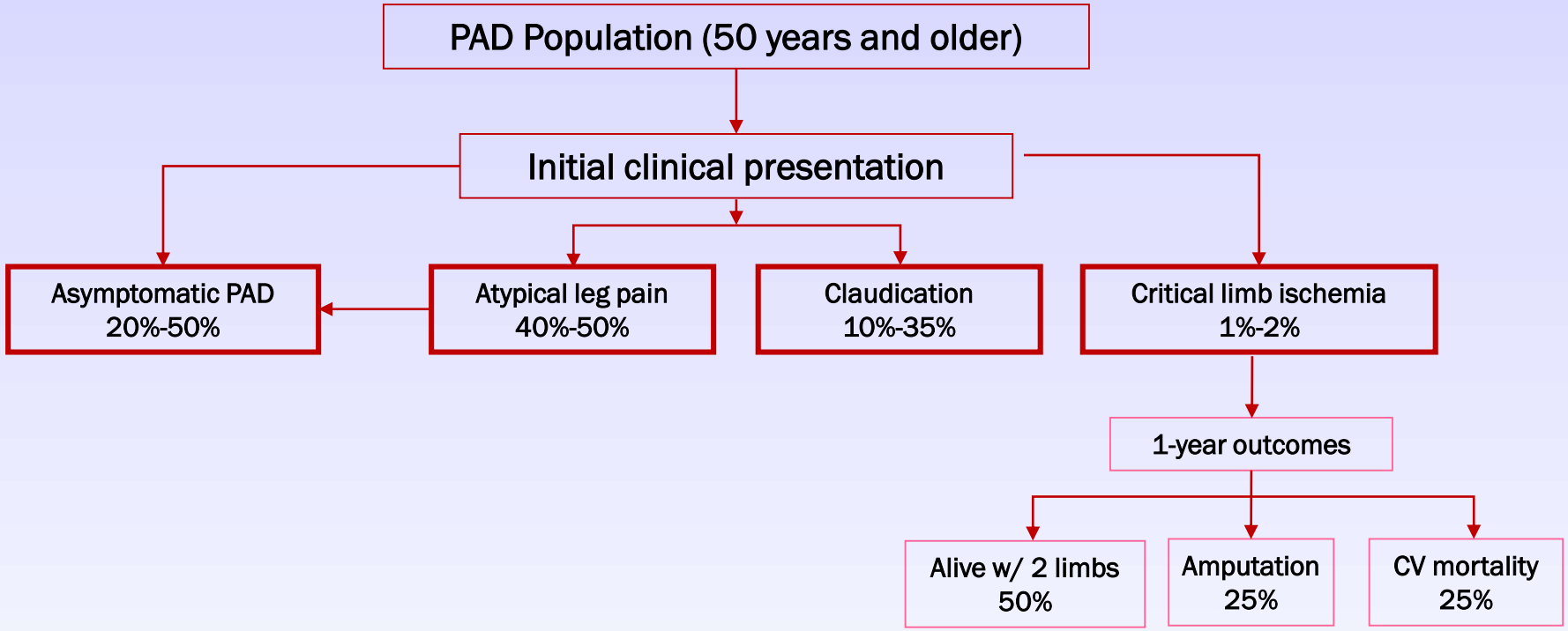
- Age >65 years
- Age 50-65 years with risk factors
  - Smoking
  - HTN (uncontrolled)
  - Dyslipidemia
  - Diabetes Mellitus
  - Family History of PAD
- Age < 50 with DM and one more risk factor
- Individuals with atherosclerotic disease in other vascular beds (CAD, CVD, AAA, renal artery stenosis)

Why Should I Care About PAD



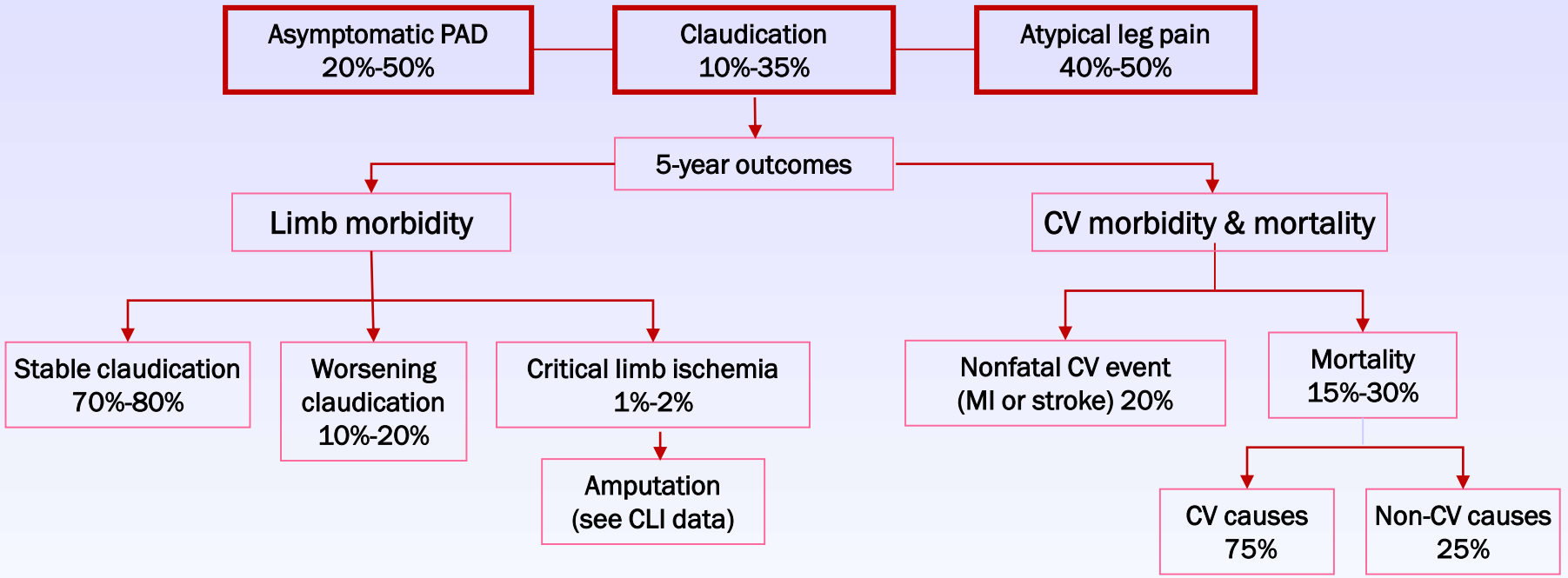
Leng GC et al. *Brit Med J.* 1996;313:1440-44.

How do These Patients Present ?



Hirsch AT, et al. *Circulation.* 2006;113:e463-654

How to Patients with Claudication Do over time?



Hirsch AT, et al. *Circulation.* 2006;113:e463-654

How do I Diagnose PAD- H&P Still works!!!

A thorough history and physical is paramount

Pulse intensity should be assessed and should be recorded numerically as follows:

- 0, absent
- 1, diminished
- 2, normal
- 3, bounding

What Tests Are Available to Confirm Diagnosis of PAD?

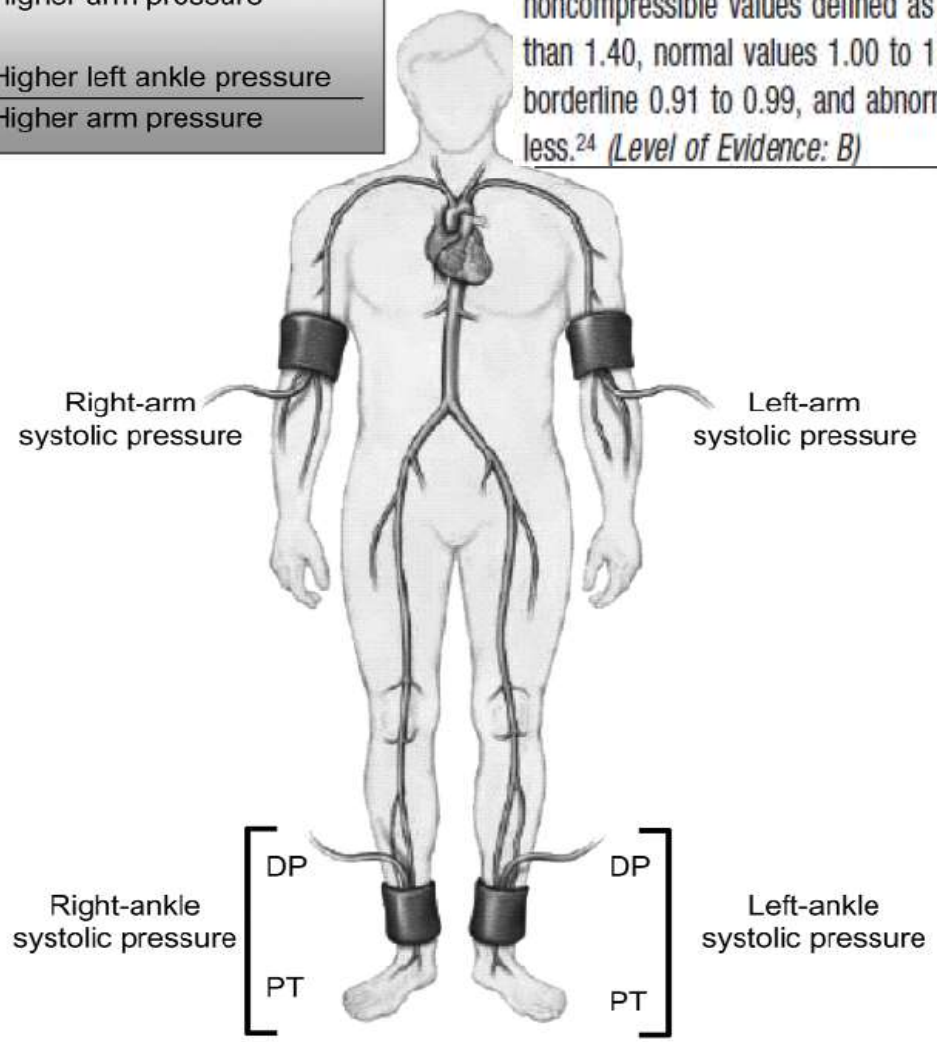
- Resting Ankle-Brachial Index (ABI)
- Exercise ABI
- Segmental pressure examination
- Pulse volume recordings
- Toe Brachial Index
- Anatomic Imaging- Ultrasound, CTA, MRA and Angiography

How Do I Measure Ankle-Brachial Index (ABI)

Right ABI = Higher right ankle pressure / Higher arm pressure

Left ABI = Higher left ankle pressure / Higher arm pressure

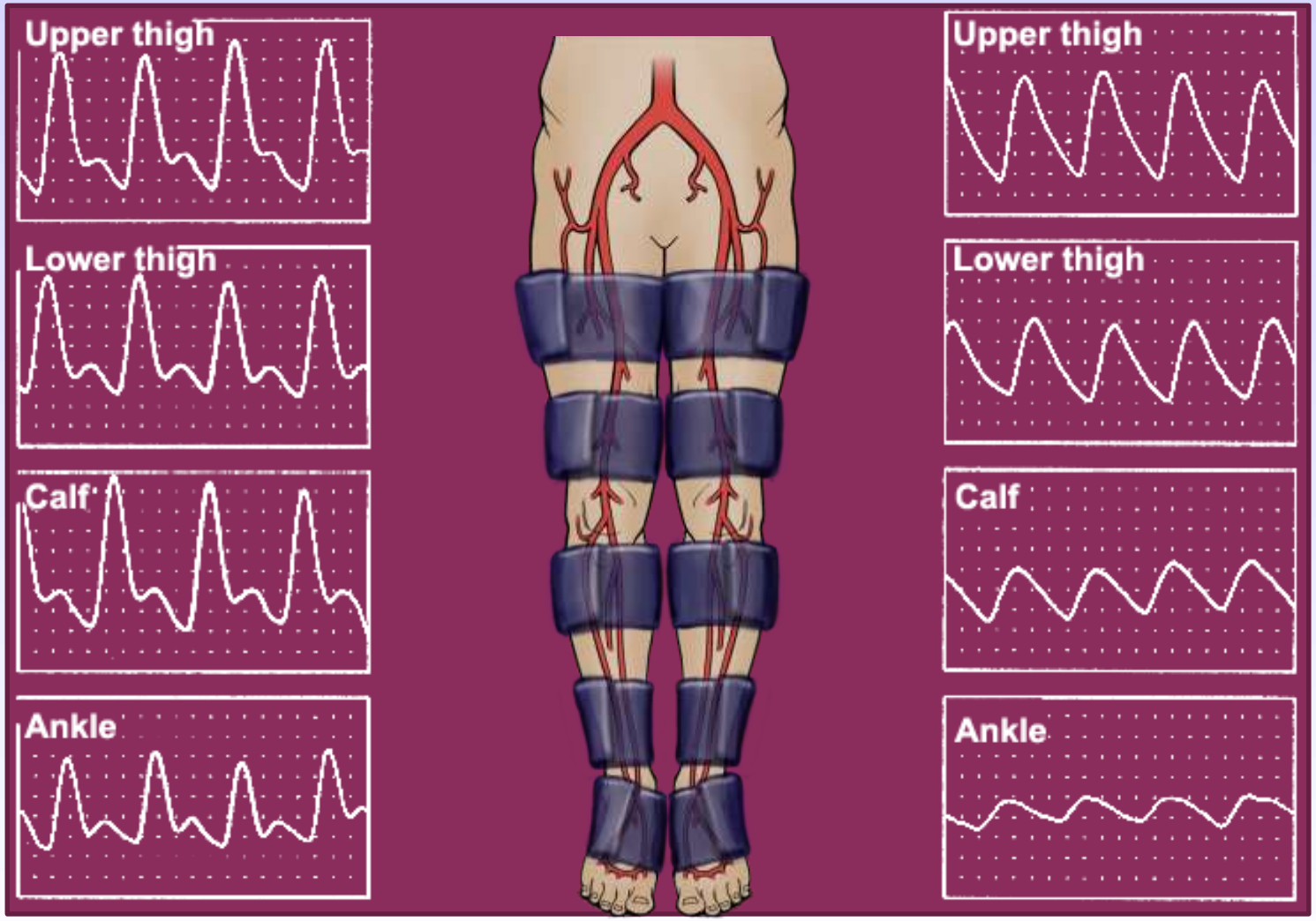
ABI results should be uniformly reported with noncompressible values defined as greater than 1.40, normal values 1.00 to 1.40, borderline 0.91 to 0.99, and abnormal 0.90 or less.[24] *(Level of Evidence: B)*



Can Patients with PAD have normal ABI?- Yes

- Calcified arteries e.g. renal failure, DM
- Moderate resting PAD especially aorto-iliac disease

What is PVR- What Am I Looking For?



Why Do Exercise ABI Testing?

- Confirms the PAD diagnosis
- Assesses the functional severity of claudication
- May “unmask” PAD when resting the ABI is normal
- Aids differentiation of intermittent claudication vs. pseudo-claudication diagnoses

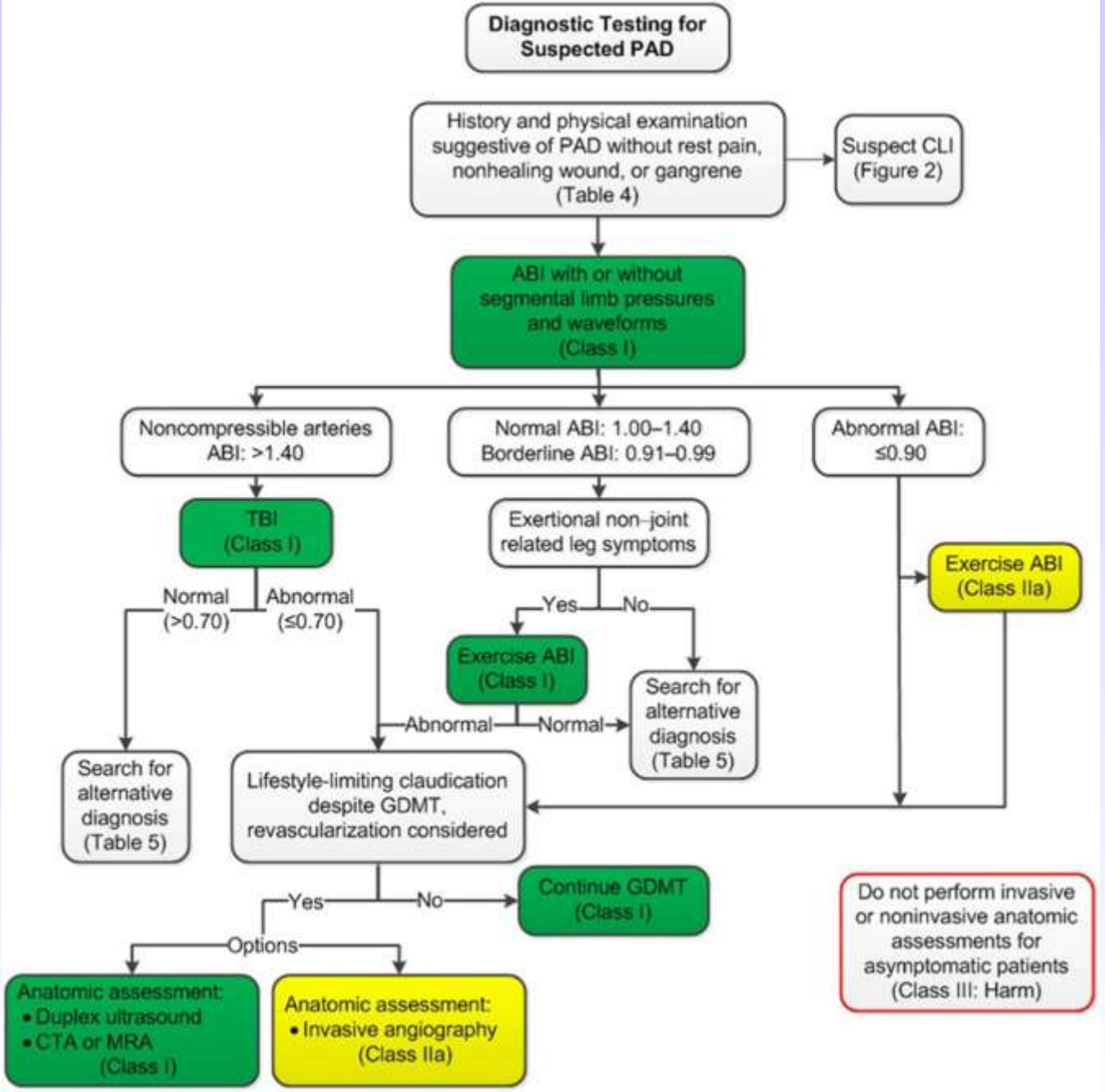
Toe-Brachial Index (TBI)

**If No big Toe, use next digit, if no toes at all, use a trans metatarsal cuff*

- The toe-brachial index (TBI) is calculated by dividing the toe pressure by the higher of the two brachial pressures.
- TBI values remain accurate when ABI values are not possible due to non-compressible pedal pulses.
- TBI values ≤ 0.7 are usually considered diagnostic for lower extremity PAD.

Anatomic Imaging- In Patients Being Considered for Revascularization

Recommendations for Imaging for Anatomic Assessment		
COR	**LOE**	**Recommendations**
I	B-NR	Duplex ultrasound, CTA, or MRA of the lower extremities is useful to diagnose anatomic location and severity of stenosis for patients with symptomatic PAD in whom revascularization is considered.[100–103]
I	C-EO	Invasive angiography is useful for patients with CLI in whom revascularization is considered.
IIa	C-EO	Invasive angiography is reasonable for patients with lifestyle-limiting claudication with an inadequate response to GDMT for whom revascularization is considered.
III: Harm	B-R	Invasive and noninvasive angiography (ie, CTA, MRA) should not be performed for the anatomic assessment of patients with asymptomatic PAD.[104–106]



2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines, Volume: 135, Issue: 12, Pages: e686-e725, DOI: (10.1161/CIR.0000000000000470)

Two Major Goals in Treating Patients With PAD

Limb Outcomes

- Improved ability to walk
  - Pharmacotherapy
  - Supervised Exercise Program
- Prevention of progression to CLI and Amputation

Patient Outcomes

- Decrease in Morbidity and Mortality
- GDMT
  - Lifestyle modification
  - Smoking Cessation
  - Antiplatelet
  - Statins
  - Management of HTN/DM

Antiplatelet Agents and Statins for Secondary Prevention

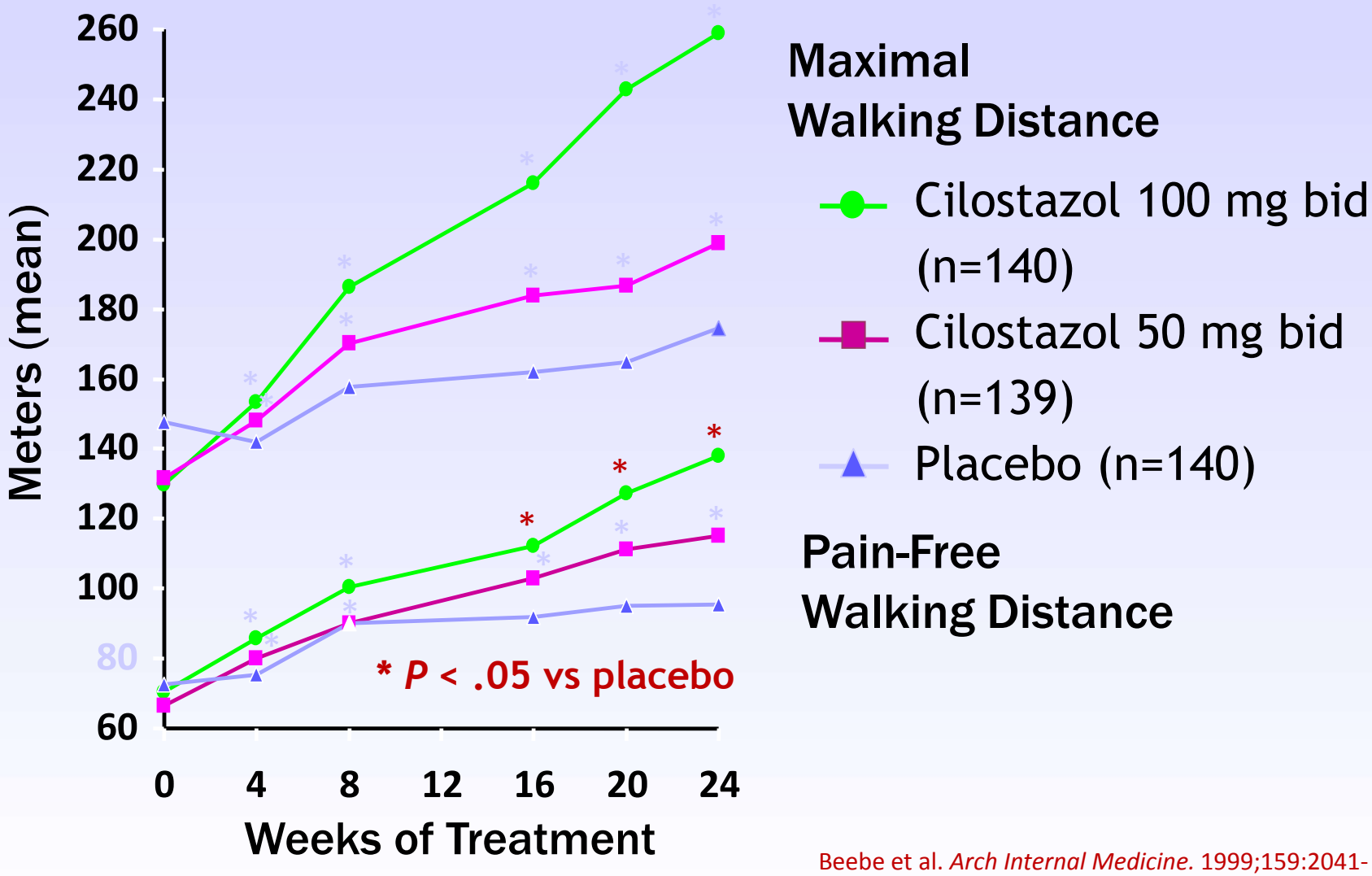
- Antiplatelet Agents
  - Symptomatic PAD
    - Aspirin or Plavix is recommended (COR-I, LOE-A)
    - Benefit of DAPT is uncertain except after revascularization (COR-IIa, LOE- LD)
  - Asymptomatic PAD
    - Aspirin or Plavix may be considered (COR-IIa, LOE- EO)
- Statins
  - Treatment with statins indicated for all patients with PAD (COR-I, LOE-A)

Pharmacotherapy for Claudication

- Cilostazol
  - Phosphodiesterase III inhibitor
  - 100 mg bid
  - Platelet aggregation inhibitor, some vasodilatation

Cilostazol and several of its metabolites are inhibitors of phosphodiesterase III. Several drugs with this pharmacologic effect have caused decreased survival compared with placebo in patients with class III-IV CHF. PLETAL® is contraindicated in patients with CHF of any severity.

Cilostazol is Effective Therapy to Improve Symptoms and Walking Distance in Patients with Claudication



Beebe et al. *Arch Internal Medicine.* 1999;159:2041-50.

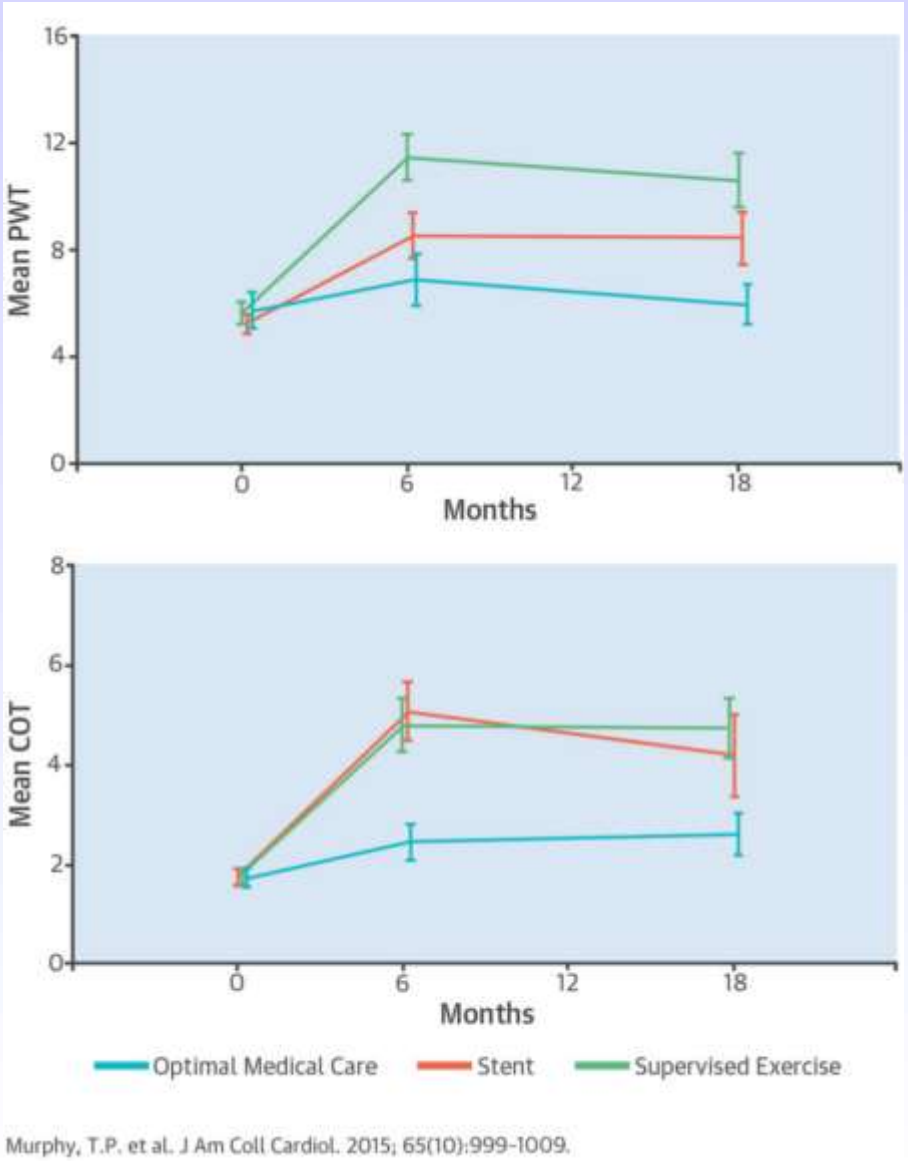
Intermittent Claudication:

Exercise Therapy (Supervised)

- Frequency: 3–5 supervised sessions/week
- Duration: 35–50 minutes of exercise/session
- Type of exercise: treadmill or track walking to near-maximal claudication pain
- Length: ≥6 months
- Results: 100%–150% improvement in maximal walking distance and associated improvement in quality-of-life

Stewart KJ et al. *N Eng J Med*. 2002;347:1941-1951.

Supervised Exercise Program-CLEVER Study



Murphy, T.P. et al. J Am Coll Cardiol. 2015; 65(10):999-1009.

Increase in Peak Walking Time
Stent- 4 minutes
Supervised Exercise-6 min

Increase in Claudication Onset Time
Stent- 3 minutes
Superv Exercise- 3.4 min

Recommendations for Structured Exercise Therapy

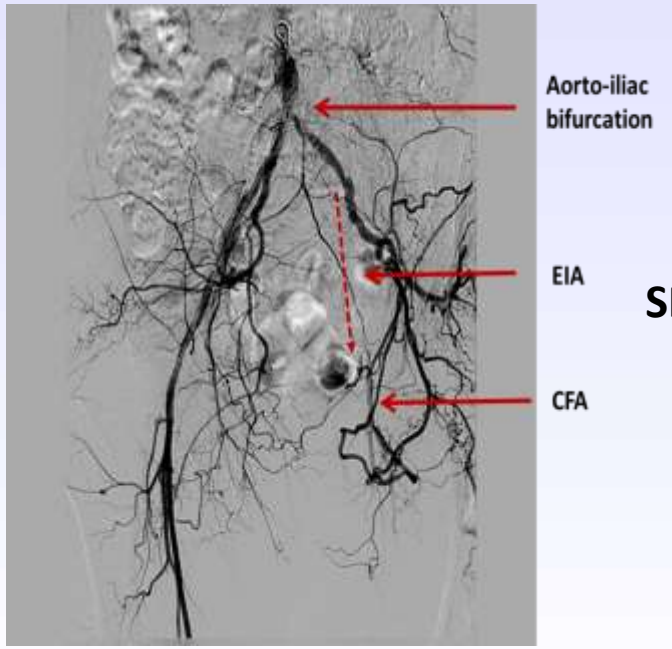
COR	LOE	Recommendations
I	A	In patients with claudication, a supervised exercise program is recommended to improve functional status and QoL and to reduce leg symptoms.[24–26,28–34,36,169,170]
I	B-R	A supervised exercise program should be discussed as a treatment option for claudication before possible revascularization.[24–26]

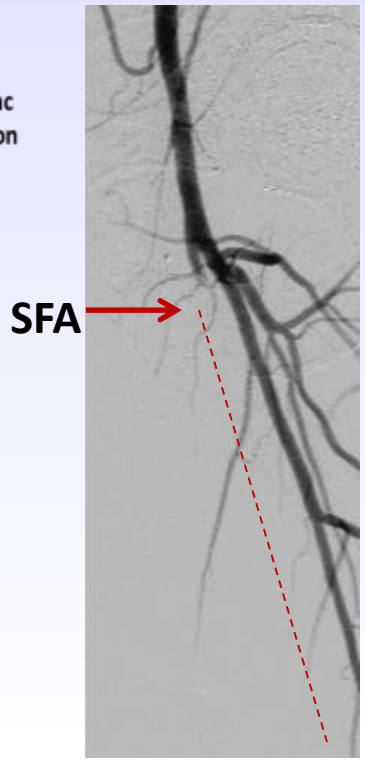
When do you refer a patient for revascularization?

- Claudication patients
  - Patient on GDMT with persistent lifestyle limiting symptoms (COR IIa, LOE A)
- CLI (Rest pain, Non healing ulcer, gangrene)
  - Revascularization should be performed when possible to minimize tissue loss
  - Goal to establish in-line flow to the foot

How do you decide Endovascular Versus Surgical Revascularization?

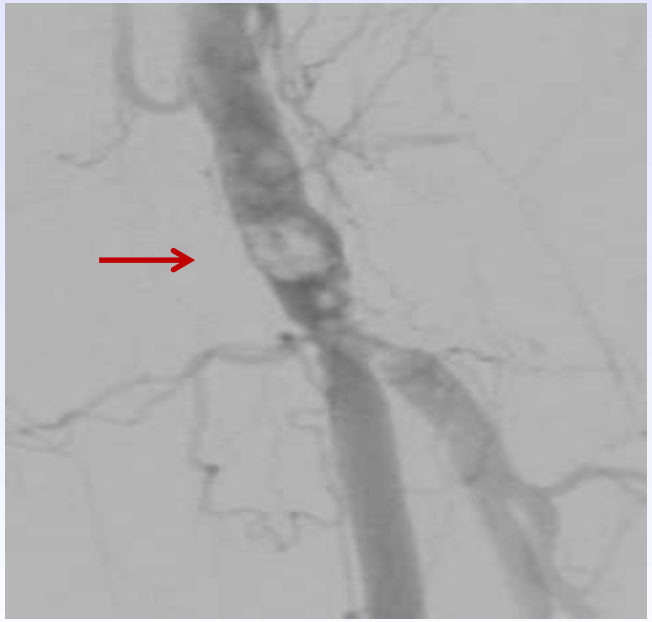
- Anatomic Considerations
  - Aorto-iliac Disease
  - Femoral-popliteal Disease
  - Below knee Disease

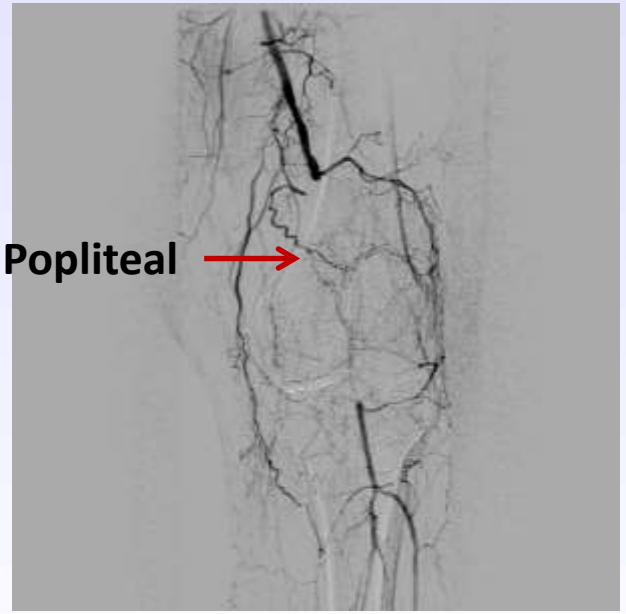




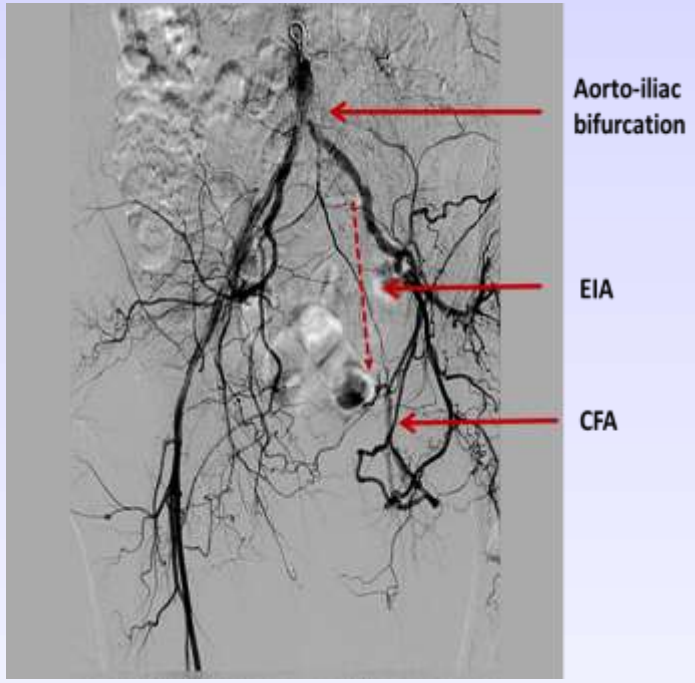
How do you decide Endovascular Versus Surgical Revascularization?

- Anatomic Consideration
  - Common Femoral Disease
  - Popliteal Disease





Disease Characteristics- Not all lesions are created equal!!!



Disease Characteristics- Not all lesions are created equal!!!

How do you decide Endovascular Versus Surgical Revascularization?

Patient Considerations

Patient's co-morbidity and functional status

Presence/absence of venous conduit for surgery

Patient Preference

How do Patients Do after Revascularization?

Aortoiliac Occlusive Disease

Surgical Therapy

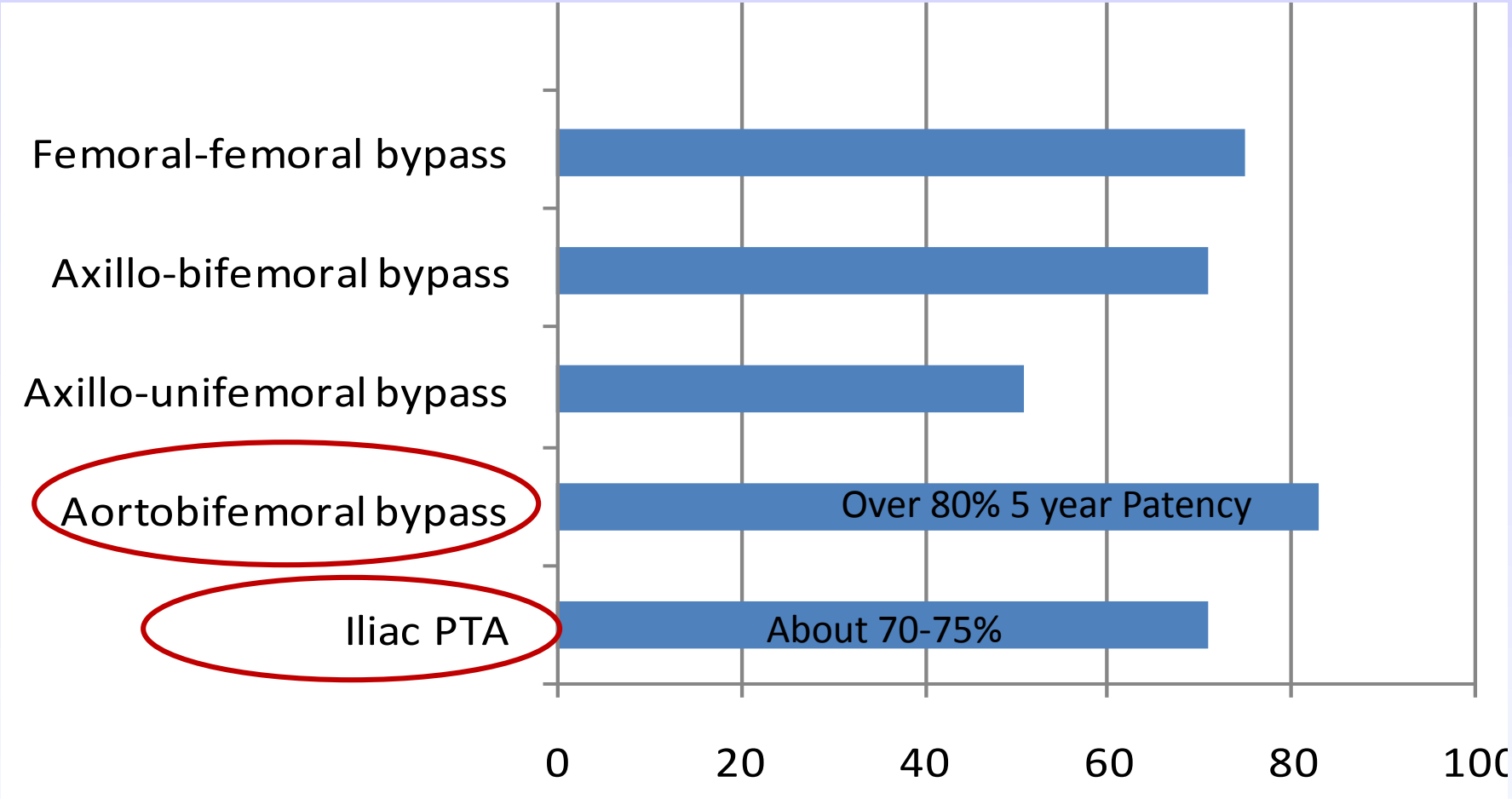


Figure 1 : 5-year patency (%) of aorto-iliac revascularization (Data from Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). *J Vasc Surg*. 2007; 45 Suppl S:S5-67.)

Aortoiliac Occlusive Disease

Endovascular Therapy

- High procedural success rates (90%)
- Excellent long-term patency
  (≥70% at 5 years)
- Factors associated with a poor outcome:
  - Long segment occlusion
  - Multifocal stenosis
  - Eccentric calcification
  - Poor runoff

(J Vasc Surg 2013;57:1030-7)

Femoral Popliteal Occlusive Disease

Surgical Therapy

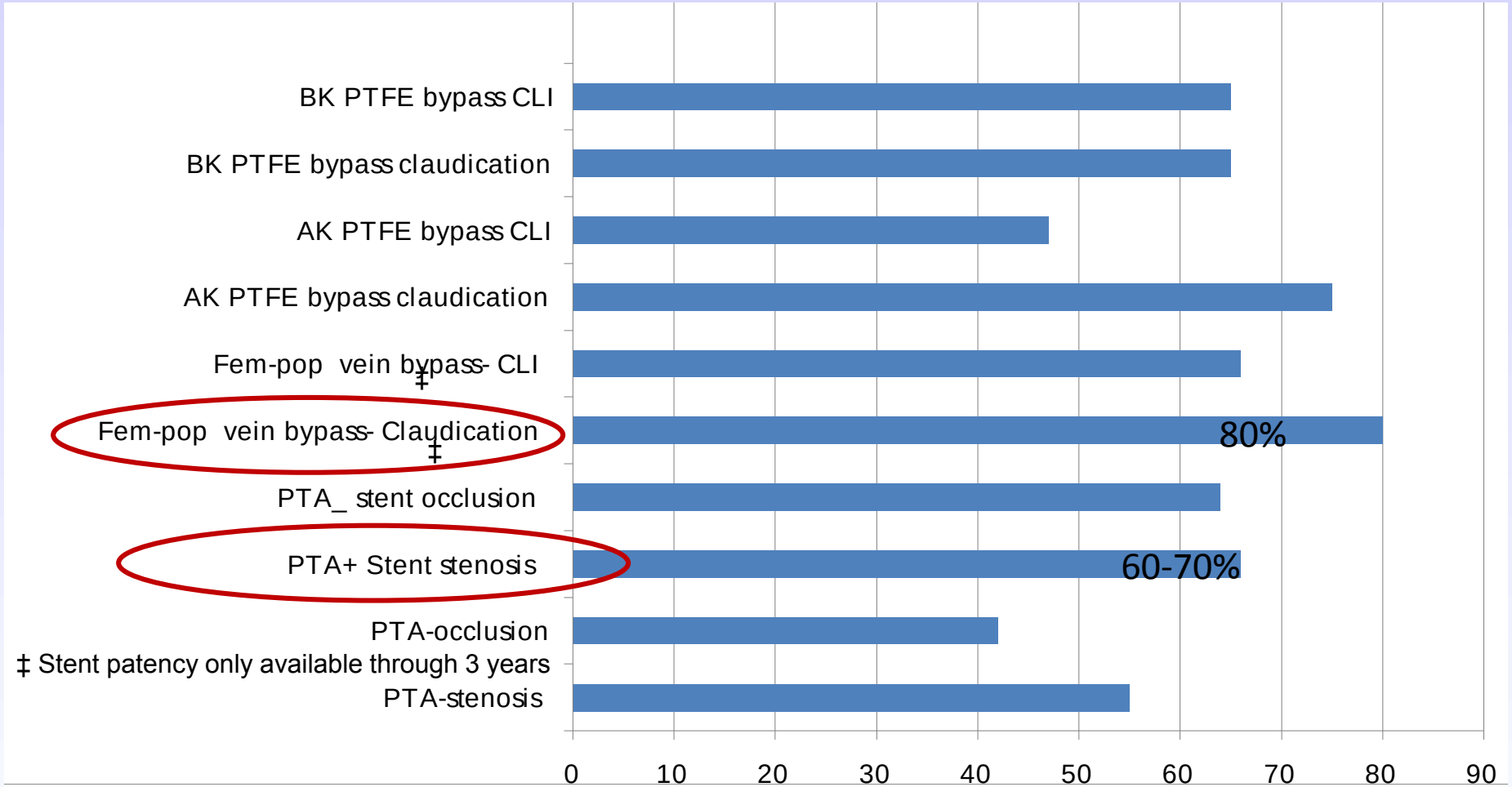
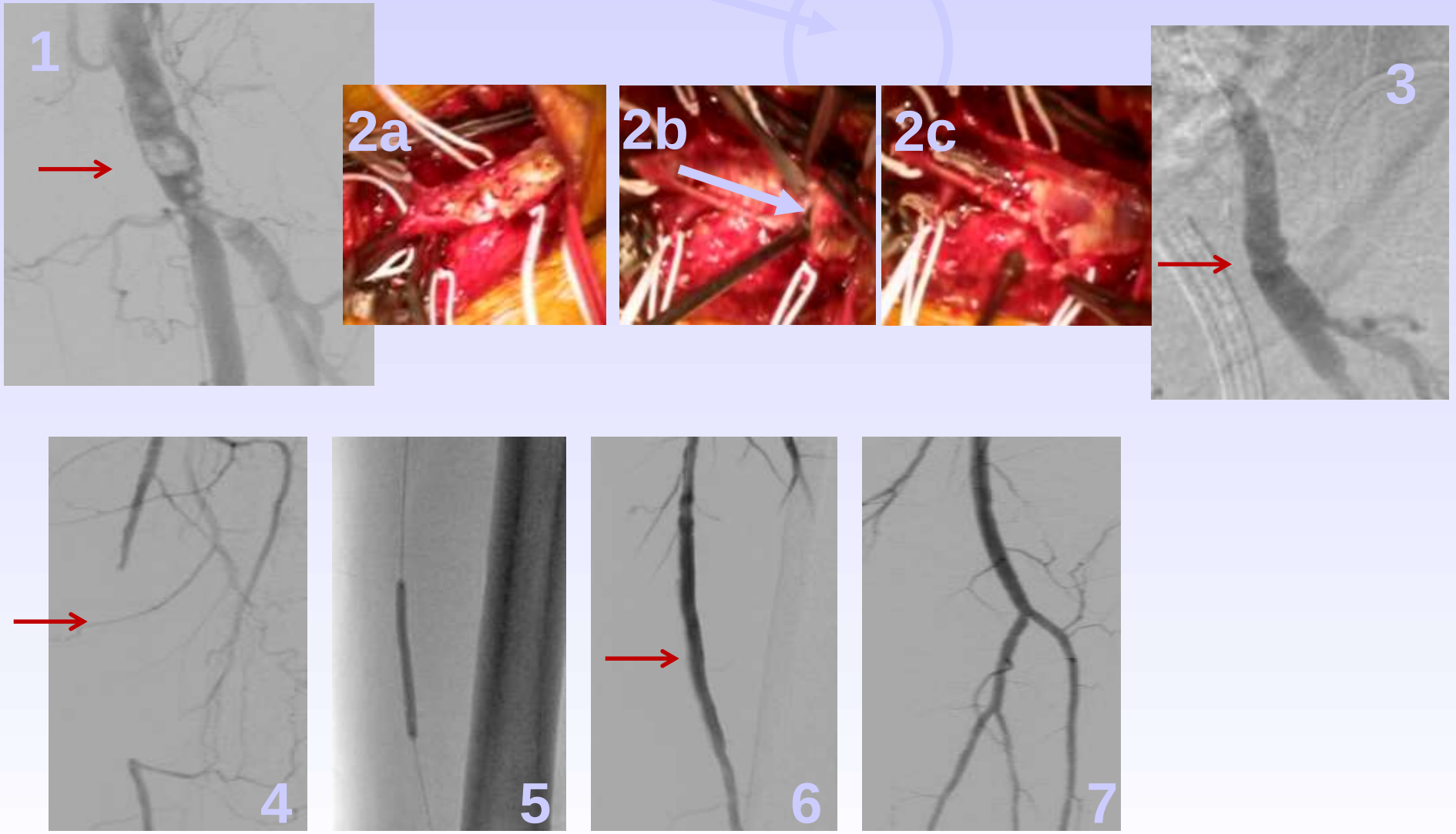


Figure 3: 5 year patency (%) of femoral popliteal revascularization. (Data from Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). *J Vasc Surg*. 2007; 45 Suppl S:S5-67.)

SFA Stent Patency – Recent Trials
The evidence accumulates…

Study	Stent	Subjects	Avg. Lesion Length(cm)	% CTO	Freedom from TLR	Fracture Rate (%)	12 M Primary Patency
							86
Zilver Trial	Zilver PTX	489	6.6	-	-	.9	83
Sirocco II	SMART (DES)	57	8.1	-	91	8	82**
Resilient	LifeStent	134	6.2	17	83	3.4	80
Saxon	Viabahn	76	14.2	42	87	0	76
Durability	Everflex	151	9.6	40	79	8.1	72
FAST	Luminexx	244	4.5	37	85	12	67
Super-SL	SMART	96	13.4	-	75	23	65
Vienna	Absolute	104	13	37	54.3	2	63
Vibrant	BMS Arm	76	16	50+	-	>30	58
Vibrant	Viabahn Arm	72	20	50+	-	2	53

Hybrid Approach



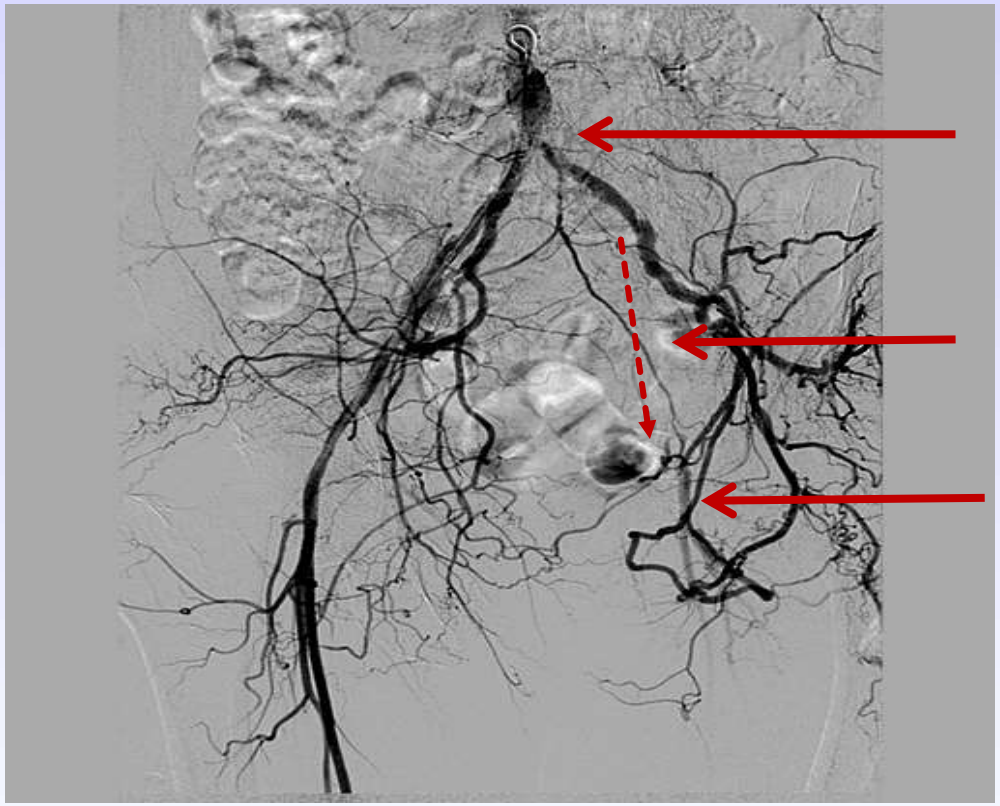
How Often Do you Follow Up Patients Post Revascularization

- Generally 1 month, 3 months and then 6-12 months
- Periodic Clinical evaluation and ABI should be considered
- Duplex ultrasound Routine Surveillance
  - Beneficial in infra-inguinal autologous vein bypass patients
  - May be reasonable after endovascular procedures

Conclusion

- PAD patients are at high risk for adverse cardiovascular outcomes
- GDMT and risk factor modification is essential to “keep your patients in circulation”
- Supervised Exercise Programs are effective in improving symptoms
- Revascularization should be considered in appropriate patients for symptom relief and improving limb outcomes

Thank you



Aorto-iliac bifurcation

EIA

CFA

Post Intervention

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