



**Brigham and Women's Hospital**

Founding Member, Mass General Brigham

## **Peripheral Artery Disease (including Carotid and Aortic Disease)**

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- Clinical focus: Thrombosis and Vascular Medicine
- Research focus: Thrombosis



# Disclosures

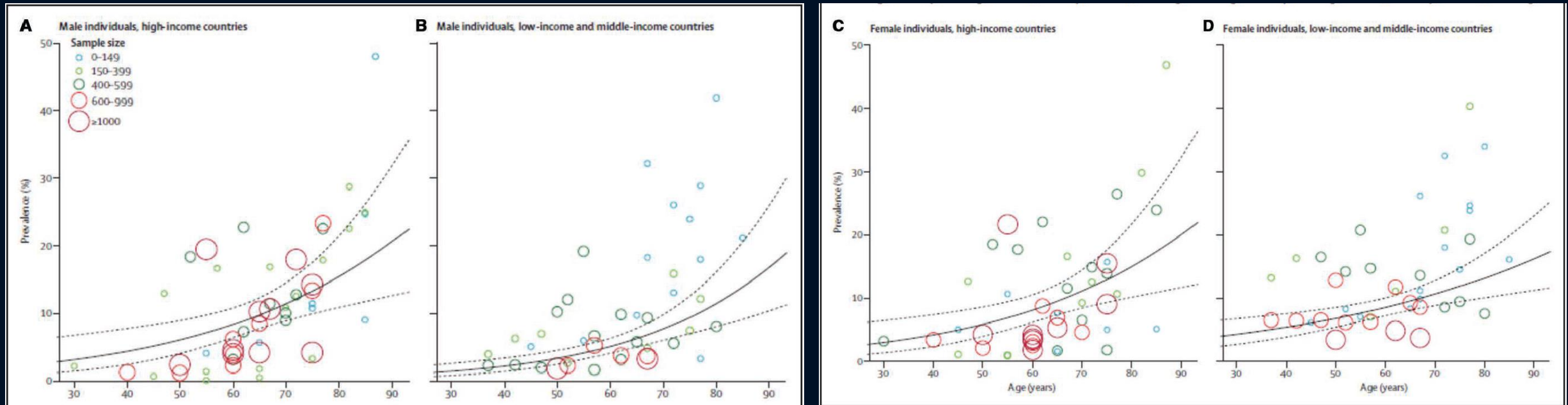
- **Research Grants:** BMS/Pfizer, Janssen, Alexion, Bayer, Amgen, BSC, Esperion, 1R01HL164717-01
- **Advisory Role:** BSC, Amgen, BCRI, PERC, NAMSA, BMS, Janssen, Regeneron

# Objectives

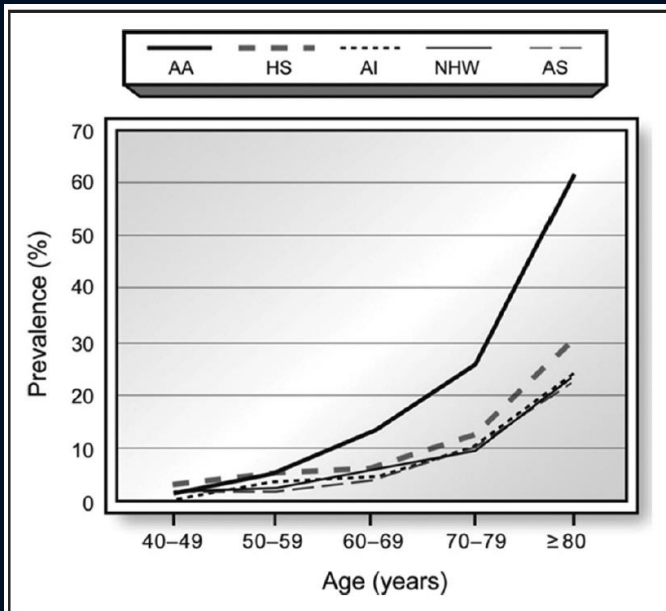
- Use case vignettes to:
  1. Understand the natural history and pathophysiology of peripheral artery disease (PAD)
  2. Describe the evaluation and management of intermittent claudication
  3. Highlight the assessment and treatment of patients with chronic limb-threatening ischemia



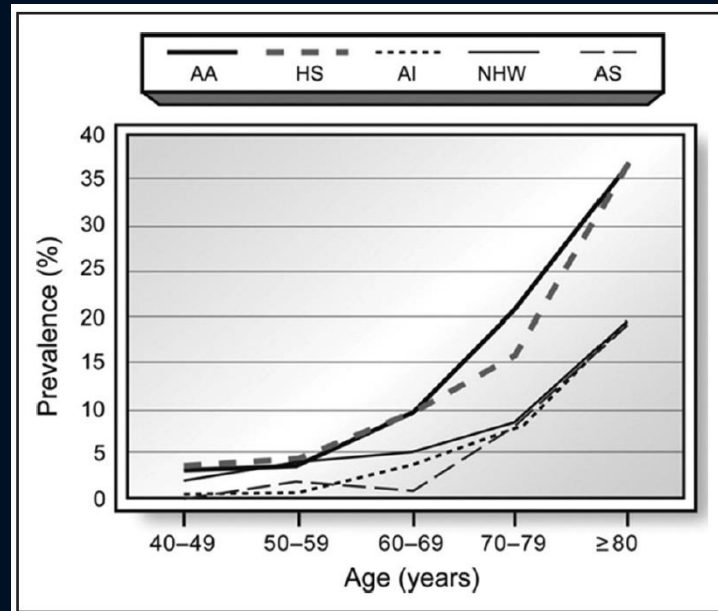
# Prevalence of PAD: Global Patterns



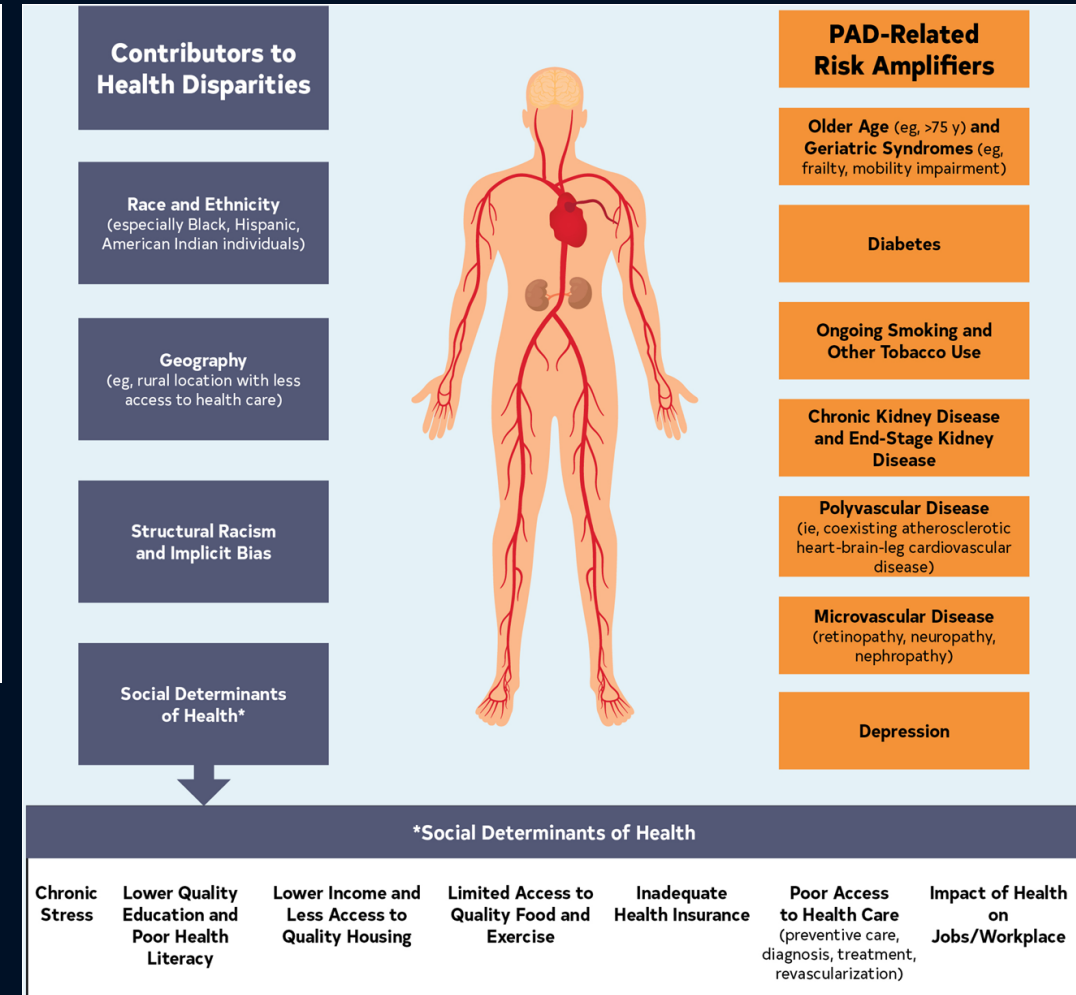
# Racial and Ethnic Disparities in Peripheral Artery Disease



**Figure 1.** Ethnic-specific prevalence of peripheral artery disease in men.

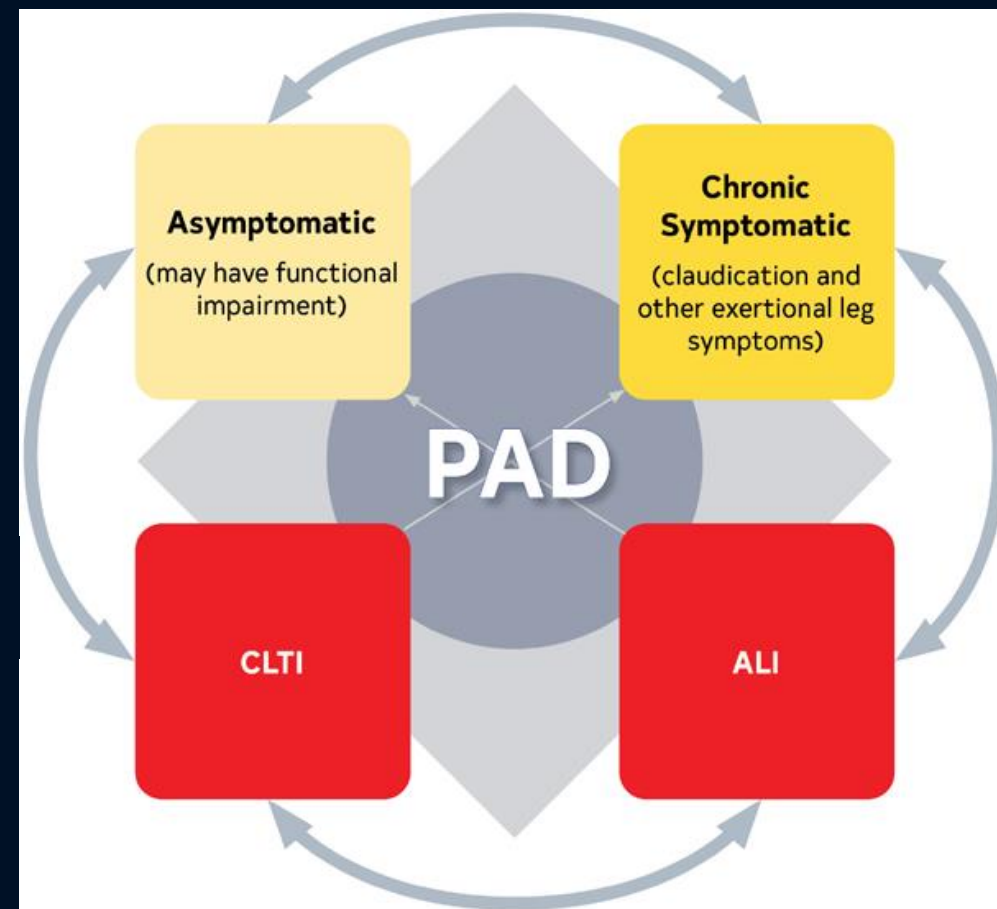
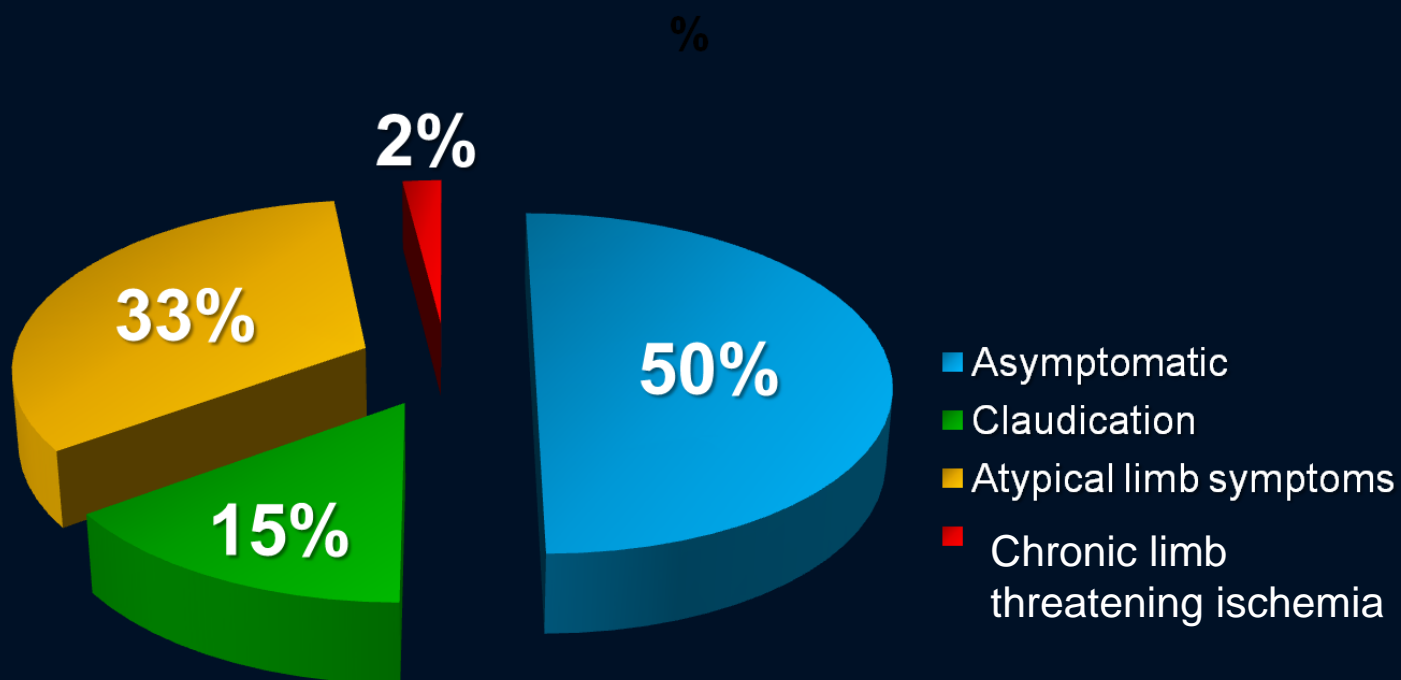


**Figure 2.** Ethnic-specific prevalence of peripheral artery disease in women.

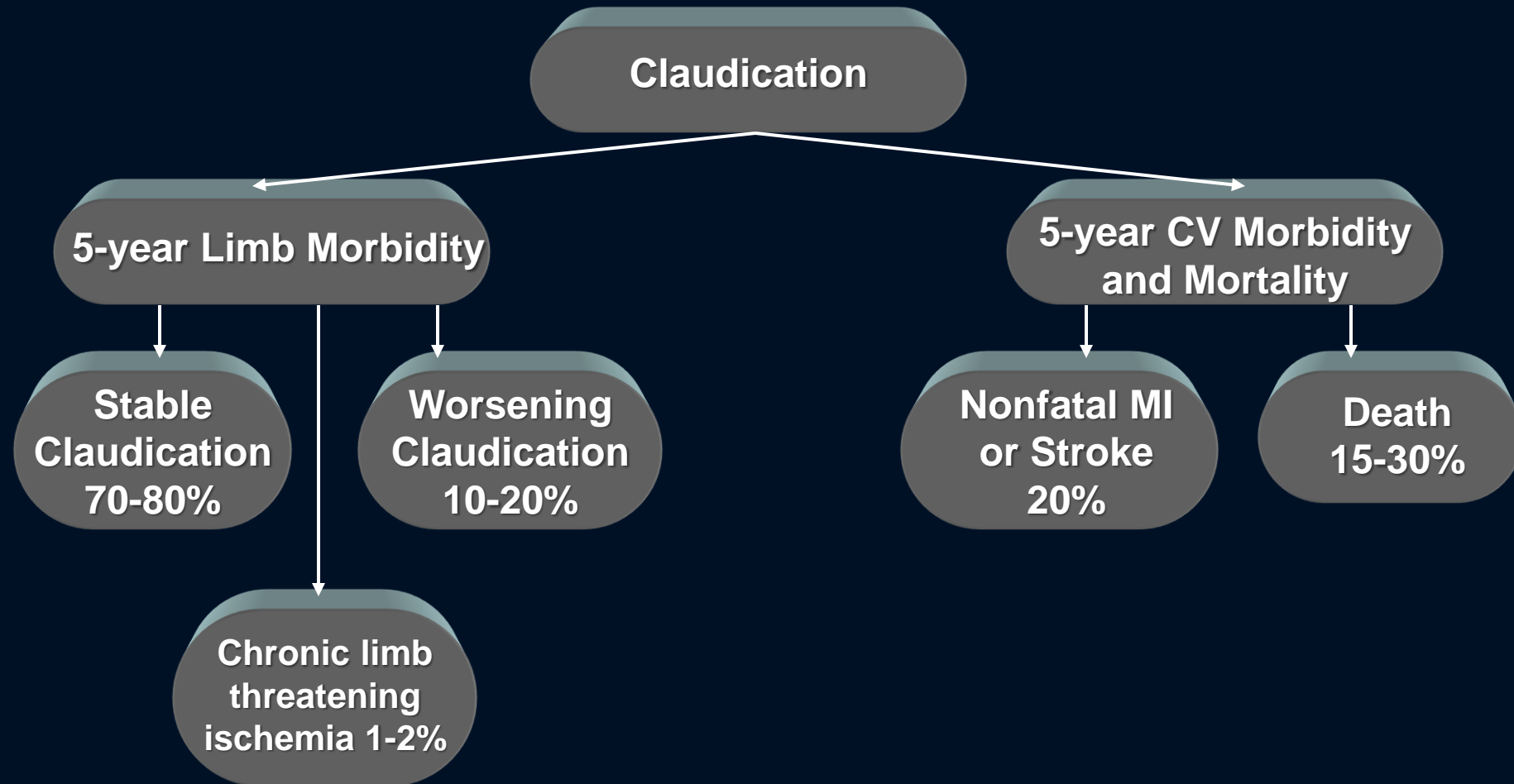


Hackler EL, et al. Circulation Research. 2021;128:1913  
Gornik HL, et al. Circulation. 2024;149:e1313

# Clinical Presentation of PAD



# Natural History



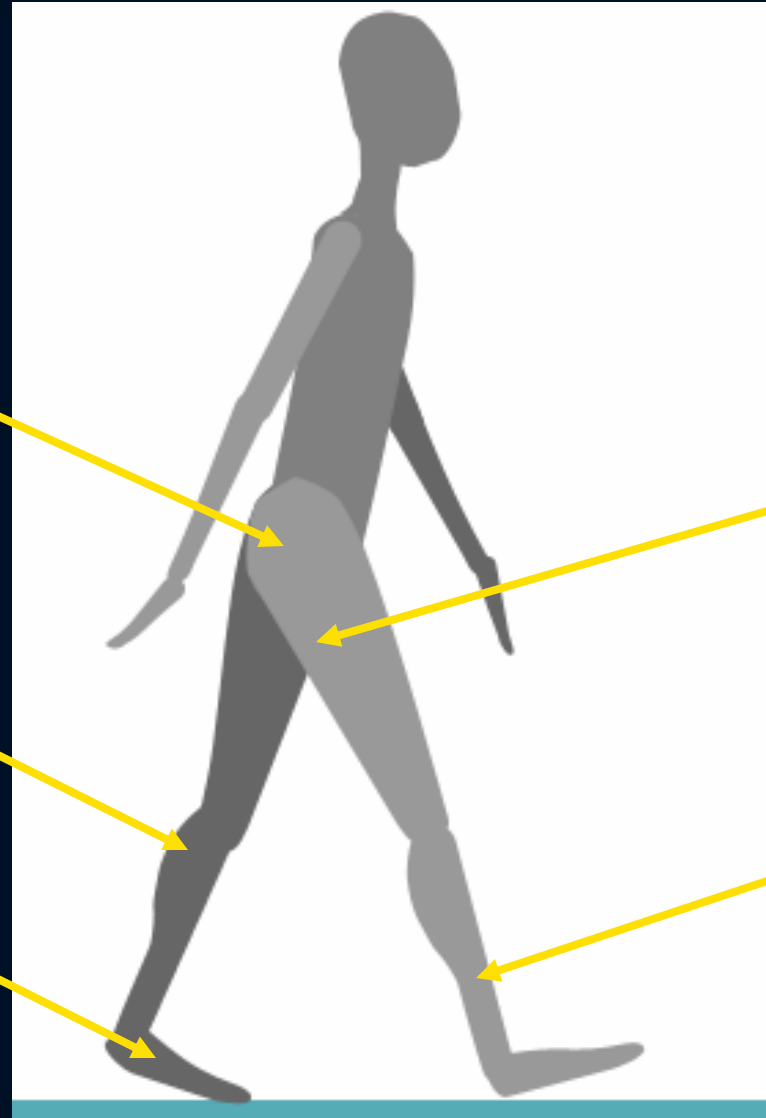
# Clinical Evaluation



**Buttock and hip-**  
aortoiliac

**Upper 2/3 of calf-**  
superficial femoral

**Foot-** infrapopliteal



**Thigh-** aortoiliac or  
common femoral

**Lower 1/3 of calf-**  
popliteal

# Case No. 1



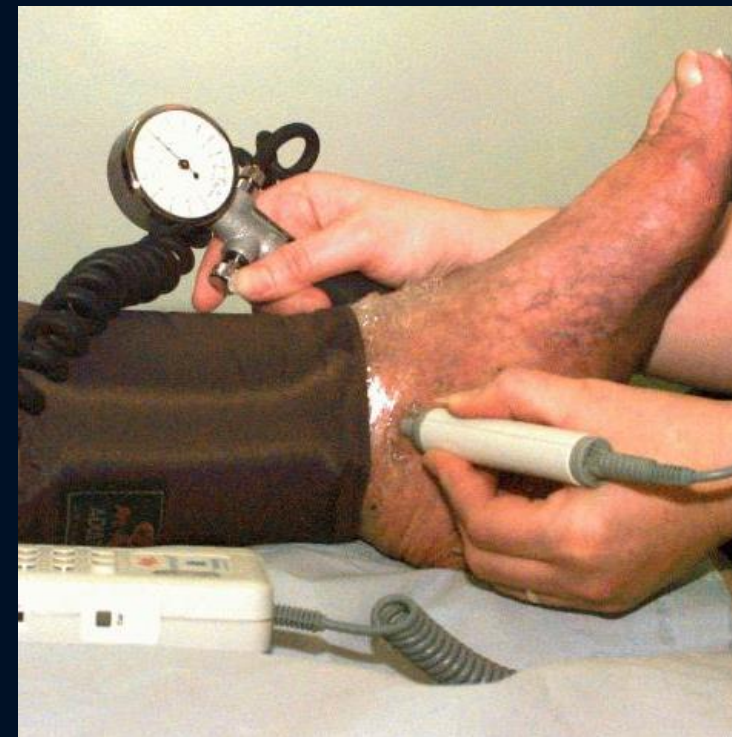
- A 67-year-old man with diabetes, prior smoking, hypertension, and high cholesterol presents with calf cramping when walking.
- He first noted the cramping when climbing hills on the golf course but now experiences it even walking on level ground.
- The discomfort resolves with rest.
- His symptoms are worse on the left.





# Case No. 1

- The patient has a blood pressure of 172/82 in the right arm and 166/80 in the left arm.
- Femoral pulses are 2+ without bruits, and popliteal pulses are 1+ bilaterally.
- Distal pulses are 1+ at the DP and PT bilaterally.
- Ankle brachial index (ABI) is 1.1 on the right and 1.0 on the left.





# Board-Style Q&A #1

- In a patient with exertional limb symptoms but normal resting ABIs, which is the best initial diagnostic study?
  1. Invasive angiogram
  2. CT angiogram
  3. MR angiogram
  4. Exercise ABIs
  5. Vascular PET scan





# Board-Style Q&A #1

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# Case No. 1



## Exercise ABIs

Stage	ABI	
	Right	Left
Rest	1.1	1.0
Immediate post	0.7	0.6
5 minutes post	1.0	1.0

# Definition: Claudication

- **Intermittent claudication:** (n)  
reproducible discomfort in a  
defined muscle group provoked  
by exercise and relieved with rest.

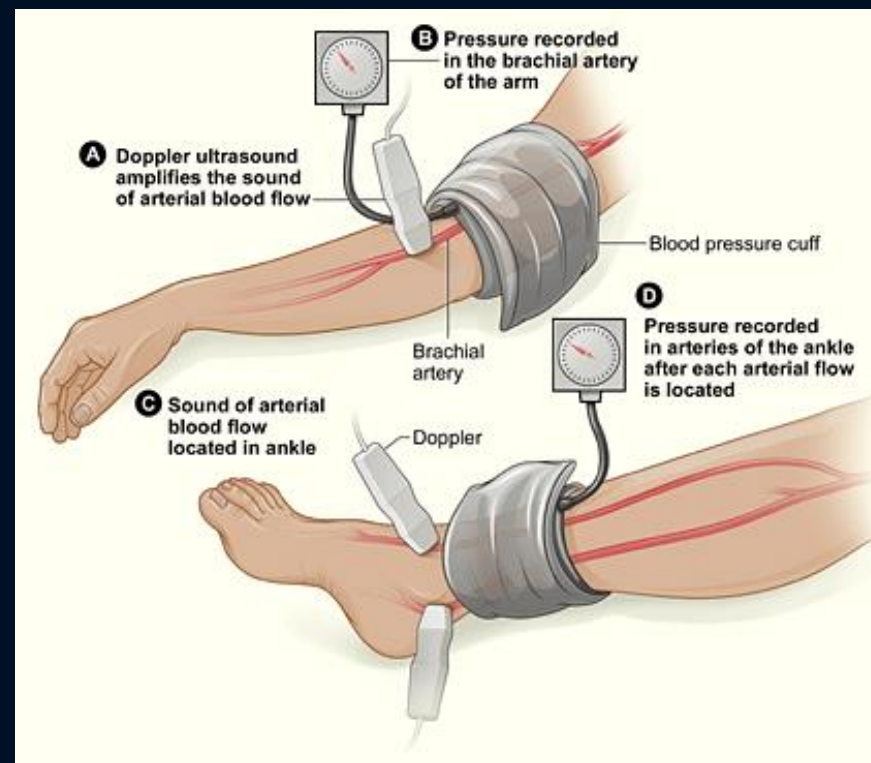
# Clinical Evaluation



Condition	Location of pain	Quality of symptoms	Effect of exercise and rest	Other
<b>Intermittent claudication</b>	Buttock, thigh, and calf	Crampy, achy, fatigue	Onset after same degree of exercise, quick relief with rest	Reproducible
<b>Spinal stenosis</b>	Hip, buttocks, thigh (dermatomal)	Weakness, pain	Onset with walking or standing, relieved with position change	History of back problems
<b>Venous claudication</b>	Whole leg	Tightness	Onset with walking, slow relief with rest	History of DVT, edema on exam

# Ankle:Brachial Index

- The ankle:brachial index (ABI) is calculated by dividing each of the systolic pressures in the ankle (DP and PT) by the highest brachial pressure.
- 95% sensitive and 99% specific for PAD
- Identifies a population at high risk of CV events



# Variation in the Calculation of ABIs

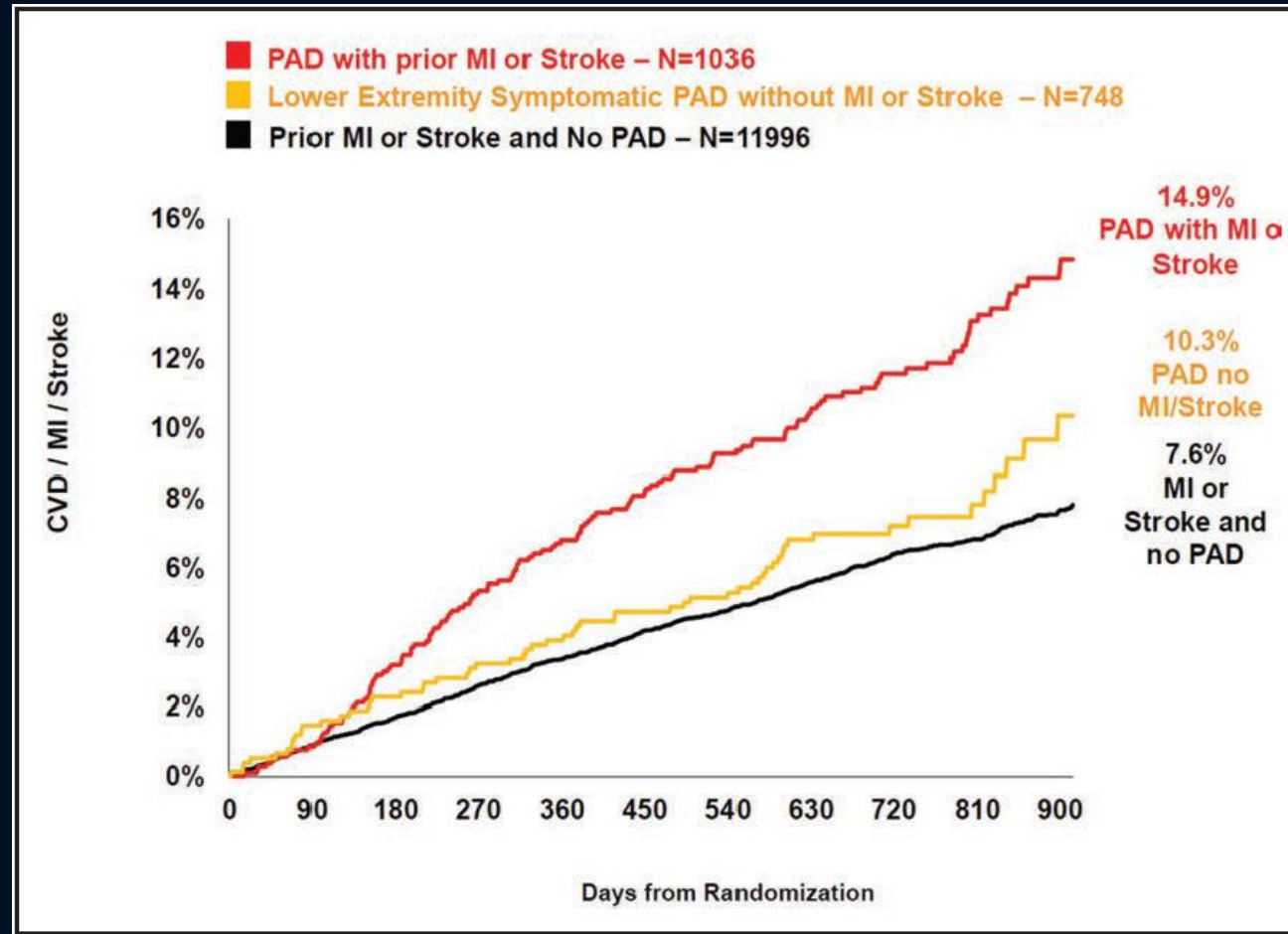
- If you want to assess for perfusion-related disease (claudication or critical limb ischemia):
  - $\text{ABI} = \frac{\text{highest ankle pressure}}{\text{highest arm pressure}}$
- If you want to assess for cardiovascular risk (atherosclerosis):
  - $\text{ABI} = \frac{\text{lowest ankle pressure}}{\text{highest arm pressure}}$

# Correlation of ABI to Severity of PAD



ABI	Clinical Syndrome
0.80 – 1.0	Usually asymptomatic. Associated with future risk of heart attack and/or stroke.
0.40 – 0.80	Claudication or atypical leg discomfort. Associated with future risk of heart attack and/or stroke.
< 0.40	Associated with increased risk of critical limb ischemia (rest pain, tissue loss). Associated with future risk of heart attack and/or stroke.

# Major Adverse CV Event Risk Increases with Diagnosis of PAD

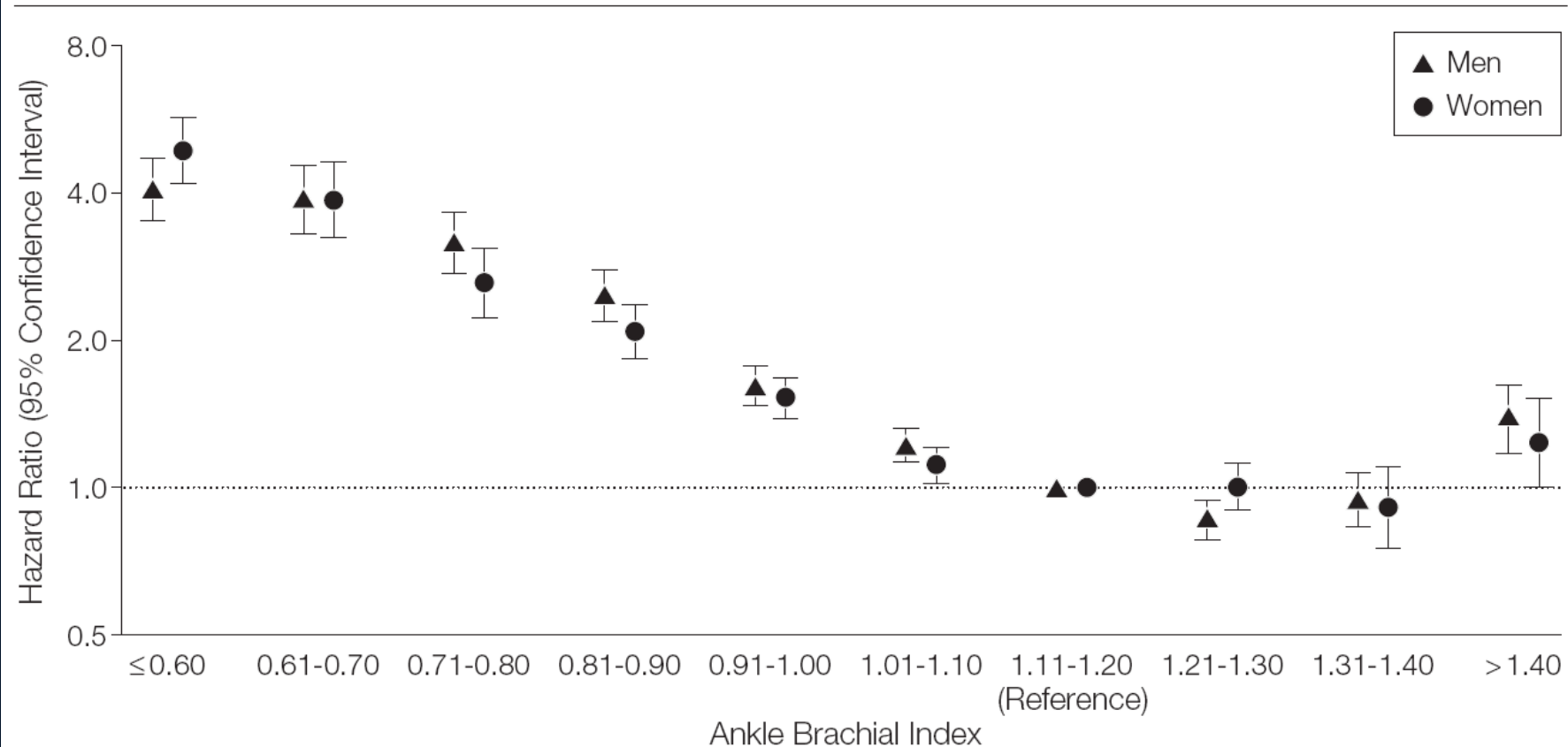




# ABI and Mortality



**Figure 2.** Hazard Ratios for Total Mortality in Men and Women by Ankle Brachial Index at Baseline for All Studies Combined in the ABI Collaboration



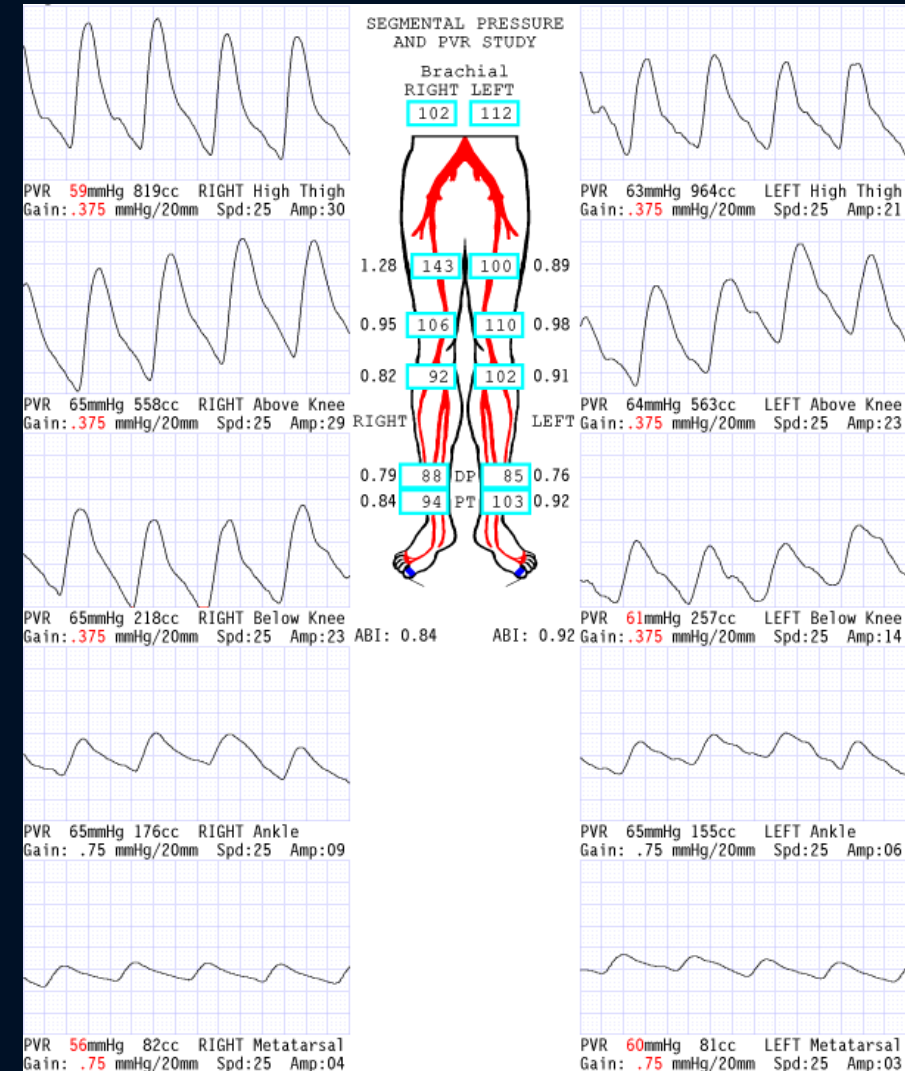
Hazard ratios are not adjusted for age or cardiovascular risk factors.

# Exercise ABIs

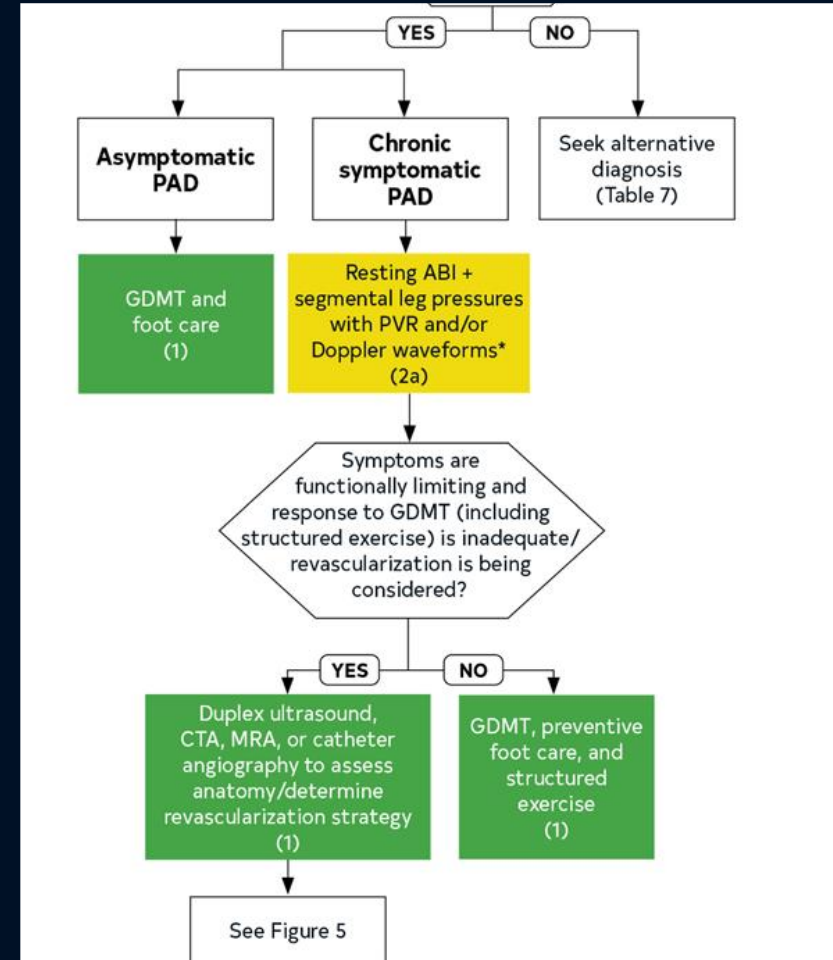
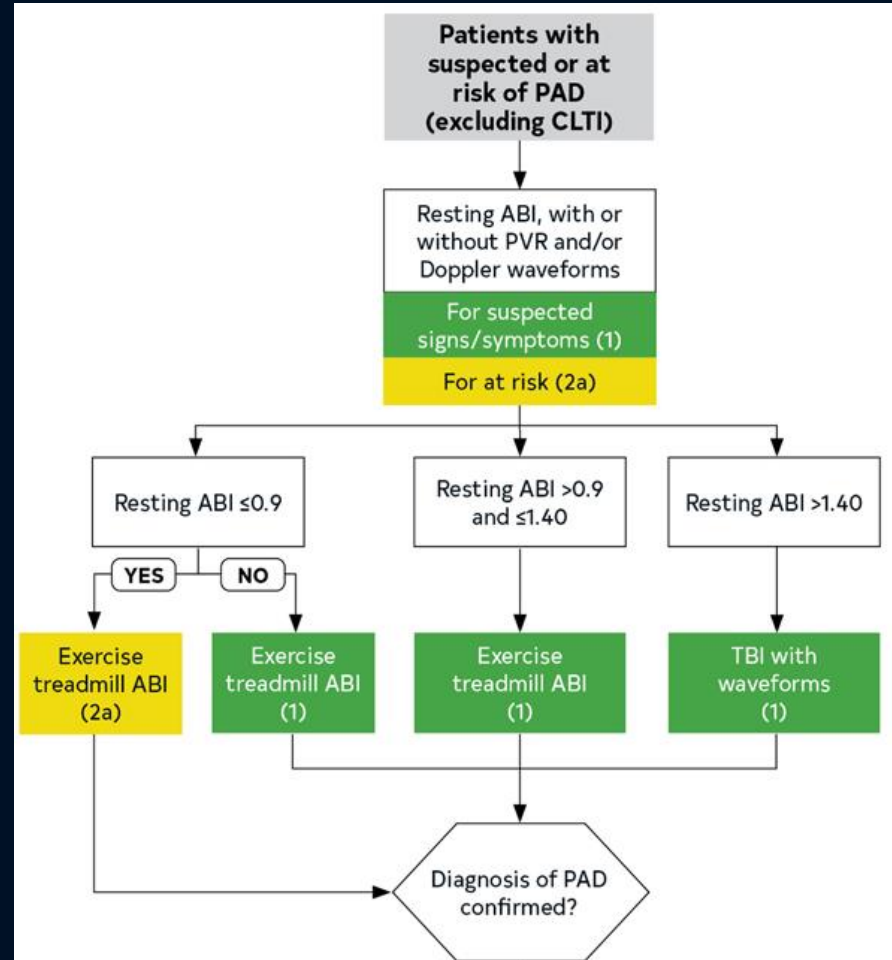
- Confirms the PAD diagnosis
- Establishes PAD as the cause of symptoms
- Assesses the functional severity of claudication
- May “unmask” PAD when the resting ABI is normal



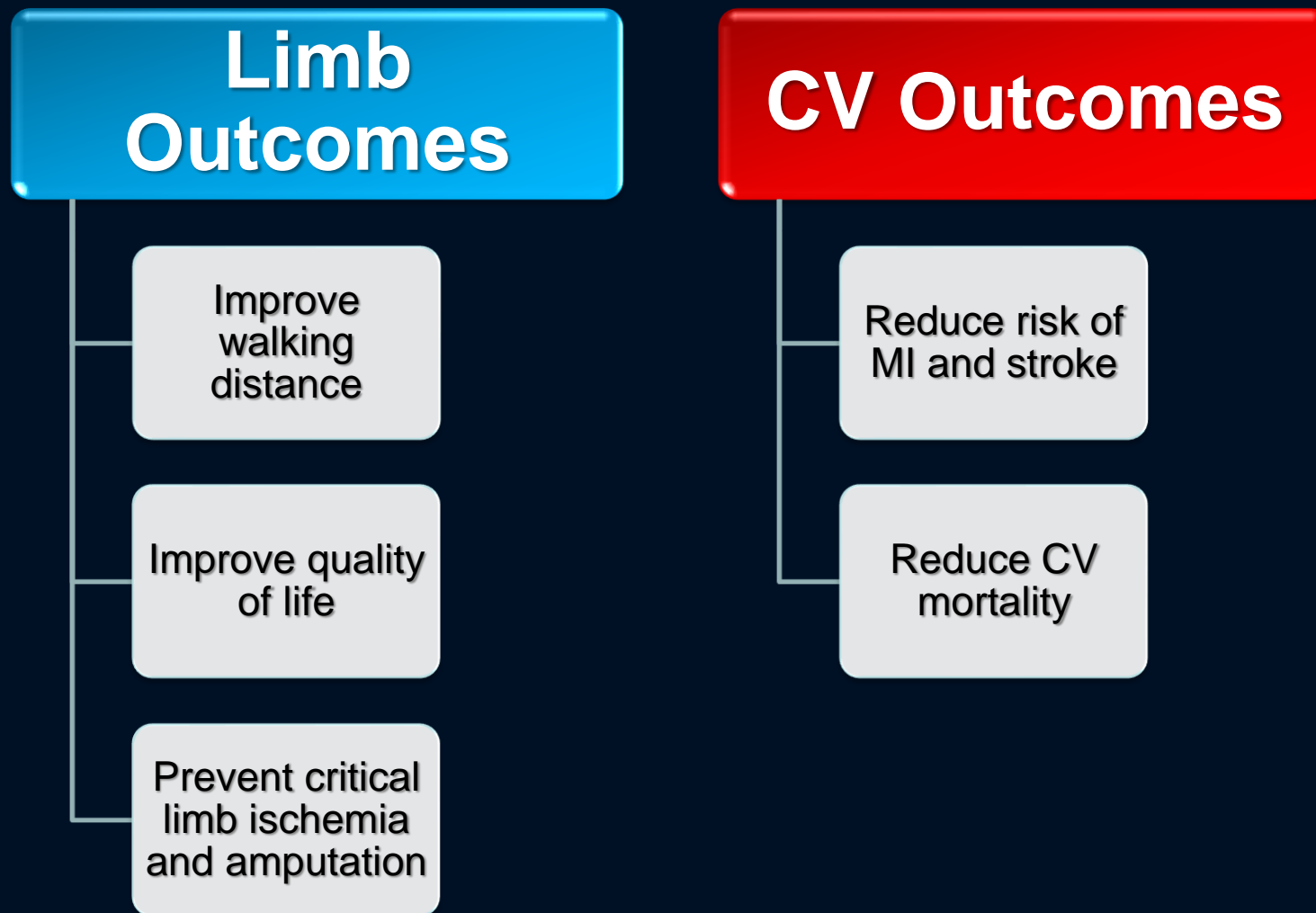
# Segmental Doppler Pressures and Pulse Volume Recordings



# 2024 AHA/ACC PAD Guidelines: Claudication



# PAD: Goals of Therapy







## Board-Style Q&A #2

- A 64-year-old woman with COPD, prior DVT no longer on anticoagulation, cigarette smoking, hypertension, and right leg claudication has a right ABI of 0.6.
- Which of the following is the most important intervention?
  1. Cilostazol
  2. Rivaroxaban and aspirin
  3. Smoking cessation
  4. Lower extremity bypass surgery



## Board-Style Q&A #2

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  3. Smoking cessation
  4. Lower extremity bypass surgery

# 2024 AHA/ACC PAD Guidelines: Claudication



## 5.4. Smoking Cessation for PAD

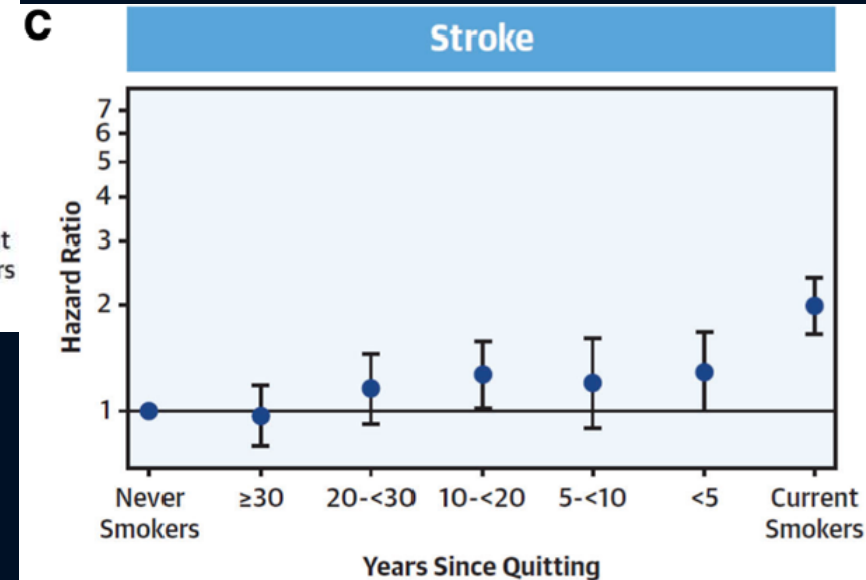
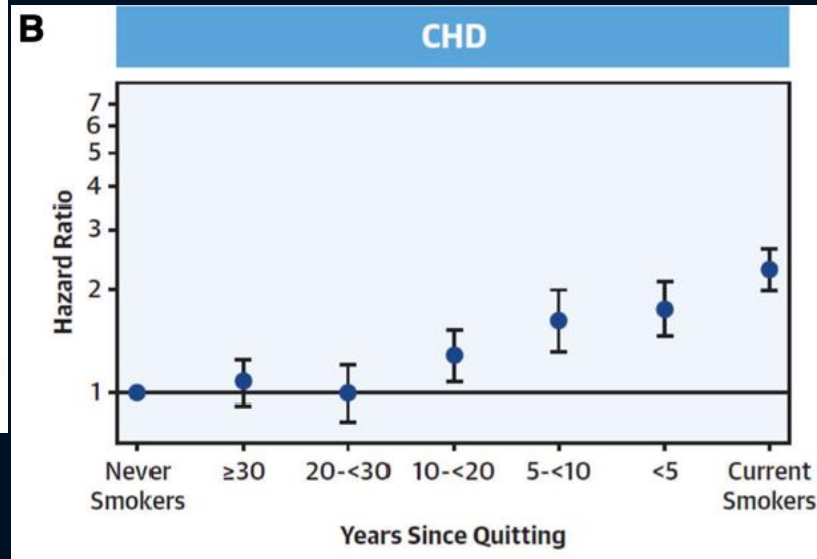
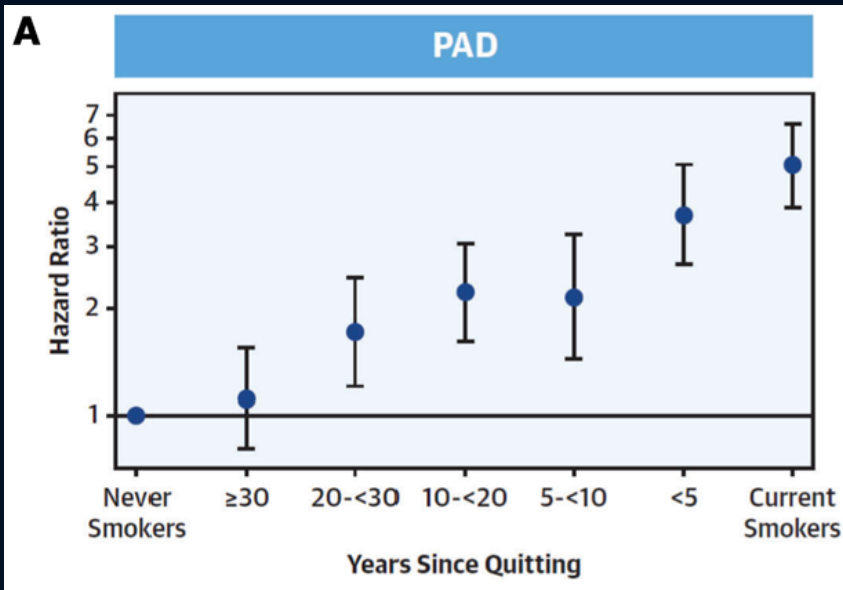
**Recommendations for Smoking Cessation for PAD**  
Referenced studies that support the recommendations are summarized in the [Online Data Supplement](#).

COR	LOE	Recommendations
1	A	1. Patients with PAD who smoke cigarettes or use any other forms of tobacco should be advised at every visit to quit or encouraged to maintain cessation. <sup>1-3</sup>
1	A	2. Patients with PAD who smoke cigarettes or use any other forms of tobacco should be assisted in developing a plan for quitting that includes pharmacotherapy (ie, varenicline, bupropion, and/or nicotine replacement therapies) combined with counseling, and/or referral to a smoking cessation program. <sup>4-9</sup>
1	B-NR	3. Patients with PAD should be advised to avoid exposure to secondhand tobacco smoke in all indoor or enclosed spaces, including work, home, transportation vehicles, and public places. <sup>10-14</sup>





# Smoking Cessation Saves Limbs and Reduces CV Events



# 2024 AHA/ACC PAD Guidelines: Claudication



## 5.1. Antiplatelet and Antithrombotic Therapy for PAD

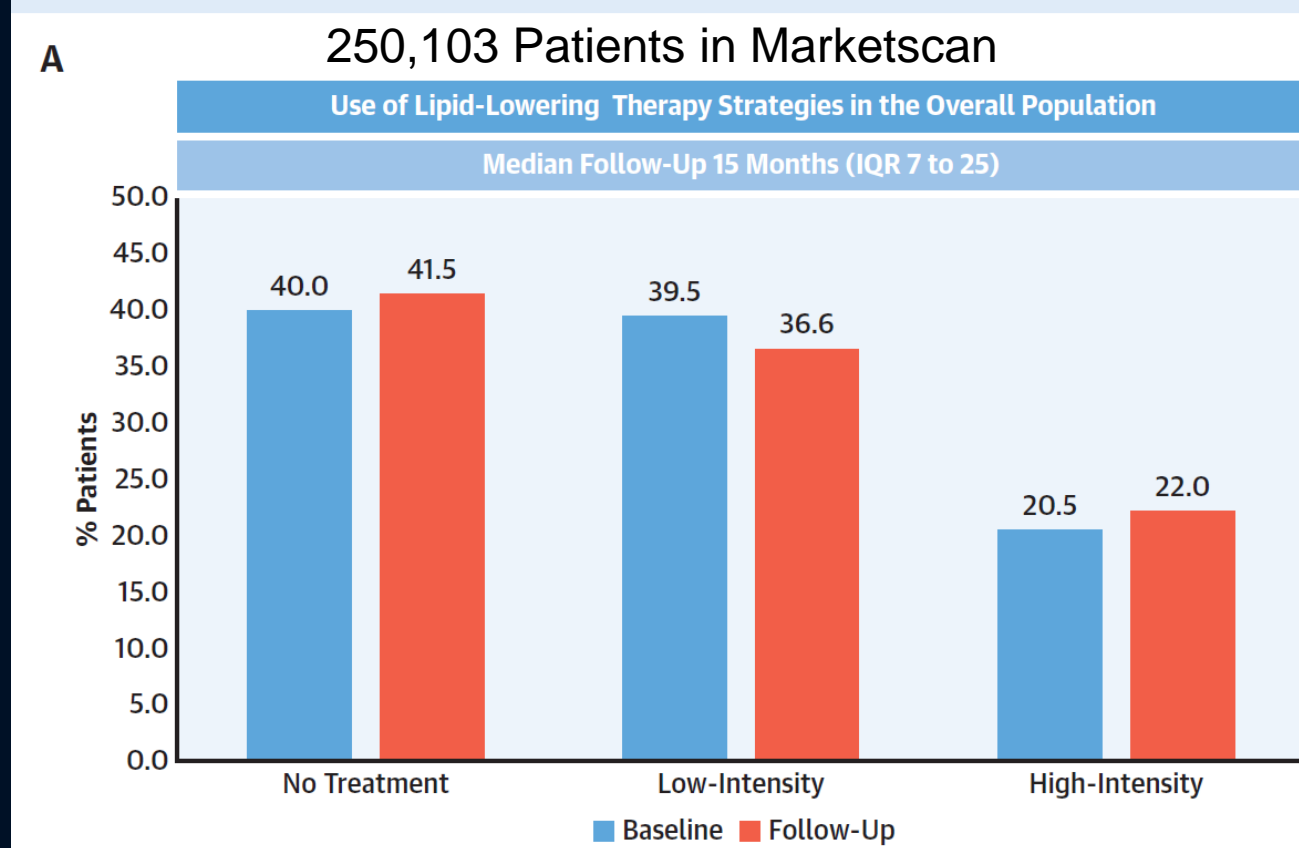
Recommendations for Antiplatelet and Antithrombotic Therapy for PAD Referenced studies that support the recommendations are summarized in the <a href="#">Online Data Supplement</a> .		
COR	LOE	Recommendations
1	A	1. In patients with symptomatic PAD, single antiplatelet therapy is recommended to reduce the risk of MACE. <sup>1-4</sup>
1	B-R	2. In patients with symptomatic PAD, single antiplatelet therapy with clopidogrel alone (75 mg daily) is recommended to reduce the risk of MACE. <sup>4</sup>
1	C-LD	3. In patients with symptomatic PAD, single antiplatelet therapy with aspirin alone (range, 75-325 mg daily) is recommended to reduce the risk of MACE. <sup>1-3</sup>

1	A	4. In patients with symptomatic PAD, low-dose rivaroxaban (2.5 mg twice daily) combined with low-dose aspirin is effective to reduce the risk of MACE and MALE. <sup>5,6</sup>
1	B-R	5. After endovascular or surgical revascularization for PAD, antiplatelet therapy is recommended. <sup>1,7-9</sup>
1	A	6. After endovascular or surgical revascularization for PAD, low-dose rivaroxaban (2.5 mg twice daily) combined with low-dose aspirin is recommended to reduce the risk of MACE and MALE. <sup>7</sup>
2a	C-LD	7. After endovascular revascularization for PAD, dual antiplatelet therapy with a P2Y12 antagonist and low-dose aspirin is reasonable for at least 1 to 6 months. <sup>8-11</sup>
2a	C-LD	8. After endovascular or surgical revascularization in patients with PAD who require full-intensity anticoagulation for another indication and are not at high risk of bleeding, adding single antiplatelet therapy is reasonable. <sup>12,13</sup>

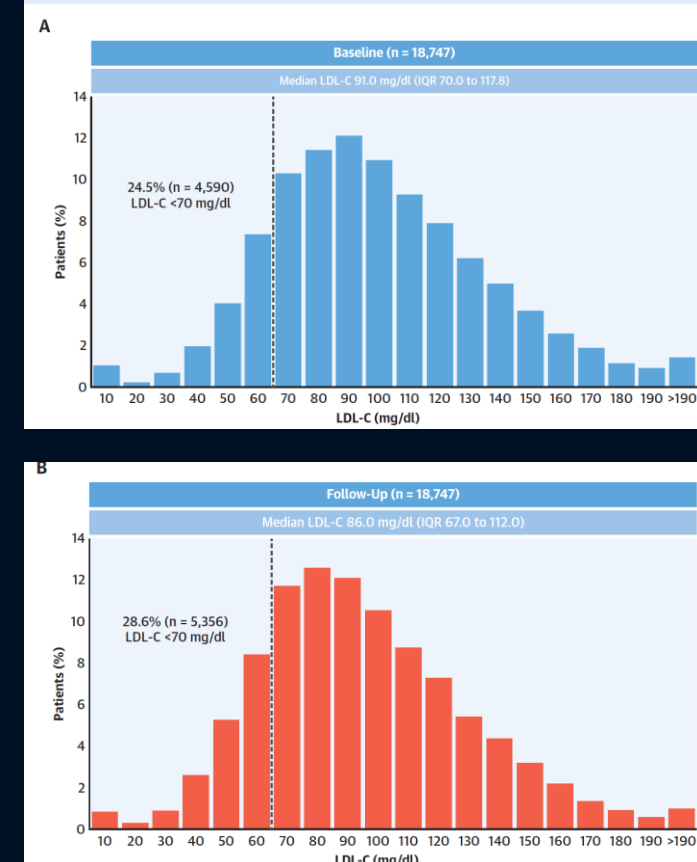
# Effectiveness of Blood Lipid Management in Patients With Peripheral Artery Disease



**FIGURE 1** Use of LLTs in the Overall Peripheral Artery Disease Population



**FIGURE 2** Distribution of LDL-C Among Patients With Baseline and Follow-Up LDL-C Levels



# 2024 AHA/ACC PAD Guidelines: Claudication



## 5.2. Lipid-Lowering Therapy for PAD

**Recommendations for Lipid-Lowering Therapy for PAD**  
Referenced studies that support the recommendations are summarized in the [Online Data Supplement](#).

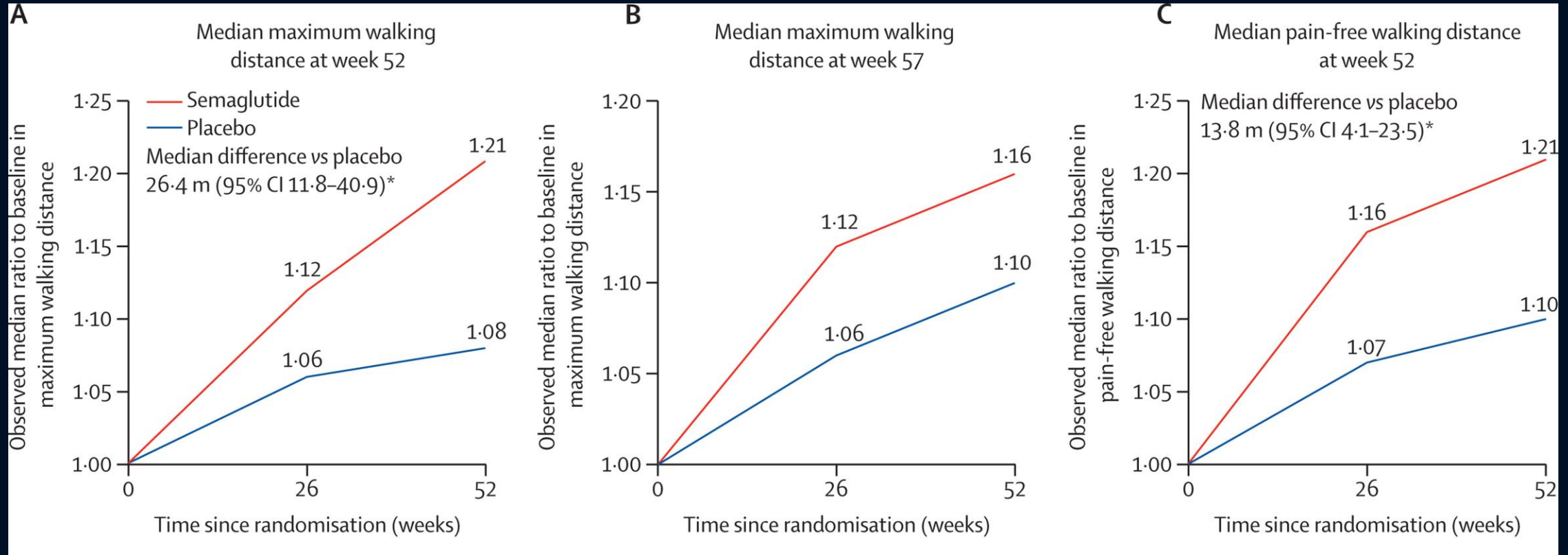
COR	LOE	Recommendations
1	A	1. In patients with PAD, treatment with high-intensity statin therapy is indicated, with an aim of achieving a $\geq 50\%$ reduction in low-density lipoprotein cholesterol (LDL-C) level. <sup>1-3</sup>
2a	B-R	2. In patients with PAD who are on maximally tolerated statin therapy and have an LDL-C level of $\geq 70$ mg/dL, it is reasonable to add PCSK9 inhibitor therapy. <sup>1,4-6</sup>
2a	B-R	3. In patients with PAD who are on maximally tolerated statin therapy and have an LDL-C level of $\geq 70$ mg/dL, it is reasonable to add ezetimibe therapy. <sup>1,7</sup>

## 5.5. Diabetes Management for PAD

**Recommendations for Diabetes Management for PAD**  
Referenced studies that support the recommendations are summarized in the [Online Data Supplement](#).

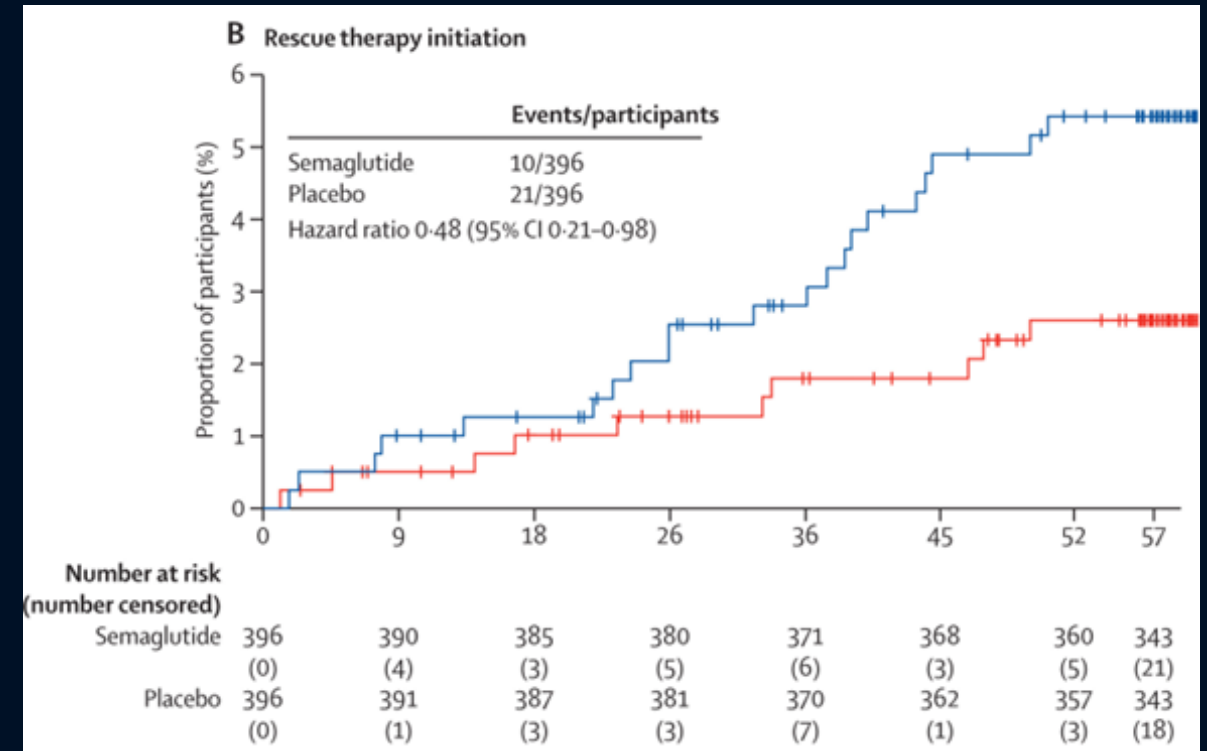
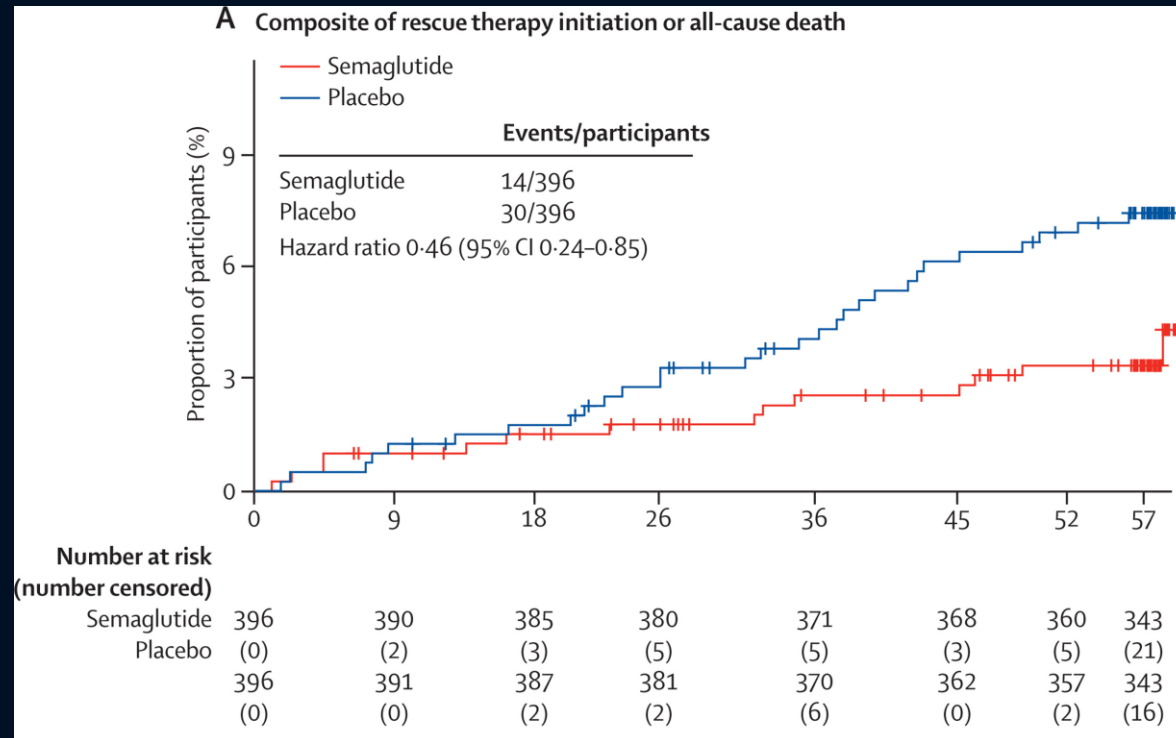
COR	LOE	Recommendations
1	A	1. In patients with PAD and type 2 diabetes, use of glucagon-like peptide-1 agonists (liraglutide and semaglutide) and sodium-glucose cotransporter-2 (SGLT-2) inhibitors (canagliflozin, dapagliflozin, and empagliflozin) are effective to reduce the risk of MACE. <sup>1-12</sup>
1	C-EO	2. In patients with PAD, management of diabetes should be coordinated among members of the health care team.
2b	B-NR	3. In patients with PAD and diabetes, glycemic control may be beneficial to improve limb outcomes. <sup>13-16</sup>

# Semaglutide and Walking Capacity in People with Symptomatic PAD and Type 2 Diabetes: STRIDE Trial





# Semaglutide and Walking Capacity in People with Symptomatic PAD and Type 2 Diabetes: STRIDE Trial



# 2024 AHA/ACC PAD Guidelines: Claudication



**Recommendations for Exercise Therapy for PAD**  
Referenced studies that support the recommendations are summarized in the [Online Data Supplement](#).

COR	LOE	Recommendations
1	A	1. In patients with chronic symptomatic PAD, SET is recommended to improve walking performance, functional status, and QOL. <sup>7,16–28</sup>
1	A	2. In patients with chronic symptomatic PAD, a structured community-based exercise program with behavioral change techniques is effective to improve walking performance, functional status, and QOL. <sup>5–15</sup>
1	A	3. In patients who have undergone revascularization for chronic symptomatic PAD, SET after revascularization is effective to improve walking performance, functional status, and QOL. <sup>29–39</sup>
1	B-R	4. In patients with functionally limiting claudication, SET or a structured community-based exercise program should be offered as an initial treatment option. <sup>17,18,25,40</sup>



# CLEVER: Supervised Exercise vs. Stenting for Claudication Resulting From Aortoiliac Disease



**Table 3. Six-Month End Points and Risk Factors**

	OMC (n=20)	SE+OMC (n=38)	ST+OMC (n=41)	SE vs OMC [95% CI] ( <i>P</i> )	ST vs OMC [95% CI] ( <i>P</i> )	SE vs ST [95% CI] ( <i>P</i> )
<b>Primary end point</b>						
Change of PWT from baseline to 6 mo, mins	1.2±2.6 (−4.1, 8.6)	5.8±4.6 (−0.4, 16.9)	3.7±4.9 (−4.7, 14.6)	4.6 [2.7–6.5] (<0.0001)*	2.5 [0.6–4.4] (0.021)*	2.1 [0.0–4.2] (0.042)
<i>P</i> , nonparametric analysis				<0.001*	0.019*	0.002
Multiple imputation analysis	1.0±2.8 (−9.5, 8.60)	6.1±4.6 (−0.4, 16.9)	3.6±4.9 (−4.7, 14.6)	5.1 [4.5–5.7] (<0.001)*	2.6 [2.0–3.2] (0.017)*	2.5 [1.9–3.1] (0.028)
<b>Secondary end points</b>						
Change in COT from baseline to 6 mo, min	0.7±1.1 (−0.6, 3.3)	3.0±2.9 (−0.8, 10.7)	3.6±4.2 (−0.3, 17.9)	2.2 [1.2–3.3] (0.003)	2.9 [1.5–4.3] (0.006)	0.7 [0.9–2.3] (0.425)
Change in hourly free-living steps from baseline to 6 mo, n†	−5.6±109.4 (−268.2, 168.9)	72.6±138.7 (−185.2, 425.7)	114.3±273.9 (−192.6, 976.4)	78.3 [0.7–157.2] (0.0625)	120.0 [3.5–236.5] (0.1024)	41.7 [73.4–156.8] (0.4661)
Change in ABI from baseline to 6 mo	0.01±0.10 (19) (−0.24, 0.12)	0.03±0.11 (36) (−0.23, 0.37)	0.29±0.33 (40) (−0.12, 1.59)	0.0 [0.0–0.1] (0.578)	0.3 [0.2–0.4] (<0.001)	0.3 [0.2–0.4] (<0.001)
<b>Risk factors (change from baseline)</b>						
LDL cholesterol, mg/dL	−4.4±42.3	−3.6±17.4	−9.3±24.7	<i>P</i> =0.813	<i>P</i> =0.686	<i>P</i> =0.474
HDL cholesterol, mg/dL	7.9±15.4	5.6±8.4	0.4±8.5	<i>P</i> =0.551	<i>P</i> =0.061	<i>P</i> =0.013
Hemoglobin A <sub>1c</sub> , %	−0.09±0.27	0.01±0.50	0.01±0.35	<i>P</i> =0.344	<i>P</i> =0.303	<i>P</i> =0.977
Fibrinogen, g/dL	31.7±64.1	−15.0±84.5	−2.0±89.1	<i>P</i> =0.043	<i>P</i> =0.151	<i>P</i> =0.541
Systolic blood pressure, mm Hg	−5.8±20.7	−0.95±19.1	−5.6±21.9	<i>P</i> =0.381	<i>P</i> =0.974	<i>P</i> =0.323

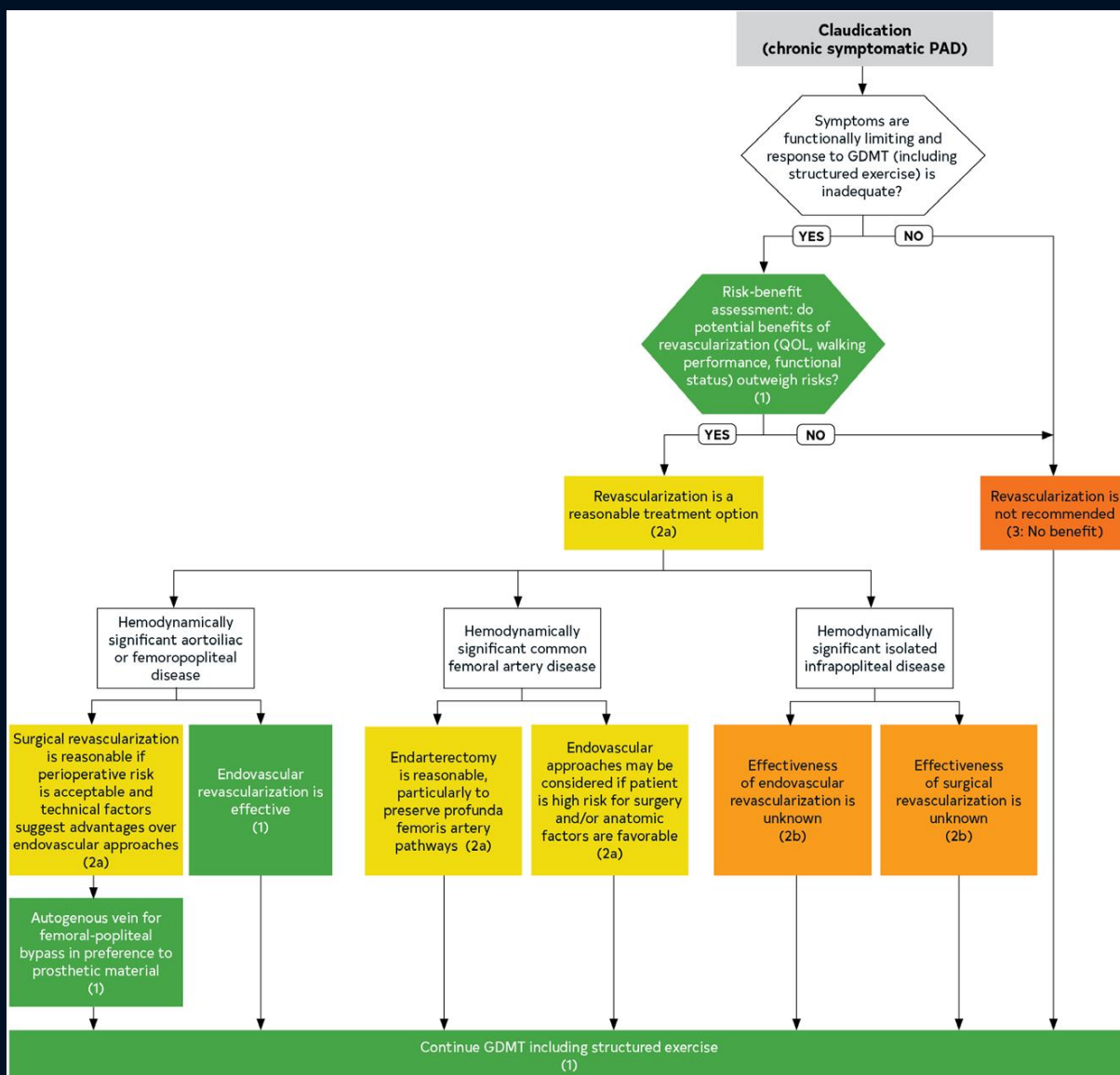
OMC indicates optimal medical care; SE, supervised exercise; ST, stent revascularization; CI, confidence interval; PWT, peak walking time; COT, claudication onset time; ABI, ankle-brachial index; LDL, low-density lipoprotein; and HDL, high-density lipoprotein. Values are mean±SD (minimum, maximum) when appropriate. *P* values are based on ANCOVA with adjustment for study center, baseline cilostazol use, and baseline value of the end point.

\*One-sided *P* value.

†Adjusted with pedometer logs.



# 2024 AHA/ACC PAD Guidelines: Claudication



COR	LOE	Recommendations
<b>Revascularization for Claudication: Initial Decision-Making</b>		
1	B-NR	1. In patients with functionally limiting claudication who are being considered for revascularization, potential benefits with respect to QOL, walking performance, and overall functional status should be weighed against the risks and durability of intervention and possible need for repeated procedures. <sup>1-6</sup>
2a	B-R	2. In patients with functionally limiting claudication and an inadequate response to GDMT (including structured exercise), revascularization is a reasonable treatment option to improve walking function and QOL. <sup>7-14</sup>
3: No Benefit	C-EO	3. In patients with claudication who have had adequate clinical response to GDMT (including structured exercise), revascularization is not recommended.

## Revascularization for Claudication: Aortoiliac Disease and Femoropopliteal Disease (Excluding Common Femoral Artery Disease)

1	A	4. In patients with functionally limiting claudication and hemodynamically significant aortoiliac or femoropopliteal disease with inadequate response to GDMT (including structured exercise), endovascular revascularization is effective to improve walking performance and QOL. <sup>7-28</sup>
2a	B-NR	5. In patients with functionally limiting claudication and hemodynamically significant aortoiliac or femoropopliteal disease with inadequate response to GDMT (including structured exercise), surgical revascularization is reasonable if perioperative risk is acceptable and technical factors suggest advantages over endovascular approaches. <sup>29-31</sup>

## Revascularization for Claudication: Common Femoral Artery Disease

2a	B-R	6. In patients with functionally limiting claudication and hemodynamically significant common femoral artery disease with inadequate response to GDMT (including structured exercise), surgical endarterectomy is reasonable, especially if endovascular approaches adversely affect profunda femoris artery pathways. <sup>32,33</sup>
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# Indications for Intervention



Lifestyle-limiting claudication

- Despite optimal medical therapy



Rest pain



Non-healing ulcer



Gangrene



## Board-Style Q&A #3

- In our patient with claudication walking the golf course and abnormal exercise ABIs, which additional screening test should be performed?
  1. Stress echocardiogram
  2. Stress nuclear perfusion scan
  3. Abdominal ultrasound
  4. CT calcium score
  5. Carotid ultrasound

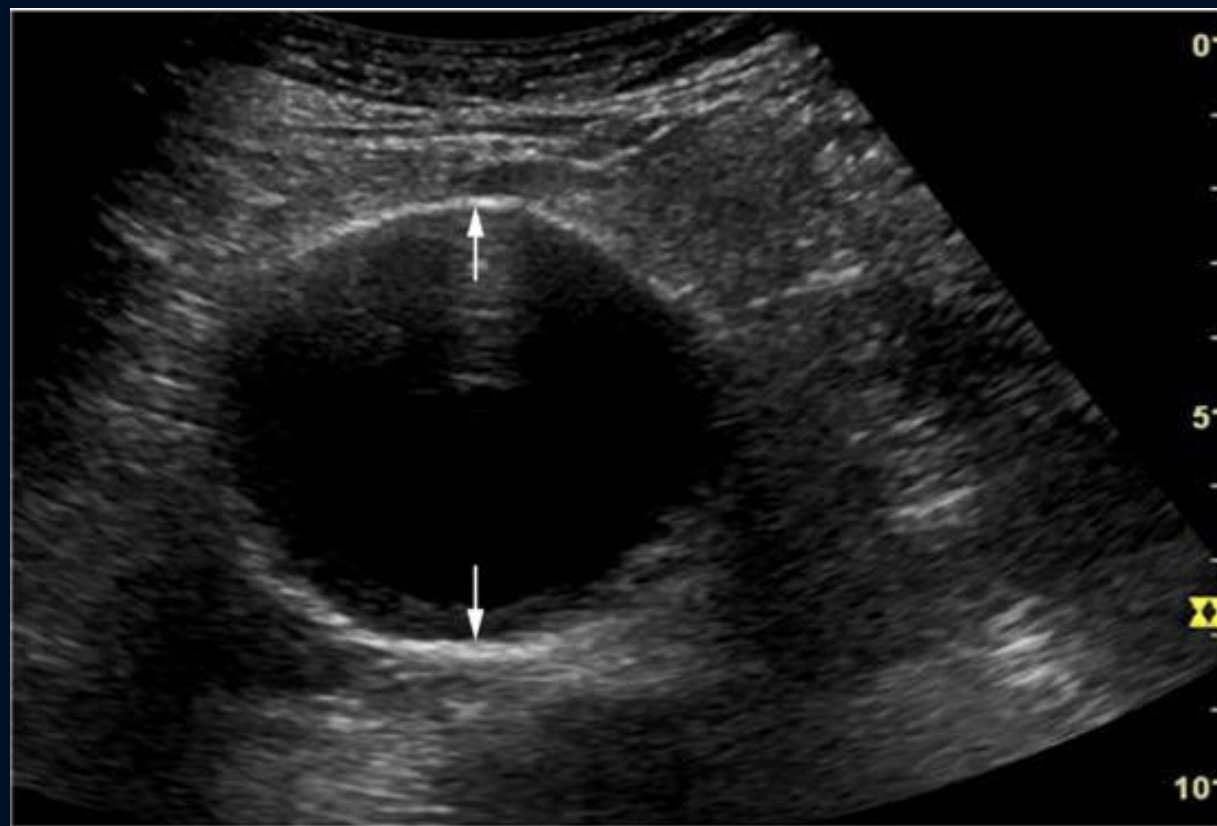


## Board-Style Q&A #3

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  3. Abdominal ultrasound
  4. CT calcium score
  5. Carotid ultrasound

# Screening for Aortic Aneurysm

- The USPSTF recommends one-time screening for abdominal aortic aneurysm (AAA) with ultrasonography in men ages 65 to 75 years who have ever smoked.
- The USPSTF recommends that clinicians selectively offer screening for AAA in men ages 65 to 75 years who have never smoked rather than routinely screening all men in this group.





# Case No. 2



- A 72-year-old woman with poorly controlled diabetes, chronic kidney disease, hypertension, and coronary artery disease presents with a painful right foot and nonhealing ulcers.
- She notes that her leg feels better when hanging off the bed.
- She describes multiple ulcers on both feet that have been present for months.



# Case No. 2



- She has numerous ulcers of varying depth with erythema and scant discharge.
- She has 1+ femoral pulses bilaterally and nonpalpable popliteal pulses.
- Her distal pulses are faintly detected by Doppler and monophasic at the PT and nondetectable at the DP bilaterally.
- Her ankle brachial index is 0.3 on the left and 0.2 on the right.
- A note is also made of bilateral carotid bruits.





# Chronic Limb-Threatening Ischemia

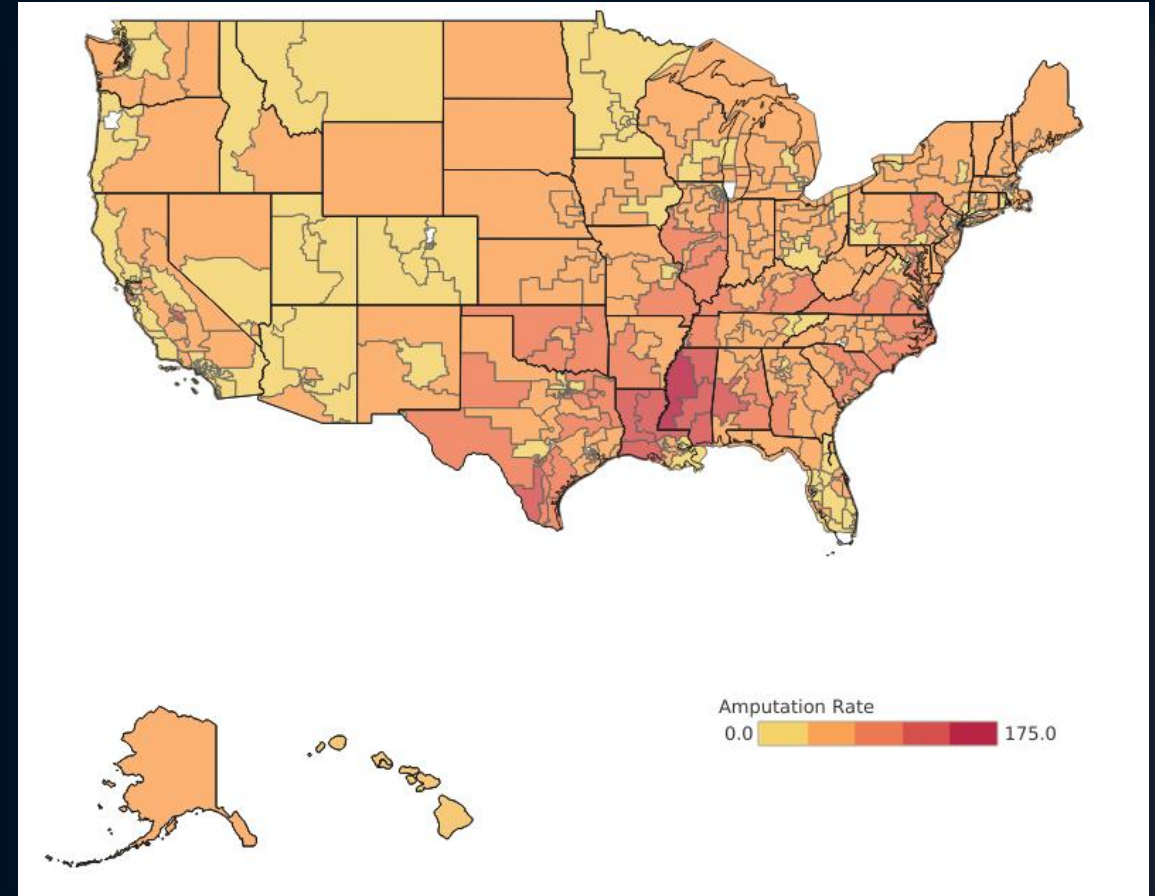


- Arterial ulceration is part of the spectrum of chronic limb-threatening ischemia that includes rest pain and gangrene.
- Chronic limb-threatening ischemia usually results when two or more levels of the arterial tree have significant disease.
- **Chronic limb-threatening ischemia inevitably leads to tissue loss or amputation unless successful revascularization is performed.**

# PAD Collaborative: Amputation Heat Map



National Amputation Rate 45.5  
cases per 100,000 population



# Clinical Evaluation

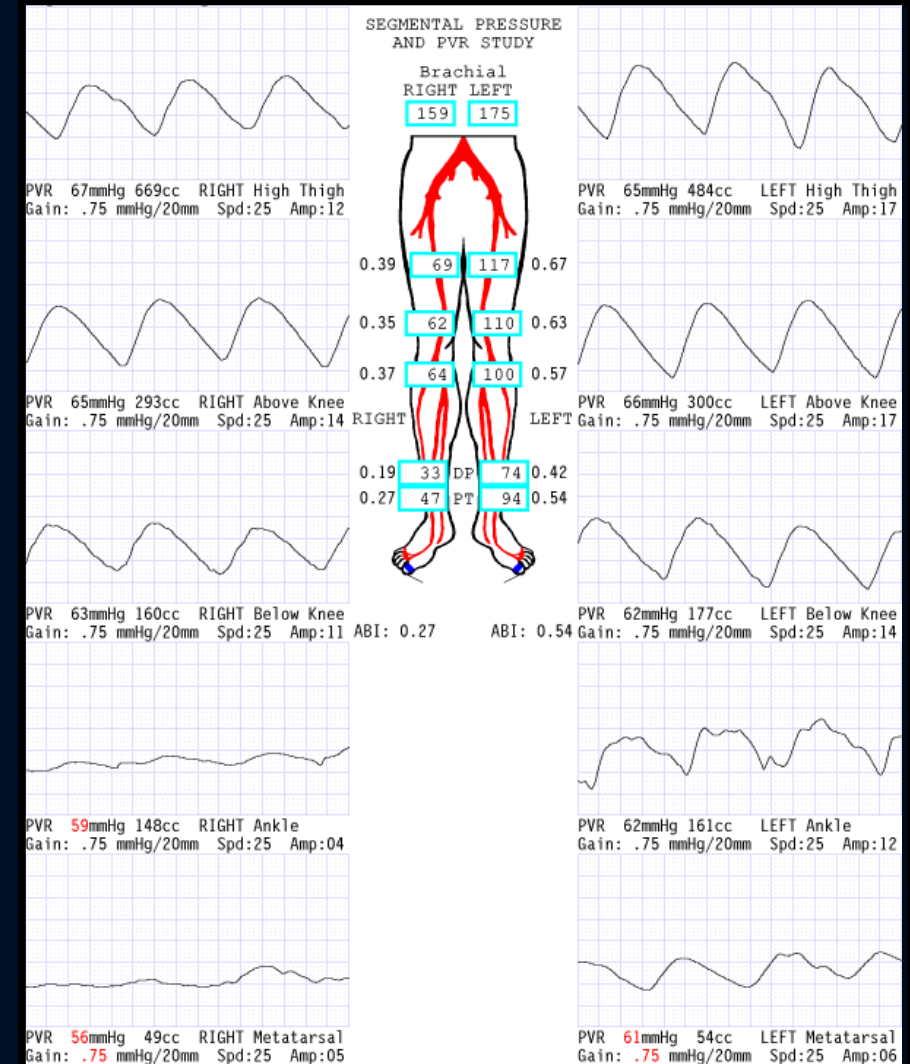


Type of ulcer	Location	Pain	Skin	Base	Edges
<b>Venous</b>	Perimalleolar	Rare	Stasis pigmentation with thickening	Wet, weepy, healthy granulation tissue	Clean
<b>Arterial</b>	Shins, toes, sites of injury/pressure	Yes	Shiny, pale, decreased hair, livedo	Dry, pale with eschar	Smooth
<b>Neurotrophic</b>	Plantar surface, pressure points	No	Callused	Healthy, pale	Trophic, callused

# Diagnostic Testing



- SDPs with PVRs help establish the level and severity of PAD.
- If SDP findings are not consistent with severe disease, an alternative etiology for the non-healing ulcer should be sought.
- Diagnostic imaging with MRA, CTA, or conventional angiography should be performed in planning for revascularization.



# 2024 AHA/ACC PAD Guidelines: CLTI



## 10.1. Team-Based Care for CLTI

### Recommendation for Team-Based Care for CLTI

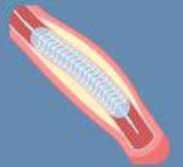
Referenced studies that support the recommendation are summarized in the [Online Data Supplement](#).

COR	LOE	Recommendation
1	B-NR	1. In patients with CLTI, a multispecialty care team should evaluate and provide comprehensive care with goals of complete wound healing, minimizing tissue loss, and preservation of ambulatory status. <sup>1,2</sup>

### Multispecialty care team



### Revascularization (endovascular, surgical, hybrid)



### Wound care and management of infection



### Pressure offloading



### Selective amputation (most distal level possible)



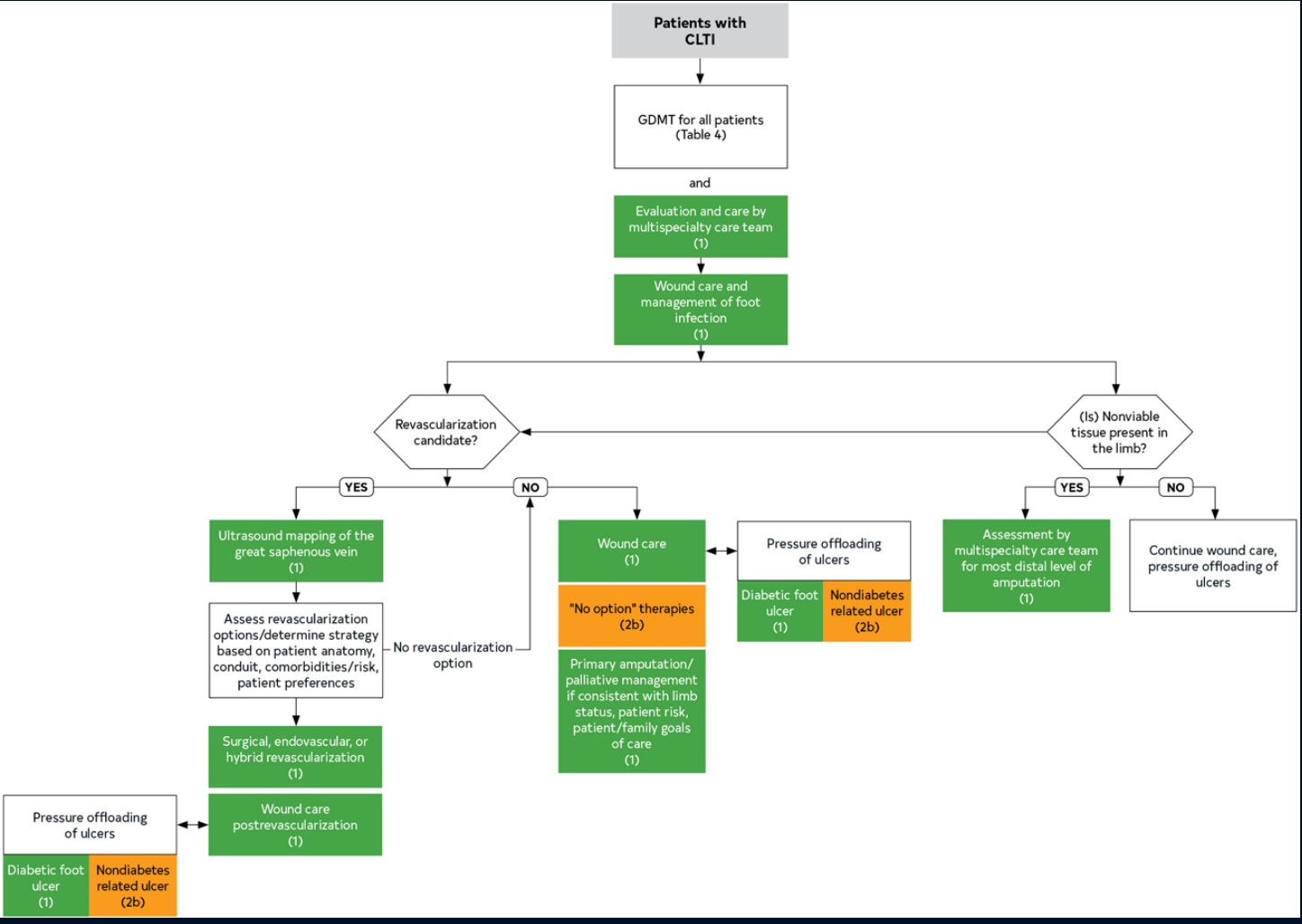
### Antiplatelet and antithrombotic therapy and cardiovascular risk reduction



# 2024 AHA/ACC PAD Guidelines: CLTI

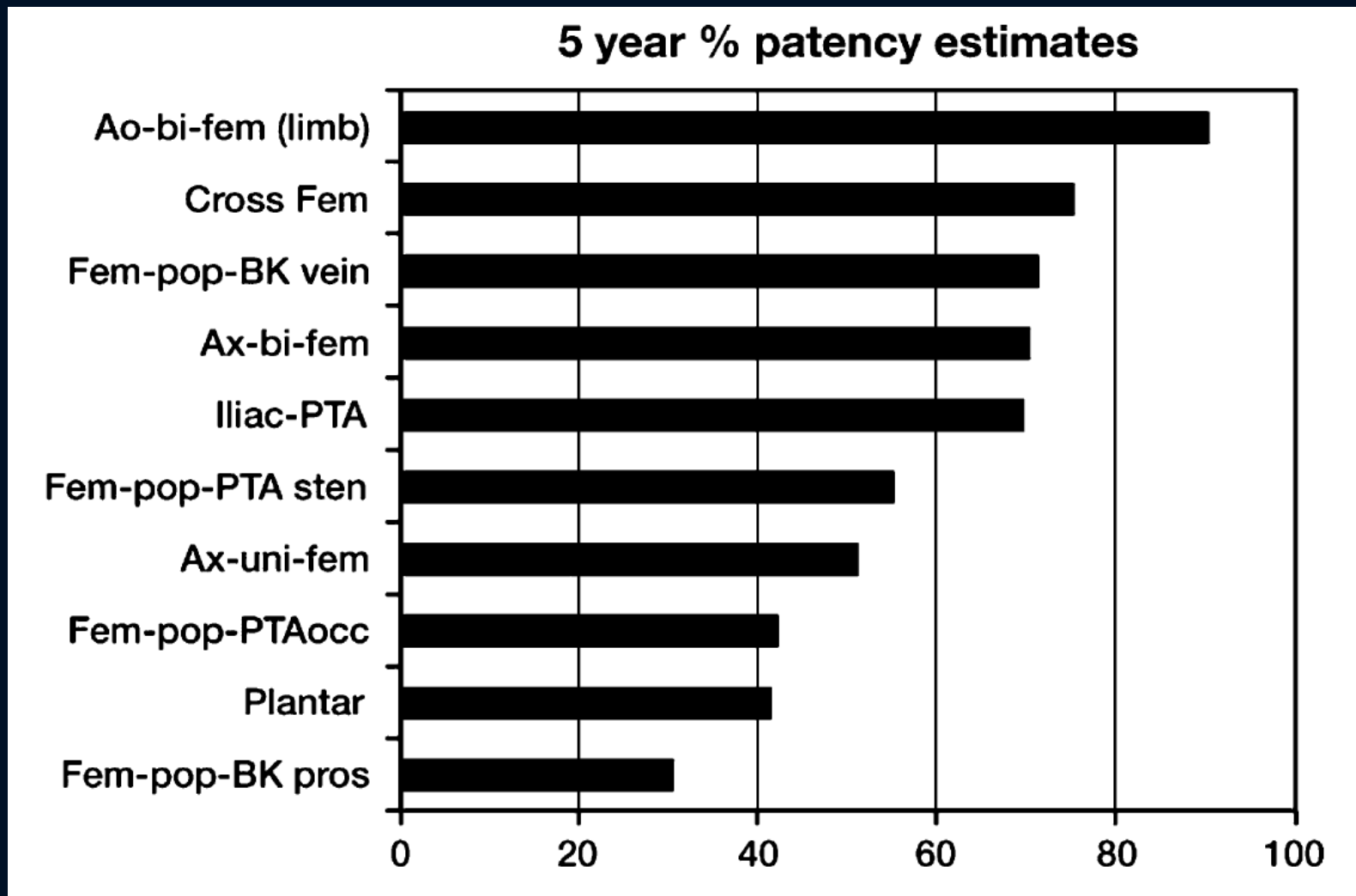


1	A	3. In patients undergoing surgical revascularization for CLTI, bypass to the popliteal or infrapopliteal arteries (ie, tibial, pedal) should be constructed with autogenous vein if available. <sup>14–20</sup>
1	B-R	4. In patients with CLTI due to infrainguinal disease, anatomy, available conduit, patient comorbidities, and patient preferences should be considered in selecting the optimal first revascularization strategy (surgical bypass or endovascular revascularization) (Table 16). <sup>3,13</sup>
1	B-R	5. In patients with CLTI who are candidates for surgical bypass and endovascular revascularization, ultrasound mapping of the great saphenous vein is recommended. <sup>3,13</sup>
2a	B-NR	6. In patients with CLTI for whom a surgical approach is selected and a suitable autogenous vein is unavailable, alternative conduits such as prosthetic or cadaveric grafts can be effective for bypass to the popliteal and tibial arteries. <sup>21–26</sup>
2a	B-NR	7. In patients with CLTI and nonhealing wounds or gangrene, revascularization in a manner that achieves in-line blood flow or maximizes perfusion to the wound bed can be beneficial. <sup>27–33</sup>
2a	C-LD	8. In patients with CLTI with ischemic rest pain (ie, without nonhealing wounds or gangrene) attributable to multilevel arterial disease, a revascularization strategy addressing inflow disease first is reasonable. <sup>34,35</sup>

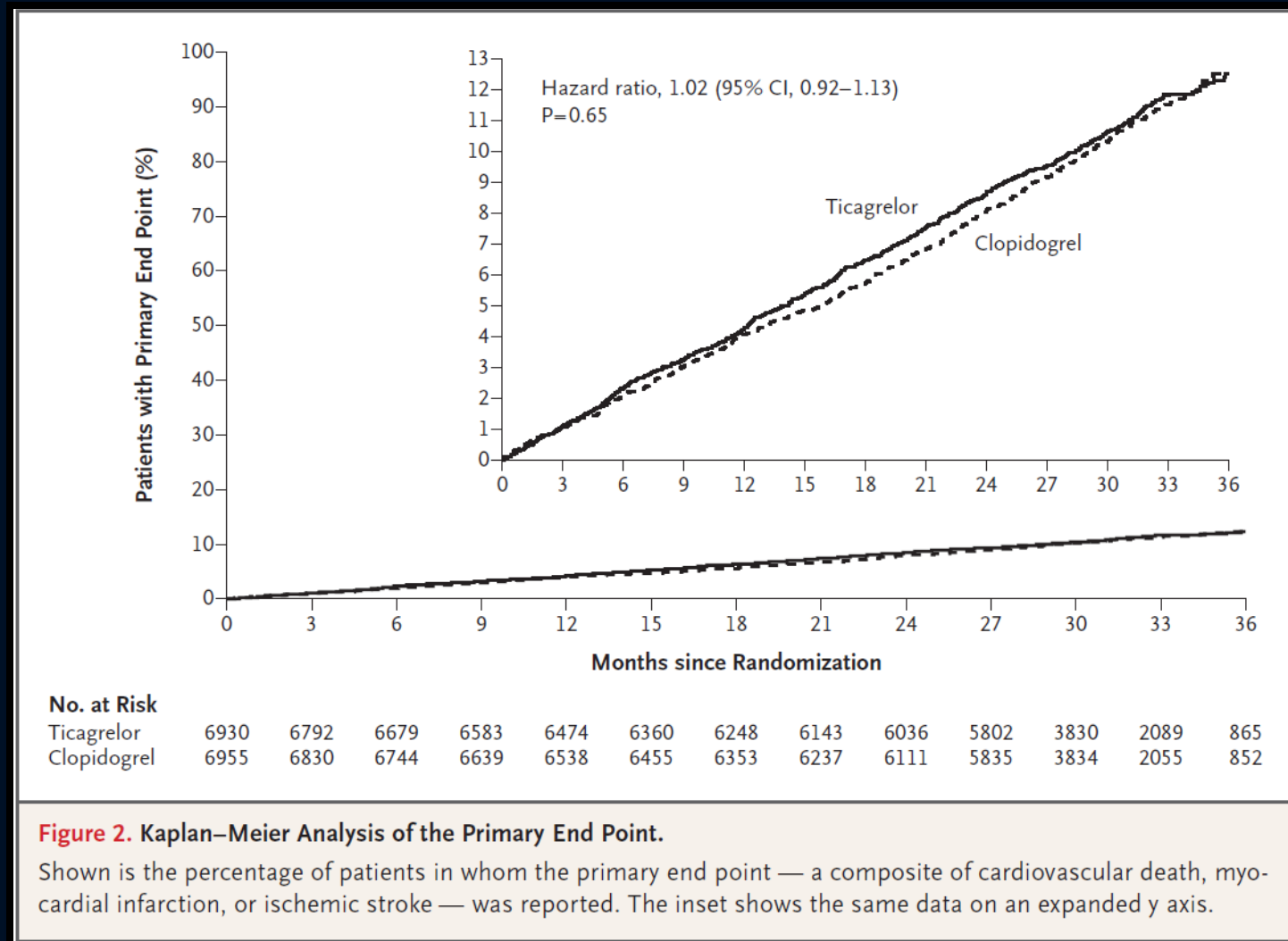




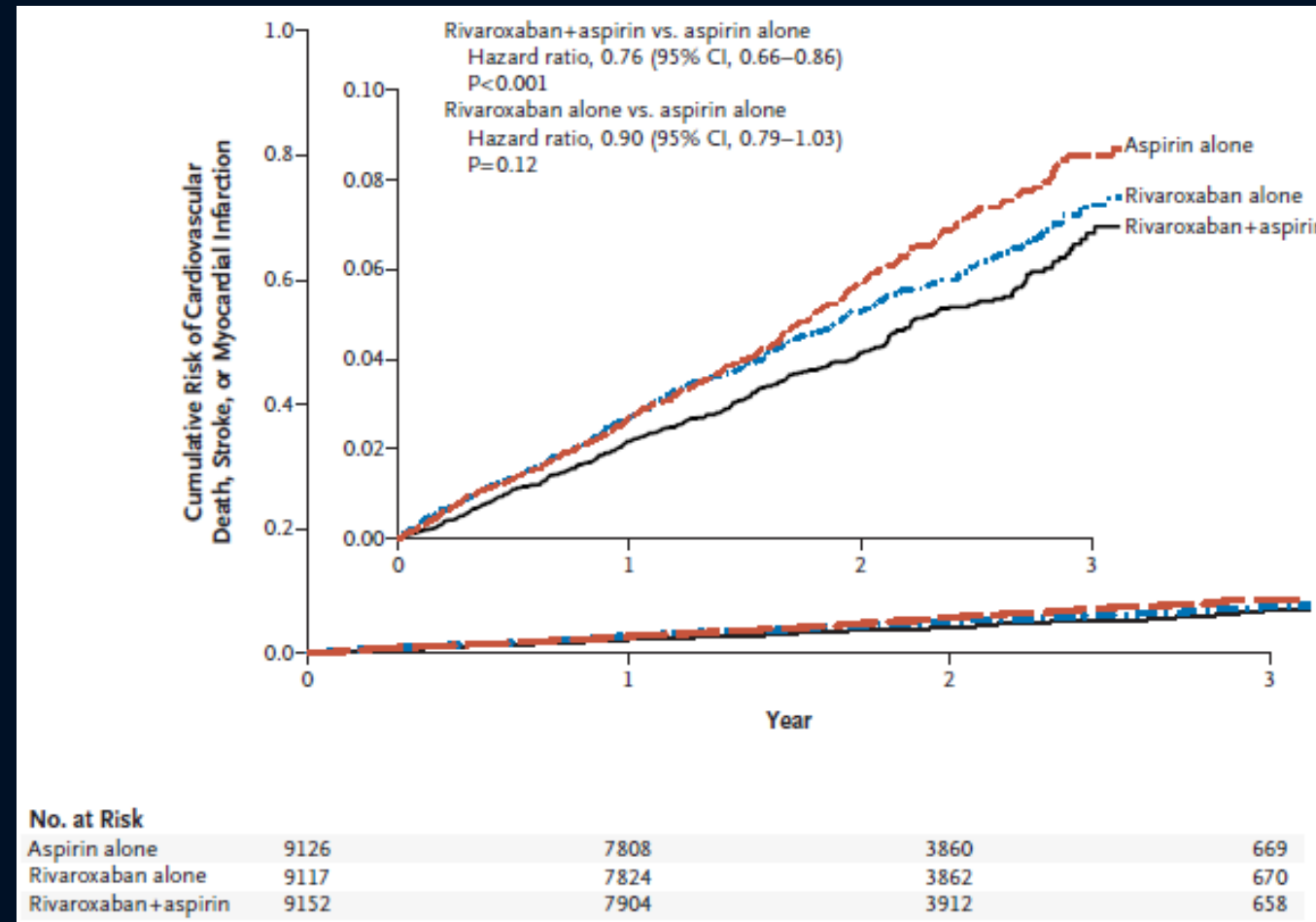
# Revascularization: 5-year Patency



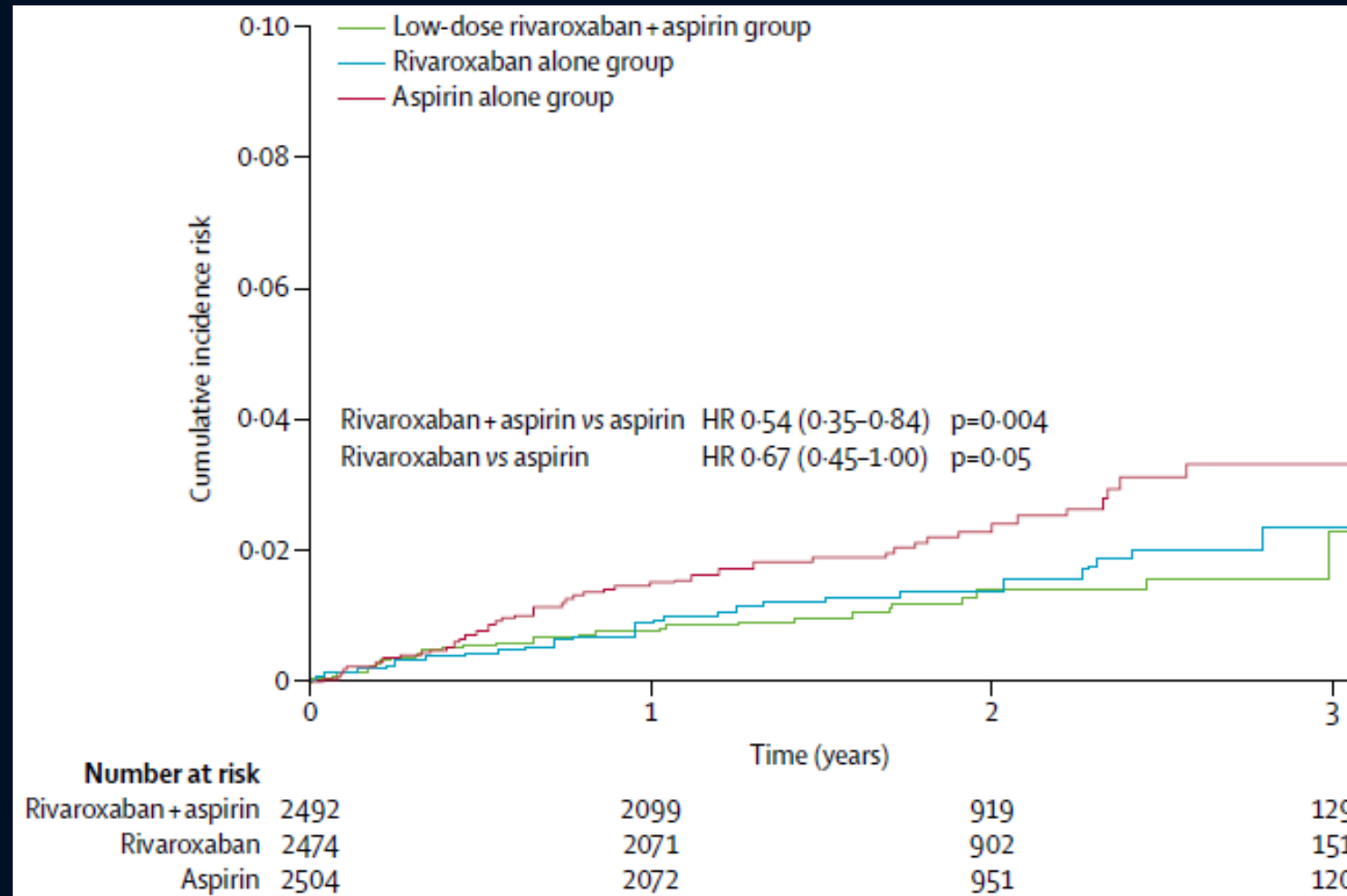
# Ticagrelor vs. Clopidogrel for PAD: EUCLID



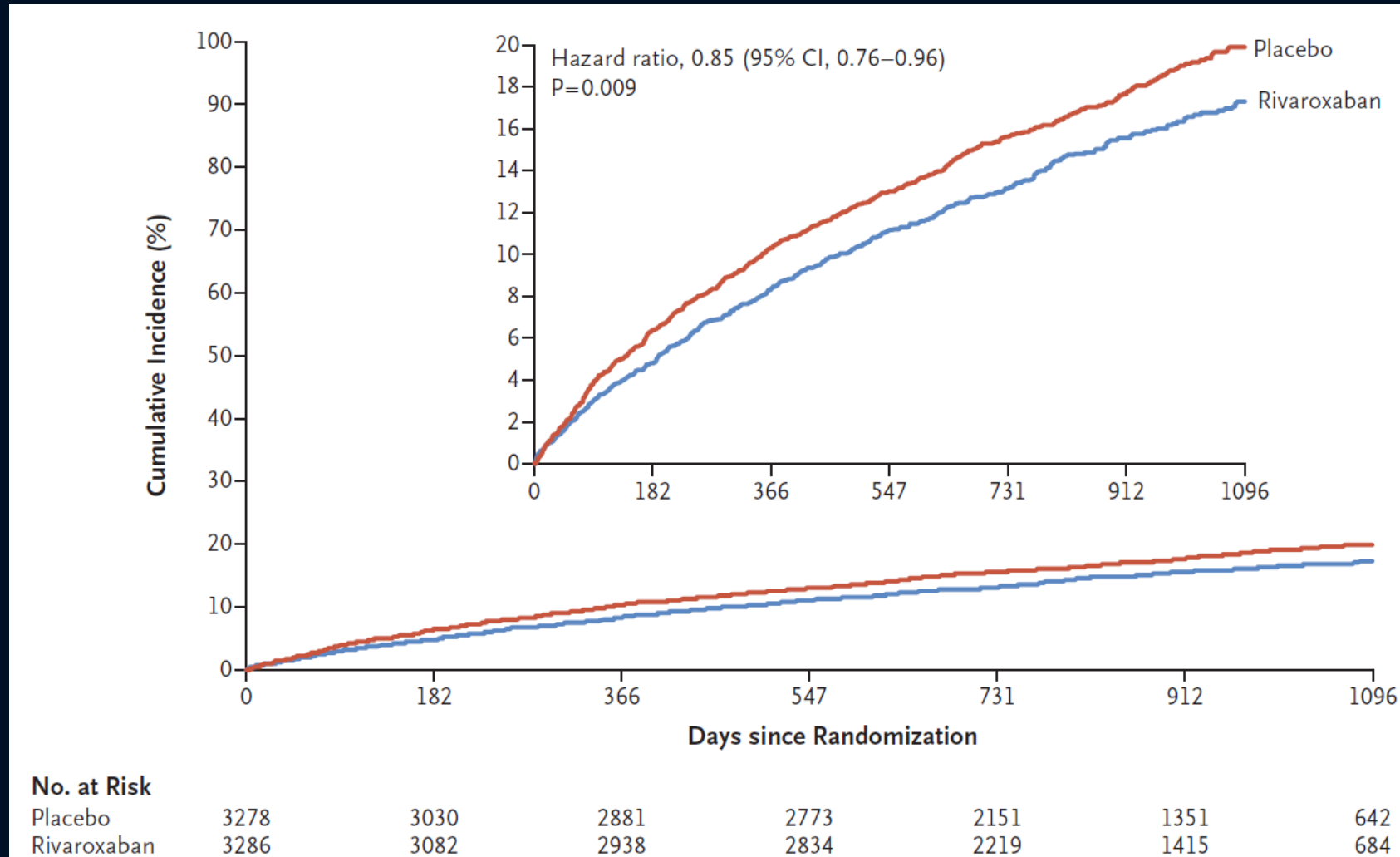
# COMPASS: Combination Therapy Works Better Than Monotherapy



# COMPASS: Major Adverse Limb Events



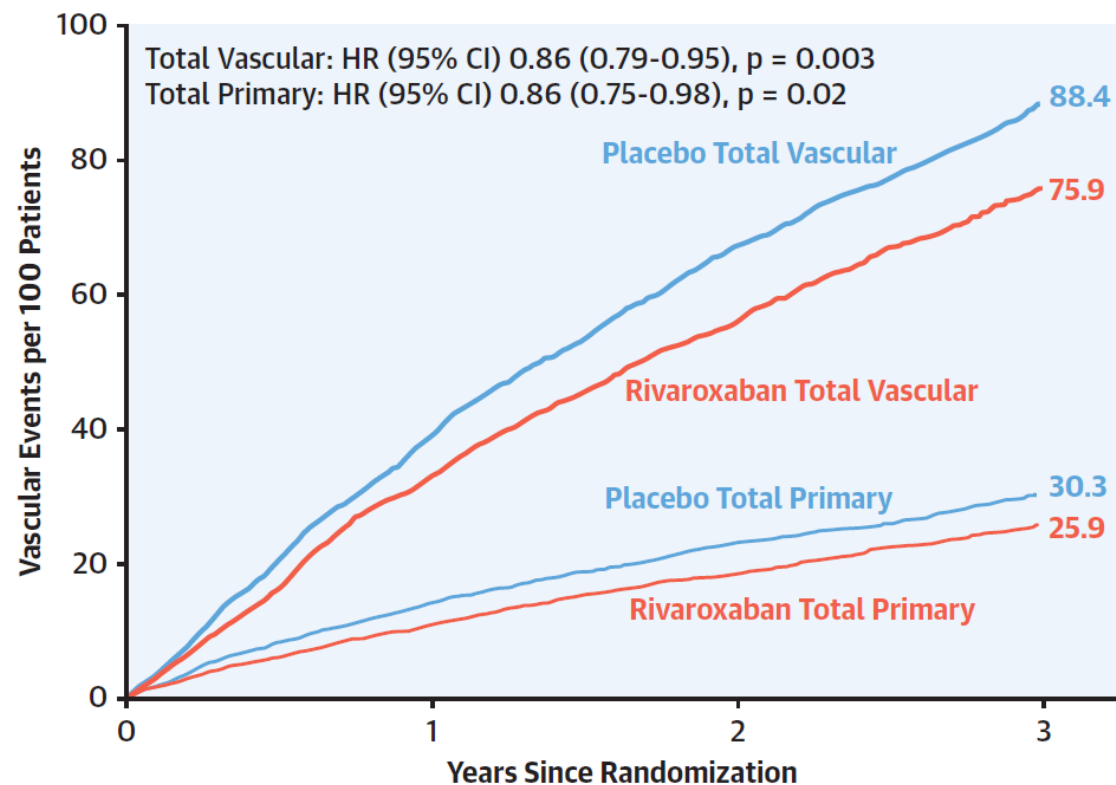
# VOYAGER PAD: MI, Stroke, CV Death, and Major Adverse Limb Events



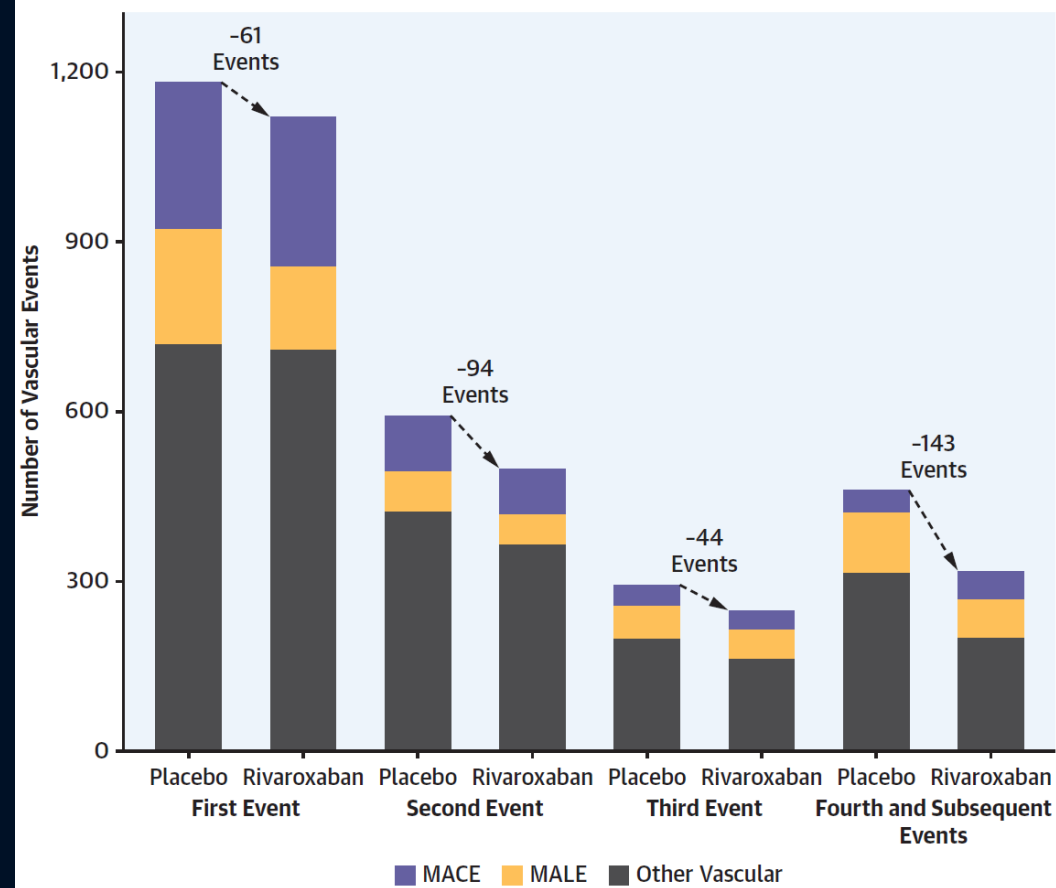
Bonaca MP, et al. N Engl J Med. 2020; 382:1994

# Total Ischemic Event Reduction With Rivaroxaban After Peripheral Arterial Revascularization in the VOYAGER PAD Trial

**CENTRAL ILLUSTRATION** Mean Cumulative Functions for Total Primary Events and Total Vascular Events

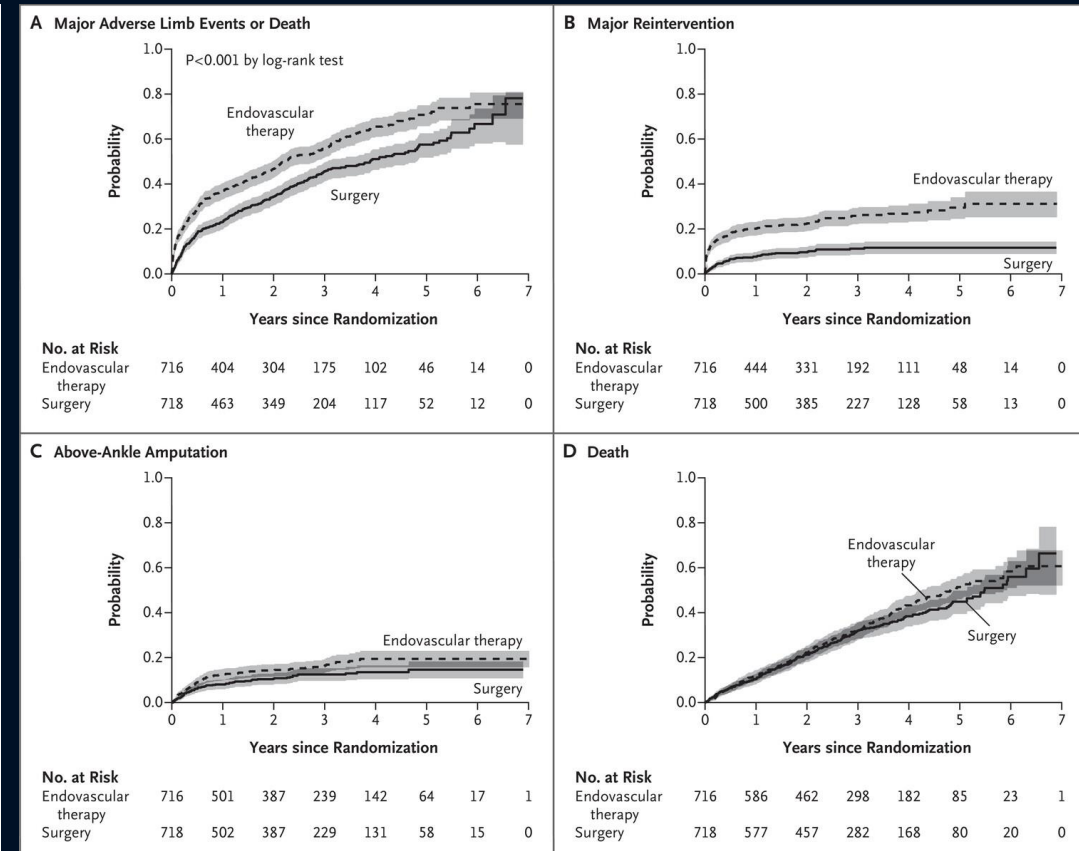
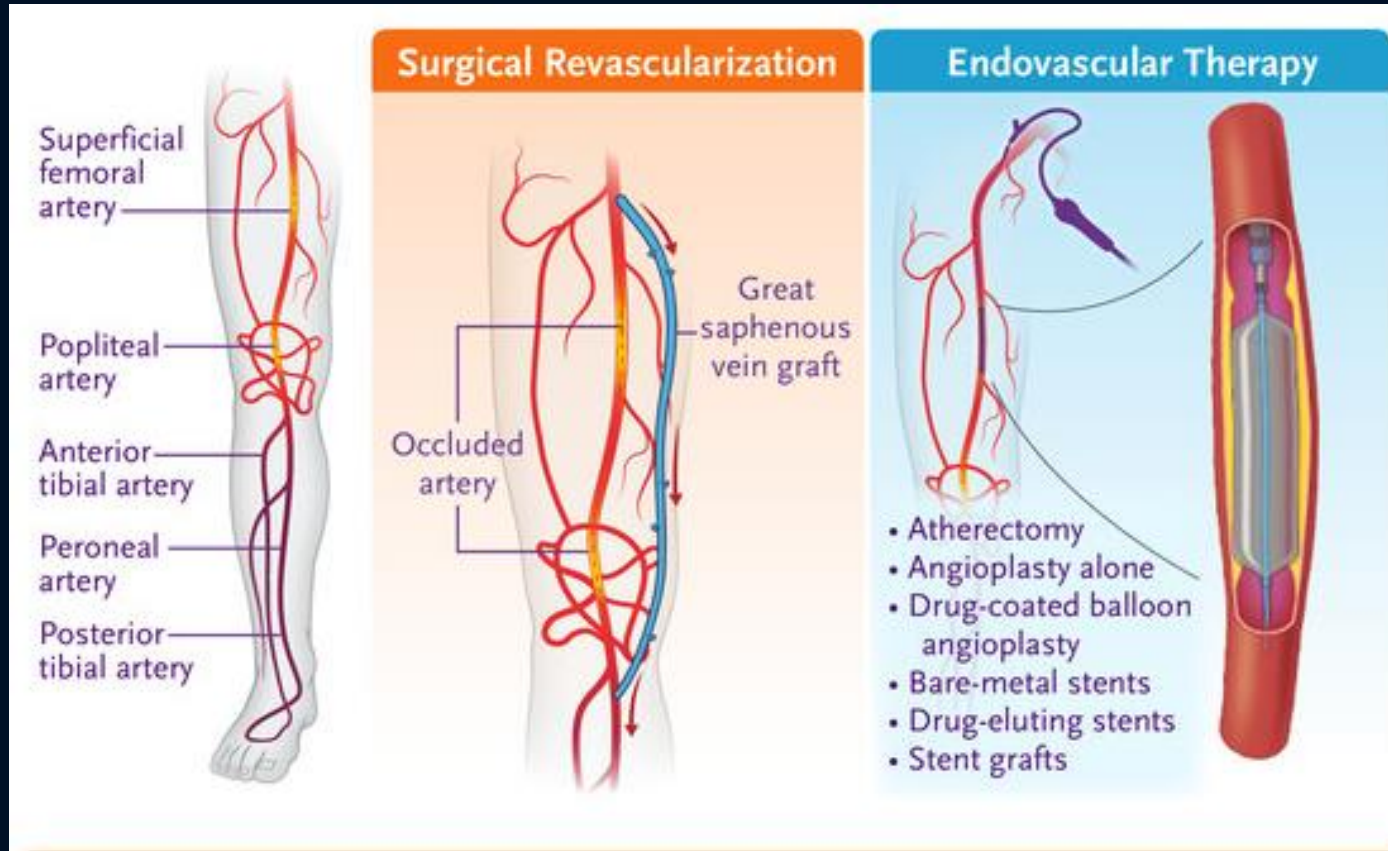


**FIGURE 2** Distribution of First and Subsequent Vascular Events





# BEST-CLI: Surgery or Endovascular Therapy for Chronic Limb-Threatening Ischemia



# 2024 AHA/ACC PAD Guidelines: Long-Term Care



## 12. LONGITUDINAL FOLLOW-UP OF PAD

Recommendations for Longitudinal Follow-Up of PAD Referenced studies that support the recommendations are summarized in the <a href="#">Online Data Supplement</a> .		
COR	LOE	Recommendations
<b>General Principles</b>		
1	C-EO	1. In patients with PAD, with or without revascularization, longitudinal follow-up with routine clinical evaluation, including assessment of limb symptoms and functional status, lower extremity pulse and foot assessment, and progress of risk factor management, is recommended.
1	C-EO	2. In patients with PAD, coordination of care among clinicians to improve the management of PAD and comorbid conditions and to optimize patient outcomes is recommended.
<b>Functional Status and QOL</b>		
1	B-NR	3. In patients with PAD, with or without revascularization, periodic assessment of functional status as well as overall health-related QOL as a component of longitudinal follow-up is recommended. <sup>1-6</sup>

## Medical Therapy

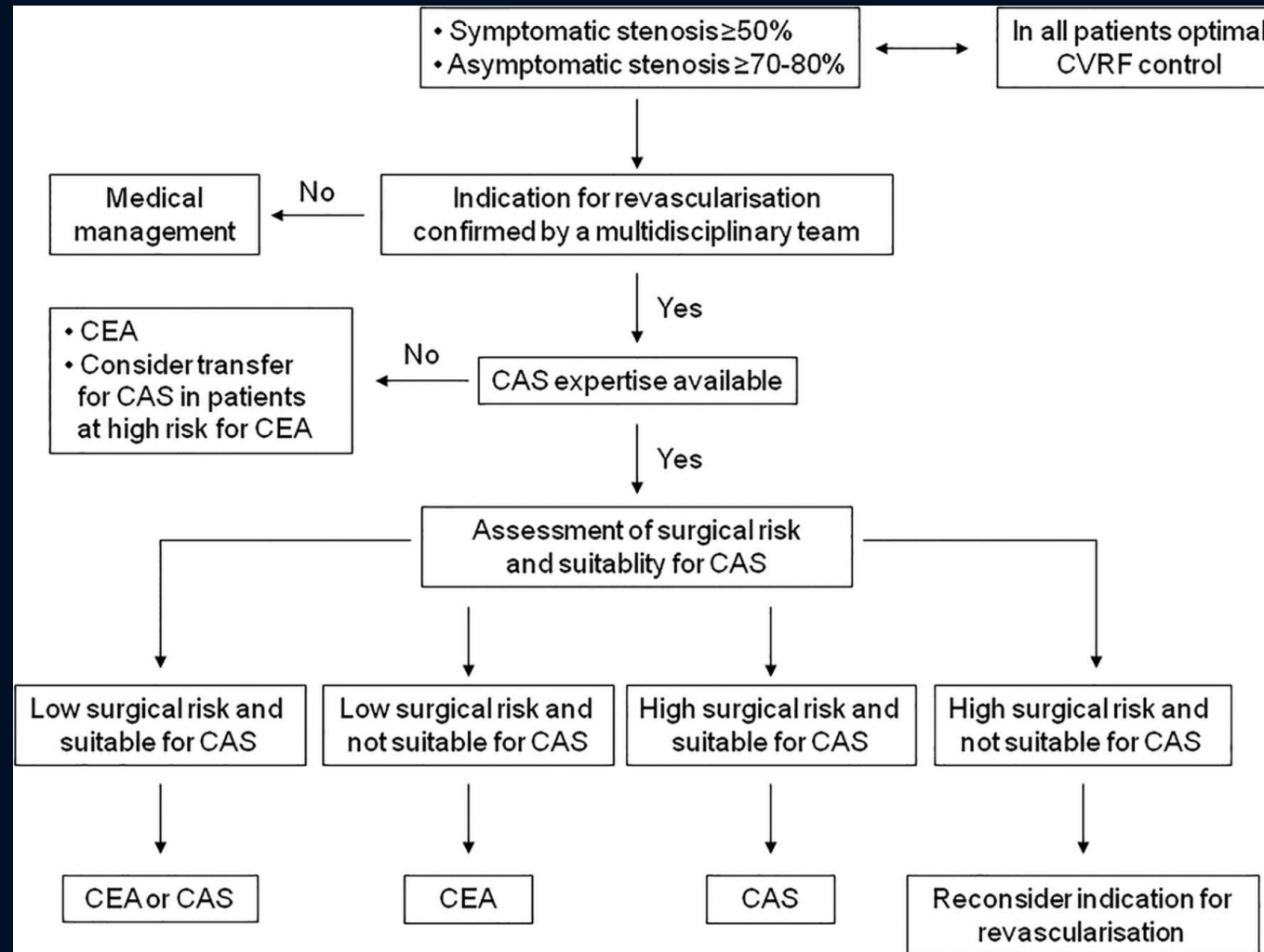
1	A	4. In patients with PAD, long-term use of GDMT to prevent MACE and MALE is recommended. <sup>7-12</sup>
<b>Postrevascularization Follow-Up</b>		
1	C-LD	5. In patients with PAD who have undergone lower extremity revascularization (ie, surgical and/or endovascular), longitudinal follow-up that includes periodic clinical evaluation of lower extremity symptoms and pulse and foot assessment is recommended. <sup>13-16</sup>
1	C-LD	6. In patients with PAD who have undergone lower extremity revascularization (ie, surgical, endovascular, or both) with new lower extremity signs or symptoms, ABI and arterial duplex ultrasound is recommended. <sup>14,17-20</sup>
2a	B-R	7. In patients with PAD who have undergone infrainguinal, autogenous vein bypass graft(s) without new lower extremity signs or symptoms, it is reasonable to perform ABI and arterial duplex ultrasound surveillance within the first 1 to 3 months postprocedure, then repeat at 6 and 12 months, and then annually. <sup>13,14,20-22</sup>



# What About Her Carotid Bruits?

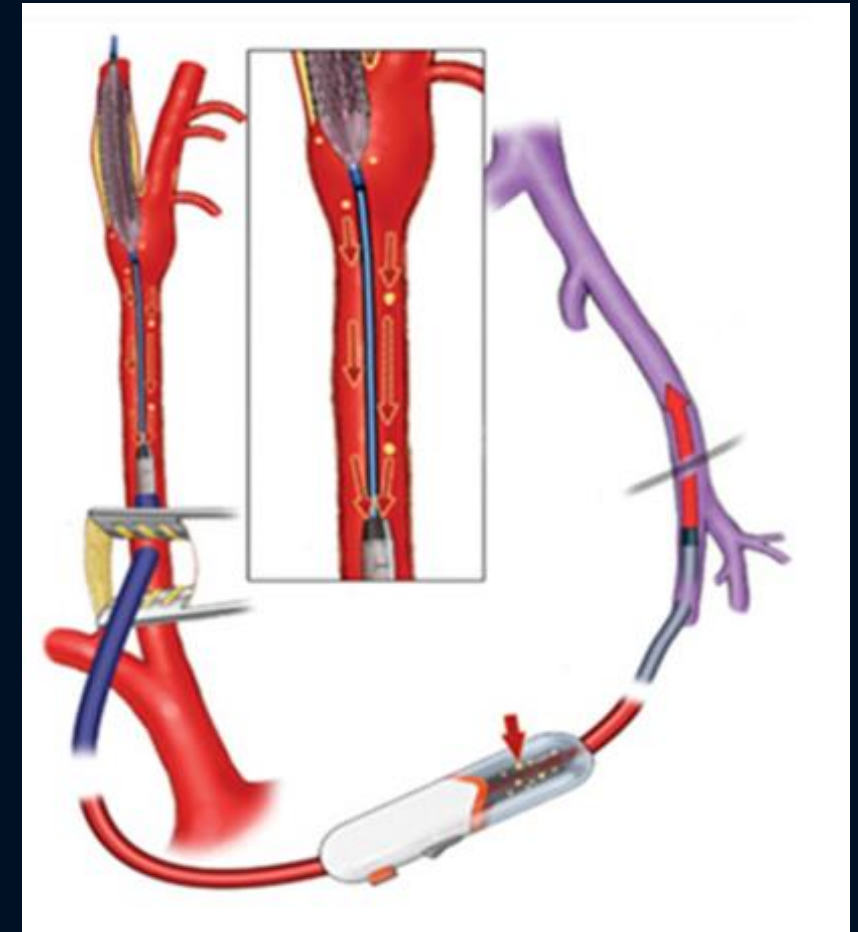
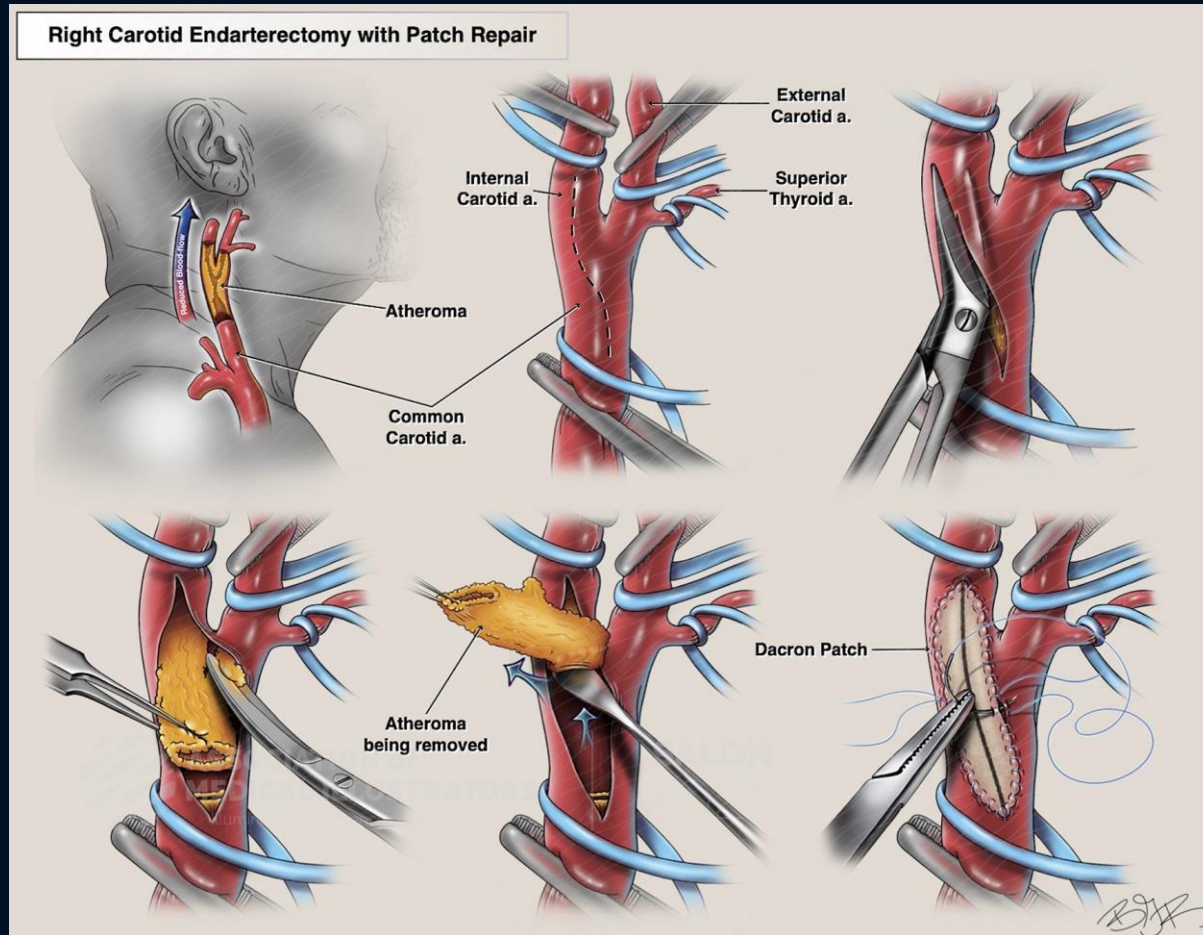
- An analysis of 28 prospective cohort articles and 17913 patients found that a carotid bruit was associated with:
  - 4-fold increase in TIA
  - 2.5-fold increase in stroke
  - 2.7-fold increase in fatal stroke
- The most appropriate next step in this patient would be a carotid ultrasound.

# Management of Carotid Stenosis



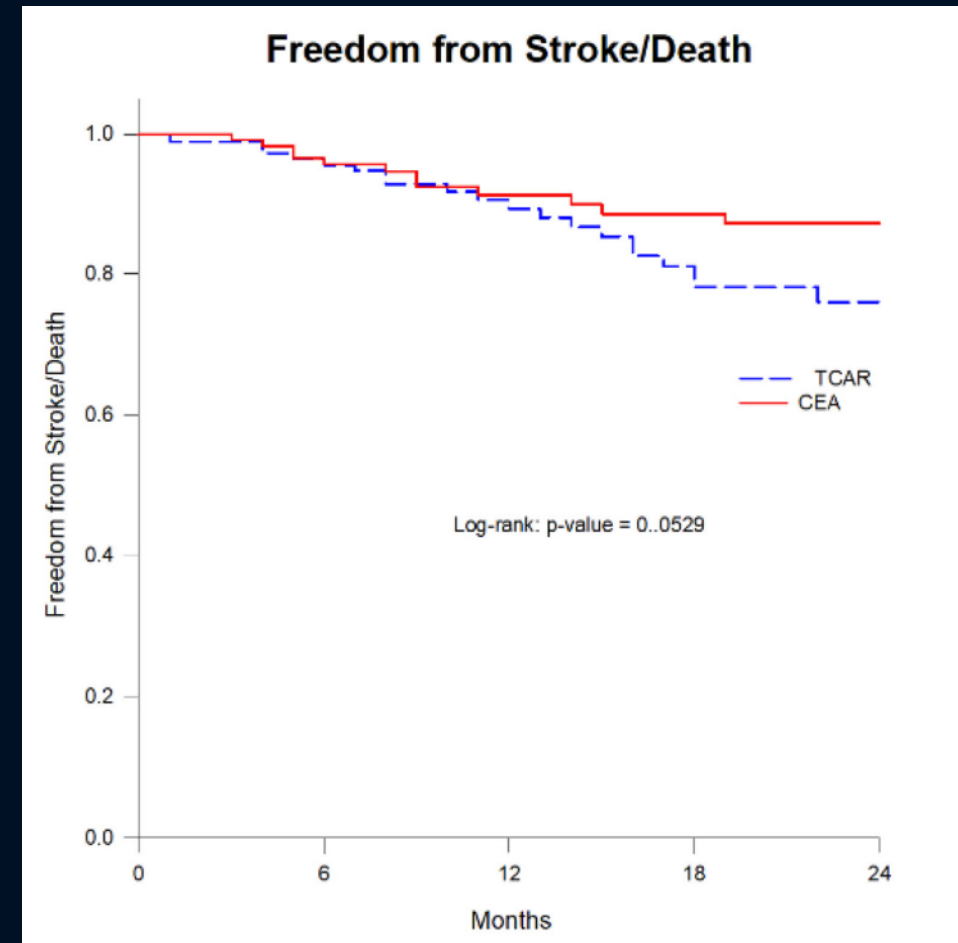
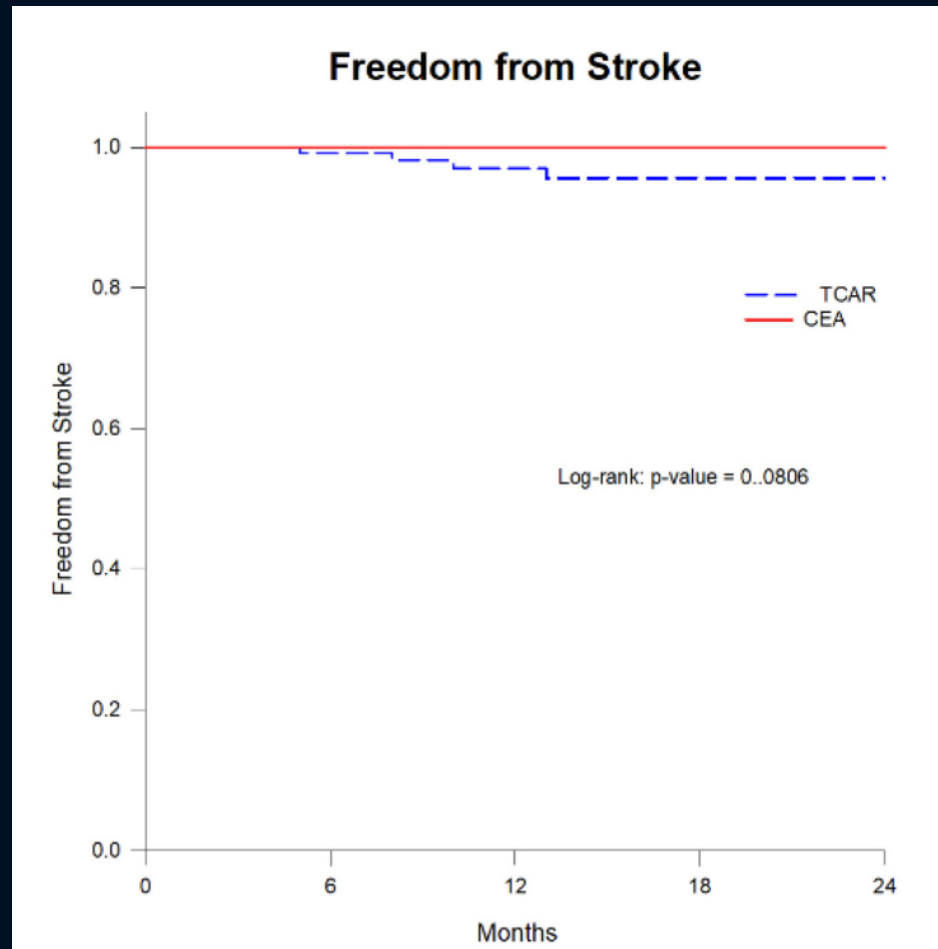


# Carotid Endarterectomy and Transcarotid Artery Revascularization (TCAR)



<https://meetingarchive.ami.org/2021/project/right-carotid-endarterectomy-with-patch-repair/>  
Tanaka A, et al. J Vasc Surg. 2022;76:961

# Transcarotid Artery Revascularization (TCAR) vs Carotid Endarterectomy





# Transcarotid Artery Revascularization (TCAR) vs Carotid Endarterectomy

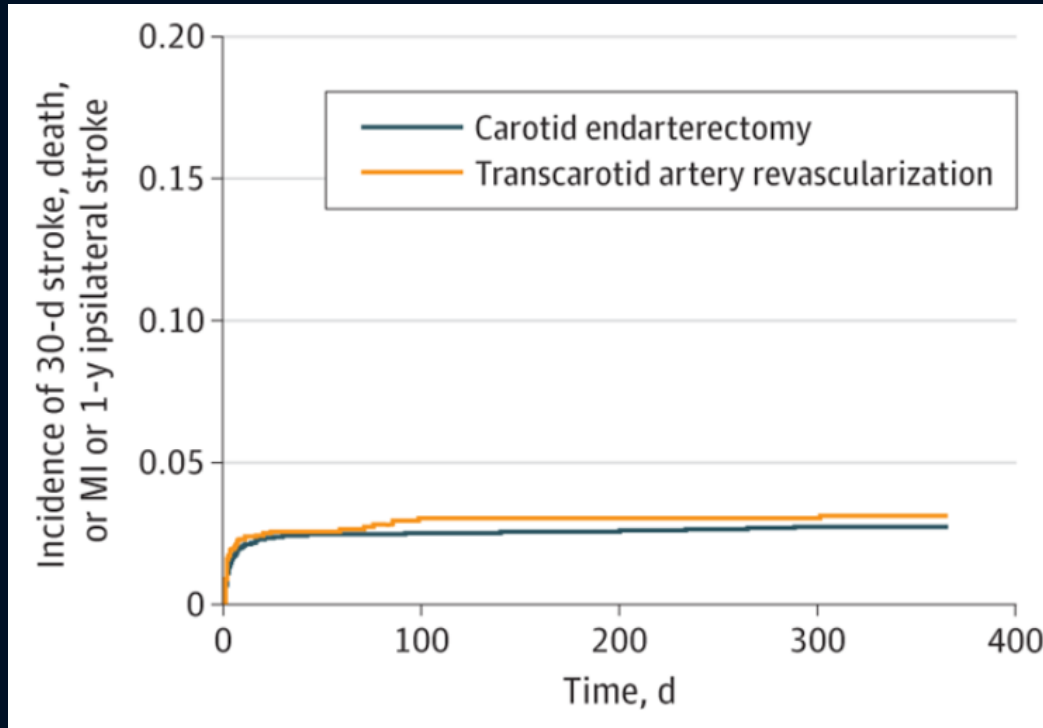


Table 2. In-Hospital Perioperative Outcomes After Transcarotid Artery Stenting or Carotid Endarterectomy Stenting in a Propensity Score-Matched Study Population

	No. (%)		Absolute difference, % (95% CI)	P value
	Transcarotid artery stenting (n = 2962)	Carotid endarterectomy (n = 8886)		
Stroke/death/myocardial infarction	58 (2.0)	151 (1.7)	0.26 (−0.31 to 0.82)	.35
Stroke	43 (1.5)	88 (1.0)	0.46 (0.01 to 0.94)	.04
Death	6 (0.2)	14 (0.2)	0.04 (−0.14 to 0.23)	.61
Myocardial infarction	14 (0.5)	63 (0.7)	−0.24 (−0.5 to 0.06)	.17
Cranial nerve injury	10 (0.3)	244 (2.7)	−2.4 (−2.8 to −2.0)	<.001
Total procedure time, mean (SD), min	72.2 (29.4)	117 (43.7)	−44.8 (−46.5 to −43.1)	<.001
Failed CMS discharge criteria	441 (14.9)	1439 (16.2)	−1.3 (−2.8 to 0.19)	.09
Failed discharge home	171 (5.8)	559 (6.3)	0.5 (−1.5 to 0.5)	.31
Length of stay >2 d	390 (13.2)	1263 (14.2)	−1.0 (−2.4 to 0.4)	.15

# Key Take Aways

- Diagnosis of PAD identifies patients at risk for limb-associated morbidity and cardiovascular events.
- The approach to patients with PAD and claudication focuses on cardiovascular risk factor reduction, medical optimization, supervised exercise, and revascularization.
- Chronic limb threatening ischemia management emphasizes goal-directed medical therapy plus revascularization whenever possible.



# References

- Gornik HL, Aronow HD, Goodney PP, Arya S, Brewster LP, Byrd L, Chandra V, Drachman DE, Eaves JM, Ehrman JK, Evans JN, Getchius TSD, Gutiérrez JA, Hawkins BM, Hess CN, Ho KJ, Jones WS, Kim ESH, Kinlay S, Kirksey L, Kohlman-Trigoboff D, Long CA, Pollak AW, Sabri SS, Sadwin LB, Secemsky EA, Serhal M, Shishehbor MH, Treat-Jacobson D, Wilkins LR. 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2024 Jun 11;149(24):e1313-e1410. doi: 10.1161/CIR.0000000000001251. Epub 2024 May 14. PMID: 38743805.
- Bonaca MP, et al. Rivaroxaban in Peripheral Artery Disease after Revascularization. *N Engl J Med*. 2020; 382:1994.
- Criqui MH, et al. Lower Extremity Peripheral Artery Disease: Contemporary Epidemiology, Management Gaps, and Future Directions: A Scientific Statement From the American Heart Association. *Circulation*. 2021;144:e171–e191.