

Peripheral Vascular Disease: 2025 Clinical and Technological Updates

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Outline and Objectives

- Epidemiology & Burden
- Diagnostics
- Guideline Updates
- Therapies & Key Trials
- Limb Preservation
- Disparities & Policy
- Emerging Technologies

PAD Overview and Clinical Spectrum

- What is PAD?
- Often Underdiagnosed
- Classic Symptom – Claudication
- Advanced Disease – CLTI: Chronic Limb-Threatening Ischemia
- Systemic Implications

Perez S, Thandra S, Mellah I, Kraemer L, Ross E. Machine Learning in Vascular Medicine: Optimizing Clinical Strategies for Peripheral Artery Disease. *Curr Cardiovasc Risk Rep.* 2024;18(12):187-195. doi: 10.1007/s12170-024-00752-7. Epub 2024 Nov 4. PMID: 39552745; PMCID: PMC11567977.

Epidemiology – Prevalence and Risk Factors

- Millions Affected
- Age and Diabetes
- Other Risk Factors: Smoking, hypertension, hyperlipidemia, and chronic kidney disease
- Sex and Ethnicity
- Underdiagnosis

<https://www.hmpgloballearningnetwork.com/site/vdm/current-us-prevalence-peripheral-arterial-disease>

<https://www.heart.org/en/news/2024/05/14/new-roadmap-to-lower-the-risk-of-amputation-in-peripheral-artery-disease>

Clinical Impact and Burden of PVD

- Mobility and QoL
 - Cardiovascular Risk
 - Limb Loss
 - Mortality after Amputation: nearly 50% of PAD patients over 65 who undergo a limb amputation die within 1 yr
 - Healthcare Burden
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- Brown T, Forster RB, Cleanthis M, Mikhailidis DP, Stansby G, Stewart M. Cilostazol for intermittent claudication. *Cochrane Database Syst Rev*. 2021 Jun 30;6(6):CD003748. doi: 10.1002/14651858.CD003748.pub5. PMID: 34192807; PMCID: PMC8245159.
 - <https://www.heart.org/en/news/2024/05/14/new-roadmap-to-lower-the-risk-of-amputation-in-peripheral-artery-disease>
 - Kelsey A. Schmittling,
 - Risk assessment modeling for diabetes-related lower extremity amputation using socioeconomic and behavioral health indicators, *Journal of Diabetes and its Complications*, **39**, 10, (109153), (2025). <https://doi.org/10.1016/j.jdiacomp.2025.109153>

Screening and Early Detection

- Recognizing At-Risk Patients
 - Physical Exam
 - Ankle-Brachial Index (ABI)
 - Screening Guidelines
 - Early Diagnosis Matters
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- <https://www.hmpgloballearningnetwork.com/site/vdm/current-us-prevalence-peripheral-arterial-disease>
 - Perez S, Thandra S, Mellah I, Kraemer L, Ross E. Machine Learning in Vascular Medicine: Optimizing Clinical Strategies for Peripheral Artery Disease. *Curr Cardiovasc Risk Rep.* 2024;18(12):187-195. doi: 10.1007/s12170-024-00752-7. Epub 2024 Nov 4. PMID: 39552745; PMCID: PMC11567977.
 - <https://www.tctmd.com/news/ahaacc-and-others-issue-pad-guideline-update-focus-collaborative-care>

Diagnostic Tools – ABI, Duplex, and Imaging

- Ankle-Brachial Index (ABI)
- Toe-Brachial Index
- Duplex Ultrasound
- Advanced Imaging: CTA (CT angiography) or MRA (MR angiography)
- Angiography

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Innovations – AI-Assisted PAD Diagnosis

- AI Algorithms for Screening
- Doppler Waveform Analysis
- Imaging Interpretation
- Pulse Volume Recording (PVR) + AI
- Future Potential

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Risk Factor Management – Medical Therapy

- Smoking Cessation
- Lipid Control: High-intensity statin
- Blood Pressure
- Diabetes Management
- Exercise and Diet

<https://www.acc.org/Latest-in-Cardiology/Articles/2024/05/14/13/40/New-ACC-AHA-Guideline-Focused-on-Management-of-LE-PAD-gl-pad>

<https://www.tctmd.com/news/ahaacc-and-others-issue-pad-guideline-update-focus-collaborative-care>

Antithrombotic Therapy in PAD

- Antiplatelet Therapy
- Dual Antiplatelet
- Rivaroxaban + Aspirin (Dual Pathway)
- Risk-Benefit
- Claudication Symptom Relief

<https://www.acc.org/Latest-in-Cardiology/Clinical-Trials/2020/03/26/19/48/VOYAGER-PAD>

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Exercise Therapy and Claudication Management

- Supervised Exercise Therapy (SET)
- Guideline Recommendation
- Typical Program
- Cilostazol
- When to Revascularize

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Critical Limb Ischemia – Limb Preservation

- CLTI Definition
- Multidisciplinary Team
- Prompt Revascularization
- Wound Care & Foot Care
- Limb Salvage Outcomes

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Revascularization Options – Endovascular vs Surgical

- Endovascular Therapy
- Surgical Bypass
- BEST-CLI Trial (NEJM 2022)
- Takeaway

<https://evtoday.com/articles/2023-jan/best-cli-shows-lower-incidence-of-major-adverse-limb-events-or-death-with-surgical-bypass-versus-endovascular-treatment-in-clti-patients-with-adequate-gsv>

Health Disparities in PAD

- Unequal Burden
- Amputation Gap
- Outcomes and Mortality
- Social Determinants
- Closing the Gap

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Policy and System Initiatives

- CMS Coverage of Exercise
- Quality Measures
- National Action Plans
- Reimbursement and Coding Changes
- Health System Response

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Emerging Technologies – Wearables & Digital Health

- Wearable Sensors
- Remote Monitoring
- Digital Wound Care
- Patient Engagement Tools
- Integrating Data

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Summary and Takeaways

- PVD (PAD) is Common and Severe
- Early Detection Helps
- Updated Guidelines (2024)
- Treatments Evolving
- Looking Ahead

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