



# The Beat

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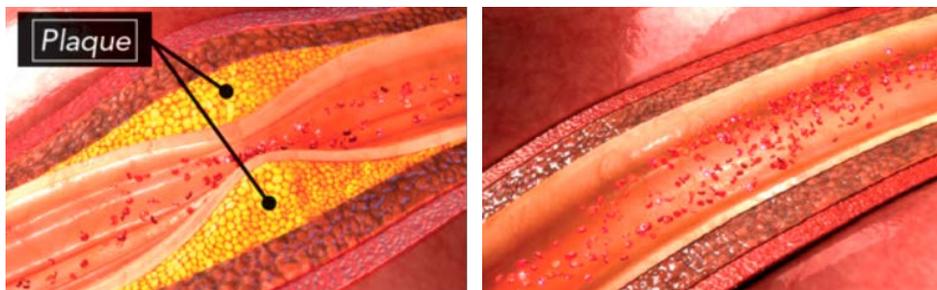


## Understanding Peripheral Artery Disease

Peripheral artery disease (PAD) is a condition that’s unknown to many, yet it affects more than 230 million people worldwide. In the U.S. alone, it’s estimated that more than 8.5 million people live with PAD, putting them at risk for serious complications. Here’s what you need to know about this seemingly silent disease.

### DEFINING PAD

PAD is characterized by a narrowing of the arteries that carry blood from the heart to other parts of the body. This narrowing, medically known as stenosis, ultimately impairs blood flow. “Most PAD cases are related to atherosclerosis—plaque buildup—which causes blockages in the arteries,” says Dr. Jennifer Ballard-Hernandez, a Cardiology Nurse Practitioner, Assistant Clinical Professor at the University of California, Irvine, School of Nursing, and NATF Medical Advisory Board member. PAD most commonly affects the lower half of the body (called lower-extremity PAD), and occurs when plaques build up in artery walls, narrow the walls, and reduce the flow of blood to the legs and feet.



Artery with plaque buildup vs. healthy artery

### RISK FACTORS

“As with other conditions, we look at PAD risk in terms of modifiable factors—things we can change—versus nonmodifiable risks, which are ultimately out of our control,” Dr. Ballard-Hernandez explains. (See chart on page 3.)

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## Asked and Answered: Anticoagulation and Surgery

Earlier this summer, NATF hosted an interactive *Ask the Expert* panel on anticoagulation. Andrea Lewin, Beata Rucinski, and Themio Papadopoulos, all pharmacists specializing in anticoagulation management, joined us to answer patients’ most pressing questions about blood thinners. Part of the forum specifically focused on blood thinners and surgical procedures. Missed the event? Here are some of the key questions that were addressed.

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## Upcoming Events

### Virtual Support Groups

September 14, 2021

October 12, 2021

November 16, 2021

*(There will be no support group in August or December.)*

*All support groups are at 7:00 PM EST*

### NATF Virtual Fall Summit: *Living in A Post-Pandemic World: What Medicine Has Learned in the Last Year*

November 18, 2021, 6:30-9:00 PM EST

This year's Summit will focus on key lessons learned from the COVID-19 pandemic. Covered topics will include:

- COVID-19 and Inflammation
- Long COVID syndrome
- The consequences of missed and delayed cardiac care
- Healthcare disparities

To register for these virtual meetings, email [events@natfonline.org](mailto:events@natfonline.org) or call 617-730-4120.



### ASKED AND ANSWERED: ANTICOAGULATION AND SURGERY

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**Q:** I'm on a blood thinner and need to have an operation. Who will manage my anticoagulation in the setting of surgery?

**A:** "First and foremost, if you're on a blood thinner, it's critically important to inform the proceduralist or surgeon as well as the rest of your healthcare team, which would include your primary care provider, cardiologist, and/or any other clinician who prescribes your blood thinner. If you work with an anticoagulation pharmacist, they should also be aware that you're having surgery," says Dr. Papadopoulos.

However, exact anticoagulation protocols may vary from institution to institution. For example, not all hospitals have an anticoagulant management service in place or anticoagulant pharmacists on staff.

"Ultimately, the anticoagulation piece is in the hands of the surgeon and the broader team that manages the surgical patients – but hospitals do have specific anticoagulation guidelines to use in surgical patients," Dr. Rucinski explains.

**Q.** Do I need to stop taking my blood thinner if I'm having surgery?

There are a few key factors to consider when an anticoagulated patient needs surgery:

1. The risk of bleeding associated with the procedure
2. The type of anticoagulant the patient takes – warfarin versus a direct oral anticoagulant (DOAC), such as rivaroxaban (Xarelto®), apixaban (Eliquis®), edoxaban (Savaysa®), and dabigatran (Pradaxa®)
3. The patient's risk for a blood clot if anticoagulation is interrupted before surgery

If the procedure carries a high bleeding risk, your healthcare team may decide to temporarily stop your blood thinner before the procedure. Compared to DOACs, warfarin has a longer half-life, meaning that the medication takes more time to leave your body. Typically, warfarin is stopped 3-5 days before a surgery. However, if your risk for a blood clot is considered high while off warfarin, your provider may choose to "bridge" you with an injection. Bridging refers to the use of short-acting anticoagulants like heparin or low-molecular-weight-heparin (LMWH) before a procedure if you've stopped your usual blood thinner.

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### SIGNS AND SYMPTOMS

One of the classic signs of PAD is intermittent claudication, which refers to cramping, pain, or weakness in the legs

brought on by exertion and relieved by resting. This pain can sometimes be felt all the way down the leg, affecting the buttocks, thighs, and calves. "We often find that intermittent claudication occurs in around 10 minutes. My patients will tell me that after only minutes into their walk around the block, they have to stop because of pain in their leg, which goes away once they stop walking," Dr. Ballard-Hernandez explains. "The quick onset of pain along with pain relief at rest are two of the key things that differentiate PAD-related pain from muscle soreness, bone/joint pain, or a blood clot in the leg. Musculoskeletal pain doesn't come on so quickly into exercising and rest may not entirely relieve it. And with a blood clot, there's usually more swelling or redness in the leg."

Importantly, not all patients with PAD will experience symptoms, which is one of the reasons that the condition is both underappreciated and underdiagnosed. "Many patients try to go about their daily lives and sometimes don't recognize that they used to be able to walk 2 miles and now struggle with walking a block. They don't always appreciate that change in their functional status and

instead try to adapt to it, which ultimately can delay diagnosis."

PAD caused by atherosclerosis is associated with a higher risk of complications, including limb ischemia and stroke. Acute limb ischemia (ALI) is a sudden episode of hypoperfusion—severely diminished blood flow to the limb—and generally occurs over a period of less than 2 weeks. Critical limb ischemia (CLI) is a severe manifestation of PAD marked by chronic pain at rest, ulcers, wounds, or gangrene in one or both legs. The most devastating consequence of CLI is amputation of the affected limb.



### WHEN TO SEE A HEALTHCARE PROVIDER

According to Dr. Ballard-Hernandez, leg pain that resolves at rest typically doesn't warrant an

emergency room visit – but it should be addressed as soon as possible at an outpatient appointment with either a primary care provider or cardiologist. Even if you don't have PAD symptoms, you may need to be screened if you're older than 65 or over the age of 50 with a history of diabetes, high blood pressure, high cholesterol, or smoking.

However, if you experience any symptoms of limb ischemia, you should be evaluated right away in the

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## PAD RISK FACTORS



### MODIFIABLE RISK FACTORS



#### SMOKING

Smokers have a 2-3x higher risk of developing PAD than nonsmokers

Use of traditional cigarettes and electronic cigarettes (e-cigarettes/vaping) increase PAD risk



#### DIABETES

Patients with diabetes have nearly triple the risk of developing PAD compared to patients without diabetes

Other PAD risks are also risk factors for heart disease in general, including:



OBESITY



HIGH BLOOD PRESSURE



HIGH CHOLESTEROL



PHYSICAL INACTIVITY

### NONMODIFIABLE RISK FACTORS



#### AGE

PAD risk increases as patients age



#### RACE & ETHNICITY

Black individuals have a higher risk for PAD than white, Hispanic, or Asian patients



emergency room. These symptoms include:

- Sudden, severe limb pain with a change in color (pallor)
- A lost or absent pulse in the foot with numbness and/or tingling
- A change in temperature where the foot becomes cold



### DIAGNOSIS

The first step in diagnosis is a screening history, which can be done in any healthcare setting with any type of provider and will include

questions about your risk factors and any history of claudication. For the patient without symptoms, "it's all about risk factor review and modification," says Dr. Ballard-Hernandez. "If I have patient who comes into my clinic, and they have high cholesterol, high blood pressure, a history of a heart attack or stroke, or if they smoke, that's someone that I will definitely be screening for PAD."

After that, diagnostic steps may include:

- **Physical exam:** Certain signs of PAD can be identified on exam, such as changes in pulses near obstructed arteries, evidence of restricted blood flow, and open ulcers or wounds.
- **Ankle-brachial index (ABI):** After the screening questionnaire and physical exam, the ABI is the first-line test done to diagnose PAD. A blood pressure cuff with a Doppler probe is used to get a blood pressure reading in the ankle. That number is then compared to the blood pressure measurement from your arm. Most primary care offices can perform ABI tests.

Additional diagnostic tests may include ultrasound and angiography. Angiography is a procedure that uses injectable dye to see how your blood flows through your arteries. Angiography is somewhat invasive and typically used when providers suspect severely compromised blood flow.



### TREATMENT

The overall goals of PAD treatment are to manage symptoms and reduce the risk of heart attack, stroke, and amputation.

Lifestyle changes are a key first step. According to Dr. Ballard-Hernandez, "if you smoke cigarettes or e-cigarettes, quitting is the most important thing you can do to prevent PAD-related complications. If you have high cholesterol or diabetes, eating a healthy diet and controlling your blood sugar is pivotal. I'm also a big fan of structured exercise programs, which are typically offered in physical therapy or cardiac/pulmonary rehab settings. These programs are recommended by our cardiology guidelines and will ultimately help you improve your exercise tolerance and quality of life."

There are also several medication options available. Cholesterol-lowering drugs (statins) are recommended for all patients with PAD. You may also be a candidate for blood pressure medication to control hypertension or medication to help control blood sugar if you have diabetes. Select patients may also be candidates for medications like aspirin or clopidogrel (antiplatelet agents) or rivaroxaban (a blood thinner). These medicines can reduce major heart and limb events. Dr. Ballard-Hernandez recommends talking with your provider to determine what therapies are appropriate for your specific condition.



If lifestyle changes and medications don't treat PAD entirely, you may be a candidate for revascularization, which is a procedure done by a vascular specialist to help restore blood flow.

If there's one thing Dr. Ballard-Hernandez wants patients to know, it's this: "PAD is not a death sentence. We have good screening tools to identify PAD, and a variety of therapies to reduce heart and limb events and prevent the progression of PAD. With tailored medical therapy and structured exercise, we can improve your symptoms and quality of life while lowering your cardiovascular risk." ■

### REFERENCES

American Heart Association. [Peripheral Artery Disease](#). Updated June 2021. Accessed July 2021.

Berger JS, Newman JD. Overview of peripheral artery disease in patients with diabetes mellitus. [UpToDate](#). Updated June 2021. Accessed July 2021.



DOACs have a short half-life – they leave your body more quickly than warfarin. Depending on things like your kidney function and age, DOACs are usually stopped 1-3 days before a procedure. There’s typically no need to bridge patients taking DOACs since the medications wear off so quickly. After the procedure—when your doctor says you can resume anticoagulation—DOACs begin working within 4-8 hours to protect you from blood clots.

While DOACs may be more convenient, there are patients who may be unable to use a DOAC, or the DOAC may not be affordable. Regardless of what blood thinner you take, your anticoagulation/ surgical team will work with you to make a plan that’s specifically tailored to your needs and that seeks to balance your risk for bleeding with your risk for blood clots.

**Q:** I have a genetic clotting disorder and have had a pulmonary embolism (PE). Now I need a knee replacement. What should I do about my blood thinner?

**A:** According to Dr. Lewin, this is a fairly common situation. Providers do encounter patients with a history of blood clots and genetic clotting issues who need an operation. The blood clot history is the first consideration. Was the clot recent or did it happen 20 years ago? Have you had another blood clot since? Timing certainly plays a role in how you’d be managed in an operative setting.

The other thing to consider is the genetic clotting disorder itself, which is called thrombophilia. While the exact protocol may vary from patient to patient, your healthcare team may want to bridge your anticoagulation for a couple of days leading up to the procedure if your blood clot was recent (within the last 3-6 months) and you have thrombophilia.

**Q:** I have not personally had a blood clot but have close relatives who have had clots. Is that something I should mention to my provider if I need surgery?

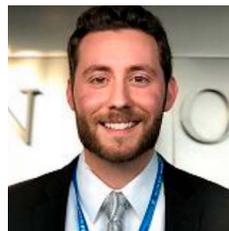
**A:** “That would be important to mention to your doctor, regardless of whether you need surgery. A family history of blood clots may not be something that’s routinely checked if you haven’t had a blood clot yourself,” says Dr. Papadopoulos. Current guidelines don’t recommend routine genetic testing for thrombophilia because even if you may have a predisposition to clotting, anticoagulation typically wouldn’t be warranted unless you’ve had a blood clot yourself. However, your provider should still be informed if someone in your family has had a clot. ■

*A big thank you to our expert pharmacists for weighing in on these questions!*



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### In Case You Missed It...

You can watch the entire *Ask the Expert* forum on anticoagulation on our [website!](#)

NATF’s *Ask the Expert (ATE)* series is a live quarterly forum where participants can ask questions about blood clots and heart health. Through *ATE*, we hope to more directly connect patients, caregivers, and families with leaders in the thrombosis field.





*Fighting blood clots  
through education*

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