

Peripheral Arterial Disease Revisited

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Describe the peripheral arteries?

The heart pumps blood into a series of blood vessels or “tubes” that we call arteries. These vessels deliver the blood that carries oxygen to various organs of the body. The arteries that supply all organs with the exception of the heart (coronaries) and the brain (carotids) are called peripheral arteries. Among the peripheral arteries are those that deliver blood to the abdomen, chest, arms, legs, kidneys and various other vital organs. In contrast to arteries, the veins bring blood into the heart to be pumped into the lungs and get loaded with oxygen. Chapter 11 will address diseases of the veins. You might hear about peripheral vascular disease (PVD). This is a general term that describes diseases that affect both arteries and veins. The term peripheral arterial disease (PAD) describes diseases that affect the arteries only. This will be the focus of this chapter.

What does the sentence “disease of the arteries” mean?

Disease of the artery is a non specific term but generally indicates build up of plaque in the actual wall of the blood vessel. Plaque (or atherosclerosis) is a build up of cholesterol, calcium, various blood elements and muscle cells under the lining of the artery. Generally, the artery accommodates the build up by bulging outward to keep a

wide opening for the blood to go through. However, when a plaque reaches 40% or so in severity it starts to protrude inside the opening of the artery (lumen) and begins the actual narrowing process of the artery. This is commonly called blockages of the arteries or as many people call it disease of the arteries. Disease of the arteries, however, can be due to other factors including inflammation, infection, aneurysms and others. For the sake of this book we will be focusing on diseases of the arteries that are related to blockages from cholesterol build up or plaque.

How common is Peripheral Arterial Disease (PAD)

PAD affects 12-14% of the general population and becomes more prevalent with age affecting up to 20% of patients over the age of 75. PAD also exists in conjunction with other diseases of the arteries namely the coronaries (arteries of the heart) and the carotids (arteries of the brain). Most people with PAD do not die of PAD itself rather of heart attacks and strokes. This is the reason why an aggressive screening for PAD is indicated to identify these high risk patients and modify their increased risk. Patients with PAD can have no symptoms and are identified on examination in a doctor's office or could be symptomatic. PAD symptoms consist of pain in the calf muscle when walking with resolution with rest (claudication) or rest foot pain at night when laying down with non healing wounds or change in the color of the foot (limb ischemia). Limb ischemia is more serious and generally tends to increase the risk of amputation in these patients. The risk of dying from the heart or a stroke is higher in proportion to the severity of the disease in

the lower legs. Therefore preventative treatment in these patients is of paramount importance and other chapters will address this issue in this book.

What is the natural history of PAD?

The natural history of PAD indicates that among patients with claudication, 7% will undergo lower extremity bypass surgery, 4% major amputations, and 16% worsening claudication. Claudication is present in 5% of men and 2.5% of women over the age of 60. The rate of progression to advanced symptoms at rest or gangrene is estimated at 2.2% per year. However, nonfatal cardiovascular events (heart attacks, stroke) occurs in approximately 20% over a 5-year period and the 5-year mortality rate is estimated to be 30% (versus 10% in controls), of which 75% were cardiovascular deaths. This natural history is very different from patients with advanced rest symptoms or non healing wounds on their legs. Limb loss is more prevalent in these patients and the worse the symptoms the more likely they will experience an amputation. In fact, patients with severe symptoms have a 28% chance to lose their leg at 6 months and 34% at 12 months. When all patients with advanced limb symptoms at rest are evaluated, the overall amputation rate ranges from 10-40% with a mortality rate of 20% at 1 year, 40-70% at 5 years and 80-95% at 10 years.

Therefore, the goals in treating the PAD patient are: 1) reduce cardiovascular mortality in this high risk population, 2) improve quality of life in severe claudicants, and 3) lower the chance of amputation in patients with limb ischemia as manifested by rest limb pain or ulceration.

Can patient with PAD present as an emergency?

PAD patients can have the emergence of abrupt symptoms of rest foot pain, change in the foot color, and/or loss of sensation and motor function of the foot. The foot typically will have no detectable pulse and is painful. The vessel is typically occluded with a clot that suddenly forms in the arteries on top of an existing blockage. A patient that presents with sudden onset of lower foot pain, numbness, and a change in the foot color needs to emergently present to the emergency room and will likely require an immediate treatment with a procedure that opens the blockage in his artery and restore blood supply to the foot. Delays in presentation can lead to gangrene in the foot (tissue death) and likely loss of the foot or even the patient dying from these complications.

How can you recognize PAD?

PAD can be recognized either by a reduced pulse in the feet when examined in a doctor's office or by the symptoms a patient describes. A patient with discomfort in their hips or calf muscles with ambulation that improves at rest, or patient with rest foot pain when elevating the foot and the pain resolves when dangling the foot down, or patient with non healing wounds on their legs are likely to have PAD. There are other reasons for non healing wound on the legs but PAD has to be excluded in these patients. PAD is highly prevalent in a diabetic and a low threshold to screen these patients is suggested. Also, smokers tend to also be at high risk of PAD. A diabetic smoker will multiply their

risk of PAD and other cardiovascular events such as stroke or heart attacks. On occasion, a patient with PAD presents with symptoms that are not typical and non specific. If these patients have multiple risk factors, particularly diabetic or smokers, screening them for PAD is recommended. The presence of PAD is a strong indicator that the patient is at high risk of stroke or heart attacks.