



## UNDERSTANDING PERIPHERAL VASCULAR DISEASE (PVD) IN AYURVEDA - A CRITICAL STUDY

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### ABSTRACT

**Introduction:** Peripheral vascular disease (PVD) is a slow and progressive circulation disorder. Narrowing, blockage, or spasms in a blood vessel can cause PVD. PVD may affect any blood vessel outside of the heart including the arteries, veins, or lymphatic vessels. In Ayurveda Uttana type of Vatarakta disease can be related with PVD. Peripheral vascular disease is also called peripheral arterial disease. **Aim:** To do a literary study on different aspects of Peripheral Vascular Disease. **Objective:** To search the details of Peripheral Vascular Disease based on the available literature. **Materials and Methods:** A review study has been conducted based on the available literary resources from the institutional library. **Review of Literature:** The most common cause of PVD is atherosclerosis, the build-up of plaque inside the artery wall. Plaque reduces the amount of blood flow to the limbs. It also decreases the oxygen and nutrients available to the tissue. Blood clots may form on the artery walls, further decreasing the inner size of the blood vessel and block off major arteries. **Discussion:** About half the people diagnosed with PVD are asymptomatic. For those with symptoms, the most common first symptom is painful leg cramping that occurs with exercise and is relieved by rest (intermittent claudication). During rest, the muscles need less blood flow, so the pain disappears. It may occur in one or both legs depending on the location of the clogged or narrowed artery. Those who smoke or have diabetes have the highest risk of complications from PVD because these risk factors also cause impaired blood flow. **Summary:** Peripheral vascular disease (PVD) is a slow and progressive circulation disorder. Narrowing, blockage, or spasms in a blood vessel can cause PVD. The Ayurvedic understanding of PVD is Uttana vatarakta disease. **Conclusion:** The main goals for treatment of PVD are to control the symptoms and halt the progression of the disease to lower the risk for heart attack, stroke, and other complications. The treatments include Lifestyle changes to control risk factors, medicines to improve blood flow, vascular surgery, angioplasty, etc. Vatarakta (arthritic) treatment shows good results.

### KEYWORDS : atherosclerosis, Uttana vatarakta

#### INTRODUCTION

Peripheral vascular disease (PVD) is a slow and progressive circulation disorder. Narrowing, blockage, or spasms in a blood vessel can cause PVD.

PVD may affect any blood vessel outside of the heart including the arteries, veins, or lymphatic vessels. Organs supplied by these vessels, such as the brain, and legs, may not get enough blood flow for proper function. However, the legs and feet are most commonly affected.

PVD typically causes pain and fatigue, often in your legs, and especially during exercise. The pain usually improves with rest. It can also affect the vessels that supply blood and oxygen to your: arms, stomach, intestines and kidneys.

According to the CDC, approximately 12 to 20 percent of people over age 60 develop PAD, about 8.5 million people in the United States. PAD is the most common form of PVD, so the terms are often used to mean the same condition.

Peripheral vascular disease is also called peripheral arterial disease. PVD is also known as: arteriosclerosis obliterans, arterial insufficiency of the legs, claudication and intermittent claudication.

**Aim:** To do a literary study on different aspects of Peripheral Vascular Disease.

**Objective:** To search the details of Peripheral Vascular Disease based on the available literature.

#### MATERIALS AND METHODS:

A review study has been conducted based on the available literary resources from the institutional library.

#### Review of Literature

##### Causes<sup>1</sup>

The most common cause of PVD is atherosclerosis, the build-up of plaque inside the artery wall. Plaque reduces the amount of blood flow to the limbs. It also decreases the oxygen and nutrients available to the

tissue. Blood clots may form on the artery walls, further decreasing the inner size of the blood vessel and block off major arteries.

Other causes of PVD may include:

- Injury to the arms or legs
- Irregular anatomy of muscles or ligaments
- Infection
- Coronary artery disease

##### Types<sup>2</sup>

The two main types of PVD are functional and organic PVD. Functional PVD means there's no physical damage to your blood vessels' structure. Instead, your vessels widen and narrow in response other factors like brain signals and temperature changes. The narrowing causes blood flow to decrease. Organic PVD involves changes in blood vessel structure like inflammation, plaques, and tissue damage.

##### Functional PVD

Your vessels naturally widen and narrow in response to your environment. But in functional PVD, your vessels exaggerate their response. Raynaud's disease, when stress and temperatures affect your blood flow, is an example of functional PVD. The most common causes of functional PVD are emotional stress, cold temperatures, operating vibrating machinery or tools and drugs

##### Organic PVD

Organic PVD means there's change in the structure of your blood vessels. For example, the plaque buildup from arteriosclerosis can cause your blood vessels to narrow. The primary causes of organic PVD are: smoking, high blood pressure, diabetes and high cholesterol. Additional causes of organic PVD include extreme injuries, muscles or ligaments with abnormal structures, blood vessel inflammation, and infection.

##### Risk factors of peripheral vascular disease<sup>3</sup>

A risk factor increases your chance of developing a disease. Some can be changed, others cannot.

Risk factors that you can't change:

- Age (especially older than age 50)
- History of heart disease

- Male gender
- Postmenopausal women
- Family history of high cholesterol, high blood pressure, or peripheral vascular disease

Risk factors that may be changed or treated include:

- Coronary artery disease
- Diabetes
- High cholesterol
- High blood pressure
- Overweight
- Physical inactivity
- Smoking or use of tobacco products

Those who smoke or have diabetes have the highest risk of complications from PVD because these risk factors also cause impaired blood flow.

It will be at higher risk for PVD if age over 50, are overweight, having abnormal cholesterol, a history of cerebrovascular disease or stroke, have heart disease, have diabetes, a family history of high cholesterol, high blood pressure, or PVD and having kidney disease on haemodialysis.

Lifestyle choices that can increase your risk of developing PVD include not engaging in physical exercise, poor eating habits, smoking and drug use

**Signs and Symptoms<sup>4</sup>**

About half the people diagnosed with PVD are symptom free. For those with symptoms, the most common first symptom is painful leg cramping that occurs with exercise and is relieved by rest (intermittent claudication). During rest, the muscles need less blood flow, so the pain disappears. It may occur in one or both legs depending on the location of the clogged or narrowed artery.

Other symptoms of PVD may include:

- Changes in the skin, including decreased skin temperature, or thin, brittle, shiny skin on the legs and feet
- Weak pulses in the legs and the feet
- Gangrene (dead tissue due to lack of blood flow)
- Hair loss on the legs
- Impotence
- Wounds that won't heal over pressure points, such as heels or ankles
- Numbness, weakness, or heaviness in muscles
- Pain (described as burning or aching) at rest, commonly in the toes and at night while lying flat
- Paleness when the legs are elevated
- Reddish-blue discoloration of the extremities
- Restricted mobility
- Severe pain when the artery is very narrow or blocked
- Thickened, opaque toenails

The symptoms of PVD may look like other conditions. See your healthcare provider for a diagnosis.

**Other symptoms include<sup>5</sup>**

Area of pain	Symptoms
legs	reduced hair growth, cramps when lying in bed
legs and arms	turn reddish blue or pale
legs and feet	thin or pale skin, weak pulses, wounds, or ulcers that won't heal
toes	blue color, severe burning, or thick and opaque toenails
muscles	feel numb or heavy

**Claudication<sup>6</sup>**

The most common symptom of PVD and PAD is claudication. Claudication is lower limb muscle pain when walking. You may notice the pain when you are walking faster or for long distances. It usually goes away after some rest. When the pain comes back, it may take the same amount of time to go away.

Claudication occurs when there's not enough blood flow to the muscles you're using. In PVD, the narrowed vessels can only supply a limited amount of blood. This causes more problems during activity than at rest.

As your PVD progresses, symptoms will occur more frequently and

get worse. Eventually, you may even experience pain and fatigue during rest. Ask your doctor about treatments to help improve blood flow and decrease pain.

**Pathophysiology<sup>7</sup>**

Peripheral vascular disease is primarily driven by the progression of atherosclerotic disease leading to macro and micro-vascular dysfunction. PVD typically affects the lower extremity vascular beds, but larger arteries, such as the abdominal aorta and iliac arteries, are frequently involved. More severe disease can involve multilevel and/or diffuse disease. The patho-physiology of atherosclerosis is a complex inflammatory response with the involvement of various vascular cells, thrombotic factors, and cholesterol and inflammatory molecules.

Atherosclerosis begins with lipoprotein accumulation within the intimal layer of large arteries. The lipoprotein presence within the endothelium leads to lipid oxidation and cytokine response with the infiltration of lymphocytes and macrophages. Macrophages consume these oxidized lipids and form foam cells leading to the development of "fatty streaks." Although not clinically significant, these fatty streaks can eventually develop into more advanced plaques consisting of necrotic lipid cores and smooth muscle cells (SMC). SMC and endothelial cells secrete cytokines and growth factors, leading to migration of SMC to the luminal side of the plaque and extracellular matrix synthesis and eventual formation of a fibrous plaque. Fibrous plaque stability is principally dependent on its composition, with more vulnerable plaques consisting of a thinner fibrous cap and more numerous inflammatory cells.

Atherosclerotic plaque builds up slowly over decades within the wall of the vessel. Plaque accumulation results in vascular stenosis and frequent vascular dilation to maximize end-organ perfusion. Once the vessel dilation capacity is maximized, the plaque continues to accumulate, which further compromises the lumen occasionally, leading to critical narrowing of the artery. As narrowing progresses and obstructs the artery, collateral circulatory beds frequently develop to preserve distal perfusion and tissue viability. These collateral circulatory pathways are unable to match the blood supply provided by a healthy vessel completely. IC results when blood flow distal to the occlusion is sufficiently compromised, resulting in fixed oxygen delivery that is unable to match oxygen demand. The most severe form of PAD is critical limb ischemia, which is defined as limb pain at rest or impending limb loss.

Acute ischemia may ensue if in-situ vascular thrombosis occurs or a cardio-embolic source suddenly occludes the narrowed vessel. Arterial thrombosis secondary to progressive atherosclerotic disease, and thrombosis represents 40% of acute limb ischemia (ALI) cases. Atherosclerotic fibrous plaque rupture leads to exposure of sub-endothelial collagen and inflammatory cells, causing platelet adhesion and aggregation with rapid in-situ thrombosis of the vessel. Patients with in-situ vascular thrombosis tend to have improved outcomes compared to embolic causes due to the presence of extensive collateral circulation. Embolic ALI causes represent 30% of ALI cases, with the femoral artery being the most common site. ALI is a vascular emergency with an immediate physician consultation required for the preservation of limb viability.

**Diagnosis<sup>8</sup>**

Along with a complete medical history and physical exam, other tests may include:

- **Angiogram.** This is an X-ray of the arteries and veins to detect blockage or narrowing. This procedure involves inserting a thin, flexible tube into an artery in the leg and injecting a contrast dye. The contrast dye makes the arteries and veins visible on the X-ray.
- **Ankle-brachial index (ABI).** An ABI is a comparison of the blood pressure in the ankle with the blood pressure in the arm using a regular blood pressure cuff and a Doppler ultrasound device. To determine the ABI, the systolic blood pressure (the top number of the blood pressure measurement) of the ankle is divided by the systolic blood pressure of the arm.
- **Doppler ultrasound flow studies.** This uses high-frequency sound waves and a computer to create images of blood vessels, tissues, and organs. Your doctor may use the Doppler technique to measure and assess the flow of blood. Faintness or absence of sound may mean blood flow is blocked.
- **Magnetic resonance angiography (MRA).** This noninvasive test

uses a combination of a large magnet, radio frequencies, and a computer to produce detailed images of organs and structures in the body. Your doctor injects a special dye during the procedure so that blood vessels are more visible.

- **Treadmill exercise test.** For this test, you will walk on a treadmill so your doctor can monitor blood circulation during exercise.
- **Photoplethysmography (PPG).** This exam is comparable to the ankle brachial index except that it uses a very tiny blood pressure cuff around the toe and a PPG sensor (infrared light to evaluate blood flow near the surface of the skin) to record waveforms and blood pressure measurements. Your doctor can then compare these measurements to the systolic blood pressure in the arm.
- **Pulse volume recording (PVR) waveform analysis.** Your doctor uses this technique to calculate blood volume changes in the legs using a recording device that displays the results as a waveform.
- **Reactive hyperaemia test.** This test is similar to an ABI or a treadmill test but used for people who can't walk on a treadmill. While you are lying on your back, your doctor takes comparative blood pressure measurements on the thighs and ankles to determine any decrease between the sites.

### Treatment<sup>9</sup>

The main goals for treatment of PVD are to control the symptoms and halt the progression of the disease to lower the risk for heart attack, stroke, and other complications.

Treatment may include:

- Lifestyle changes to control risk factors, including regular exercise, proper nutrition, and quitting smoking
- Aggressive treatment of existing conditions that may worsen PVD, such as diabetes, high blood pressure, and high cholesterol
- Medicines to improve blood flow, such as antiplatelet agents (blood thinners) and medicines that relax the blood vessel walls
- Vascular surgery — a bypass graft using a blood vessel from another part of the body or a tube made of synthetic material is placed in the area of the blocked or narrowed artery to reroute the blood flow
- Angioplasty — your doctor inserts a catheter (long hollow tube) to create a larger opening in an artery to increase blood flow. There are several types of angioplasty procedures, including:
  - Balloon angioplasty (a small balloon is inflated inside the blocked artery to open the blocked area)
  - Atherectomy (the blocked area inside the artery is "shaved" away by a tiny device on the end of a catheter)
  - Laser angioplasty (a laser is used to "vaporize" the blockage in the artery)
  - Stent (a tiny coil is expanded inside the blocked artery to open the blocked area and is left in place to keep the artery open)

Lifestyle changes alone aren't enough, you may need medication. Medications for PVD include:

- cilostazol or pentoxifylline to increase blood flow and relieve symptoms of claudication
- clopidogrel or daily aspirin to reduce blood clotting
- atorvastatin, simvastatin, or other statins to lower high cholesterol
- angiotensin-converting enzyme (ACE) inhibitors to lower high blood pressure
- diabetes medication to control blood sugar, if you have diabetes

Significant artery blockages may require surgery like angioplasty or vascular surgery. Angioplasty is when your doctor inserts a catheter or long tube into your artery. A balloon on the tip of the catheter inflates and opens up the artery. In some cases, your doctor will place a small wire tube in the artery, called a stent, to keep it open. Vascular surgery allows for blood to bypass the narrow area through vein grafting.

### Differential Diagnosis<sup>10</sup>

A provider has to take into account various differential diagnoses when a patient presents with the above-mentioned signs and symptoms. Following are some of the most important ones:

#### Neurological

- Nerve root compression
- Spinal stenosis
- Peripheral neuropathy
- Nerve entrapment

#### Musculoskeletal

- Medial tibial stress syndrome
- Osteoarthritis

- Muscle strain
- Baker cyst

### Vascular

- Chronic venous insufficiency
- Thrombophlebitis
- Deep venous thrombosis
- Raynaud phenomenon
- Thromboangiitis obliterans

### Prognosis<sup>11</sup>

The overall prognosis of patients with peripheral vascular disease must take into account patient risk factors, cardiovascular health, and disease severity. In terms of limb health at 5 years, nearly 80% of patients will have stable claudication symptoms. Only 1% to 2% of patients will progress to critical limb ischemia in 5 years. 20 to 30% of patients with PAD will die within 5 years, with 75% of those deaths attributed to cardiovascular causes.

### Complications<sup>12</sup>

Complications of PVD most often occur because of decreased or absent blood flow. Such complications may include:

- Amputation (loss of a limb)
- Poor wound healing
- Restricted mobility due to pain or discomfort
- Severe pain in the affected extremity
- Stroke (3 times more likely in people with PVD)

Following an aggressive treatment plan for PVD can help prevent complications.

### Preventive measures<sup>13</sup>

To prevent PVD, take steps to manage the risk factors. A prevention program for PVD may include:

- Quit smoking, including avoidance of second hand smoke and use of any tobacco products
- Dietary changes including reduced fat, cholesterol, and simple carbohydrates (such as sweets), and increased amounts of fruits and vegetables, low-fat dairy, and lean meats
- Treatment of high blood cholesterol with medicine as determined by your healthcare provider
- Weight loss
- Limiting or quitting alcohol intake
- Medicine to reduce your risk for blood clots, as determined by your healthcare provider
- Exercise 30 minutes or more daily
- Control of diabetes
- Control of high blood pressure.

### Some other points about PVD

- Peripheral vascular disease can affect all types of blood vessels.
- Blood flow is restricted to the tissue because of spasm or narrowing of the vessel.
- This disease more often affects the blood vessels in the legs.
- The most common symptom is pain, which becomes worse as the circulation more limited.
- Restoring blood flow and preventing disease progression is the goal of treatment.

### Ayurvedic perspective

Peripheral vascular disease is similar to coronary artery disease, except that it occurs in the arteries of the body's peripheral parts, such as the legs, and hands.

It usually doesn't cause any symptoms, but it can cause nonspecific ones like walking pain or rashes that go away with a little rest. These peculiarities are called intermittent claudication or constriction.

*Uttana vatarakta* is the Ayurvedic term for peripheral blood vessel disease. Blockages (*Avarana*) occur when the *Kapha* and *Pitta doshas* accumulate in the blood channels, or *Marga*. *Vatarakta* and its complications result from this effect on circulating *Vata*, known as *Vegapratibadha*. *Vatarakta* is a disease that affects both *Vata* and *Rakta*.

Improper diet and lifestyle aggravate the *Tridoshas* (dominated by *Vata*) by causing *Aama* (toxins) to form. This vitiates the blood and makes it thick and heavy in nature due to *Aama* and *Kapha*, and the vessels become narrow due to the *Vata* vitiation, which reduces the elasticity of the vessel, and *Kapha* and *Aama*, which settle in the



vessels and form cholesterol. With time, there is pressure on the heart to pump blood through these narrow vessels around the body. This results in stiffening or hardening of the artery walls.

### Vatarakta

Excess intake of salty, sour, pungent, alkalies and fatty substances, hot food, consumption of rotten and dried flesh, fleshes of aquatic animals like fish, animals living in the area where there are dense forest and heavy rainfall, cake of oil seeds after extraction of oil (*Pindyaka*), radish (*Raphanus sativus*), red gram, black gram, green vegetables, *Palala* (grated flesh), sugarcane, curd, sour gruel, *Sauveera* and *Shukta* (vinegar), butter milk, *Sura* and *Asava* (alcohol and medicinal preparations having high concentration of alcohol), intake of food inspite of indigestion (*Ajeerna*), incompatible food (*Viruddhahara*), eating food before proper digestion of previous one (*Adhyashana*), anger, sleeping in daytime and vigil during the night; in general the delicate persons who are indulged in sweet and delicious food substances and are not in habit of physical activities, the *Vata* and *Shonita* vitiate.<sup>14</sup>

Due to injuries, not purifying the body (by *Shodhana karma*) and indulged in consuming astringent, pungent, bitter, *Rooksha* food items (grains of low nutritional content), starvation, traveling by horses, camels and carts, sporting in water, jumping, leaping, excessive walking in hot season, excessive sexual intercourse and suppression of natural urges are responsible for vitiation of *Vata*.

Due to etiological factors described earlier and obstruction in passage by vitiated *Rakta* the *Vata* aggravates, which again vitiates the *Rakta* and known as *Vatashonita*, having synonyms as *Khuda*, *Vatabalasa* and *Adhyavata*.

### Disease sites<sup>15</sup>

The Disease sites are hands, feet, fingers and all other joints. At first it settles its root (initial involvement) in hands and feet and then spread all over the body.

Due to subtleness and pervasiveness of *Vata*, and liquidity and flowing property of *Rakta*, they travel all over the body through blood vessels. Near the *Parva Sandhis* (small joints of fingers), as blood vessels are in slanting pattern, the vitiated blood is stagnated there and thereafter the vitiated *Vata* and *Rakta* along with *Pitta* etc. produce different types of *Vedana* (unpleasant sensation like pain etc.) so that there are *Dukkha* (pain and other abnormal sensation) in the joints. The *Vedana* (pain) is so severe, which is difficult to tolerate.

### Poorvaroopa<sup>16</sup> (premonitory signs)

There is excessive or absence of perspiration, black colour of the body, poor or lack of tactile sensation, high intensity of pain on trauma, laxity of joints, lassitude, malaise, appearance of boils, feeling of heaviness, numbness and itching in knee, thigh, waist, shoulder, hands, legs and other joints of the body, appearance of pain in the joints and abatement (without treatment), discoloration of body, appearance of *Mandala* (circular skin lesions) are the premonitory symptoms of *Vatashonita*.

### Vatarakta types<sup>17</sup>

As this is said there are two types of *Vatashonita* - *Uttana* (superficial) and *Gambheera* (deep). The *Uttana* is located in *Twak* (skin) and *Mamsa dhatu* (muscles) while the *Gambheera* is located in the deep tissues.

### Clinical features of Uttana vatarakta

Symptoms of *Uttana vatashonita* are itching, burning sensation, pain, stretching sensation, piercing pain, fasciculation, feeling of constricting and the colour of skin becomes blackish, red or coppery.

### Clinical features of Gambheera vatarakta

Symptoms of *Gambheera vatashonita* are – oedema in the involved parts of the body, stiffness of joints, hardness of the part, severe pain inside, the colour of the part involved becomes either blackish or coppery. There is burning sensation, pricking pain, fasciculation and finally the part become inflamed and ulcerated. When *Vata* reaches *Sandhi*, *Asthi dhatu* and *Majja dhatu* (joints, bones and bone marrow) it causes severe pain and burning sensation. The forcefully moving *Vayu* having reached the joints causes cutting nature of pain whereby making them crooked, produces limping or lameness while moving all over the body. When the symptoms of both types – *Uttana* and *Gambheera* are present in a patient, it should be considered as

*Ubhayashrita* (superficial and deep both).

.Vitiated *Vata* having reached the joints of extremities obstruct the way of the *Rakta* and vitiated *Rakta* obstructs the way of *Vata*, thus causes the unbearable pain and leads to death.

### Upakrama

The Ayurvedic treatment method focuses primarily on boosting blood flow to the extremities and preventing cell damage. Depending on the severity of the condition, the root cause should be addressed. Internal medicines are often combined with external treatments to strengthen the vasculature and boost blood flow.

### Basic Treatment

- Balance *Doshas* (Balance aggravated *Vata*)
- *Aama* elimination (Remove block)
- Cleansing Channels (Blood purification)
- Balance *Agni*, the metabolic Fire (Increase blood circulation)
- *Tridosha* Alleviation (Regulate tissue metabolism & contraction relaxation of Heart muscles)
- *Rasayana* (Strengthens tissues)

### Raktamokshana therapy<sup>18</sup>

*Raktamokshana* (bloodletting) should be done by applying the leech if one is suffering from discomfort, burning sensation, pain and pricking sensation. If the patient is suffering from tactile dysfunction, itching and tingling, his blood should let out with either *Shringa* (animal horn) or *Alabu* (hollow gourd).

If the symptoms and complications in *Vatashonita* are not localised to a specific part rather are of fleeting nature, the blood should be let out with *Siravyadha* (venesection) or by *Pracchana*. In case if there are *Angaglani* (*Anga shosha* or atrophy), dryness, and other symptoms of *Vata* dominance, the bloodletting should not be done.

### Management principles

After proper oleation, *Vatarakta* patient shall be treated with mild therapeutic purgation with unctuous substances or with dry substances (in case of excess oiled patient). After purgation, the patient should be given frequent *Basti* (enema of medicated substances) including *Anuvasana basti* (unctuous enema) and *Nirooha basti* (enema made from decoction of medicinal herbs). Besides fomentation, massage, ointments, food and *sneha* (unctuous substances) be given to the patient which do not cause burning sensation. Now listen; specific remedies.<sup>19</sup>

### Oral medications :

According to dosha involvement and prakruti of patient one must follow medications at least for minimum 3-6 months with proper balanced ayurvedic diet.

### Panchakarma :

According to dosha involvement and prakruti of patient, physician may advice you following panchakarma.

1. Vamana
2. Virechana
3. Basti
4. Raktamokshana

Among all Panchakarma, Raktamokshana having excellent results in acute condition of PVD. Along with above classical treatment can follow following treatment regimen in PVD.

1. Shastikshalipindasweda
2. Lepam
3. Siravedhanam

### Contra-indications<sup>20</sup>

The patient of *Vatarakta* should abstain from day sleep, exposure to heat, excessive physical exertion, coitus, eating of pungent, salty, sour, *Ushna*, *Guru* (difficult to digest) and *Abhishyandi* food (food articles which after consumption are responsible for the excessive secretions in the body) substances.

### Diet for Vatarakta persons<sup>21</sup>

Old barley, wheat, *Njavara*, *shali* and *Shastika dhanya* (special qualities of red rice) are good to eat and soup of flesh of *Vishkira* (birds which scratch the ground) and *Pratuda* (birds which pick the food and eat like pigeon) or soup of pulses, pea, bengal gram, lentils and

*Makushtha (motha)* can be taken by adding plenty of ghee, by the patients of *Vatarakta*.

Green vegetables like *Sunishnaka* (*Marsilia minula*), *Vetagra* (new buddings of *Salix caprea*), *Kakamachi* (*Solanaum nigrum*) buddings of *Shatavari* (new buddings of *Asparagus racemosus*), *Vastuka* (*Chemopodium album*), *Upodika* and *Sauvarchala* (*Gynandropis pentaphylla*), cooked with either ghee or *Mamsa rasa* (soup of fleshes) can be given to the patients who are suited for these and followed by intake of milk of cow, buffaloes, or goats is beneficial.

## DISCUSSION

### Deterrence and Patient Education

Patient management for the desired outcomes is based on a holistic approach that includes non-pharmacological lifestyle modification and pharmacological management, such as:

- Smoking cessation
- Ambulatory blood pressure monitoring
- Medication and exercise therapy compliance
- Cholesterol management through diet and statin therapy
- Weight reduction
- HbA1c goal of less than 7% (or more for significant comorbid conditions or hypo-glycaemia)
- Regular follow up with an inter-professional team

### Healthcare outcomes

Peripheral vascular disease is a progressive systemic disease with poor long-term outcomes. Although symptoms of claudication remain stable for many years, these patients are at high risk of fatal and nonfatal cardiovascular events. Inter-professional coordination is necessary for identifying patients at risk of disease, preventing secondary progression, and presenting patients with various options for their disease. Primary care providers are essential for patient education regarding risk factors for cardiovascular disease and management of tobacco abuse, hypercholesterolemia, hypertension, and diabetes mellitus. Cardiologists should be involved, given nearly 75% of patients with PAD die from cardiovascular events.

Vascular surgeons and endovascular specialists' input provides patients with various options for refractory disease. Vascular medicine specialists and podiatrists are very frequently vital members of the inter-professional team. Nurses are valuable for their familiarity with the patient and for updates on how the patient's condition has progressed. Pharmacists are needed for patient and physician education on potential medication side effects and drug-to-drug interactions.

Current guidelines by the American College of Cardiology recommend patients with symptoms of IC undergo ABI testing. [Level 2] Patients diagnosed with PAD and unresponsive to exercise therapy should receive cilostazol for symptomatic improvement and increased walking distance. [Level I] Endovascular procedures are recommended in patients who have not responded to exercise and pharmacological therapy and who have debilitating symptoms.

### Summary

Peripheral vascular disease (PVD) is a slow and progressive circulation disorder. Narrowing, blockage, or spasms in a blood vessel can cause PVD. The Ayurvedic understanding of PVD is *Uttana vatarakta* disease

### CONCLUSION

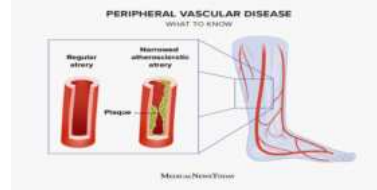
The main goals for treatment of PVD are to control the symptoms and halt the progression of the disease to lower the risk for heart attack, stroke, and other complications. The treatments include Lifestyle changes to control risk factors, medicines to improve blood flow, vascular surgery, angioplasty, etc. *Vatarakta* (arthritic) treatment shows good results.

### Take Home Message

Peripheral Vascular Disease (PVD) is a dreadful disease if not diagnosed and treated well often causes deformities in the body and limitations to life activities. The treatment of PVD should be well planned by applying suitable life style changes and proper medication. The aim behind must be improvement in quality of life of persons with the disease.

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