(2) **Arterial Bypass surgery**: A bypass can be made between the patent arteries above and below the site of obstruction. Surgical incisions are needed to expose the arteries for bypass. Either the patient's own vein or a synthetic bypass graft can be used as the bypass conduit.

Arterial Bypass Surgery

(3) **Combination of endovascular intervention and bypass surgery**: The combination of both endovascular and open bypass treatment is used to treat patients with more complicated arterial occlusive disease.

(4) **Endarterecomy**: In special situations where a short segment of artery is affected by atherosclerotic plaque, an incision made over the vessel and removal of the plaques can improve blood flow through the artery.

(5) **Minor amputation and wound debridement**: If ulcer/gangrene of the toe and foot has already set in at the time of treatment, minor amputation or wound debridement may be necessary to ensure rapid recovery and to restore the walking ability of the individual. The need for minor amputation and debridement very much depends on the site and severity of tissue loss on presentation.

Multi-disciplinary approach

We, Vascular specialists, team up with the physicians, endocrinologists, anaesthetists, podiatrists, wound-care nursing specialist, and rehabilitation specialists to provide a comprehensive care to the Peripheral Artery Disease patients. With proper treatment and care, majority of the PAD patients with tissue loss will be able to heal up the ulcer/gangrene, avoid limb loss and walk again.

Contact information

Department of Cardiac, Thoracic and Vascular Surgery
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(except on Public Holidays)

For appointments, please contact
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For International Patients And Visitors
The International Patients Liaison Centre (IPLC) is a one-stop service centre to support all the medical needs of our foreign patients

Tel : (65) 6779 2777 (24-Hours Helpline)
Fax : (65) 6777 8065
Website : www.nuh.com.sg/iplc.html

National University Hospital
5 Lower Kent Ridge Road, Singapore 119074
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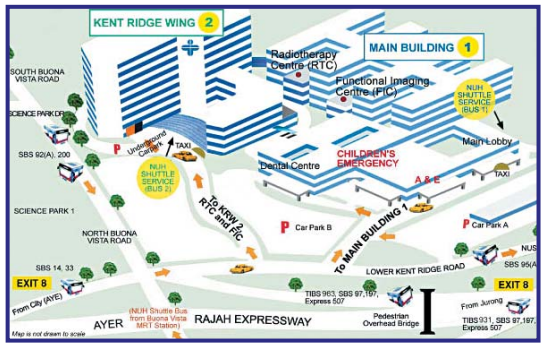
Location



Free Shuttle Bus Service

Free Shuttle Bus Service from Dover MRT Station to NUH

Operation hours : 8.00 am – 8.30 pm (Mondays – Fridays)
8.00 am – 2.00 pm (Saturdays)
Not available on Sundays and Public Holidays

Dover/NUH passenger pickup/ drop off point : 1. Dover MRT Station (opposite Singapore Polytechnic)
2. Main Building, Lobby Entrance (near roundabout)
3. Kent Ridge Wing, Level 3, South Entrance

For more information on Shuttle Bus schedule, you may go to NUH internet website at www.nuh.com.sg

NUH National University Hospital

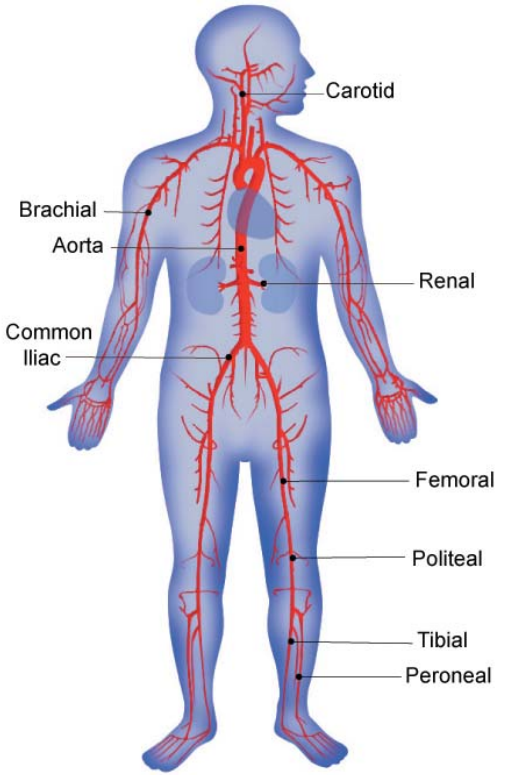
National University Heart Centre, Singapore

Peripheral Arterial Disease – Mobility is Life

A member of NUHS

What is lower limb Peripheral Arterial Disease PAD (PAD)?

Arteries are vessels that carry blood rich in oxygen and nutrients from the heart to various organs in our body. When an artery is affected by atherosclerosis, its lumen will get narrowed or occluded. Blood supply to the corresponding organ will be diminished. The sites of arteries that are frequently affected by atherosclerosis include coronary (heart) artery, lower limb arteries, and carotid (neck) artery. Atherosclerosis usually affects people aged more than 50, smokers, with chronic medical disease including diabetes, hypertension or hyperlipidaemia. Reduction in blood supply to the lower limb may cause deterioration in walking capacity, pain in the foot and toes, ulcer or gangrene, and even limb loss depending on the severity of the disease.



Human body artery system

Symptom of lower limb PAD

Early disease could be totally without symptoms, whereas more severe disease can present as intermittent claudication, rest pain, ulcer/gangrene of the foot and toe.

- **Intermittent claudication –** one will experience tightness or soreness of the calf muscle after certain period of walking. The discomfort will go away after a period of resting. In some people, the discomfort can occur in buttock region.
- **Rest pain –** pain over the toes and foot, even at rest. Pain will usually get worse at night and may wake the patient up. The pain is due to insufficient oxygen supply to the most far away tissue of the lower limbs.
- **Ulcer/gangrene –** when the blood supply to the extremities further deteriorates, the healing ability worsens. Minor injury to the toe or foot can cause a persistent wound. Ulcer/gangrene (local tissue death) may develop even without injury.

Significance of lower limb PAD

1) This signifies you have higher cardiovascular risks throughout the body (e.g. heart attack and stroke)
2) The disease may adversely affect your walking capacity and quality of life
3) The disease may cause chronic pain and even limb loss

Diagnosis of PAD is easy

1) Symptom and history
2) Examination of the lower limb pulses at various positions and clinical assessment of the foot and toe condition
3) Ankle-Brachial Index (ABPI): The ratio between highest ankle pressure and arm pressure (Ankle-Brachial Index) should normally be > 1.0. Narrowing of the lower limb artery will result in diminished ABPI (<0.9).
4) Further investigation may be indicated depending on the severity of the disease and other clinical findings

Predisposing factors

Diabetes, Hypertension, Hyperlipidaemia, and Smoking.

Treatment goals

1) Reduce cardiovascular risk
2) Prevent lower limb loss
3) Restore walking capacity and improve quality of life

Management

Control Atherosclerosis

1) Risk factors screening and control. Change of life style (quit smoking, healthy diet, moderate exercise etc)
2) Anti-platelet agents. Long term anti-platelet agent reduces the risk of all cardiovascular diseases (e.g. Aspirin, Plavix, Ticlid)

Non-surgical treatment to improve walking capacity

1) Walking exercise – Majority of people having intermittent claudication can get some improvement by doing regular walking exercise (at least 50 minutes, 3 or more times per week)
2) Medications to reduce intermittent claudication symptom are available.

Surgical treatment – Revascularisation

This is only indicated in patients with significant symptoms. The aim of surgical treatment is to improve the blood supply to the affected tissues. If ulcer/gangrene has already set in, surgical debridement will be needed to enhance wound healing.

(1) **Minimally invasive Endovascular intervention**: The narrowed arteries can be opened up using various equipments including guidewires, angioplasty balloons, atherectomy catheters, and stents under X-ray. The procedure will be carried out through a puncture over the groin region under local or regional anaesthesia.