

Rapid Recovery Hyperbarics

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Foot at risk

Age Well

By Dr LIEW NGOH CHIN

Are limb amputations due to diabetes preventable?

DIABETES mellitus is a major global health problem and has reached epidemic proportions in many developed and developing countries. This is contributed by the global changes of population growth, longevity, urbanisation, mechanisation, obesity, and lifestyle. At present, the highest number of people with diabetes is in Europe and America. It is predicted that by 2025, the number of diabetes sufferers in Asia would exceed 100 million.

In Malaysia, the prevalence of diabetes has increased; 4% in the 1980s, 8.3% in 1996, to 14.9% in 2006 – an increase of 250% over 20 years!

Diabetics are often afflicted with many complications – eye problems, kidney failure, heart attack, stroke, and leg amputations.

It is predicted that if this trend continues, one in every five adult Malaysians above the age of 30 would be diabetic.

Diabetic foot problem

Diabetics are often afflicted with many complications – eye problems, kidney failure, heart attack, stroke, and leg amputations.

Of the complications listed, peripheral arterial disease (PAD) leading to amputation is not commonly recognised. In the National Health and Morbidity Survey 2006 conducted by the Health Ministry, 4% to 7% of known diabetics had undergone toe or leg amputations.

Diabetic foot is defined as a condition of the foot directly caused by diabetes or is due to its long term complications. There are three factors leading to this condition:

1. Peripheral arterial disease – narrowing or blockage of the arterial supply to the foot, causing ischaemia of the tissue.
2. Peripheral neuropathy – an affliction of the nerve of the foot leading to loss of sensation, numbness, paraesthesia or altered sensation, pain, and deformity of the foot and toes.
3. Infection – this occurs as a direct result of the two previous conditions.

Diabetics also suffer from impaired immunity, leading to the inability to ward off minor infections.

Sixty percent of diabetic ulcers will heal with antibiotics, dressings, and off-loading (taking the load off the ulcer) alone.

There has been a misconception that PAD is not common among Asians. On analysis of the publications, the prevalence of PAD in diabetics in Asia ranges from 6% to 23%; a figure equal to, if not higher, than the Caucasian population.

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In 2007, a multi-country study was conducted among diabetics in seven Asian countries. The study, known as PAD-SEARCH, involved 6,625 patients and showed a prevalence rate of 17.7% of PAD among diabetic patients. The risk factors leading to PAD are: duration of diabetes, duration of hypertension, poorly controlled diabetes (high HbA1c), smoking, and high cholesterol.

Diabetic peripheral neuropathy (DPN) is a common affliction of the nerves of the lower extremity. Thirty to 50% of diabetics with disease of longer than 10 years duration suffer from this condition.

DPN may affect the sensory nerves, leading to pain, numbness and tingling, and many other altered sensation and discomfort only patients could describe.

When the motor nerve fibres are involved, patients have imbalances of the small joints in the foot, leading to deformity and loss of normal weight bearing structure of the sole. Unusual bony protrusions become the focus of repeated trauma and ulceration.

It has been estimated that 60% of non-traumatic lower limb amputations in the US is a result of DPN. Involvement of the autonomic nerves in the foot leads to a dry, shiny and scaly skin that is easily traumatised, becoming a port of entry for infection.

Management issues

Unfortunately, there are challenges in managing this condition in Asia, and Malaysia is no exception. There is inadequate understanding of the disease among patients and some healthcare providers.

An interesting study done in Penang showed that about 40% of patients undergo no treatment, or self-medicate initially when they developed a diabetic foot problem. Many present late and had to undergo amputations.

The trend is not uncommon in Asia – experiences of other vascular surgeons showed that of those diabetic feet that underwent vascular reconstruction, 38% to 80% of the patients present with either an ulcer or gangrene.

The issue is confounded by the widely and legally available alternative therapy.

While some of this therapy is known to complement the mainstream therapy, for instance, hyperbaric oxygen may hasten wound healing in a diabetic foot without vascular compromise, other less established therapies are harmful to the patient. Patients often go on prolonged periods of “trial and error” in treatment, and arrive too late to the hospital, resulting in major amputations or other afflictions like severe infection and kidney failure.

This confusion is caused by a lack of understanding of the disease. Sixty percent of diabetic ulcers will heal with antibiotics, dressings, and off-loading (taking the load off the ulcer) alone.

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Typically, this is due to DPN. When the blood supply is adequate, which means no ischaemia, some of the gangrene would demarcate and drop off by itself (auto-amputate).

The other 40% or so have peripheral arterial disease and most of these require vascular reconstruction. Unless healthcare workers impart such information to the patients, those non-ischaemic ulcers that are destined to heal with dressings alone would be seen to be cured by some miracle cream or drugs or some unconventional therapy.

Magnitude of the problem

There are few local hospital data on the number of amputees in Malaysia.

Globally, it has been estimated that the incidence of major amputations is 120-150/million population. From this conservative estimate, about 4,000 people in this country would lose their leg due to diabetes.

This is excluding those tens of thousands that undergo minor amputations of the toes.

Diabetics are also afflicted with a multitude of medical problems and those with PAD are at higher risk of death. The relative five-year mortality rate showed that PAD causes more death than breast cancer or lymphatic cancer.

Management of diabetic foot

In no field is the phrase “prevention is better than cure” more appropriate than in the management of diabetic feet.

Diabetics should ensure that they have a rigid control of their blood glucose, and regular checks with their general practitioners are mandatory. They should ensure that their associated hypertension and high cholesterol is controlled with appropriate medication.

Obesity should be reduced and regular exercises are essential to maintain overall well-being.

Smoking is strictly prohibited because it would act as a double jeopardy due to the increased atherosclerosis risk.

Caring for the diabetic foot

Understanding that the long term effect of diabetes in the lower limbs is peripheral neuropathy and peripheral arterial disease, the “foot-at-risk” should be diagnosed early. This is easily done by general practitioners or nurses using basic clinical examinations.

In neuropathy, neurological examination would pick up the loss of sensation at the sole, and the deformed joint known as Charcot’s foot is easily identified. The pulses in the foot should be rigorously sought for by palpation.

If DPN or PAD is present, these patients are referred to diabetic foot clinics. At these clinics, nurse educators, podiatrists (or foot specialists) and rehabilitation doctors and therapist would further examine and advise the patient on the current

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status of the foot and warning signs of foot at risk. Advice on foot wear, cleansing of the foot, and self examination for infection are given. For established foot infection or ischaemia, patients would be further evaluated by the orthopaedic and vascular surgeon for the need of surgery or vascular reconstruction.

In the hospital, the patient is also evaluated by their physicians, endocrinologists and cardiologists for other associated problems. Such a team approach has been shown to drastically reduce the amputation rate. Experience from Europe has shown that a dedicated diabetic foot-care programme is able to reduce the amputation rate by 50% to 75%.

Treatment options available for PAD

There has been much progress made in the management of PAD. The interaction between the endothelium (the inner lining of the blood vessel wall) and platelets during disease and health has been much researched, resulting in the emergence of potent drugs that can prevent thrombus formation during angioplasty and stenting of the arteries.

A collaborative effort by different international societies has resulted in a consensus guideline that recommends modality of treatment in certain disease states.

Unlike the past, when patients with occluded arteries had to undergo bypass surgery to allow blood flow into the ischaemic tissues, percutaneous treatment of these blockages are now possible, decreasing the complications and risk of death during intervention.

Percutaneous intervention is done under local anaesthesia and sedation. The femoral artery is punctured and a sheath is placed in the artery. A guide-wire is passed down or up the artery, crossing the site of obstruction.

After successfully crossing the artery, a balloon is passed to the site of obstruction and then inflated. The distended balloon ruptures the plaque obstructing the artery, and allows blood flow to be re-established.

If the plaque remains craggy or narrowed despite the ballooning, a stent is inserted at the site of obstruction to prevent it from collapsing and to smoothen out the irregularity.

Once blood flow is re-established, the ulcer will begin showing signs of healing. The gangrenous toes will turn dry and mummified and establish a line of demarcation.

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Importance of prevention

Diabetes has reached epidemic proportions, and so will the complications that come along with the disease.

Many patients will suffer from DPN and PAD, leading to non-healing ulcers and gangrene of the toes. If left unattended, these lesions will progress to major amputations.

Amputation in diabetes is preventable, and globally, the success of amputation reduction reaches 50% to 75%. To attain these goals, the government, healthcare providers, support groups, citizens and patients must commit to the implementation of a diabetic foot-care programme.

This is a special programme involving multidisciplinary group comprising general practitioners, surgeons, physicians, nurses, podiatrists, and rehabilitation doctors that champion the cause of preserving limbs in diabetics. The key to preserving the limbs is to educate the patient, identify, and manage the "at-risk-foot" early and rigorously. This year, the theme for diabetics is "Leg for Life", and patients need not lose their legs to diabetes!

