



How to run a multidisciplinary diabetic foot clinic

Highlights from the annual Diabetic Foot Master Class, King's College Hospital, London, 25 June 2010.

The 2010 conference at King's College Hospital (KCH), organised by Mike Edmonds (*Professor of Diabetic Foot Medicine, KCH*) and Christian Pankhurst (*Senior Orthotist, NHS Southwark*), attracted a capacity multidisciplinary and international audience. Introducing the meeting, Professor Edmonds pointed out that, throughout the world, there is a diabetic foot-related amputation every 30 seconds. The reason for this 'horrendous' situation is

that the natural history of the diabetic foot is rapidly progressive and complex, making the patient very vulnerable. The theme of the meeting was on running a multidisciplinary diabetic foot service and Professor Edmonds explained that reversing this natural history depended on cooperation between the various services which make up the multidisciplinary team, thus giving cause for optimism in the future.

The ischaemic foot and vascular services

Professor Edmonds had pointed out that the three great pathologies are ischaemia, neuropathy and infection. The multidisciplinary approach was exemplified by three speakers who explained the contributions of vascular services to the successful diabetic foot clinic. David Goss (*Clinical Scientist, Vascular Laboratory, KCH*) said that whilst a clinical assessment is often the first investigation of peripheral vascular disease (PVD), there are a number of back-up techniques available. Dr Goss in particular emphasised the Doppler ultrasound examination. This provides a non-invasive, quantitative, haemodynamic assessment of PVD. Furthermore, colour duplex ultrasound combines B-mode ultrasound imaging with spectral Doppler ultrasound and Doppler colour flow mapping, providing anatomic and physiological flow information.

Discussing the challenges faced by the vascular surgeon, Hisham Rashid (*Consultant Vascular Surgeon, KCH*) said the typical diabetic patient is elderly, often with renal failure and ischaemic heart disease. The challenge of the actual surgery is the small size artery, poor foot arch run-off, arterial calcification, limited vein conduit and wound infection. Dean Huang (*Consultant Radiologist, KCH*) then discussed the role of vascular imaging and the potential advantages of endovascular intervention in the care of the diabetic foot.

Liz Pendry (*KCH*) described her role as a diabetic foot practitioner. This is to supervise the admission and management of diabetic foot

inpatients and to coordinate all aspects of multidisciplinary care. She has to implement strategies to reduce hospital length of stay, such as negotiating in-house fast track vascular services. Thus, patients are assessed in a vascular laboratory and seen by the vascular surgeon within 24 hours of admission and receive angiography or MRA within one to five days of admission. There are weekly joint diabetic/vascular ward rounds and early discharge clinics have been established. Strategies to enhance wound healing include Vacuum Assisted Closure (VAC) which helps to speed up granulation and reduce wound volume.

The neuropathic foot

In the session on the neuropathic foot, Melanie Doxford (*Principal Podiatrist & Diabetic Foot Practitioner, KCH*) told delegates that the complex diabetic foot wound presents many healing challenges. It involves deeper structures, and is poorly perfused with the presence of non-viable tissue. It is complicated by infection and the presence of oedema, and the patients are medically unwell. The management aims are to encourage wound contraction and granulation, maintain wound bed perfusion, continuously remove non-viable tissue, prevent infection, manage peripheral oedema and wound exudate, and to offload. She discussed VAC, Versajet, surfactants, the different dressings and the problems of biofilms.

David Bennett (*Consultant Neurologist, KCH*) reminded delegates that painful diabetic neuropathy is common and increasing in prevalence with 30% of diabetic patients developing

neuropathy, and up to 26% of those with neuropathy develop chronic pain. Appropriate clinical examination and investigation are required to exclude mimics. Dr Bennett said that treatment remains a challenge: the newer anti-epileptic drugs and duloxetine are helpful but probably do not have any greater efficacy than traditional treatments though they may have fewer side effects. Topical treatments can be a very useful addition.

Discussing casting and debridement, Maureen Bates (*Podiatry Manager, KCH*) explained that the main aim in healing the ulcer as quickly as possible is to reduce pressure and friction and to prevent and aggressively deal with infection. There are a number of options but total contact cast (TCC) is the gold standard and has many advantages, e.g. being bespoke, it fits all shapes and sizes, with experience can be applied quickly and spreads plantar pressures evenly. Its disadvantages include that it may be difficult to detect infection, worsening ulceration or new lesions and, if patients do not follow advice, the results can be serious. It needs to be within a hospital multidisciplinary service. Discussing debridement, Ms Bates said that this is an important part of wound control; it removes callus (thus lowering plantar pressures), enabling the true dimensions of an ulcer to be seen, and allows drainage of exudate.

Foot complexities

Tim Cooney (*Senior Orthotist, NHS Southwark*) and Alan McDougall (*Senior Prosthetist, Chas A Blatchford & Sons Ltd and Bowley Close Rehabilitation*



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Centre) updated delegates on modern techniques in orthotics and prosthetics. Mr Cooney explained that orthotists take a biomechanical approach towards achieving their aims of pressure redistribution, absorption of shear forces and ulcer prevention or healing. In designing footwear for people with diabetes, a good fit is important as this allows effective transfer of forces from the footwear into the body. He explained the measurements needed – often outside normal variants – and how orthotists can use shoes from a large library of last sizes as well as having the potential to make bespoke shoes. It is important that the shoes should look good and fashionable as well as being effective. Whilst many established methods of design and manufacture are still relevant, modern advances have mainly come from computer aided design and manufacturing technology, and relate to the way orthotists capture and modify foot and leg shape and, ultimately, how they design and manufacture the end product.

Mr McDougall explained that prosthetics involve replacing missing limbs, knees, feet, ankles or combinations of these. Normally, about two weeks following amputation, patients are in physiotherapy and walking with a trial limb. Between two and four weeks they are cast and measured for bespoke limbs. Physiotherapy continues and patients are reviewed regularly for socket fit. Modern prosthetics use carbon fibre, aluminium or titanium and, where appropriate, pneumatics and hydraulics. Mr McDougall illustrated, with a series of video clips, some of the remarkable results obtained with this increasingly hi-tech speciality.

The renal foot

Jennifer Tremlett (*Podiatrist, KCH*) reminded delegates that diabetes is a leading cause of renal failure in Europe and the USA and that foot complications are twice as more likely to occur than in a diabetic patient without renal failure; indeed, up to 30% of diabetic patients on dialysis undergo a major amputation. Ms Tremlett emphasised the importance of the multidisciplinary team in the management of the renal foot, involving vascular, microbiological

and wound control. Cases are complex, often with extensive tissue necrosis complicated by infection and aggressive treatment is needed.

Psychology of the diabetic foot patient

Rehabilitation counsellors Angie Shiress and Lisa Ferguson (*NHS Southwark*) discussed the psychology of the diabetic foot patient. At first, amputees often feel that they have lost an integral part of themselves and counselling can help them adjust to a new reality, with the degree of psychological impact and support required varying between patients. They stressed the importance of listening to the patient before Ms Ferguson pointed out the importance of considering factors such as age, individual personality, self-esteem, family/friends' support and any past history of psychological illness, and such signs of depression as flatness of mood and a loss of appetite or interest in sex. As part of looking after patients, Ms Shiress pointed out that health care professionals have to look after themselves, and discussed the importance of taking time to reflect, exercise and having a break.

Modern management Infection

Discussing modern management of infection, Professor Edmonds exploded a number of myths which impact on antimicrobial therapy. For example, it is not true that diabetic foot infections always present with the classical signs of local infection (erythema and pain may be absent). Neither do they always present with the classical signs of systemic infection (often there is no leucocytosis and fever). Digital necrosis is not usually due to an occlusive lesion of the microcirculation but is caused by infection. Diabetic foot infections are not only caused by Gram positive bacteria and anaerobes but Gram negative bacteria may also be important and always need investigation as rational antibiotic therapy is dependent on identification of the infecting bacteria. Whilst diabetic foot infections often need surgery to remove sloughy, liquefied and necrotic material, osteomyelitis can sometimes be cured with modern antibiotics.

Charcot's osteoarthropathy

Nina Petrova (*Research Fellow, KCH*) explained the clinical classification of Charcot's osteoarthropathy. With the acute active Charcot foot, patients require casting whilst, in the case of the inactive Charcot foot, patients are out of cast and being rehabilitated to footwear. Early acute Charcot foot presents as the hot, red swollen foot, with normal X-ray, positive bone scan and MRI and CT changes. The advanced acute Charcot foot has an abnormal X-ray as well as changes on the bone scan, MRI and CT, and there is often deformity. MRI is useful in showing early bone damage, bone marrow oedema, fracture, cyst and erosions. Maureen Bates described the main aims of conservative management of the Charcot foot. These are to reduce pressure throughout the foot, to provide stability, especially at the ankle, to keep deformity to a minimum, to reduce pain and oedema, and to heal ulcers associated with Charcot.

Venu Kavarthapu (*Orthopaedic Consultant, KCH*) presented an orthopaedic overview and told delegates that, within the multidisciplinary approach, there was an increasing role for surgical correction. He discussed the various correction techniques ranging from acute to gradual, including some of the newer surgical approaches to correct deformity.

- On arrival, delegates were asked to complete a questionnaire itemising the adequacy of services in their areas. These were analysed during the day and, closing the meeting, Professor Edmonds was able to report that there had been some improvement over the year in a few areas: angioplasty, vascular by-pass, home IV antibiotics and – particularly relevant to the day's proceedings – multidisciplinary foot clinics (up to 81%).

The 2011 conference will include a session on the role of major amputation in the management of the diabetic and renal foot, and will also discuss ways of improving life after amputation for these patients. For further details please contact Christian Pankhurst on: diabeticfootmasterclass2011@yahoo.com.

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