A paradigm shift is needed in diabetic foot care

This short paper explains why clinicians should place greater emphasis on the management of diabetic foot ulcers of neuroischaemic origin. It also calls for a new classification system to help decide when vascular intervention is necessary in patients with neuroischaemic ulcers.

NEUROISCHAEMIC ULCERS ARE A MAJOR PROBLEM

Recent large cohort studies of individuals with diabetes who subsequently develop foot ulcers found that at least 60% of ulcers are neuroischaemic or ischaemic in origin [1,2]. However, at present, the main focus of diabetic foot treatment is on neuropathy and its consequences [3,4].

EARLIER REVASCULARISATION IS ESSENTIAL

Intervention decisions in patients with neuroischaemic diabetic foot ulcers have been based on the need for revascularisation (reconstructive vascular surgery or angioplasty). This is indicated by the presence of claudication and rest pain or the extent of tissue loss (using the Fontaine classification) [4,5]. However, pain at rest or claudication in individuals with diabetic foot ulcers are substantially less frequent than in individuals with ischaemia without diabetes [4]. The consequence of this is that, in most clinics, revascularisation is considered too late in the progress of a diabetic foot lesion. As a result, 30 to 50% of individuals with diabetes and foot ulcers already have gangrene (a score of 4-5 on the Wagner scoring system) at admission for revascularisation and are therefore considered unsuitable for this intervention [4,5].

To address the problem of late presentation, non-invasive vascular testing, such as toe pressure and TCO2 ankle pressure, has been suggested as an indicator for earlier vascular intervention since these levels have been shown to be related to poor outcomes [2-4,6]. The absence of pedal pulses may indicate the presence of peripheral vascular disease. However, there is substantial individual variation in clinicians’ ability to assess pedal pulses without special training. Absence of pedal pulses is also not directly related to outcome (there is still a 40 to 50% rate of healing by primary intention when pedal pulses are absent) [2,4,5]. It has long been recognised that the presence of peripheral vascular disease presents differently in subjects with and without diabetes [7].
RESEARCH LIMITATIONS

Most studies of patients with an ulcerated diabetic foot with decreased perfusion or ischaemia have focused on feasibility and outcome in relation to a specific vascular intervention technique with various selection biases, criteria for inclusion and outcome parameters. The patient populations studied have also not been directly comparable, with patients with claudication, pain at rest and gangrene all included in the same cohort. As a consequence, most of these studies are not comparable with regard to patient population, intervention or outcome.

Today we also have access to a number of studies that, with various levels of success, have evaluated drug treatments or other non-surgical strategies to improve perfusion or outcome in diabetic patients with foot ulcers [8,9-12]. These drugs are considered in combination with vascular surgery, when vascular intervention is not possible or in a phase before vascular intervention is considered (on a risk-benefit ratio). Some of these studies are considered successful but have been hampered by substantial methodological considerations with regard to classification of patient population, selection and outcome parameters.

NEED FOR IMPROVED UNDERSTANDING OF NEUROISCHAEMIA

Initially the term 'microangiopathy' was used to describe an obstruction of vessels in the diabetic foot that meant the patient was considered unsuitable for vascular mechanical intervention. However, research has revealed that microangiopathy in diabetes, as well as in vascular disease, is not simply focused on occlusive disease [7]. The presence of capillary leakage, haemorheological disturbances, hormonal activity in the vessel and inflammation in the wall all indicate that decreased perfusion in the diabetic foot is more complex [7].

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BROADER CLASSIFICATION REQUIRED TO OPTIMISE CARE

In large cohort studies of patients with diabetes and foot ulcers the outcome has been measured with regard to the possibility of primary healing (healing without amputation) or of avoiding major amputation at or above the ankle [2,13]. In many studies of diabetic patients, usually about 10 to 15% (and sometimes as many as 30%) of patients not considered suitable for vascular surgery have been shown to heal without amputation or without a major amputation [2, 4].

Studies with regard to vascular intervention, on the other hand, have focused on 'limb salvage' and graft survival [6,8,14-17], indicating a need to introduce and recognise decreased perfusion or impaired circulation as an indicator for intervention in the diabetic foot to achieve healing and maintain healing and to avoid or delay a future amputation [1,2,5,13,18-20].
A new classification system is needed that recognises the various degrees of disturbed perfusion to better match appropriate treatment to individual patients – whether that be reconstructive, endovascular or pharmacological – alone or in combination.

FUTURE FOCUS

These findings indicate a need for the recognition that a new approach and classification in neuroischaemic diabetic individuals is required, both with regard to clinical practice and science/research. New strategies must be developed and implemented for patients with a diabetic foot with decreased perfusion to improve healing, healing rate and to avoid amputation, irrespective of the intervention technology chosen. Clinicians must also recognise that a diagnosis of neuroischaemia is not only based on the presence of obstructive vascular disease.

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References


