The 'ABC' approach to preventing diabetic foot problems

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ARTICLE POINTS

1 Diabetes-related foot ulcers are common and have high associated mortality.

2 Peripheral neuropathy and peripheral vascular disease contributes to diabetic foot complications.

3 A multidisciplinary approach is the key issue for quality care.

4 Regular screening, glycaemic control and blood pressure control should be optimal.

5 Appropriate footwear and risk factor control can reduce foot complications in diabetes.

KEY WORDS
- **Foot ulcer**
- **Lower extremity amputation**
- **Mnemonic tool**
- **Foot complications**

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Introduction

Diabetes-related foot complications are the main cause of non-traumatic lower limb amputation (Dang and Boulton, 2003). A simple, logical approach can reduce the incidence of diabetes-related foot ulcers and amputations (Malone et al, 1989). Careful assessment, monitoring, control of risk factors and identification of the at-risk foot are important. In this article, the authors describe a simple strategy aimed at reducing the incidence of diabetes-related foot ulcers and amputations. This mnemonic tool is intended as a simple set of guidelines for professionals working in the assessment and management of the diabetic foot.

The provision of optimal foot care is of paramount importance in avoiding catastrophic foot complications from diabetes. According to Calle-Pascual et al (2001), a thirteen-fold reduction in the incidence of foot-related complications of diabetes could be achieved through the provision of optimum foot care.

The diabetes team at the George Eliot Hosptial in Nuneaton has previously published a mnemonic template (the 'Alphabet Strategy') for providing comprehensive diabetes care (Patel and Morissey, 2002). An audit (Lee et al, 2003) showed that use of the Alphabet Strategy resulted in better outcomes in terms of optimal systolic and diastolic blood pressures, eye and foot examination frequency, appropriate use of 'guardian' drugs (e.g. aspirin, angiotensin-converting enzyme [ACE] inhibitors, statins) and coronary heart disease risk scores. The strategy is easily adapted and applicable in primary care and secondary care as well as for healthcare providers in the community. It can also be used as an educational tool.

As a subset of the recommendations set out in the template, the authors present a simple yet effective 'ABC' approach to identify, prevent and minimise the risk of diabetic foot-related complications – mainly amputations.

The ABC approach was designed to provide a simple set of guidelines for professionals working in assessment, treatment and management of the diabetic foot.

The 'ABC' approach

'A' is for assessment, advice and access

Assessment

In people with diabetes, the lifetime risk of developing a foot ulcer is as high as 15% (Boulton, 2004). Lavery et al (1998) demonstrated that the risk of foot ulceration is higher in males and in patients with poor glycaemic control, with diabetes of 10 years or more, with the presence of deformity or prior amputation or with subjective evidence of peripheral neuropathy. Assessment is important in the detection of early neuropathy and ischaemia. Moulik et al (2003) reported the presence of peripheral neuropathy in 61% of patients presenting to the foot clinic for the first time with a foot ulcer.

Identifying the at-risk foot early is important. The presence of sensory loss (e.g. as assessed with a 10g monofilament), ischaemia (as identified by absent pulses and reduced ankle brachial pressure index), deformity, callus, joint instability or oedema should all be assessed as they help in identifying the at-risk foot (Reiber et al, 1999).

The risk of ulcer formation is high in those patients with a history of foot ulceration (Lavery et al, 1998). In addition, Pecoraro et al (1990) demonstrated that in more than 80% of cases, amputation was preceded by foot ulceration. Therefore, interventions to

reduce the risk of ulceration are important. Both the use of orthotic devices (Colagiuri et al, 1995) and pressure relief (Lavery et al, 1996) have been shown to reduce the risk of foot ulceration.

All diabetes patients should have regular foot assessment as part of their diabetic foot programme (Peters et al, 2001), which should include complete neurovascular assessment.

Advice

Advice is important to the prevention of diabetic foot complications. For example, advice on re-vascularisation should be sought from vascular surgeons by podiatrists/chiropodists when dealing with ischaemic limbs and/or ulcers. Furthermore, all people with diabetes should be given advice on appropriate foot care, daily foot inspection and avoidance of trauma. Advice on smoking cessation also should be given and reinforced at every opportunity.

Access

All diabetes patients should have access to a trained podiatrist/chiropodist.

'B' is for blood pressure

The United Kingdom Prospective Diabetes Study (UKPDS; UKPDS Group, 1998) showed that diabetes-related microvascular and macrovascular complications are reduced when tight blood pressure control is achieved. Blood pressure targets should therefore be strictly followed in people with diabetes.

'C' is for control of infection

The presence of infection delays ulcer healing (Pecoraro et al, 1990). In a study by Armstrong et al (1998), patients with wound infection were at higher risk of amputation than people with non-infected foot ulcers. In the authors' opinion, the presence of infection should be diligently searched for in non-healing or recurrent foot ulcers. Aggressive and appropriate antibiotic therapy should therefore be instituted in those people with infected ulcers (Lipsky, 2004).

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Table 1. ABC approach tick-box proforma used in Nuneaton

A: Advice, assessment, access	
Foot inspection	❑
Smoking cessation	❑
Assessment	❑
Need for re-vascularisation	❑
Access to podiatrist/chiropodist	❑
B: Blood pressure optimal	❑
C: Control of infection	❑
D: Debridement, dressings	
Debridement	❑
Dressings	❑
E: Education	❑
F: Footwear, Fluid retention	
Footwear needed (specify type)	❑
Fluid retention	❑
G: Guardian drugs	
Asprin	❑
ACE inhibitor	❑
Blood pressure lowering	❑
Lipid lowering	❑
H: Complete	❑

'D' is for debridement and dressings

Debridement

Adequate debridement has shown improved healing in diabetic foot ulcers (Steed et al, 1996; Jeffcoate et al, 2004). Regular wound inspection and debridement cleanses the wound surface; removes dead tissue, callus, bone and pathogenic bacteria; drains pus; and promotes healing.

Callus formation is a consequence of chronic continued foot pressure and leads to ulcer formation (Boulton, 2004). Debridement in ischaemic or neuroischaemic ulcers should be limited to removal of slough/pus.

Dressings

Dressings maintain the moist wound environment, help avoid trauma and minimise the risk of infection. Specially formulated dressings may absorb exudates and maintain hydration status in the wound. Many types of dressings are available, such as non-adhesive paraffin-impregnated and allogenic skin substitutes (e.g. Dermagraft [Smith and Nephew, Hull], Graftskin [Novartis, Camberley], Regranex [Janssen-Cilag, High Wycombe]). Specialist advice should be sought from a podiatrist/chiropodist in choosing the most suitable dressing.

'E' is for education

People with diabetes need education, re-education and reinforced education. Faglia et al (2001) demonstrated a reduction in new ulceration/amputation in people with diabetes that were given intensive education. In the authors' opinion, education should be an ongoing process and addressed at each clinic visit. Every opportunity should be taken to remember this aspect of care. Stress should be placed on daily inspection of the feet. Patients should be educated to contact the foot care team early.

Similarly, health professionals should be educated to recognise early warning signs and urgent action should be taken when problems are detected.

'F' is for footwear and fluid retention

Footwear

Skin breaks when circulation is compromised by pressure. In the presence of neuropathy, this process can remain unnoticed until an ulcer develops. Pressure relief, therefore, forms an integral part of optimal foot care. Pressure reduction and/or off-loading is central to foot ulcer healing (Armstrong and Lavery, 1998; Boulton, 2004).

When deformity is present (e.g. hammer toes, prominent metatarsal heads, bunions), correct footwear (e.g. wide-fitting shoes) can prevent an ulcer from appearing. People with Charcot foot need specially moulded shoes to avoid repetitive trauma. Methods of off-loading include bed rest, total contact casting, removable walking casts, surgical shoes, felted foam dressings and half-shoes. Total contact casting is considered the 'gold standard' modality for off-loading (Lavery et al, 1996).

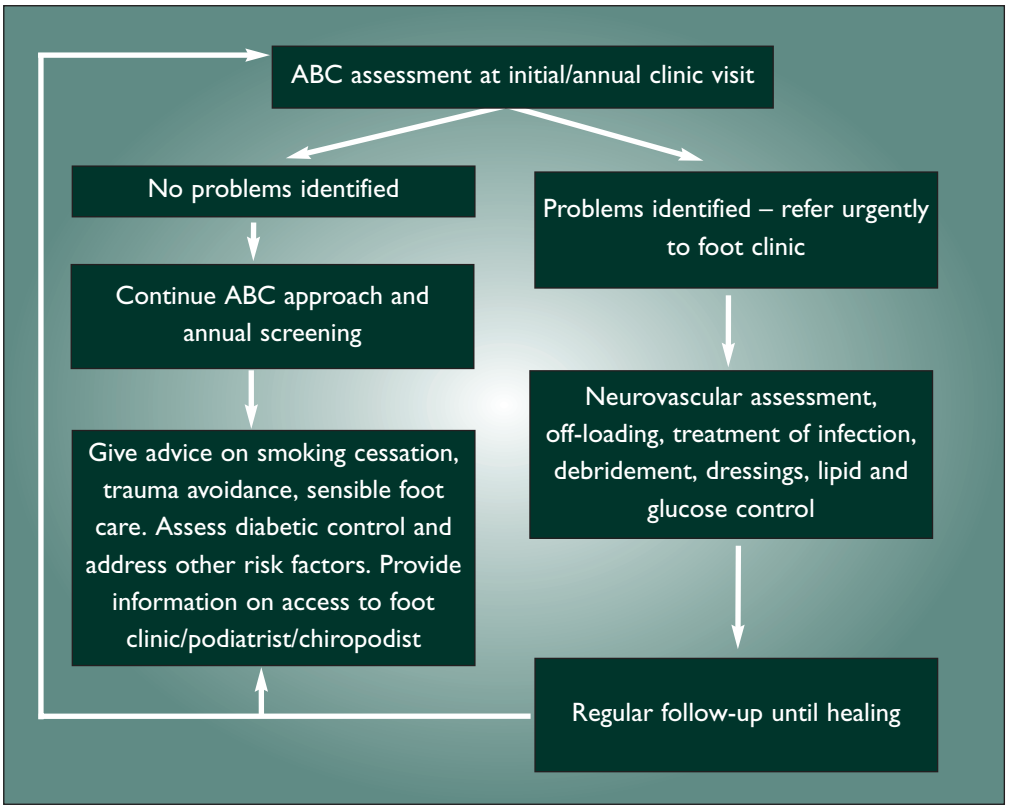

Figure 1. Use of the ABC approach in Nuneaton. The authors suggest this protocol could also be useful in other areas.

Fluid retention

Fluid retention in lower extremities can cause fluid-filled blisters that rupture to leave a raw surface. Unrecognised raw surfaces could emerge as a nasty ulcer. Fluid retention in the lower limb should therefore be minimised by, for example, simple elevation of foot, judicious use of diuretics, treatment of heart failure, and TED (thromboembolic deterrent) stockings (American Diabetes Association [ADA], 1999).

'G' is for 'guardian' drugs

'Guardian' drugs is the authors' term for the specific drugs that are used in treatment of the metabolic syndrome. Examples are lipid-lowering therapies, anti-platelet agents and ACE inhibitors. These therapeutic agents should be properly initiated and doses titrated to achieve specific targets (e.g. blood pressure and cholesterol targets).

The quest for ideal glycaemic control should not be forgotten and every effort should be made to obtain an HbA_{1c} level of 7% or less in people with diabetes (ADA, 2004). This should be a continued process by use of drugs, diet and exercise.

Diabetes UK currently recommends aspirin use in people with diabetes who are over 30 years of age and have additional risk factors (e.g. smoking, overweight, dyslipidaemia; Diabetes UK, 2001). In addition, current recommendations from the ADA are to use low-dose aspirin as a primary prevention strategy in people with type 2 diabetes who are above 40 years of age or who are at high risk of cardiovascular disease. Dosages as low as 75 mg/day are effective (Colwell and ADA, 2004).

Use of the strategy in practice

The ABC approach has been incorporated into the diabetes care pathways in the diabetes centre at Nuneaton. Each patient's clinic letters include the tool mnemonics and, during the patient's vist, the outpatient nurse and consultant physician ensure these are ticked. In this way, people who fail a parameter are easily identified and corrected – e.g. patients who are not taking aspirin when they should be or who are not meeting blood pressure targets.

The ABC strategy forms an initial assessment tool at the time of a patient's first clinic visit and is then used at annual review visits. It is for use by all healthcare professionals who provide ongoing care to people with

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2 The ABC strategy proforma is followed and ticked by the outpatient or diabetes specialist nurse in the diabetes clinic and by the chiropodist or podiatrist in the foot clinic.

3 Any unticked boxes are addressed in the clinic by the consultant physician.

4 In the authors' experience, use of the ABC strategy in this way has improved outcomes.

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1 The ABC strategy is a mnemonic approach that highlights the various aspects diabetic foot care.

2 Use of the mnemonic has made it simple to use effectively by all care providers.

3 The results of audits to examine the effects of the Alphabet Strategy for diabetes care in general (of which this ABC approach to diabetic foot care is one component) suggested improved outcomes in patient care.

diabetic foot problems. In Nuneaton, the podiatrist and chiropodist use the ABC protocol regularly. See *Table 1* for a proforma template used in the Nuneaton clinical setting.

The proforma is followed and ticked by the outpatient or diabetes specialist nurse in the diabetes clinic and by the chiropodist or podiatrist in the foot clinic. Any unticked boxes are addressed in the clinic by the consultant physician. In this way, for example, anti-hypertensive therapy may be intensified, aspirin treatment initiated or the patient initiated on to insulin therapy if glycaemic control is sub-optimal.

In the authors' experience, use of the ABC strategy in this way (*Figure 1*) has improved outcomes in terms of:

- people with diabetes meeting blood pressure, lipid and glycaemic targets
- the early identification of people at high risk of foot ulceration or ulcer recurrence.

Conclusion: 'H' is for healing

The authors believe that if stress is placed on following points 'A' to 'G' in the care of diabetes patients then diabetic foot ulcers can be prevented, identified early when present and treated appropriately to be more effective for complete healing.

The ABC strategy is a mnemonic approach that highlights the various aspects of diabetic foot care. Use of the mnemonic has made it simple to use effectively by all care providers. The results of audits carried out in Nuneaton (e.g. Lee et al, 2003) to examine the effects of the Alphabet Strategy for diabetes care in general (of which this ABC approach to diabetic foot care is one component) suggested improved outcomes in patient care, including in relation to the diabetic foot. ■

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