Do we care about our diabetic patients’ feet?: Diabetic foot examination at the front-door

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INTRODUCTION

• Diabetes poses a growing health challenge to the UK; in 2011, 2.9 million people were living with diabetes.¹
• Diabetic foot complications (DFCs) account for the majority of diabetes-related hospital admissions². DFCs are a combination of a) peripheral neuropathy and b) peripheral vascular disease (PVD).³
• 20% of people with diabetes develop foot ulcers every year.⁴ Foot ulcers, left undetected and untreated, can lead to complications such as cellulitis, abscess formation and osteomyelitis.⁵
• DFCs also comprise the rare chronic deformity of Charcot’s neuropathofromatopathy.⁶
• Complication of toe ulcers can also lead to gangrene, necessitating amputation.⁷
• DFCs increase the financial burden on the NHS through outpatient costs, increased bed occupancy and prolonged stays in hospital⁸; a significant amount is spent on treating DFCs, particularly on lower limb amputations (LLAs).⁹
• LLAs are associated with an increased morbidity and mortality in people living with diabetes. PVD or neurological disease has to be found to account for 95% of cases of LLA.¹⁰
• In 1989, the St Vincent Declaration set out the aim of reducing LLAs in these patients by half.¹¹ In 1992, the Department of Health and Diabetes UK united to set up a taskforce to help meet this aim, yet almost a decade later, the problem persists in the UK with 0.5% of people with diabetes having a LLA annually.¹²
• It has been estimated that up to 85% of these LLAs may be avoided by simple measures, e.g., early detection of DFCs, timely intervention of a diabetic footcare team, good diabetes control and patient education.¹³
• NICE outlines the significance of adequate foot assessment upon a DFC admission in recent guidelines (CG119).¹⁴ We audited doctors’ practice against these guidelines with regards to foot assessment in a DFC-related acute admission at Queen Elizabeth Hospital Birmingham (QEHB).¹⁵
• We also noted Waterlow scoring done by nursing staff for the purposes of pressure risk assessment.¹⁶

METHODS

Audit standards
• Derived from NICE clinical guidelines: CG119 Diabetic foot problems: Inpatient management of diabetic foot problems.⁶
  1. Rates in examination and assessment of the foot at all and in any capacity in the first 24 hours (section 1.2)
  2. Areas of foot assessment
    • Peripheral neuropathy (section 1.2.11.1)
      Defined as assessment of any of: full neurological examination of the limb, sensation (any from: light touch, 10g monofilament, vibration/tuning fork, pinprick).
    • Limb ischaemia (sections 1.2.5, 11, 15, 38)
      Defined as assessment of any of: full peripheral vascular examination, dorsalis pedis pulse, posterior tibial pulse, capillary refill time, skin colour and temperature.
    • Ulceration (sections 1.2.11, 15, 38)
    • Inflammation/Infestation (sections 1.2.11.15)
    • Deformity, including Charcot’s arthropathy (sections 1.2.11, 12)

INCLUSION CRITERIA

From International Classification of Disease 10 (ICD-10).¹⁰
• Patients with diabetes who were identified by:
  o E10 – E14 (Any) Diabetes Mellitus
  o DFCs were defined by the following terms:
    o L03.0 Cellulitis of the toe
    o L03.1 Cellulitis of other parts of the limb (specifically the foot)
    o M86 Osteomyelitis (of the toe/foot)

Data collection
• Patient population: patients with diabetes acutely admitted with DFC across 8 year period (2002 – 2010).
• Patients identified by hospital’s Informatics department.
• Data was obtained using paper case notes and the Prescribing Information and Communications System Software (PICS).
• See Figure 1 for patient inclusion and exclusion process.

RESULTS

Demographics
• Males: females, 67 : 33%
• Age range: 28 – 84 years (median = 60.43 years)
• Type 1 diabetes: Type 2 diabetes, 17.20 : 82.85%

Admission
• Median hospital stay length was 6 days (IQR= 9.25 days).

Foot Assessment
• 96.6% (n= 56) of patients had their feet examined in some form, but areas of foot assessment were poorly performed as shown below.

DISCUSSION

Peripheral Neuropathy & PVD
• People with long-term diabetes are more likely to develop sensory neuropathy, vasculopathy and severe ulcerative changes.¹¹ Foot screening in patients with diabetes has been shown to significantly reduce overall and major amputations when compared to non-screened patients.¹²
• Our audit illustrates the importance of early/adequate foot assessment in reducing DFCs.
• Peripheral neuropathy was assessed in 29.3% of patients, falling short of NICE recommendations. Rates of PVD assessment were slightly better at 43.1%.

Infection
• Foot ulceration in patients with diabetes have been shown to be neuropathic (39.4%), vascular (24.2%) or mixed (36.4%).¹³
• Assessment for ulceration and signs for inflammation/infestation was carried out in 79.3% and 96.6% of patients respectively. Use of an ulcer classification system has found that nature/severity of ulceration is significantly associated with healing.¹⁴ An ulcer classification system would prove clinically useful and influences management.
• There was no evidence of use of an ulcer classification system at QEH.

Deformities
• Checking for deformities is clinically important as they are a DFC and predictive of ulceration.¹⁵ Audit results show deformity was checked for only 5.2% of patients.
• It is not unreasonable to assume that with foot assessment being carried out in 96.6% of patients, deformity may not have been documented if absent.

Waterlow Scoring
• Waterlow scores were recorded in only 34.5% of patients; this is a potential area for improvement as patients with diabetic neuropathy are at a high risk of the development of pressure ulcers of the heel region.¹⁶
• It is clear that NICE recommendations of thorough foot assessment are a part of the drive to halt the sequelae of development of DFCs.

LIMITATIONS

• Small patient population
  o Alternative coding terms used for admission
  o Limited CD0 search used
  o Patients excluded for various reasons (see Figure 1)
  o 39% of included notes were in hospital circualtion

RECOMMENDATIONS

• A complete assessment of peripheral neuropathy, limb ischaemia, ulceration and deformity (including Charcot’s arthropathy) should be performed in all patients presenting with a DFC.
• Waterlow score assessments must be performed by nursing staff in all patients, particularly those presenting with a DFC.
• All examinations performed, including significant positive and negative findings, must be accurately documented.