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Predictive Factors and outcomes of Diabetic Foot Ulcers

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Infected diabetic foot ulcers are a major cause of morbidity and mortality in patients with diabetes. Despite this, the diagnosis of infection is problematic with ambiguity regarding the presence of infection often an issue. We therefore undertook a study to identify factors which may predict infection and therefore, poor outcomes. Patients were selected at random from a cohort of patients attending a specialist foot clinic at Tameside General Hospital. Demographics, foot temperatures, ulcer characteristics, blood results (inflammatory markers and HbA1c) and outcome data were recorded. Outcome was assessed as healing at three months. Temperature was recorded at the centre of the ulcer and 2cms away; and on the opposite foot and the difference was calculated. Swabs were performed in 12 patients. Antibiotic usage was according to clinic protocol. Thirty consecutive patients attending the diabetic foot clinic were selected [Mean age 71 (range 51-94) years, 23 males, 27 with type 2 diabetes]. The majority of ulcers (n=19) were on the toes. Using pre-defined clinical criteria patients were classified as infected (n=17) or non-infected (n=13). Amputation was performed in only one patient and seven patients were diagnosed with osteomyelitis. Inflammatory markers including white cell count, C-reactive protein, fibrinogen and HbA1c were not predictive of outcome. However, erythrocyte sedimentation rate, was higher in those patients whose ulcer healed within 3 months ($p=0.02$). The following variables were not found to be good predictors of outcome (healed or not healed at 3 months); presence of pus, presence of slough, pain, erythema and induration. A clinical score based upon the predefined criteria was calculated dependant upon these variables and was not predictive of outcome (chi squared test). Temperature in the centre, and 2cm away from the ulcer and the opposite foot had a mean of $29.9 \pm 3.0^{\circ}\text{C}$, $30.8 \pm 2.8^{\circ}\text{C}$ and $27.4 \pm 2.6^{\circ}\text{C}$, respectively; $p < 0.001$ for ulcerated versus non-ulcerated foot. Those patients with osteomyelitis confirmed on x-ray had no difference in outcome compared with those without osteomyelitis. Similarly, those patients with MRSA confirmed by swab, had no difference in outcome when compared with those without. Within three months, 15 ulcers healed and 10 remained un-healed and no difference was noted in temperature and inflammatory markers between these two groups. In conclusion, foot ulcer temperature and clinical score does not appear to be a good predictor of outcome following diabetic foot ulcer although the population size was small.