OBSERVATIONS

Prevalence of Calcification in the Pedal Arteries in Diabetes Complicated by Foot Disease

Medial arterial calcification (MAC) typically affects the distal vasculature, probably because of a causative relationship with peripheral and autonomic neuropathies. The complex processes involved have recently been reviewed (1). Classic surveys reported that MAC was particularly common in Charcot disease (2,3), suggesting that it might be a specific feature of the condition. However, it is equally possible that it may represent a less specific response to local inflammation. The aim of the present study was to determine the prevalence of MAC in patients with Charcot disease as well as other disorders of the foot such as osteomyelitis and uncomplicated foot ulcers.

Cases were identified from a clinic database, for which ethical approval is not required when used for audit purposes. The population comprised all those attending a specialist service for diabetic foot disease from 2002 to 2005 whose X-rays remained on file. X-rays taken prior to 2002 were destroyed, and the electronic Picture Archiving and Communications System was introduced in 2005. The presence of calcification in the most recent set of dorsal-plantar images from each individual was determined independently by three observers (A.S., B.E.S., and K.J.F.). Demographic and clinical details were taken from the database and the hospital electronic information system, with the diagnoses being confirmed by two specialists in diabetic foot disease (F.L.G. and W.J.J.). Analysis was undertaken using the Statistical Package for Social Sciences (SPSS) version 14. Reliability scores were determined using Cronbach α. Data were compared using nonpaired *t* tests, two-tailed Fisher exact test, or Pearson χ^2 tests; forward stepwise binary logistic regression analysis was performed using Hosmer-Lemeshow goodness-of-fit test.

Of 122 (16.4% type 1) subjects, 34 (23 male and 11 female subjects) had acute Charcot disease, 53 (33 male and 20 female subjects) had osteomyelitis, and 35 (18 male and 17 female subjects) had an uncomplicated foot ulcer. There was no difference between groups in sex, age, diabetes duration, prevalence of neuropathy, and renal dysfunction. Inter-rater reliability and intra-reliability (undertaken by A.S. on 20 cases) scores were both good: Cronbach α 0.951 ($P < 0.001$, 95% CI 0.933–0.964) and 0.985 ($P < 0.001$, 95% CI 0.963–0.994), respectively. Calcification was detected in 72 (59.0%) cases, with no difference ($P = 0.38$) between groups: Charcot in 18 (52.9%), osteomyelitis in 35 (66.0%), and uncomplicated ulcer in 19 (54.3%). The only factor independently associated with calcification was duration of known diabetes ($P = 0.004$).

The prevalence of MAC in Charcot disease was lower than in classic case series (2,3). This may relate to the diagnosis of Charcot disease being made at an earlier stage: the independent relationship between diabetes duration and MAC demonstrated in this study confirms the observation of Young et al. (4). Although 91% of the population had signs of neuropathy, the prevalence of MAC was higher than the 40% previously reported in neuropathy alone (5). This finding is compatible with current understanding that MAC is especially likely in those with diabetes, neuropathy, and metabolic factors, as well as a source of local inflammation (1). Young et al. (4) also noted that MAC was more common in those with previous foot disease. The present data indicate that the nature of the underlying foot disease does not appear to be important.

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