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Peripheral Neuropathy, End Organ Microvascular Disease and Immobility as Predictors of Low Impact Calcaneal Fractures in Poorly Controlled Diabetes

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Background: We present a case series of 3 patients with poorly controlled diabetes and end organ microvascular disease presenting with traction type fragility fractures of their calcaneum after a period of immobility. These fractures are unusual because calcaneal fractures are usually compressive in nature.

Case 1: A 52-year-old woman with a 27 year history of poorly controlled type 1 diabetes. She was known to have autonomic neuropathy, renal impairment, bilateral laser treated proliferative retinopathy, and dense peripheral neuropathy. She had been treated with a total contact plaster cast for a neuropathic ulcer on the plantar aspect of her left 3rd MTPJ for three months. One week after removal of her cast she presented with a very red, hot swollen leg and foot with a 3.5˚C temperature difference. A DVT was excluded, but an ankle radiograph showed she had a traction type fracture of her left calcaneum (Figure 1). Unfortunately she then had left sided bi-malleolar ankle fracture which was internally fixed. Her leg was again immobilised. However, on resumption of mobilisation after treatment of her left side she suffered a similar traction type fracture of her right calcaneum (Figure 2).

Figure 1

Figure 2

Case 2: A 42-year-old man with a 26 year history of poorly controlled type 1 diabetes. He had previously had laser treated proliferative retinopathy and a simultaneous kidney / pancreas transplant. During that admission, he developed bilateral heel ulcers, a femoral nerve palsy and also fractured his left tibia and fibula. He was placed in a total contact cast to treat his ulcers. His heels healed after 4 months but 1 week after coming out of the casts, he complained of a swollen foot. X-ray showed a traction type fracture of his right calcaneum (Figure 3).

Case 3: A 64-year-old man with a 50 year history of type 1 diabetes. He was known to have a dense peripheral neuropathy. He had been laying some paving slabs and fractured his left calcaneum after some minor trauma (Figure 4). 8 years later he had surgical debridement of a right 1st MPJ ulcer. He went home and, interpreting his instructions literally, kept off his feet for 4 months. Once his wound had healed, he began gently mobilising. He presented a week later with foot pain. An X-ray showed a similar traction type fracture of his right calcaneum (Figure 5)

Figure 4

Figure 5

Figure 3

Discussion: Two of the patients described had suffered bilateral calcaneal fractures suggesting that patients with poorly controlled or long standing diabetes who have evidence of end organ microvascular damage are at risk of developing fragility traction type fractures of their calcaneum, particularly after a period of immobility. We suggest, that in such individuals, a protected graded increase in activity may prevent such fractures. Further studies need to be done to determine the optimal approach for this.

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