A compartment syndrome is defined as an elevation of the interstitial pressure in a closed osteofascial compartment causing microvascular compromise. The common causes include trauma, arterial injury, limb compression and burns. Rarely, it can also occur spontaneously in association with type-I diabetes mellitus,\(^1\) \(^2\) hypothyroidism,\(^3\) influenza-virus-induced myositis,\(^4\) leukaemic infiltration,\(^5\) the nephrotic syndrome,\(^6\) a ruptured aneurysm,\(^7\) anticoagulation\(^8\) and a ganglion cyst.\(^9\) Four cases of spontaneous compartment syndrome in diabetics have been described previously and many theories regarding the aetiology have been advanced, including metabolic changes giving rise to increased fluid pressure in the osteofascial compartment, vascular occlusion and muscle necrosis.

Case report

A 47-year-old man of Asian origin developed pain in the anterolateral aspect of the left leg after a brief walk. It was moderate in intensity but was not relieved by rest. He had suffered from type-I diabetes mellitus, well controlled on insulin, for almost 20 years. He also had hypertension and was undergoing laser treatment for diabetic retinopathy.

He attended the Emergency Department with a localised red, tender area over the upper lateral aspect of the left leg below the knee. No definite diagnosis was made and he was given analgesics and discharged. The pain was not relieved and he was prescribed stronger analgesics by his general practitioner. The pain increased in intensity over the next four days and he developed foot drop. He was seen again and referred for an orthopaedic opinion.

There was swelling, redness and tenderness over the anterolateral aspect of the left leg. He had normal sensation but was unable to dorsiflex his foot. Both the dorsalis pedis and posterior tibial pulses were present. The differential diagnoses were an intrafascial bleed, infection, spontaneous muscle necrosis or a compartment syndrome.

Haematological investigation revealed a mild leucocytosis (12.8 x 10^9/l). Biochemical analysis was normal except that the level of creatine kinase was increased to 4178 U/l, raising the suspicion of muscle necrosis and a compartment syndrome. Decompression of the anterior and lateral compartments was carried out. The muscles were found to bulge beneath the deep fascia and the compartmental pressure was raised. Both the dorsalis pedis and posterior tibial pulses were present. The differential diagnoses were an intrafascial bleed, infection, spontaneous muscle necrosis or a compartment syndrome.

Histological examination of the excised specimen showed areas of devitalised skeletal muscle without evidence of inflammation. There were some viable atrophic muscle fibres (Fig. 1) with blood vessels showing thrombus and recanalisation (Fig. 2).

References

He was reviewed in the Outpatient Clinic after two weeks when his wound had healed. There has been no improvement in the foot drop. He continues to attend for physiotherapy and a tendon transfer is being considered.

**Discussion**

Spontaneous compartment syndrome has been reported in influenzal myositis, hypothyroidism, leukaemic infiltration, nephrotic syndrome, vascular anomalies, anticoagulant therapy and cystic lesions. There have been four other case reports of spontaneous compartment syndrome in diabetes mellitus.

In 1997 Chautems et al described a similar case when the patient was operated on within eight hours of the onset of symptoms. He suffered no neurological deficit. Smith and Laing reported a case of bilateral compartment syndrome in a diabetic patient who presented to the Emergency Department after four days. He was found to have muscle necrosis, a bilateral sensory deficit in the distribution of the deep peroneal nerve, and a foot drop. The delay in the diagnosis of compartment syndrome in our patient may be excused by its atypical presentation. Initially, he had localised swelling and only moderate pain. Absence of pain has been reported previously by Ciacci et al, who suggested a possible neurapraxic block of the deep peroneal nerve as an explanation.

There are two conflicting views regarding the development of spontaneous compartment syndrome in diabetics. One suggests that metabolic disturbances cause osmotic accumulation of fluid in the muscle which may be the primary event leading to increased pressure. The muscle necrosis develops as a result of the ischaemia. The other view is that spontaneous muscle infarction, because of microvascular blockage, is the primary event and that compartmental pressures rise subsequent to that. We prefer the latter explanation since our patient had a localised swelling initially and the symptoms progressed over several days. The histopathology of the excised muscle showed thrombi in the small blood vessels with attempts at recanalisation (Fig. 2). A relevant coincidence is that our patient, and two other reported patients, had diabetic retinopathy which suggests coexisting microvascular disease. There have been other recorded cases of spontaneous muscle infarction in diabetics. They are common in type-I diabetes and are strongly associated with other microvascular complications such as neuropathy, retinopathy and nephropathy. The usual presentation has been a swelling in the muscles of the thigh and the treatment has...
mostly been conservative.\textsuperscript{16,17} Since the compartment in the calf is smaller and tighter, swelling within it can easily result in a compartment syndrome. Early surgery is more likely to be curative.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References