tuberculous lesion in the greater trochanter, and metastasized to the greater trochanter due to increased vascularization.

In countries such as Spain, where the incidence of tuberculosis is still high (Mallolas and Soriano 1988), this clinical possibility should be borne in mind when making a differential diagnosis of any lung lesion. It is imperative that the diagnosis of suspected tuberculosis be demonstrated both bacteriologically and histologically, in view of the possible involvement of other nosological entities, including tumors, which may otherwise escape diagnosis.

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Methadone-induced fibrous and calcified myopathy—a report of 2 cases

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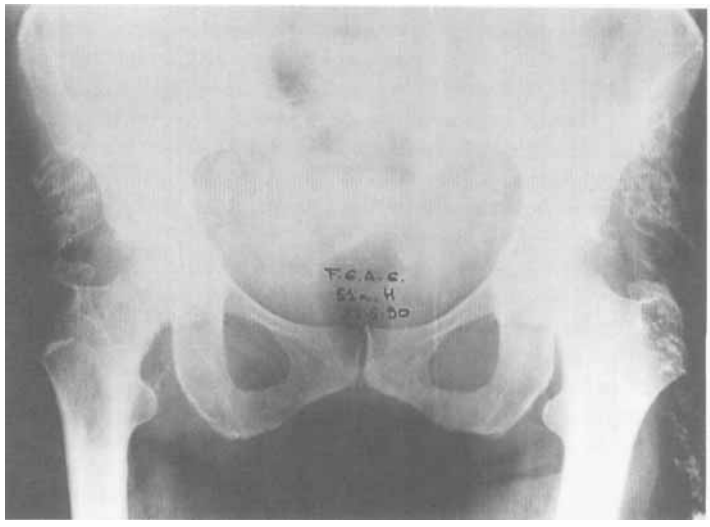
Case 1

A 62-year-old woman was admitted to a psychiatric unit suffering from methadone addiction and severe depression. She had injected 1 ampoule (10 mg) of methadone into the gluteal muscles, 3 times a day for at least the last 20 years. The patient was referred to us from the psychiatric unit with acute sciatic pain in the left leg. Clinical examination revealed substantial subcutaneous fibrosis and a woody induration in both skin and buttocks. Mobility of both hip joints was significantly reduced, especially flexion and adduction, so that sitting was virtually impossible. The patient complained of pain and loss of strength throughout the areas supplied by the sciatic nerve, with considerably reduced superficial and deep sensitivity along the anterior aspect of the thigh, and from the knee downwards (areas L4, L5, S1). Needle electromyography of the right lower limb revealed increased duration of the mean motor unit potentials and increased polyphasic potentials in the gluteus maximus, tibialis anterior and gemellus muscles. Laboratory studies (lactic dehydrogenase, creatine kinase, alkaline phosphatase, calcium, urea, proteinogram, creatinine, cholinesterase, triglycerides, sodium, potassium, hematocrit, platelets and ESR) showed normal values. Cholesterol, glucose and alanine aminotransferase levels were slightly increased. Radiography revealed calcification of both gluteal muscles (Figure). CT of the lumbar spine was normal. The sciatic nerve was surgically released by excision of surrounding fibrous tissue and calcified deposits. Histopathological analysis revealed a decreased muscle fiber density, together

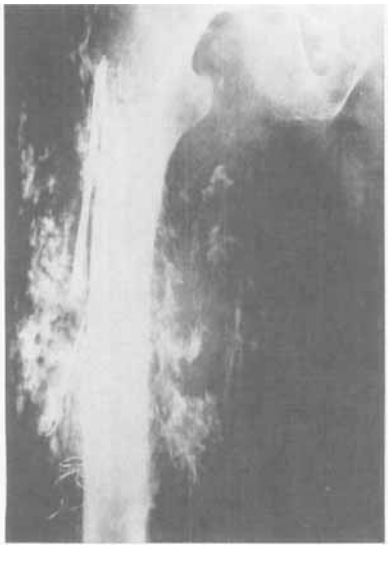


Case 1. Calcification of the left gluteal muscle and part of the left vastus lateralis.

with heterotopic calcification and fibrosis. 4 years later, the pain had largely abated, although some numbness was still reported, and there was no improvement in limb movements. Electromyographic findings remained much the same.

Case 2

A 60-year-old man was referred to us by the internal medicine unit with several pus-producing fistulas in the left thigh; femoral osteomyelitis was initially suspected. He had almost complete stiffness in both hips and the shoulders. These areas were hard to palpation, and the skin had a fibrotic appearance. The patient reported that he had in the past 30 years, following surgery, injected 1 ampoule (10 mg) of methadone every 6 hours in m. quadriceps. No injections had been given in the shoulders. There was almost complete loss of mobility in all 4 limbs, resembling the stiff-man syndrome; the patient had spent the last 10 years in the supine position. Radiography of both lower limbs (Figure) showed diffuse calcification of the hip adductor muscles and of the quadriceps muscle without hip arthrosis, together with minor calcification of both deltoid muscles. Laboratory values were largely normal, except for a slight increases in the levels of aspartate aminotransferase (AST), glucose, alkaline phosphatase, uric acid and ESR. Bacteriological samples revealed the presence of *Staphylococcus aureus*, and fistulography showed a focal infection in the calcified vastus lateralis muscle. The patient was treated with cloxacillin, debridement and extirpation of infected tissue; the infection resolved in 1 month. Methadone administration was changed to oral, and the patient was referred for physical therapy; no improvement in limb movement occurred.



Case 2. Extensive calcification of soft tissue in left thigh, affecting part of m. quadriceps and adductor musculature.

Neither case showed evidence of cranioencephalic injury or any other neurological disorder which might account for the myositis ossificans.

Discussion

The appearance of muscle fibrosis following prolonged intramuscular administration of narcotics such as pentazocine (Oh et al. 1975, Genth 1979, Rousseau et al. 1979, Roberson and Dimon 1983, De Schepper and Degryse 1990), meperidine (Aberfeld et al. 1968, Mastaglia et al. 1971, Genth 1979) and, to

a lesser extent, hydromorphine hydrochloride (Mastaglia and Argov 1981) and butorphanol (Wagner and Cohen 1991) is well known. However, there are no reports of muscle damage secondary to methadone abuse, nor of heterotopic calcification secondary to injection of narcotics. The cause of fibrosis is not clear. Repeated needle trauma seems unlikely (Mastaglia and Argov 1981, Brumback et al. 1982, Von Kempf et al. 1989, De Schepper and Degryse 1990). Some authors (Oh et al. 1975, Von Kempf et al. 1989) have suggested a toxic effect; these drugs have an acid pH and precipitate in the alkaline environment of the extracellular medium, which may lead to a foreign-body reaction. Bleeding and low-grade infection may contribute (Mastaglia et al. 1971). In the particular case of methadone, rhabdomyolysis may also occur (Genth 1979). Some authors have pointed to a more generalized myotoxic effect, reporting several cases of symmetrical contracture in all 4 limbs, unrelated to the muscle injected, and even cases secondary to prolonged oral administration of pentazocine (Roberson and Dimon 1983).

In our cases, fibrosis may have been triggered by the same mechanism, as with other opiates, and the prolonged administration may have caused heterotopic bone formation in fibrotic areas. The fibrosis could not exclusively be caused by the local injection trauma, since in the second case the patient developed fibrosis in both shoulders, which had never received any injections.

Compression of the sciatic nerve as a result of muscular fibrosis has been described in pentazocine addicts (Rousseau et al. 1979), in whom—as in our case—nerve release and neurolysis diminished the symptoms.

Most physicians are unfamiliar with muscle alterations secondary to narcotics administration and the condition may be confused with other muscle disorders, such as end-stage inflammatory myopathy, infiltrate myopathy, eosinophilic fascitis, stiff-man syndrome and myositis ossificans. Oral administration of methadone is preferable, since the pharmacological effect is similar and there are fewer side-effects—indeed, none affecting the locomotor apparatus.

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