A particular difference from European communities is that we have the distinct impression that stress is not an important factor here—we rarely see the hypertensive with "executive stress," so frequently encountered elsewhere. It has always been difficult to explain the apparent hypotensive effect of propranolol on pharmacological grounds, and it could be that the mild tranquillizing effect attributed to it is responsible. Such an effect might have little action on the blood pressures of Jamaicans; it is noteworthy that we scarcely ever use phenobarbitone as a hypotensive here.

We do not think that there is any justification for using propranolol as a hypotensive agent at the present time, but there is an obvious and immediate need for a properly controlled trial in European patients, preferably for a longer period than that of our own trial.

Summary

Eighteen hypertensive Jamaicans underwent a double-blind cross-over trial of propranolol in order to prove or disprove the assertion that the drug is a relatively potent hypotensive agent.

Though the dosage used was high there was no significant difference in effect between the drug and an inert placebo. It is suggested that this may have been so because the "tranquillizing" effect of the drug is unlikely to be of value in Jamaican hypertensive patients.

We stress that our conclusions do not necessarily apply to European patients, in whom a properly controlled trial is urgently needed, preferably for longer periods of therapy to exclude any possible "carry-over" effect.

Propranolol in high dosage is remarkably free from side-effects when given to carefully selected patients.

We should like to express our thanks to Imperial Chemical Industries, Ltd., and in particular to Mr. Timothy Wortman, for assistance and for the supply of placebo tablets and of propranolol (Inderal). Our thanks also go to our patients; to the Jamaican Ministry of Health for permission to publish this paper; to Staff Nurses Tulloch, Samuels, Brown, and Distant, of the Kingston Public Hospital; and to Miss Ruth Bell, of the M.R.C., for statistical advice.

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Medical Memoranda

Double Charcot's Disease

Brit. med. J., 1968, 2, 603–604

Charcot's arthropathy (Charcot, 1868) is usually asymmetrical, with gross destruction, disorganization, and often dislocation (or subluxation) of a joint, associated with disproportionately mild discomfort, exuberant bony overgrowth, and synovial effusion.

Charcot and Marie (1886) in Paris, and Tooth (1886) independently in Cambridge, described a syndrome in which wasting and weakness started in the lower limbs, affecting predominantly the peronei, anterior tibials, and small muscles of the feet, and slowly spread proximally. The wasting stopped abruptly in a transverse line across the lower part of the thigh, giving the "inverted champagne bottle" appearance. Several years later weakness and wasting occurred in the hands and forearms. The onset of the disease was usually in early childhood or adolescence, and the condition was found to be hereditary in most cases.

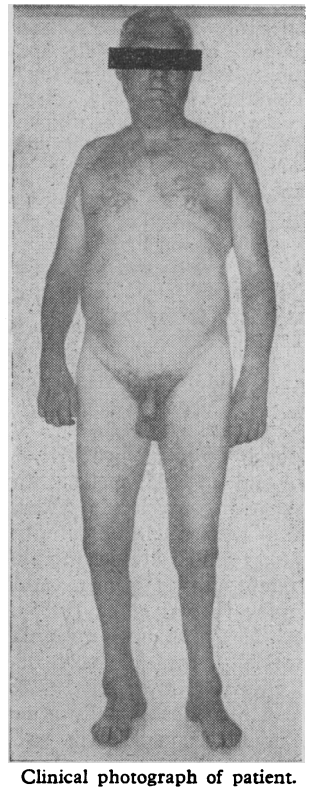
This paper provides the first report in the English literature of a case in which Charcot's arthropathy is attributable to Charcot–Marie–Tooth disease.

Case Report

A 58-year-old male caretaker had suffered from weakness of his feet since the age of 9 years and weakness of his hands which started two or three years later. He noticed numbness of his limbs a few years after the onset of the weakness. Both weakness and numbness had progressed steadily throughout his life, but more rapidly in the previous two years. Recently the ground had felt less solid when he walked and his gait had been unsteady.

At the age of 14 he fractured his right ankle, but subsequently had no joint symptoms until the age of 40, when his left ankle began to swell, and eight years later, when swelling started in his right ankle. The ankles ached a little after exercise but were never painful. A few weeks before he was seen at the Middlesex Hospital, in October 1966, he developed an ulcer on the sole of his left foot. There was no family history of neurological disorder.

On examination no abnormalities were found in the cranial nerves. In particular, the fundi were normal and there was no nystagmus. There was some wasting and weakness of all the small muscles of both hands and weakness without wasting of the long wrist and finger extensors. There was no intention tremor. Muscle tone was diminished. There was symmetrical wasting of the small foot muscles, calves, and, to a less extent, the lower third of the thighs (Fig. 1). Complete paralysis of the peronei was present on both sides, and almost complete paralysis of the anterior tibial muscles and the intrinsic muscles of both feet. Muscle tone was diminished. There was no abnormality of the trunk and limb girdle musculature and no ataxia in the heel–knee test. All tendon reflexes in the limbs were absent and plantar responses were flexor. Pain sensation was absent to pin-prick, and appreciation of light touch and temperature was reduced in a stocking distribution to the mid-calf. No pain was aroused by pinching the tendo Achillis. Vibration sense was diminished over the pelvis and absent at the knees, ankles, and toes. Joint position sense was severely impaired at the toes and to a lesser degree at the ankles. In the upper limbs sensation to light touch, pain, and temperature was reduced in a glove distribution to above the wrist. Vibration sense was absent in the fingers and



Clinical photograph of patient.

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wrists but present at the elbow, and joint position sense was reduced in the fingers.

Bilateral moderate pes cavus deformity was present. Movement of the ankle joints through their range was pain-free, though a coarse grating was audible. This movement was restricted in all planes by bony overgrowth of the internal and external malleoli (Figs. 1 and 2).

Recent x-ray films of ankle joints.

A tender indolent ulcer was found on the sole of the left foot with an area of cellulitis around it. There were no abnormalities in the abdomen or in the cardiovascular and respiratory systems.

Investigations.—The blood count was normal and the E.S.R. (Westergren) 11 mm. in one hour. Serum vitamin B_{12} was 139 $\mu\mu$g./ml., blood urea 30 mg./100 ml., and serum uric acid 3.7 mg./100 ml. Serological tests for syphilis were negative. Oral glucose tolerance was normal.

An electromyogram in 1957 (Gilliatt and Thomas, 1957) showed evidence of denervation in the muscles supplied by the median and ulnar nerves. Right ulnar nerve motor conduction velocity was grossly reduced (11 m./sec.). Stimulation of the lateral popliteal nerves produced no response in the peronei, anterior tibials, and extensores digitorum breves. On repeating the examination in 1967 the motor findings were similar. In addition, ascending action potentials were absent when recordings were made from the median and lateral popliteal nerves with the techniques of Gilliatt and Sears (1958) and Gilliatt, Goodman, and Willison (1961).

An x-ray examination in 1956 showed what were thought to be premature osteoarthritic changes at the ankle joints. However, recent radiographs of the ankles showed the classical appearances of Charcot's joints (Fig. 2) with deformity, bony hypertrophy, and exuberant osteophyte formation. There were also destructive changes—periarticular fractures and loose-body formation.

Comment

Neurogenic arthropathy is a well-known complication of tabes dorsalis, diabetic neuropathy, and syringomyelia. In childhood the commonest cause is meningomyelocele (Carr, 1956). More rarely, it has been noted in congenital insensitivity to pain (Mooney and Mankin, 1966), familial dysautonomia (Brunt, 1967), hereditary sensory neuropathy (Johnson and Spalding, 1964), peripheral nerve injury (Floyd *et al.*, 1959), the neuropathy of leprosy (Paterson, 1955), pernicious anaemia myelopathy (Halonen and Järvinen, 1948), multiple sclerosis (Rosenthal, 1965), and spinal-cord injury (Kettunen, 1957). A similar radiological picture has been seen occasionally after intra-articular corticosteroid injection (Alarcón-Segovia and Ward, 1965), but whether this is due to increased weight-bearing on a joint rendered pain-free, a direct effect of the injection, or an unrecognized joint infection introduced at the time of injection is not known.

The first case of neuroarthropathy in Charcot–Marie–Tooth disease was reported by Alajouanine and Boudin (1945), and a second case was added by Borsari and Jéquier (1966), again in the French literature.

The present case, though lacking a family history of peroneal muscular atrophy, has all the other clinical features of the condition. In this and in the two French cases mentioned above sensory manifestations were prominent. Though changes in the posterior roots are seen at necropsy in Charcot–Marie–Tooth disease (Alajouanine *et al.*, 1967), moderate or severe sensory loss is not often found clinically. It has, however, been described by Halliday and Whiting (1909), by England and Denny-Brown (1952), and by Charcot and Marie (1886) in their original paper.

The present patient had reduced motor nerve conduction velocities—usually seen in Charcot–Marie–Tooth disease (Dyck *et al.*, 1963), though normal velocities have been reported in some cases (Christie, 1960 ; Myrianthopoulos *et al.*, 1964). No ascending nerve action potentials could be recorded in the present case, a finding that is consistent with the clinical sensory loss, and confirms that this is due to a peripheral lesion.

The relative rarity of neuropathic joints in Charcot–Marie–Tooth disease confirms the assumption that sensory loss is an essential factor in the production of the arthropathy. Abnormal mobility of the ankle joints owing to paralysis of the leg and foot muscles is a relatively common finding in these patients, and it is clear that this alone is not sufficient to produce the Charcot joints.

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