mark and the brain tumour is perpendicular to the floor of the operating room; d) osmotic drugs that produce excessive cerebral dehydration should not be administered during the operation; c and d are carried out to avoid the brain moving with gravity. After the dura has been opened, the removal of the tumour is carried out with the help of an operating microscope. If the tumour is not visible at the cortical surface, it is necessary to confirm its position by accurately measuring the distance between the wound edges and the site of the corticotomy; this must be equal to the distance between the wound edges and the scalp mark. Furthermore, a careful evaluation of the relationship between the tumour and the near cortical sulci, shown both on high resolution CT scan and on the operating field, allows confirmation of the site for corticotomy. In some cases this evaluation permits removal of the tumour through a microsurgical trans-sulcal approach (fig.).

In the past few years the possibility of integrating the precision of stereotactic methods with new sophisticated instruments, has resulted in the successful treatment of small cerebral lesions. Unfortunately, these facilities are not available to most neurosurgeons, and small subcortical brain tumours can be easily removed by free-hand microsurgery even when located within or near critical cerebral areas. To do this it is necessary to know the exact location of the tumour. This is not a difficult problem when the lesion is in a cerebral area easily recognisable both on the CT slices and at operation (that is, the poles of cerebral lobes). When the tumour is located in other sites, especially in or near critical areas, the identification and removal of the tumour without risk of damaging healthy brain tissue can be very difficult. In these cases it is essential to localise the lesion as accurately as possible both on the scalp and on the cortical surface.

Many methods have been proposed to relate the data provided by the CT scan to the patient's scalp using bony landmarks or reference markers attached to the scalp. Other techniques have been described to locate the tumour, as seen on the CT slices, to skull radiographs. Nevertheless, all these methods are prone to error.

Our method has the following advantages:

- a) it is simple, safe, inexpensive and reliable in localising small subcortical brain tumours;
- b) the exact localisation of the tumour permits the smallest possible craniotomy and corticotomy to be performed. Apart from the necessity of exact tumour localisation on the scalp there is the need for careful surgical technique.
- Whilst our method is useful for removal of subcortical tumours, stereotactical procedure is the treatment of choice for deep-seated tumours.

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Mononeuropathy associated with hyperthyroidism

Thyrotoxic polyneuropathy has been reported by some authors, but mononeuropathy associated with hyperthyroidism has received little attention. We report two patients with thyrotoxicosis who presented with mono-neuropathies.

Case 1 was a 37 year old male cook who had a three month history of hyperthyroaidism and noticed distal weakness of his legs with gait disturbance and hypeaesthesia and dysaesthesia of his feet for two months. Before administration of thiamae, and dysaesthesia developed on the lateral aspect of his thighs. He had minimal diffuse weakness of the proximal muscles of the arms and legs including the shoulder and hip girdle. However, weakness of the tibialis muscles were out of proportion to the muscle weakness elsewhere, causing complete foot drop of the right and impairment of dorsiflexion of the left. The deep tendon reflexes were brisk. Hypoaesthesia and dysaesthesia of his feet and thighs were localised to the sensory distributions of the peroneal and lateral cutaneous nerves of the thigh. Taps on the inguinal ligament just medial to the anterior superior iliac spine (ASIS) and on the fibular head resulted in an electric tingling sensation in each of the mentioned nerve distributions. The combination of peroneal nerve palsy and meralgia paraesthetica suggested a mononeurophtis multiplex. Tinel's sign of median nerve was positive bilaterally without sensory disturbance on his fingers. Diagnosis of type 2 Graves' disease was made on the basis of laboratory findings (TSH, T3, T4, and anti-TSH receptor-antibody) and thyroid scintigram.

Electromyographic studies of sampled muscles showed a proximal myopathy and denervation potentials in the anterior tibial muscles. Nerve conduction studies revealed asymmetry of peroneal nerve motor conduction velocities and low amplitude evoked responses (right: 40.5 m/s, 1.0 mV; left: 53.0 m/s, 0.9 mV). The other nerves were normal. Muscle biopsy of the rectus femoris showed mild myopathy. The clinical course was marked by a resolution of neurological symptoms and electrophysiological findings that paralleled the remission of Graves' disease after oral treatment with 30 mg thiamazole daily. The asymmetry of right to left peroneal nerve conduction velocity diminished and the amplitude of evoked responses normalised.

Case 2 was a 36 year old male industrial worker who was admitted because of a 12 month history of hyperhydrosis, weight loss and fine finger tremor. He had difficulty in carrying objects because of weakness in his arms. Two weeks before admission, he noticed dysaesthesia on the lateral aspect of the left thigh with decreased superficial sensation. He showed mild weakness of proximal muscles. The deep tendon reflexes were brisk. All modalities of sensation were preserved except for the lateral aspect of the left thigh. A tap on the left inguinal ligament just medial to the ASIS resulted in an electric tingling sensation in the lateral aspect of the thigh. Tinel's sign of median nerve was present bilaterally. Laboratory findings revealed hyperthyroidism with low TSH level and positive anti-TSH receptor-antibody. Thyroid scintigram by 123I showed increased uptake and enlargement of the thyroid gland. Electromyographic studies of sampled muscles showed mild myopathy of proximal muscles. Muscle biopsy of the rectus femoris showed mild myopathy with changes that suggested neurogenic atrophy. Sensory nerve conduction studies revealed asymmetry of the lateral cutaneous nerve of the thigh, right: 63.1 m/s 7.5 µV, left: 45.6 m/s 0.8 µV. The other nerves had normal conduction velocities. Treatment with...
of mononeuropathy

These symptoms were diagnosed as a peripheral neuropathy, including two cases with peroneal nerve palsy, one with a mononeuropathy of the right foot, and two others with involvement of the common peroneal nerve. In the former case, Tinel's sign was positive, and the patient complained of paraesthesias in the sole of the foot. In the latter case, Tinel's sign was negative, and the patient complained of weakness in the toes and hypoaesthesia of the lateral foot. MRI of the thoracic cord in TSP showed increased signal intensity on T2-weighted images, with atrophy of the thoracic cord in TSP. However, there was some difference in the pattern of high signal seen in the two groups, with more diffuse and uniform high signal in TSP and focal high signal in MS. These differences in the MRI findings are slight and a reliable distinction between the two conditions cannot be made on these grounds.

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Correction:
This letter was printed in the August issue with only one MRI image.

MRI of thoracic cord in tropical spastic paraparesis

Tropical spastic paraparesis (TSP) is a disease occurring in Afro-Caribbean following HTLV-1 retro-virus infection. There is some evidence that the geographical and ethnic distribution of HTLV-1 illness is even wider and HTLV-1 associated myelopathy (HAM) in Japan is probably the same disorder. Abnormalities are found on MRI of the brain in both TSP1 and HAM. High signal areas are found in the brain similar to those in multiple sclerosis (MS), though they tend to be less extensive. The thoracic cord (on which the brunt of the pathological process falls) has been examined in only three patients, one of whom had atrophy.2 Since the clinical picture of TSP may resemble that of progressive MS, we have made a systematic comparison of the MRI characteristics of the thoracic cord in the two conditions.

Nine patients with TSP who were born in the Caribbean were compared with an age and sex matched group of European white patients with clinically definite MS,3 all of whom had a progressive spastic paraparesis. Disability was scored using the Kurtzke Disability Status Scale.4 The patients with TSP were anti-HTLV1 positive and had HTLV-1 genome integrated into leucocyte DNA. Eight were female. The mean age was 53 years (range 45–65 years), the mean symptom duration was 12 years (range 1.5–23 years), and the mean Kurtzke disability score was seven (range five to eight). The mean age of the MS patients was 42 years (range 35 to 53 years), the mean symptom duration was 11 years (range seven to 17 years), and the mean Kurtzke disability score was five (range 4 to 6). The spine was imaged by a Picker 0.5T superconducting machine with T1 weighted (SE1500 5 mm contiguous parasagittal slices) using a surface coil. All MS patients and five TSP patients had additional T2-weighted sequences (SE1500 5 mm contiguous parasagittal slices) to detect abnormal signal. Images were reported without knowledge of the individual diagnosis by one of the authors (IBH B).

Atrophy of the thoracic cord was seen in six of nine patients with TSP and five of nine patients with MS. Three of five patients with TSP who had T2-weighted images of thoracic cord had diffuse high signal and all three had atrophy (fig). Five of nine with MS had high signal return on T2 weighted images, one of whom did not have atrophy. The pattern of high signal was diffuse in two and focal or patchy in three (fig).

These results confirm the previous MRI finding of atrophy in the thoracic cord in a proportion of patients with TSP. However, a similar degree of atrophy is seen as frequently in patients with MS who had a progressive spastic paraparesis, a finding compatible with pathological studies where cord atrophy is present in 72% of patients with MS at necropsy.5 There was some difference in the pattern of high signal seen in the two groups, with more diffuse and uniform high signal in TSP and focal or patchy high signal in MS. However, these differences in the MRI findings are slight and a reliable distinction between the two conditions cannot be made on these grounds.

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