due to either of these mechanisms will lead to a fall in the CMAP. It seems that on the scale of wasting used here, the relation to CMAP amplitude is linear. Thus wasting progressing from mild to moderate is associated with the same relative change in CMAP amplitude as wasting progressing from moderate to severe.

Two clinically relevant conclusions can be drawn from these findings. Firstly, an LMN lesion, causing the CMAP to fall by roughly half, may be present and yet the MRC score may not register weakness. This holds true whether the reduction in CMAP amplitude is due to axonal degeneration and hence reduction of either the number or diameter of excitable muscle fibres, or due to conduction block, in which the number of muscle fibres may remain normal but they are inaccessible from nerve stimulation—that is, conduction block may be present even though there is no overt weakness. Secondly, wasting on a simple four point classification better reflects the amount of excitable tissue than does the MRC score, at least in the first dorsal interosseous muscle.

K R MILLS
Clinical Neurophysiology Unit, University Department of Clinical Neurology, The Radcliffe Infirmary, Oxford OX2 6HE, UK

1 *Aids to the examination of the peripheral nervous system*. London: Bailliere Tindall (on behalf of the Guarantors of Brain), 1986.
2 Wiles CM, Mills KR, Edwards RHT. Quantitation of muscle contraction and strength. In: Dyck PJ, Thomas PK, Griffin JW, Low PA, Podulso JF, eds. *Peripheral neuropathy*. 3rd ed. Philadelphia: WB Saunders, 1993: 698–705.

Management of parkinsonism and psychotic depression in a case of acute intermittent porphyria

Although parkinsonian syndromes are common,[1] and the acute porphyrias affect one in 10 000 of the population in the United Kingdom,[2] little is known of the effects of dopamine agonist drugs on porphyrin metabolism. Most people with inherited porphyria remain asymptomatic[2] but all are at risk of developing an acute attack if exposed to precipitating factors, of which drugs are the most common. Although levodopa, benserazide, and anticholinergic drugs have been used safely in patients with acute porphyria,[3] both lysuride and bromocriptine may precipitate an acute porphyric attack.[4] Similarly, tricyclic antidepressants and monoamine oxidase inhibitors are contraindicated in porphyria,[5] and there is conflicting evidence concerning the safety of selective serotonin reuptake inhibitors (SSRIs) in patients with acute intermittent porphyria (AIP).[4]

A 56 year old right handed woman was found to have biochemical AIP on screening prompted by the acute presentation of her brother with bilateral radial nerve palsies. She had never experienced symptoms which could have been due to an acute attack of porphyria, her blood level of porphobilinogen deaminase activity was 12·7 units (normal female range 30–54 units), but her urinary porphyrins had never been significantly raised.

Eight years previously she was diagnosed as having a parkinsonian syndrome but treatment was difficult from the onset. Although she displayed levodopa responsiveness, there was pronounced end of dose bradykinesia, and prominent peak dose dyskinesiae which became remarkably sensitive to the size and frequency of the levodopa unit dose. She had no history of exposure to dopamine receptor blocking agents and no autonomic symptoms.

As her parkinsonism advanced she became increasingly depressed with hypochondriacal and paranoid delusions. She fulfilled the criteria for a severe depressive episode with psychotic symptoms (International Classification of Diseases (ICD) 10), but she also described visual hallucinations and was noted to have a fluctuating level of consciousness.

Neurological examination disclosed increased axial tone, impaired postural reflexes, and a short stepped, festinant gait. She had hypometric saccadic eye movements, orofacial bradykinesia, and slow rapid alternating movements of her tongue. There was a resting tremor in all four limbs, associated with a symmetric akinetic rigid syndrome. On three hourly co-beneldopa (62·5 mg) she alternated between profound bradykinesia prelevodopa (motor subsection of the unified Parkinson's disease rating scale[6] (UPDRS) = 44; Hoehn and Yahr stage 47), and a florid dyskinesia 30 minutes after her medication. The lowest periods of her mood coincided with the periods of choreodystonia. There was no evidence of pyramidal, cerebellar, or autonomic dysfunction.

The patient is one of 13 siblings. Two brothers and five other sisters have biochemical AIP. One brother with biochemical AIP also fulfills UK Brain Bank criteria for Parkinson's disease (three hours after levodopa of 24 motor subsection UPDRS = 24). A maternal aunt was also diagnosed as having Parkinson's disease.

Acanthocytes were absent on a blood film. Urinary organic acid, amino acid, and copper studies were normal. No basal ganglia abnormalities were found on CT and MRI and autonomic function studies were within normal limits.

Benzhexol led to a modest improvement in her tremor. After this, pergolide was slowly introduced in weekly 50 μg increments to 250 μg thrice daily. Her urinary porphyrin concentrations were monitored every 48 hours and remained undetectable. Her mobility and independence improved. Three weeks of lofepramine led to a modest improvement in her affect but the psychotic symptoms persisted. She responded well to six applications of electroconvulsive treatment (ECT) using propofol as the anaesthetic agent. Over the subsequent eight months she did not develop any symptoms suggestive of acute porphyria and her urinary porphyrins remained within the normal range. Her psychotic depression relapsed within three months despite lofepramine maintenance but she again responded to further ECT.

This patient had idiopathic Parkinson's disease in addition to biochemical AIP. The erratic and "brittle" response to levodopa treatment experienced by this patient may have been a result of porphyria modulating the expression of her parkinsonism or the therapeutic "window" for levodopa. Similarly, although porphyria may have been responsible for or have influenced the expression of her affective disorder, the visual hallucinosis and clouding of consciousness raises the possibility of diffuse Lewy body disease, or an adverse effect of her antiparkinsonian medication.

In some case reports, ECT has improved both bradykinesia and depression in patients with idiopathic Parkinson's disease,[8] and it was effective in treating our patient's depression. Her parkinsonian syndrome improved while the pergolide dose was being increased without adverse consequences, providing some evidence to support the safety of pergolide in the treatment of porphyria

PF CHINNERY
NEF CARTLIDGE
DJ BURN
Department of Neurology, Royal Victoria Infirmary, Queen Victoria Road, Newcastle upon Tyne NE1 4LP, UK
PG CLELAND
Regional Neurosciences Centre
I MCKEITH
Department of Old Age Psychiatry, Newcastle General Hospital, Westgate Road, Newcastle upon Tyne NE4 6BE, UK

Correspondence to: Dr PF Chinnery, Department of Neurology, The Medical School, The University of Newcastle upon Tyne, Newcastle upon Tyne, NE2 4HH, UK.

1 Schoenberg BS, Anderson DW, Haerer AF. Prevalence of Parkinson's disease in the biracial population of Copiah County, Mississippi. *Neurology* 1985;35:841–5.
2 Moore MR. *Porphyria*. Orphan Europe, 1994.
3 Gorchein A. Treatment of Parkinson's disease in a patient with acute intermittent porphyria. *Br J Clin Pharmacol* 1995;40:105–6.
4 McColl KEL, Dover S, Fitzsimons E, Moore MR. Porphyria metabolism and the porphyrias. In: Weatherall DJ, Leadingham JGG, Warrell DA, eds. *The Oxford textbook of medicine*. 3rd ed. Oxford: Oxford University Press 1996:1397.
5 *British National Formulary*. London: British medical Association and the Royal Pharmaceutical Society of Great Britain, 1996; vol 31.
6 Fahn S, Elton RL, and Members of the UPDRS Development Committee. Unified Parkinson's disease rating scale. In: Fahn S, *et al*, eds. *Recent developments in Parkinson's disease*. New York: Macmillan, 1987:153–63.
7 Hoehn MM, Yahr MD. Parkinsonism: onset, progression and mortality. *Neurology* 1967; 17:427–42.
8 Douyon R, Serby M, Klutchko B, Rotrosen J. ECT and Parkinson's disease revisited: a "naturalistic" study. *Am J Psychol* 1989;146: 1451–5.

A case of Machado-Joseph disease presenting with spastic paraparesis

Machado-Joseph disease is the most common autosomal dominant spinocerebellar degeneration.[1] The pathogenic gene responsible for the disease, which was recently identified, contains an abnormal CAG expansion in the coding sequence of a novel protein, MJD1.[2] The CAG expansion is inversely correlated with the age at onset, as in other triplet diseases.[2–4] Four clinical subtypes of Machado-Joseph disease are well known.[1] Type I patients show pronounced pyramidal signs and extrapyramidal signs such as dystonia, with a relatively early onset. Type II patients have cerebellar and pyramidal signs. Type III patients present with cerebellar signs and peripheral neuropathy, with a later onset. Type IV patients develop predominantly parkinsonism with distal amyotrophy. In this report, we describe a patient with Machado-Joseph disease who presented with spastic paraparesis without dystonia or ataxia.

A 38 year old woman was admitted to our hospital complaining of gait disturbance. She began to walk at the age of 1 year and 6 months. At the age of 7 years, she attended a school for mentally handicapped children. She walked on her toes, and sometimes she felt stiffness in her legs. At the age of 27 years, she became unable to go downstairs and walk without assistance.