

immediately frozen in liquid nitrogen. Indirect immunoperoxidase³ was performed on cryostat sections using a monoclonal antibody D1-12, which reacts with a monomorphic determinant of the HLA-DR molecule.⁴ Figure (A) shows the intense HLA-DR staining of cells in the white matter; about 20–30% of the cells are stained. In some of these cells rather long processes can clearly be seen. The stained cells are scattered throughout the white matter. Perivascular cells, and possibly endothelial cells are also stained (fig (B)). As a control, monoclonal antibodies raised against CEA were used and no staining could be seen (data not shown), demonstrating that the binding of D1-12 is not merely nonspecific binding of immunoglobulin to oligodendrocytes. We think that the HLA-DR positive cells may be astrocytes and this is based on the following: (a) the stained cells are not restricted to the area around blood vessels and they have processes; (b) cultured glioma cells, positive for glial fibrillary acidic protein (GFAP), also express HLA-DR;² (c) tissue around a brain metastasis with numerous reactive astrocytes, but no lymphoid cells, was very strongly stained for HLA-DR. These are not definitive proofs that the HLA-DR positive cells are astrocytes and some of them may be microglial cells. We plan to perform double staining with anti-GFAP and anti-HLA-DR antibodies in order to clarify this point.

The expression of Ia antigens in the murine brain has been reported,⁵ and very recently in the white matter of the temporal lobe of two children who underwent temporal lobectomy for epilepsy.⁶ It is not yet clear whether the HLA-DR positive cells in the brain may play a role in the induction of immune responses, but we feel that this possibility should be seriously considered as a mechanism for the development of autoimmune diseases of the central nervous system. Recent experimental work showing that mouse astrocytes present myelin basic protein to encephalitogenic T cell lines *in vitro* strongly favours this hypothesis.⁸

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Accepted 28 October 1983

Unusual CT scan findings in pseudohypoparathyroidism

Sir: Pseudohypoparathyroidism is a rare hereditary disorder characterised by symptoms and signs of hypoparathyroidism in association with distinctive skeletal and developmental defects.¹ We report a patient with the classical features of pseudohypoparathyroidism with extensive intracranial calcification in the CT scan. Such findings have not to our knowledge been reported previously.

An 18-year-old boy was admitted for uncontrolled generalised seizures from the age of 6 years. He was mentally retarded, short in stature, with a short neck and short stubby fingers and toes. When the hands were closed dimples were seen over the fourth knuckles. There were dense cataracts in both eyes and the teeth were poorly formed. The serum calcium was 1.50 mmol/l phosphorous 3.2 mmol/l and creatinine 88 μ mol/l. Radiographs of the hand showed short fourth metacarpals in both hands, and short second, third and fourth metatarsals in the feet, the third being the shortest. Radiographs of the skull showed bilateral basal ganglia calcification. CT scan without contrast showed extensive

calcification involving the basal ganglia, and the white matter of the frontal, parietal and occipital lobes bilaterally (fig). There was also striking calcification in both cerebellar hemispheres. He was given vitamin D3 in a dose of 600,000 iu orally every week with oral calcium. After 9 months the serum calcium level reached 2.2 mmol/l. He has now been followed up for 24 months and his seizures are well controlled with phenytoin sodium 200 mg/day.

Radiographs of the hands and feet of the patient's mother, elder sister and elder brother also showed short metacarpals and metatarsals. Their serum calcium and phosphorous levels were normal.

Since the first three cases were reported by Albright 40 years ago,² the biochemical and endocrine aspects of pseudohypoparathyroidism have been extensively studied.³ Sixty per cent of these patients show subcutaneous soft tissue calcification and 50% show basal ganglia calcification.¹ However such extensive calcification of the white matter of the cerebral hemispheres and cerebellar parenchyma have not to our knowledge been reported previously. However, CT scan findings in idiopathic hypoparathyroidism have been reported. It is important to note that basal ganglia calcification alone sometimes occurs in normal persons.⁵ We are grateful to Professor Sir John Walton, for his helpful comment and for reading through the manuscript.

We thank Dr K Jagadeesan, Director K J Hospital, Madras, for the CT scan.

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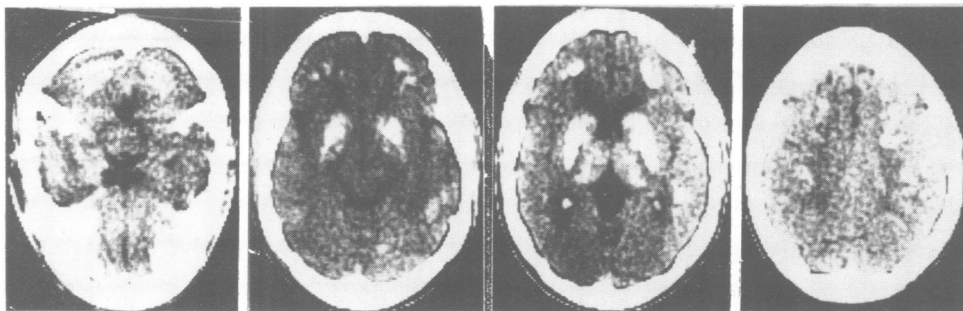


Fig. CT scan without contrast: calcification of basal ganglia, frontal, parietal and occipital lobes and cerebellum is seen on both sides.

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Accepted 14 October 1983

Chorea in digoxin toxicity

Sir: The central nervous system manifestations of digoxin intoxication include visual disturbances, delirium and seizures, but there have been no previous reports of the occurrence of chorea with digoxin toxicity.^{1,2}

A 76-year-old woman was admitted to hospital with atrial fibrillation and congestive cardiac failure. She was treated with digoxin and diuretics, eventually being discharged on digoxin 0.25 mg daily. Four weeks after the onset of digoxin therapy, she developed nausea and vomiting together with the progressive onset of choreic movements in the face, the left arm and the left leg. These movements increased and when the patient was reviewed in the clinic two weeks later her plasma digoxin level was 4.2 nmol/l (therapeutic range: 1.2-2.6 nmol/l). The patient had not received neuroleptic drugs and there was no past history of rheumatic fever or chorea. The packed cell volume, urea, electrolytes, liver function and thyroid function tests were within normal limits and autoantibodies were negative. A

CT brain scan showed only cortical atrophy. Discontinuation of treatment with digoxin was associated with marked improvement but not abolition of the choreic movements over the following seven days.

The relationship of the treatment with digoxin to the onset of the choreic episodes and the improvement on stopping therapy raises the possibility that the chorea was unleashed by the toxic levels of digoxin. The unilateral distribution of the dyskinesias, however, suggests an underlying structural lesion in the basal ganglia and a small lacunar cerebral infarct cannot be excluded. In patients with chorea induced by oral contraceptives a history of antecedent rheumatic chorea or striatal abnormality is invariably present.³ Both digoxin and oral contraceptives are structurally similar in the possession of a steroid nucleus and may trigger chorea by altering central dopaminergic activity within the corpus striatum.

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Accepted 18 November 1983

Notices

Congress of Neurological Surgeons

The Thirty-fourth annual meeting will be held in New York, 30 September to 5 October, 1984. Information may be obtained from Michael Salzman, MD, 22 South Greene Street, Baltimore, Maryland 21201, USA.

The European Society for Paediatric Neurosurgery will meet in Vienna, 10-14 October 1984. Information may be obtained from Prof. W. Th. Koo, Neurochirurgische Universitäts Klinik, Alser Strasse 4-A1090 Vienna.