Adrenoleukodystrophy in a seven year old boy

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Introduction

Leukodystrophies are a heterogeneous group of disorders chiefly affecting myelin in the central nervous system[1]. They produce dysmyelination, where myelin formation is delayed, arrested or not maintained. The main types include metachromatic leukodystrophy, globoid cell leukodystrophy, neutral fat leukodystrophy and adrenoleukodystrophy.

Childhood adrenoleukodystrophy is transmitted in a X-linked recessive manner and is therefore almost exclusively confined to males[2]. This usually presents with progressive behavioural abberations, visual loss, ataxia and adrenal insufficiency. Adrenal hypofunction may not be clinically overt[3]. Pathologically the cerebral lesions are most severe in the occipital, parietal and posterior temporal white matter, and they have a pathognomonic brain CT and MRI appearance[4,5]. With the availability of the newer brain imaging techniques (CT, MRI), diseases affecting the white matter of the brain like leucodystrophies can now be reliably diagnosed in Sri Lanka. As successful treatment of some of these inherited white matter diseases of the brain depends on their early detection, doctors need to be aware of these conditions, so as to suspect them and carry out appropriate investigations. We report a seven year old boy who presented with fits, poor school performance, visual impairment and ataxia due to childhood adrenoleucodystrophy.

Case Report

A 7 year old boy, the eldest child of a non consanguinous marriage, had generalised fits from the age of two years. He had a normal birth history and an uneventful neonatal period. Immunisations were complete. During the last eight months he developed deterioration of school performance, hyperactivity, repeated falls on standing and deterioration of vision. He had difficulty in walking and tended to walk a few steps sideways or backwards. There was no history of a similar illness in members of his family. He had bilateral primary optic atrophy and postural hypotension but did not have pigmentation of his body. There were no focal neurological signs or evidence of a peripheral neuropathy. His serum sodium was 130 mmol/l and potassium was 5.7 mmol/l. Other basic biochemical and haematological investigations were normal. The basal 9.00 am serum cortisol was 3.2 micrograms/dl (normal range 7-24 micrograms/dl), and failed to rise following administration of ACTH (synacthen) for 2 days (3.31 micrograms/dl). The morning plasma ACTH was 1052 nanograms/litre (normal range 10 – 80 nanograms/litre). These findings confirmed primary adrenal hypofunction. Nerve conduction studies and cerebrospinal fluid analysis were normal, and there were no metachromatic granules in the urine. A cerebral T2 weighted MRI scan

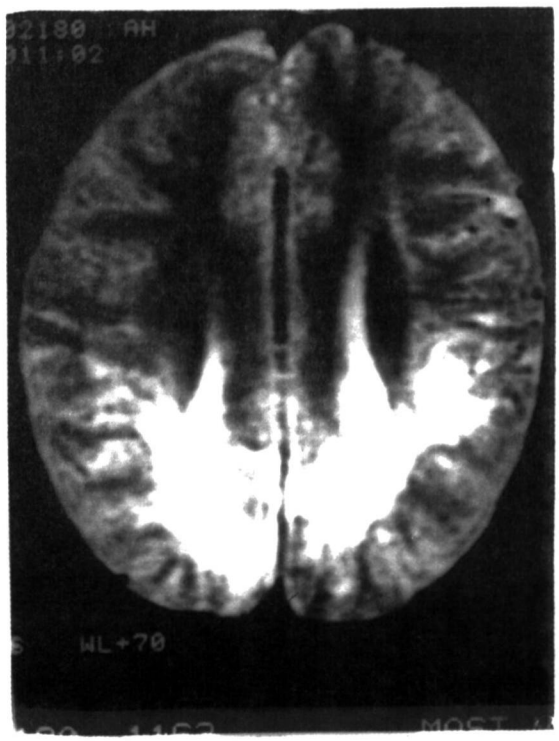

Figure 1. AT2 weighted MRI scan of the brain showing bilateral occipital white matter demyelination.

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Discussion

showed extensive demyelination in the occipital periventricular white matter (Figure 1). Plasma Very long chain fatty acid (VLCFA) (C 26:0 - hexanoic acid) levels were elevated.

Our patient had classical clinical and MRI features of adrenoleukodystrophy. This was confirmed by the detection of elevated levels of VLCFA's in his plasma. In adrenoleukodystrophy there is an accumulation of VLCFA's predominantly in the brain and adrenal cortex[6]. Measurement of increased levels of these VLCFA's in the plasma or cultured skin fibroblasts is a reliable diagnostic test[7]. This condition has not been previously reported in Sri Lanka.

Several dietary treatments[8], immunosuppression and bone marrow transplantation[9] are being investigated as methods of treatment. To be beneficial, they have to be initiated early in the course of the disease. At present the overall prognosis is poor due to lack of awareness and consequent delays in diagnosis. Adrenocortical insufficiency needs to be treated and genetic counselling offered to all patients[10].

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