NEURODEGENERATION WITH IRON ACCUMULATION TYPE1

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Abstract

Neurodegeneration with iron accumulation type 1 is a rare degenerative disorder presenting with dementia and progressive extrapyramidal dysfunction. A 10 yrs old girl reported with complaints of difficulty in speech and involuntary movements. MRI Brain showed 'eye of tiger appearance' which is suggestive of neurodegeneration with iron accumulation type 1. Treatment is symptomatic and chelating agents have no effect. The disease is progressively fatal

Key Words: *Neurodegeneration with iron accumulation type 1, Hallervorden-Spatz disease, Dystonia*

Introduction

Dystonia is a slow, intermittent twisting motion that produces abnormal posture of limbs and trunk. Major causes of dystonia include perinatal asphyxia, kernicterus, generalized primary dystonia, drugs, Wilson disease and Hallervorden-Spatz disease and numerous other genetic mutations.[1,2]

Case report

A 10 yr girl, 3rd product of 2nd degree consanguinous marriage was admitted to hospital with complaints of abnormal body movements, inability to speak and feeding difficulty of 2 years duration. She developed dystonia which started as fisting, extension of the elbow and shoulder along with internal rotation and extension of neck. Initially these movements were intermittent and localised to extremities. Gradually movements increased in frequency and extent involving trunk and facial muscles; this resulted in inability to sit, stammering, followed by inability to speak and difficulty in chewing and swallowing. Family history, birth history and developmental history were not contributory. Central nervous system (CNS) examination revealed dystonia (Fig 1), dysarthria, rigidity in all limbs with extensor plantars. Other systems were normal. Fundus examination and slit lamp examination for Kayser-Fleischer (KF) rings and Sunflower Cataract was negative.

Fig 1: Dystonic posturing

Hematological and renal parameters were within normal limits. MRI of brain showed bilaterally symmetrical areas of altered signal intensity in globus pallidus appearing

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hypointense with a central hyperintense signal in T2W and FLAIR images giving "eye of tiger appearance" (Fig2) suggestive of HALLERVORDEN-SPATZ DISEASE. Urinary copper excretion after penicillamine challenge was within normal limits.

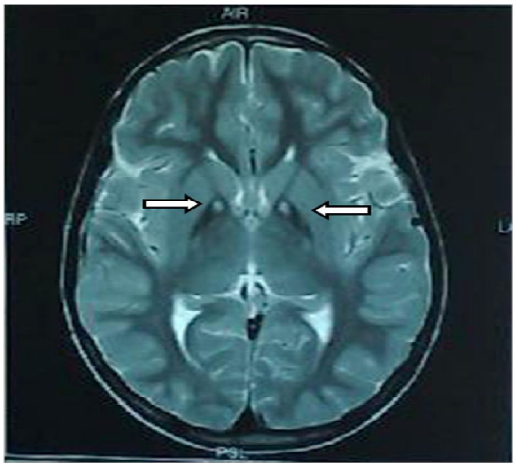

Fig 2: "Eye of tiger" appearanc in T2W image of MRI Brain.

Child was treated with levodopa and trihexyphenidyl. She responded partially to the treatment. She was able to swallow semisolids and liquids.

Discussion

Hallervorden and Spatz first described the disease in 1922 as a form of familial brain degeneration characterized by iron deposition in the brain. To date only seven cases have been reported from India. The term neurodegeneration with brain iron accumulation type1 (NBIA-1) has been used in more recent publications. Hallervorden-Spatz disease is a rare relentlessly progressive degenerative disorder which manifests in late childhood.[1,3] It can be sporadic or familial (autosomal recessive). Exact incidence and patho-physiology of the disease is unknown. Recently, a role for mutation in the PANK2 gene (band 20p13) has been proposed.[4] Neuropathological evaluation reveals rust brown discoloration of the globus pallidus and substantia nigra pars reticulata secondary to iron deposition.[5] It is characterized by extrapyramidal-pyramidal-dementia complex.

Clinical manifestations vary from patient to patient. The symptoms usually begin in the first decade with a motor disorder of extrapyramidal type and gait difficulty as was evident in our case. Symptoms including rigidity of extremities, slowness of movement, dystonia, choreoathetosis, and tremors dominate the clinical picture. In some patients, extrapyramidal dysfunction may be delayed for several years, as spasticity and dysarthria may be the presenting symptoms. Dystonia is a prominent and early feature. Significant speech disturbances can occur early on. Dysphagia is common and is due to rigidity and corticobulbar involvement. Physical examination reveals signs consistent with extrapyramidal and corticospinal dysfunction. In addition to rigidity, dystonia, and chorea, patients may experience spasticity, brisk reflexes, and extensor plantar responses.

The typical MRI appearance is of bilaterally symmetric hyperintense signal changes in anterior medial globus pallidus with surrounding hypointensity on T2-weighted images. These imaging features are fairly diagnostic of HSD and have been termed the "eye-of-the-tiger" sign. The hyperintensity represents pathologic changes including gliosis, demyelination, neuronal loss, and axonal swelling, and the surrounding hypointensity is due to loss of signal secondary to iron deposition based on which the diagnosis is made.[6] No changes in biochemical parameters have been found. Treatment is symptomatic and chelating agents are not effective. Dietary modification to reduce iron intake have not shown to halt the progression of disease. Deep brain stimulation (pallidum stimulation) and pallidotomy has recently being tried in

terminally ill cases and is found to be of some benefit.[7] The disease has a progressive course leading to death in adolescence.[8]

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