

## CASE REPORTS

### CHILDHOOD NEUROLOGICAL WILSON – A DISEASE WITH ENIGMATIC CLINICAL PRESENTATIONS AND MAGNETIC RESONANCE IMAGING

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#### ABSTRACT

An 11-year-old girl, born to "non-consanguineous" parents presented with drooling of saliva, protrusion of tongue and difficulty in speech. She had signs of pyramidal tracts involvement, bulbar dysfunction and lingual dyskinesia. Magnetic resonance imaging (MRI) of brain revealed classical findings in basal ganglia consistent with Wilson Disease. Aggressive medical treatment was started with strict follow-up visits. It is always difficult to sift through the myriad neurological presentations, to reach a definite diagnosis in a child with this rare disease. Early and prompt treatment is imperative not only for the child but also for other siblings.

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#### INTRODUCTION

Wilson disease (WD) or hepatolenticular degeneration is an autosomal recessive hereditary disease. It is caused by mutations to the gene coding for ATPase copper transporting beta poly-peptide (ATP7B), which is located on chromosome 13 and is characterized by a deficiency of ceruloplasmin, the serum transport protein for copper<sup>1</sup>. The most pronounced involvement is in the liver and brain. Neurological symptoms can occur in absence of hepatic symptoms and signs and typical sites of involvement are basal ganglia and central white matter<sup>2</sup>. Magnetic resonance imaging (MRI) is an emerging tool for determining the extent of the disease and to monitor response, even before overt neurological manifestations. The purpose of this case report is to highlight the varied clinical and MRI manifestations in neurological WD.

#### CASE REPORT

An 11-year-old girl, born to "non-consanguineous" parents, reported to combined military hospital (CMH) Lahore with complaints of difficulty to speak, involuntary protrusion of the tongue and drooling of saliva for the past two month. Symptoms got worse over the past 15 days and now she was unable

to speak and swallow. There was no history of any drug ingestion, loss of consciousness, jaundice, headaches, seizures or vomiting. She was initially treated by local quacks and other specialists. Eventually a neurosurgeon after ruling out space occupying lesion on MRI referred her to pediatrics department. On examination she had evidence of bulbar dysfunction, drooling of saliva and inability to speak and swallow. She walked with short steps and had increased tone and brisk reflexes. Her higher mental functions and cerebellar functions were intact. There was no jaundice or hepatosplenomegaly. Her blood counts, urine examination and renal function tests were unremarkable; however, the liver functions were mildly deranged. The MRI films were reviewed and revealed well defined abnormal signal intensity areas in basal ganglia and posterior limb of internal capsule. Lesions appeared hypo-intense on T1 and hyper-intense on T2 and FLAIR (fig-1). These findings were suggestive of neurological WD and slit lamp examination revealed Kayser-Fleischer (K-F) ring. Serum ceruloplasmin level was low = 0.03 G/L (N-0.25- 0.45 G/L). A final diagnosis of Wilson disease was made. She was given Zinc, pyridoxine and chelation with d-penicillamine, showing remarkable recovery within 2 months. The patient was advised regular follow up and low copper diet. Family screening revealed that two of her siblings had subclinical Wilson disease.

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Received: 10 May 2013; revised received: 23 Jun 2014; accepted: 25 Jun 2015

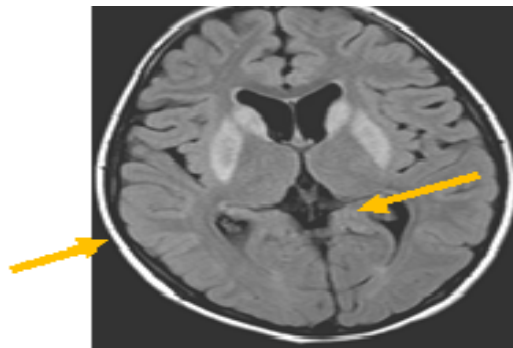
## DISCUSSION

The MRI findings in neurological Wilson in children. Wilson first described it in 1912<sup>3</sup>. WD occurs worldwide particularly where consanguineous marriage is common. However, in our case the parents were non-consanguineous. The disease frequency is around 1 in 30,000 and the carrier frequency is 1 in 90<sup>4</sup>. The mean age of onset of neurological WD is in the second to third decade but may present earlier<sup>5</sup>. Patients commonly present with extrapyramidal, cerebellar and cerebral-related symptoms. The most common initial presentation are bulbar symptoms characterized by difficulty in speech and swallowing as in our patient. Cerebellar features include ocular movement abnormalities, limb in-coordination and impaired tandem gait. There may be psychiatric disturbances commonly manifested as deterioration in school performance. Rigidity, dystonia, bradykinesia and wing-beating tremors are the major manifestations of involvement of basal ganglia. Dystonia of the facial and jaw muscles can produce a typical smile known as 'vacuous smile'. Pyramidal tract involvement is infrequent, however, our patient had involvement of pyramidal tracts manifested by hyperreflexia and ankle clonus. Interestingly, the sensory system remains intact<sup>6</sup>. The K-F ring is an important marker in neurological WD.

The MRI is a very sensitive method for revealing abnormalities in WD. On T1-weighted images, generalized brain atrophy is seen with hypo-intensities in the basal ganglia. On T2-weighted images, one-third of cases demonstrate hyper-intensity in the basal ganglia, white matter, thalamus or brainstem as was the case in our patient<sup>7</sup>. Some WD-related changes exhibit characteristic features on MRI, for instance 'face of the giant panda'<sup>8</sup> (fig-2).

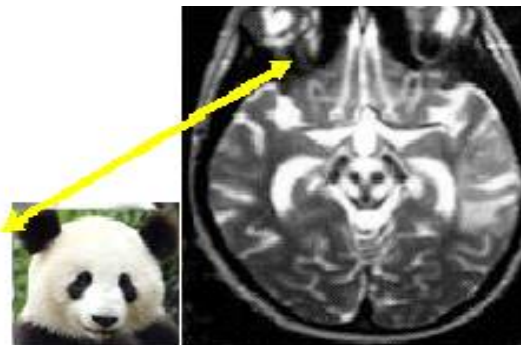
Patients should avoid copper-rich food such as chocolate, nuts and liver. Since 1955, d-penicillamine has been the most commonly used chelating agent<sup>9</sup>. Our patient started showing improvement in clinical features after 2 months of therapy. Zinc was given as it interferes with copper absorption, with

Pyridoxine (vitamin B6). Trientine and ammonium tetrathiomolybdate are other alternatives<sup>10</sup>. These drugs are costly and are not without side effects. Fortunately, our patient responded well to d-penicillamine. Hepatic transplantation is indicated in patients



**Figure -1: Axial T2-weighted FLAIR MRI of the brain showing hyper-intense basal ganglia.**

with neurological WD in whom chelation therapy proves ineffective. The treatment of



**Figure-2: Axial T2-weighted MRI of the brain showing Face of the Giant Panda sign, which is seen in the midbr.**

dystonia and parkinsonian features include the administration of anti cholinergics, tizanidine, baclofen, levodopa, or  $\gamma$ -aminobutyric acid agonists. WD patients require lifelong treatment.

## CONFLICT OF INTEREST

The study has no conflict of interest declared by any of the author.

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