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Anam Abrar

*Shifa International Hospital, islamabad*

Arsalan Ahmad

*Shifa International Hospital, islamabad*

Ejaz A Khan

*Shifa International Hospital*

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# HALLERVORDEN SPATZ DISEASE – A RARE CLINICO-RADIOLOGICAL DIAGNOSIS

Anam Abrar<sup>1</sup>, Arsalan Ahmad<sup>2</sup>, Ejaz A Khan<sup>3</sup>

<sup>1</sup> Medical Officer, Division of Neurology, Shifa International Hospital, H-8/4, Islamabad.

<sup>2</sup> Associate Professor and Consultant Neurologist, Shifa International Hospital, Shifa Tameer-e-Millat University, H-8/4, Islamabad.

<sup>3</sup> Associate Professor and Consultant Pediatrician, Shifa International Hospital, Shifa Tameer-e-Millat University, H-8/4, Islamabad.

**Correspondence to:** Dr Arsalan Ahmad, Associate Professor & Consultant Neurologist, Shifa International Hospital, Shifa Tameer-e-Millat University, H-8/4, Islamabad.

Email: arsalanahmad65@gmail.com, arsalan.ahmad@shifa.com.pk

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## ABSTRACT

Hallervorden Spatz disease, also known as pantothenate kinase associated neuro-degeneration, is a rare, progressive neurological disorder usually seen in first decade of life. It is associated with extrapyramidal effects, dysarthria and dementia. Hallervorden Spatz Disease is also associated with psychiatric symptoms, depression and behavioral changes. Affected patients are disabled predominantly by dystonia. MRI, in later stage of the disease, shows “eye of the tiger” appearance which is fairly diagnostic of Hallervorden Spatz Disease. Response to drugs is often poor and of limited value to these patients. This report highlights a classical case of Hallervorden Spatz disease that presented as an outpatient with dystonia and psychotic symptoms and was diagnosed on the basis of clinical and radiological evidence.

## CASE REPORT

A 9 years old boy, with no previous significant medical history, presented to Neurology as an outpatient on 20th February 2014 with a 3 years history of abnormal movements of all limbs and trunk, ataxic gait, cognitive impairment and psychomotor agitation. Three years back, he was perfectly healthy, both mentally and physically, studying in second grade. At the age of six, his family noticed behavioral changes including hyperphagia, general irritability and impulsiveness, irrelevant talk, muttering to himself and occasional episodes of aggressiveness. He had once burnt himself and at another occasion put his hand in the blender. After few months, he developed abnormal movements first noticed in the lower limb which gradually progressed to the rest of the body. There was no preceding history of fever, use of any drugs, jaundice, incontinence, seizures or any focal deficit. He is the youngest, born to first degree consanguineous parents. He has 13 siblings, all of whom are

physically and mentally healthy. He was born via a full-term spontaneous vaginal delivery, with normal childhood milestones, fully vaccinated and no previous history of hospitalization or any significant illness. On Examination, he had a blank facial expression. He had generalized dystonia, marked in right upper limb. He had burn scars on his arm and neck. He had a tip-toe walk and ataxic gait. His lower limb reflexes were brisk, MRI brain showed bilateral basal ganglia hypodensities with centrally placed area of hyperdensity, also known as the “eye of the tiger” appearance, mostly seen in patients with Hallervorden Spatz disease. His further investigations included those needed to rule out Wilson’s disease, ceruloplasmin, copper, ferritin; Vitamin B12 levels and amino acid chromatography were within normal range. (Table1) His ophthalmological examination done for Kayser – Fleischer ring and retinitis pigmentosa was normal. His peripheral film was unremarkable. His blood iron levels were slightly decreased and his post exercise lactic acid was elevated at 1:4 ratios.

**Table 1:** Pertinent Investigations

Tests	Results	Reference Range
Serum Iron levels	31 µg/dL	Male 65-175 µg/dL
Vitamin B12 levels	47.4 pmol/L	25-165pmol/L
Ceruloplasmin levels	23 mg/dL	20-60 mg/dL
Copper Serum	103.02 ug/dL	Children(6 Years) 90-190 ug/dL Children(12 Years) 80-160 ug/dL

Lactic Acid (pre-exercise)	10.9mg/dL 45.1mg/dL	4.5-19.8 mg/dL
Lactic Acid (post exercise)		
Ferritin levels	101.71ng/mL	Male 22.0-275.0 ng/mL Female 5.0-204.0 ng/mL
Amino acid Chromatography	Unremarkable	Unremarkable

He was diagnosed as Hallervorden Spatz disease. The family was counselled about the progression and prognosis of the disease. He was given a trial of Trihexiphenidyl, clonazepam and baclofen. The patient on follow up was neurologically the same but dystonia had improved slightly.

## DISCUSSION

Hallervorden Spatz disease is an autosomal recessive disease, first described by Julius Hallervorden and Hugo Spatz in 1922<sup>(1)</sup>. In most cases, defect lies in the gene coding for pantothenate kinase 2 (PANK2) located on chromosome 20p13-p12.3<sup>(2)</sup>. This gene causes iron storage in brain, which in the presence of oxygen, causes degeneration of the nervous system<sup>(3)</sup>. However, in 15% of people it may be sporadic<sup>(4)</sup>. One of the limitations of the case is that we were unable to do genetic

studies due to limited resources.

The symptoms of Hallervorden Spatz Disease are usually found between 7-15 years of age. The disease has also been reported in infancy and adults<sup>(5,6)</sup>. Very few cases of this disease have been reported in Pakistan<sup>(7)</sup>. The diagnostic criteria for HSD consist of three obligate, two or more collaborate and none of the exclusion features, as shown in table 2.

CT scan findings are non specific. MRI in early stage of the disease may be normal, later, however, it may be helpful in diagnosis. MRI shows bilateral symmetrical hyperintense signal changes in anterior globus pallidus with a surrounding hypointensity as shown in Figure 1. The hypointensity is due to loss of signals secondary to iron deposition and hyperintensity is a result of various pathological changes including axonal swelling and demyelination. These imaging features are fairly diagnostic of HSD<sup>8</sup>.

**Table 2:** Diagnostic Features<sup>(3)</sup>

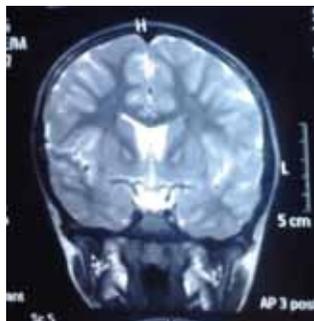
Obligate Features	Collaborate Features	Exclusion Features
Onset during first two decades of life	Pyramidal tract signs	Non progressive nature of the disease
Progressive nature of the disease	Progressive cognitive impairment	Family history positive for Huntington's disease, caudate atrophy or autosomal dominant movement disorder
Extra-pyramidal dysfunction	seizures	Absence of extrapyramidal signs
	Retinitis pigmentosa	Predominant epileptic episode
	Positive family history	Abnormal ceruloplasmin or copper level
	Hypodensity in basal ganglia on MRI brain	
	Abnormal cytoplasm in lymphocytes	
	Sea blue histocytes on bone marrow	

There is no known cure for this disease. Hence the treatment is mainly directed towards managing symptoms of the patient. Studies suggest safety of desferrioxamine as

chelating agents for iron accumulation in the brain, but there has been no study so far proving its beneficial role<sup>(9)</sup>. Anti-Parkinson's drugs including levodopa, bromocriptin

**Figure 1:** MRI Brain (a) Coronal T2 W image (b) axial FLAIR image showing bilateral symmetrical hyperintense signal changes in anterior globus pallidus with a surrounding hypointensity.

**Fig 1 (a)**



**Fig 1 (b)**



tine and anticholinergics, have been used for extrapyramidal effects in patients. Baclofen has also been used for dystonia and has been of limited benefit to these patients. Use of conventional antipsychotics for psychiatric symptoms has not been recommended, however, there are studies on efficacy of clozapine and atypical antipsychotics<sup>(10)</sup>.

## CONCLUSION

Unfortunately, there is limited literature on Hallervorden Spatz disease and more studies need to be done for full understanding of the disease and management. Because the disease is rare, reporting such cases would benefit the practicing neurologist to be familiarized with this rare disease.

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### Author's Contribution:

**Anam Abrar:** Concept and design, data collection, data analysis, manuscript writing, manuscript review

**Arsalan Ahmad:** Concept and design, data collection, data analysis, manuscript writing, manuscript review

**Ejaz A Khan:** Data analysis, manuscript writing, manuscript review