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"Fahr's Disease"- A Rare Entity Presenting with Cognitive Impairment and Neuro-Psychiatric Behavioural Symptoms

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ABSTRACT

Idiopathic basal ganglia calcification, also known as "Fahr disease", is a rare, genetically dominant, inherited neurological disorder characterized by abnormal deposits of calcium in areas of the brain that control movement.

Case Presentation: *We report a case of 58 years old male patient presented with neuropsychiatric, behavioural and cognitive impairements with movement disorder. Non contrast CT scan of brain was suggestive of "Fahr's Disease or Syndrome".*

Conclusion: *Fahr's disease is a rare neurodegenerative disorder with characteristic bilateral symmetrical calcifications in brain especially in basal ganglia, The disease should be considered in the differential diagnosis in patients with psychiatric symptoms. Non contrast CT scan may help in early diagnosis*

Keywords: *Fahr's disease, CT scan, Cognitive impairment, Tremors.*

CASE REPORT

A 58-year-old male patient presented with history of irritability, abnormal behaviour, and psychosis. History ofinvoluntary movements of hand (tremors), unsteady gait, and slurred speech was also present for 10-12 years along with progressive cognitive impairment. There was worsening of these symptoms for last2 months. Vision and intellectual functions were normal.

Family history of similar complains in patient's mother.

On physical examination, patient was conscious, cooperative and well oriented to time place and person. Bilateral hand tremors were noted. Gait was unsteady. Slurring of speech was also observed. The mental status examination revealed normal immediate memory, with impairment in recent and remote memory.

No other motor or sensory neurological deficit was found.

Examination of other systems was within normal limits

Various haematological and biochemical investigations were done (including complete haemogram, FBS, LFT, RFT, Electrolytes (including calcium, phosphate and magnesium levels), Thyroid function tests Parathormone (PTH), Calcitonin, Vitamin D levels, Rheumatoid factor, Antinuclear antibodies, Urine examination. All hematological and biochemical investigations shows normal ranges.

Non contrast CT scan of Brain reveals, symmetrical high density calcifications in basal ganglia, periventricular white matter, thalami, temporal lobes, occipital lobes, and cerebellum (description in Figures 1-4)

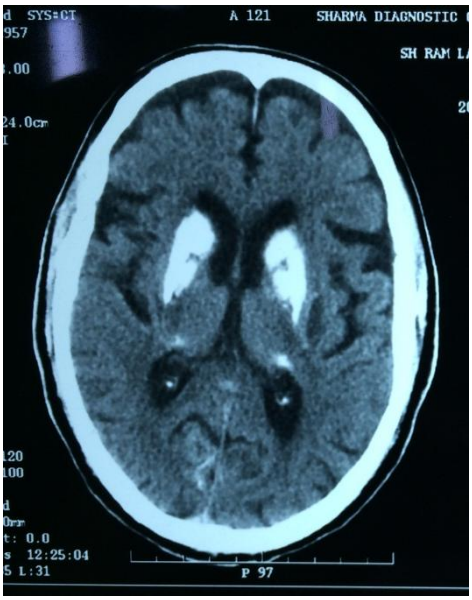

Figure 1: Non-contrast CT axial imagereveals symmetrical high density basal ganglia calcifications with predominant involvement of globuspallidi, and caudate nuclei. Specks of symmetrical calcifications are also seen in thalami posteriorly.

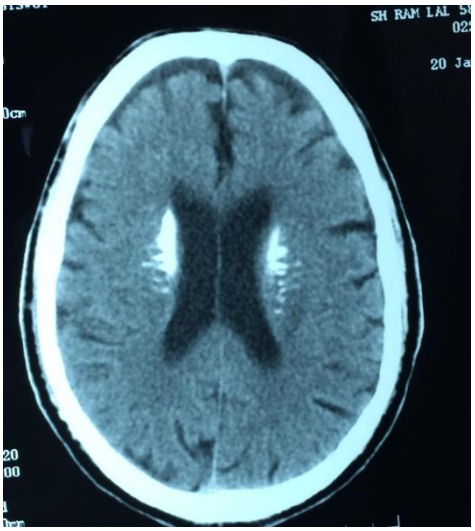

Figure 2: Non-contrast CT axial image reveals extension of high density calcifications into periventricular white matter.

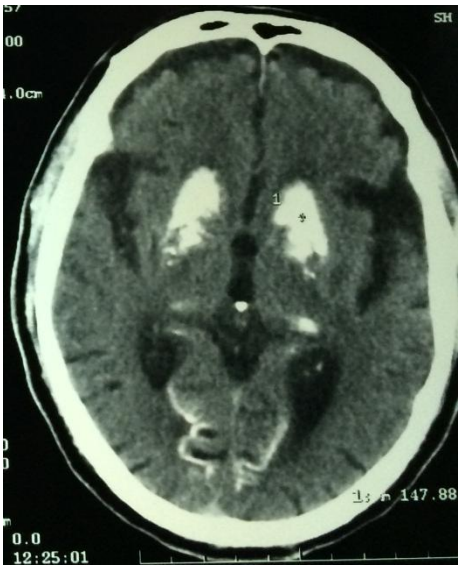

Figure 3: Non-contrast CT axial imagereveals symmetrical high density basal ganglia calcifications. Portions of thalami, temporal lobe, and occipital lobes are also involved.

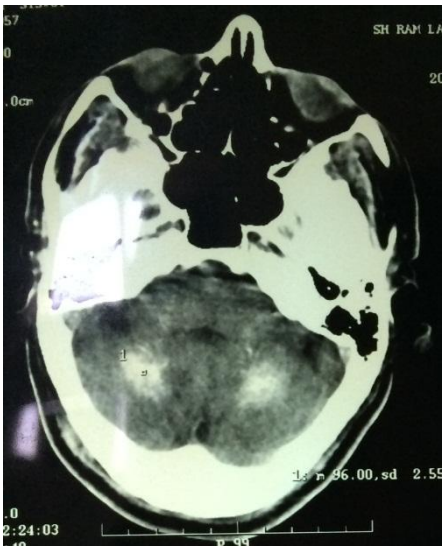

Figure 3: Non-contrast CT axial imagereveals symmetrical high density calcifications in cerebellum involving dentate nuclei.

On the basis of history, examination & laboratory investigations, possibility of various organic brain diseases (like Parkinsonism, Alzheimer's disease, Pick's disease, and other neurodegenerative disorders) were kept as differential diagnoses.
Final diagnosis of Fahr's disease was made on the basis of non contrast CT scan findings and clinical features.

INTRODUCTION

Idiopathic Basal ganglia calcification is also known as Fahr's disease or Fahr's syndrome. It is a rare inherited (Autosomal Dominant) or sporadic neurological disorder with a prevalence of <1/1,000,000.[1] It was first described by German neurologist Karl Theodor Fahr in 1930.[2] It is characterized by abnormal deposition of calcium in areas of the brain that control movements including basal ganglia, thalamus, dentate nucleus, cerebral cortex, cerebellum, subcortical white matter, and hippocampus .[3]

CLINICAL FEATURES

The onset is bimodal, occasionally in children, but more commonly in adults in their fourth to sixth decade.[4,5]

It usually presents with clumsiness, fatigability, unsteady gait, slow or slurred speech, difficulty swallowing, involuntary movements or muscle cramping. Seizures of various types are common. Neuropsychiatric symptoms, which may be the first or the most prominent manifestations, range from mild difficulty with concentration and memory to changes in personality and/or behavior, to psychosis and dementia.[6]

Some cases present with late onset paranoid delusions with associated mild cognitive impair-ent.[7] Early onset schizophrenia-like psychosis with Fahr's disease, presenting with auditory hallucinations, delusions, disorganized speech, perseveration, obsessions and inattention has been reported with calcifications involving the basal ganglia and dentate nucleus of the cerebellum.[8]

Cognitive symptoms in patients with Fahr's disease include: dementia, delirium, and mental retardation. Cases of dementia with Fahr's disease have been reported with neuropathological changes not due to Alzheimer's disease or Pick's disease.[9]

Some cases present with features of frontal lobe syndrome.[10]

ETIOPATHOGENESIS

A locus at 14q has been suggested, but no gene has been identified.[11] A second locus has been identified on chromosome 8 and a third has been reported on chromosome 2.[12,13] This suggests that there may be some genetic heterogeneity in this disease.[14]

A mutation in the gene encoding the type III sodium dependent phosphate transporter 2 (SLC20A2) located on chromosome 8 has also been reported.[15]

The most commonly affected region of the brain is the lenticular nucleus and in particular the internal globuspallidus. Calcifications in the caudate nuclei dentate nuclei, putamen and thalami are also common. Occasionally calcifications begin or predominate in regions outside the basal ganglia.[16]

INVESTIGATIONS

In addition to the usual routine haematologic and biochemical investigations, the serum calcium, phosphorus, magnesium, alkaline phosphatase, calcitonin and parathyroid hormone should also be measured. The cerebrospinal fluid (CSF) should be examined to exclude bacteria, viruses and parasites.[17]

CT and MRI scanning of the head is indicated diagnostically. [18]

TREATMENT

There is currently no cure for Fahr's Disease, nor a standard course of treatment. The available treatment is directed symptomatic control. If parkinsonian features develop, there is generally poor response to levodopa therapy. Case reports have suggested that haloperidol or lithium carbonate may help with psychotic symptoms.[19]

One case report described an improvement with the use of a bisphosphonate.[20]

DISCUSSION

A Fahr's disease diagnosis is confirmed when bilateral brain calcifications occur in cases with movement disorders. Psychiatric and cognitive

complaints along with a positive family history are also often present. The cause of the brain calcification is not known, but it may be related to hyperphosphatemia. [21]

Other differential diagnoses to rule out would generally include hypoparathyroidism, toxoplasmosis, rubella, cytomegalovirus, cysticercosis, autoimmune deficient syndrome, Wilson's disease, Cockayne syndrome, tuberous sclerosis, and rarely Down's syndrome. Always consider idiopathic basal ganglia calcification in persons with cognitive and movement disorders and behavioral abnormalities, especially when there is a familial component.[22,23]

CT scanning of the head would then be indicated diagnostically. [18]

Laboratory parameters in most patients reveal normal calcium, phosphorus, and parathyroid hormone (PTH) levels, but some individuals present with hypocalcemia and an inappropriately normal PTH, which warrants the exclusion of hypoparathyroidism.

CONCLUSION

In conclusion, Fahr's disease is a rare neurodegenerative disorder with characteristic bilateral symmetrical basal ganglia calcifications, dentate nucleus of the cerebellum and other parts of brain. The disease should be considered in the differential diagnosis in patients with psychiatric symptoms whether the symptoms are acute/ chronic or in patients who present with movement disorders, especially when there is a history of cognitive impairment, neuro-psychiatric behave-ur & neurological deficit in patients and/or their families.

CT scan may be considered, it may help in early diagnosis. Further research is needed on this entity to bridge the gap existing in our current knowledge on the prevalence, etiology, symptoms, and treatment. Proper genetic counselling of parents should be considered if there is positive family history of this entity.

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