Fahr's Disease: A Rare Neurological Disorder Associated with Secondary Cause

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ABSTRACT

Fahr's disease is characterized by idiopathic bilateral deposition of calcium in the striopallidodentate area. We are presenting 83-year-old female, who failed responding while having lunch around 10 AM soon after she lost consciousness for an hour. It was associated with difficulty in walking, mood disturbances, fatigability, blurring of vision and occasional dizziness since past 4 months. Her neurological examination revealed Parkinsonian features. Her computed tomography of head report showed bilateral, symmetrical, large area of calcification over the basal ganglia, the thalamus and the cerebellum. To rule out the seizure disorder we have done an electroencephalogram and some laboratory test including calcium, Phosphorus, Parathyroid hormone and magnesium, vitamin D which were suggestive of Fahr's disease.

KEY WORDS

Basal ganglia diseases, Calcinosis, Fahr's disease, Neurological disorder

INTRODUCTION

Fahr's disease (FD), also known as Basal ganglia calcification or Fahr's Syndrome, is a rare genetically dominant, neuro degenerative disorder commonly transmitted as an autosomal dominant trait. It can also occur sporadically. It was first described by German neurologist Karl Theodor Fahr's in 1930.[1] It is characterized by idiopathic bilateral deposition of calcium in the stria-pallido-dentate area; manifested as Neuropsychiatric, cerebellar symptoms, seizures, Parkinsonian features, dementia, speech disorders and extrapyramidal symptoms. Fahr's syndrome typically manifests in age 30s or 40s.[2] To rule out secondary causes of Fahr's disease, we tested calcium, Phosphorus, Parathyroid hormone, magnesium, HIV, vitamin D, EEG.

CASE REPORT

An 83-year-old woman from Kathmandu was admitted on 21st July 2022 to medical unit of Nepal Mediciti Hospital after being found unresponsive while having her lunch. She had shortly before complained of swallowing difficulties, nausea and had an episode of vomit prior to this incident. In the past four months, she had walking difficulties, mood disturbances, fatigability, blurring of vision and occasional dizziness. Her medical conditions included hypertension, Type II diabetes mellitus, dyslipidemia and iron deficiency anemia. She was on regular medications for these conditions. She was moderately built and is a non-smoker and non-alcoholic.

The patient was disoriented when she gained consciousness. Her vitals were as follow: Blood pressure 160/66 mm of hg, Pulse 55 beats per minute, body temperature 36.7-degree Celsius.

Upon physical examination, she had varied manifestations. These included delirium, dysarthria, and dysphagia with ataxic gait. Her motor power assessment was 3/5 of both upper and lower limb bilaterally. Her cranial nerve was intact. There was no rigidity, tremor, and abnormal movements. Intact deep tendon reflex and other systemic examinations were normal. The patient's relatives were examined, and no clinical abnormalities were detected in them.

To rule out cause of unresponsiveness, initially workup was done for metabolic and endocrine cause. Her laboratory findings blood serum reported calcium level (7.9 mg/dl), corrected calcium level (8 g/dl), phosphorus level (6.10 mg/dl), intact parathyroid hormone level (104.20 pg/ml),

magnesium level (2 mg/dl) and Vitamin D level (15.4 ng/ml). On the other hand, her hematology profile, thyroid function, alkaline phosphatase, and other investigations were normal. On 22nd July, 2022, Computed Tomography scan of head (Fig. 1) was done which revealed large area of bilateral symmetric calcification over the basal ganglia, the thalamus and the cerebellum which suggest the Fahr's disease. On 22nd July 2022, EEG report showed intermittent abnormal generalized bursts frequently sharp, spike and slow wave in the record was reported which were suggestive of seizure disorder.

She was started initially on treatment with 20 ml of 10% calcium gluconate diluted in 10% of 50 ml of dextrose over 10 minutes along with broad spectrum antiepileptic drug (Levetiracetam), calcium supplement, and vitamin D supplement for a month. Despite of the treatment she had severe difficulty in swallowing liquid and solid diet for a month. On 7th August 2022 she underwent for upper GI Endoscopy procedure and the result was normal. Additionally, percutaneous endoscopic gastrostomy (PEG) was conducted due to difficulty in swallowing solid and liquid food. On her follow-up on 21st September 2022, she was asymptomatic, and she was able to eat solid and liquid diet herself so, Percutaneous endoscopic gastrostomy was removed.

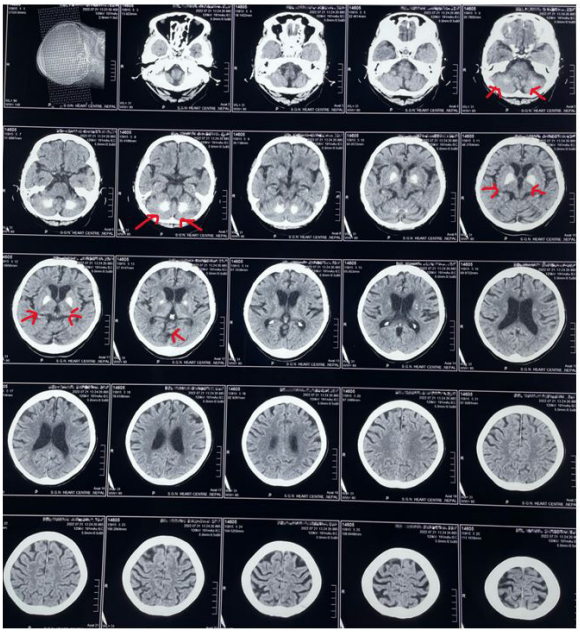

Figure 1. Computed tomography scan of head showing lesions on basal ganglia, thalamus, cerebellum, lateral ventricle.

DISCUSSION

In Fahr's Disease, patients are usually in good health in their youth and tend to develop this progressive neurodegenerative disease later in adulthood.

Classical symptoms include both motor and psychiatric disorders. The most common presentations of Fahr's Disease are movement disorders. Among these, Parkinsonism, chorea, tremor, dystonia, athetosis and orofacial dyskinesia was seen.[3] Due to the divergency of brain calcifications and associated impairments, it is common to see various symptoms other than movement disorders. These include epileptic seizures, dysarthria, mood disorders, problems with cognition (memory and concentration), behaviour/personality changes, psychosis and dementia.[4]

Fahr's disease has two etiological forms: primary and secondary.[5] The primary form of Fahr's is familial or sporadic, but the secondary form, as in our instance, is connected with metabolic or, more typically, endocrine diseases. The gene responsible for the disease is unknown. Linkage to chromosome 14q has been established in one family.[4] Genetic studies have shown an autosomal dominant inheritance in the familial cases. Endocrine disorders, particularly parathyroid disturbances are commonly associated with Fahr's syndrome and other cause are mitochondrial myopathies, dermatological abnormalities and infectious diseases, Cockayne syndrome type 1 and type 2, Aicardi-Goutières syndrome, Tuberous sclerosis complex, Brucellosis, Coat's disease.[6,7]

In our patient we considered her Fahr's disease due to a metabolic/ endocrine disorder like hypocalcaemia, hypoparathyroidism. Our patient laboratory results showed low parathyroid hormone, low calcium, high phosphate, low vitamin D level. However, she had never undergone any surgeries, radiation therapies or any autoimmune condition which excludes cause of secondary hyperparathyroidism. Hence, suggests she has primary hyperparathyroidism. The imaging finding is used to assess the location and severity of immense calcification, as seen in our case. Computed tomography scan is the most effective screening tool8, which (Fig. 1) revealed large area of bilateral symmetric calcification over the basal ganglia, the thalamus and the cerebellum which confirmed the diagnosis. No prenatal or genetic tests are available for genetic counselling. To clarify whether the disease is sporadic or familial, doing the imaging scan of the parents and other relatives is more reliable than their clinical screening.

Several approaches for treatment have been done based on diverse biological theories and small-scale clinical experiences have been proposed. There is no cure or standard treatment plan for Fahr's syndrome.[5] Symptoms and disease presentation are treated on an individual basis. Pharmacologic treatment can be helpful in alleviating seizures, headaches and some psychiatric symptoms. Seizures and movement disorders in Fahr's syndrome which are related to the parathyroid disorder has shown good result with the correction of phosphate and calcium levels. For e.g., treatment with alpha hydroxy vitamin d3 and corticosteroids reversed neurological deficits.[9] Oxybutynin is used for urinary incontinence and antiepileptics are used for seizures. Clonazepam and atypical antipsychotics such as quetiapine also showed advantage in treating patients with Fahr's syndrome. There are no known studies on whether dementia medications are helpful in treating

associated symptoms in Fahr's Syndrome. Parkinson-like symptoms are generally non-responsive to Levodopa.[10]

The presence of bilateral basal ganglia calcification, together with bilateral cerebellar calcification, and high levels of serum calcium, parathyroid hormone, phosphorus, Vitamin D, and magnesium, strongly supports the diagnosis of Fahr's Disease associated with secondary cause.

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REFERENCES

1. Asokan AG, D'souza S, Jeganathan J, Pai S. Fahr's Syndrome- An Interesting Case Presentation. *J Clin Diagn Res*. 2013 Mar;7(3):532-3. doi: 10.7860/JCDR/2013/4946.2814. Epub 2013 Mar 1. PMID: 23634413; PMCID: PMC3616573.
2. Shah SY, Hadi FA, Idrees M, Levin-Carrion Y, Pande H, Oorloff MD, et al. Fahr's Syndrome Secondary to Primary Hypoparathyroidism Presenting With Seizures and the Role of Steroid Therapy. *Clin Med Insights Case Rep*. 2023 May 28;16:11795476231178119. doi: 10.1177/11795476231178119. PMID: 37284033; PMCID: PMC10240851.
3. Jaworski K, Styczyńska M, Mandecka M, Walecki J, Kosior DA. Fahr Syndrome - an Important Piece of a Puzzle in the Differential Diagnosis of Many Diseases. *Pol J Radiol*. 2017 Sep 15;82:490-493. doi: 10.12659/PJR.902024. PMID: 29662577; PMCID: PMC5894054.
4. Kadel A, Chandra A, Rajbhandari R, Shrestha P, Rajbhandari P. Bilateral Striopallidodentate Calcinosis in Female: A case report. *AJHS*. 2021 Feb 10;1(1):33-4.
5. Saleem S, Aslam HM, Anwar M, Anwar S, Saleem M, Saleem A, et al. Fahr's syndrome: literature review of current evidence. *Orphanet J Rare Dis*. 2013 Oct 8;8:156. doi: 10.1186/1750-1172-8-156. PMID: 24098952; PMCID: PMC3853434.
6. Pistacchi M, Gioulis M, Sanson F, Marsala SM. Fahr's syndrome and clinical correlation: a case series and literature review. *Folia Neuropathol*. 2016;54(3):282-94. doi: 10.5114/fn.2016.62538. PMID: 27764521.
7. Mahmood N, Hamid J, Khan F, Khurram M, Alam M. Secondary Fahr's Disease: A Consequence of Post-Thyroidectomy Hypoparathyroidism. *Eur J Case Rep Intern Med*. 2019 Jun 4;6(6):001109. doi: 10.12890/2019_001109. PMID: 31293991; PMCID: PMC6601690.
8. Aghemo K, Salmanzadeh R, DeAngelo O, Salmanzadeh AM. Advanced Early-Onset Fahr's Disease: A Case Report. *Cureus*. 2023 May 25;15(5):e39495. doi: 10.7759/cureus.39495. PMID: 37362501; PMCID: PMC10290546.
9. Khan QA, Shahi A, Shahi A, Baqi A, Tango T, Verma R, et al. Seizures in activating calcium-sensing receptor antibodies positive autoimmune hypoparathyroidism and preponderance of steroids therapy: A case report. Clin Case Rep. 2023 Feb 10;11(2):e6901. doi: 10.1002/ccr3.6901. PMID: 36789314; PMCID: PMC9913179.
10. Chen JQ. Fahr's syndrome, intracranial calcification and secondary hypoparathyroidism. *QJM*. 2022 Jul 9;115(7):481-482. doi: 10.1093/qjmed/hcac078. PMID: 35298651.