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Case Report

Fahr's syndrome with hypoparathyroidism in a 65 year old: a case report

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ABSTRACT

Fahr's syndrome also known as idiopathic basal ganglia calcification (IBGC) is a notably rare neurological disease with an autosomal dominant pattern of inheritance and genetic heterogeneity, resulting from symmetric bilateral calcification commonly in basal nuclei and cerebellum. Regardless of being a rare disorder, Fahr's can have a dramatic effect on patients, and is characterized by spectrum of metabolic, biochemical, neuro-radiological, and neuro-psychiatric alterations leading to cognitive dysfunction, motor impairment and neurological manifestations. Our case of a 65-year male, deals with array of varied clinical symptoms and diagnostic difficulties of Fahr's associated with hypoparathyroidism. The case report contributes to the expanding comprehension of the Fahr's highlighting its genetic aspect and clinical heterogeneity and developing avenues for appropriate diagnostic and imaging modalities as-well-as intervention techniques. The motives of this article extend beyond the clinical case, influencing future research, diagnostic and prevention strategies.

Keywords: Striato-pallido-dentate calcinosis, Chorea, Basal ganglia calcification hypoparathyroidism

INTRODUCTION

Fahr's syndrome, which is also called 'bilateral striato-pallido-dentate calcinosis' is an unusual neurological condition, portrayed by abnormal calcium deposition in the basal nuclei, dentate nuclei, and white matter of cerebral cortex.[1]

Today, only a handful of research delves into the statistical analysis of basal nuclei calcification. In a paper by Kazis, CT scans of 7040 patients were investigated, among which 72 (10.02%) had well defined uniform calcific lesion, out of which only 39 (0.49%) confirmed diagnosis of Fahr's.[2]

The prevalence of Fahr's is <1/1,000,000, making it an uncommon disorder. It can be either sporadic or inherited.[3]

Fahr's syndrome can be diagnosed based on several criteria which has been revised and taken from studies by Moskowitz, Ellie and Manyam.[4-6]

They are as follows: Bilateral calcification of the basal nuclei visible on imaging. Additional regions of brain may also be involved. Escalating neurological problems, usually comprises of movement disorder and/or psychiatric problems. Generally seen for the first time in fourth or fifth decade of life. Absence of biochemical abnormalities and somatic features suggestive of a mitochondrial or metabolic disease or other systemic disorder, no infections associated, no toxins associated, no history of trauma and autosomal dominant pattern of inheritance seen in family.

In a report by Manyam, out of 99 patients, nearly 68% of the patients showed symptoms.[7] And among subjects those who showed symptoms, the most common were, disorders in movement (55%) (like Parkinsonism, chorea, tremors, athetosis, dyskinesia, dystonia), cognitive impairment (39%), speech and related disorder (36%), cerebellar dysfunction (36%), and psychiatric manifestations (31%).

Other rare features which were seen includes pyramidal symptoms, gait disorders, pain and sensory changes.[7]

Various genetic mutations are believed to be associated with Fahr's. Some of them according to a study by Ramos et al. are, PDGFB, platelet-derived growth factor receptor-beta (PDGFRB), SLC20A2, and xenotropic and polytropic retrovirus receptor 1 (XPR1). Conventionally, first of all, sequence analysis of SLC20A2 is done, and if no identification of causal variants is present then the sequence analysis of PDGFB, PDGFRB and XPR1 is done.[8] Multigene panel and more comprehensive genomic testing are also done for investigation purpose.

CASE REPORT

A 65-year-old male presented to the casualty of hospital with complaint of difficulty in speech since last 1 year along with abnormal, involuntary body movement since last 5 days. His memory and behavior were normal with no limitation in daily routine activities. Patient had been having similar bouts of involuntary body movements since last 5 years but didn't pay heed to episodes. It was not associated with fever, headache and/or loss of consciousness. He has no h/o any significant physical trauma, hospitalization or medical intervention for same. Patient denied illicit drug use and tobacco consumption. Family history was insignificant for similar complaints.

On examination, patient appeared conscious and well oriented to time, place and person. Vitals were normal, and had BP of 128/76 mm of Hg in the right arm, pulse rate of 78-bpm and an oxygen saturation of 96% in room air. Neurological examination revealed choreiform movements in both upper and lower limbs along with ataxia. Deep tendon reflexes were diminished in both upper and lower limbs. Patient had dysarthria with normal repetition and comprehension. Memory was intact both recent and past. In motor examination, power was 4/5 in bilateral lower limbs. Patient had dysdiadochokinesia with abnormal finger nose test. Sensory exam was normal.

Comprehensive blood panel was normal along with normal liver function and renal function tests. Electrolytes panel revealed calcium levels of 5.31 mg/dL (normal 8-10.4 mg/dL); inorganic phosphorous 5.81 mgm% (normal 2.5-5 mgm%).

NCCT head showed dense calcific changes in bilateral corona radiata, basal ganglia and cerebellum (Figure 1) Although contrast enhanced MRI of brain is not routinely done but we performed and results showed calcification in bilateral basal nuclei region, dentate nuclei and white matter of cerebrum appearing hypointense on T2W imaging. Diffuse cerebellar atrophy with prominent foliage pattern was seen.

Vitamin D level and PTH levels were performed revealing normal vit D level and PTH level of 5.7 pg/ml (normal 8.7-79.6).

All the findings helped in substantiating the diagnosis of Fahr's associated with hypoparathyroidism.

Furthermore, cerebrospinal fluid was examined to investigate the presence of viruses, bacteria, or parasites that could be a reason or contributing factor to aforementioned calcifications. The patient was negative for syphilis, brucella and toxoplasmosis.

Patient was started on propranolol along with calcium and vitamin D supplements, improving his symptoms.

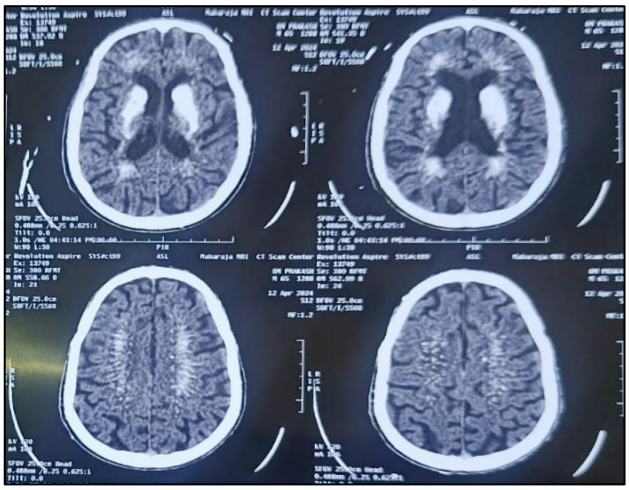

Figure 1: NCCT head showing bilateral calcifications.

DISCUSSION

Fahr's syndrome is described radiologically by the existence of striatopallidodentate, non-arterio-sclerotic, symmetric bilateral calcifications.[9]

The involvement of basal nuclei as a primary site for calcification can be explained by its rich vascular supply and high metabolic demand. This makes it more susceptible to hypoxia, high deposits of calcium and phosphorus along with their placement in periventricular area, which enables the trafficking of calcium and phosphate between the cerebral parenchyma and the cerebrovascular fluid. Also, other mineral and non-mineral contents also target the basal nuclei.[10-12]

Fahr's syndrome is usually presents with movement abnormalities which include many differentials; hence it is clinically difficult to have a suspicion. Also, the variety clinical features associated with Fahr's is wide ranging. Also, the clinical features may not always correlate with the anatomical site involved. In Fahr's, the extrapyramidal symptoms are one of the major manifestations along with cerebellar features and pyramidal syndromes, and cognitive dysfunctions with escalating development to dementia.

Considering the broad spectrum of clinical symptoms, various other causes of intra-cerebral calcific lesions

should be explored such as endocrine disorders, systemic disorders, celiac disease, infectious causes, brain tumors associated with primary or secondary calcification, and other various diseases (such as chronic kidney failure, vit-D toxicity).[13-5] In these cases, the calcified lesions are not necessarily symmetrical nor bilateral and are not usually confined to the central grey nuclei, which is seen in Fahr's. Therefore, it is very hard to establish the chief causal association in the lack of well-defined physio-pathological elements.[16] Therefore we must strongly emphasize on significance of diagnosis and diagnostic techniques, pathophysiology and treatment modalities of Fahr's, as well as more research on the disease.

Generally, there is a delay in the diagnosis of Fahr's. 40 to 50 years is the median age of diagnosis. It is casually found in patients with primary hypoparathyroidism compared to other causes and is usually associated with male predominance. Moreover, incidental detection on neuro-radiological imaging examination is seen in several reported cases of Fahr's which clinically asymptomatic.[17]

A non-contrast CT scan of the brain is gold standard for diagnosing intra-cerebral calcifications. Magnetic resonance imaging (MRI) of the brain is not routinely used for calcifications, although when performed, T1 and T2 weighted images reveals hyperintense signals associated with the affected areas.[18] The NCCT imaging technique is an efficient modality to precisely recognize the calcific regions in the basal nuclei and other parts of brain, enhancing the accuracy of making a confirm diagnosis.

The treatment of Fahr's includes: calcium supplements, vitamin D therapy and identification and correction of the etiological cause.

Calcifications and related neurophysiological and neuropsychiatric disorders can be prevented by early intervention, especially in hypoparathyroidism related cases. However, there is no definite intervening treatment limiting the advancement of the calcifications in the basal nuclei and other part of brain. New treatment modalities need to be fathomed out and engaged to decrease the loss of functionality associated. Of even more importance is to put some light on the genetic component of the disease and the significance of genetic counseling before conception of known at risk parents.

CONCLUSION

This case contributes to the expanding comprehension of the Fahr's highlighting its clinical aspects and developing avenues for appropriate diagnostic and imaging modalities as-well-as intervention techniques. The motives of this article extend beyond the clinical case, influencing future research, diagnostic and prevention strategies.

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REFERENCES

1. Katwal S, Bhandari S, Ghimire A, Ghimire P. Fahr's syndrome with hypoparathyroidism, thrombocytopenia, and seizure: a rare case report. Ann Med Surg (Lond). 2023;85(8):4131-3.
2. Kazis AD. Contribution of CT scan to the diagnosis of Fahr's syndrome. Acta Neurol Scand. 1985;71(3):206-11.
3. Saleem S, Aslam HM, Anwar M, Shahzad A, Maria S, Anum S, et al. Fahr's syndrome: literature review of current evidence. Orphanet J Rare Dis. 2013;8:156.
4. Moskowitz MA, Winickoff RN, Heinz ER. Familial calcification of the basal ganglions: a metabolic and genetic study. N Engl J Med. 1971;285(2):72-7.
5. Ellie E, Julien J, Ferrer X. Familial idiopathic striopallidodentate calcifications. Neurology. 1989;39(3):381-5.
6. Manyam BV. What is and what is not 'Fahr's disease'. Parkinsonism Relat Disord. 2005;11(2):73-80.
7. Manyam BV, Walters AS, Narla KR. Bilateral striopallidodentate calcinosis: clinical characteristics of patients seen in a registry. Mov Disord. 2001;16(2):258-64.
8. Ramos EM, Oliveira J, Sobrido MJ. Primary Familial Brain Calcification. 2004. In: Adam MP, Feldman J, Mirzaa GM editors. GeneReviews®. Seattle (WA): University of Washington, Seattle. 1993-2024.
9. Berrabeh S, Messaoudi N, Elmehraoui O, Assarrar I, Karabila I, Jamal A, Zeryouh N, Rouf S, Latrech H. Hypoparathyroidism and Fahr's Syndrome: A Case Series. Cureus. 2023;15(6):e40502.
10. Manyam BV. What is and what is not 'Fahr's disease'. Parkinsonism Relat Disord. 2005;11(2):73-80.
11. Goswami R, Sharma R, Sreenivas V, Gupta N, Ganapathy A, Das S. Prevalence and progression of basal ganglia calcification and its pathogenic mechanism in patients with idiopathic hypoparathyroidism. Clin Endocrinol (Oxf). 2012;77(2):200-6.
12. Zavatta G, Clarke BL. Basal ganglia calcification in hypoparathyroidism and pseudohypoparathyroidism: local and systemic metabolic mechanisms. J Endocrinol Invest. 2021;44(2):245-53.
13. Younes-Mhenni S, Thobois S, Streichenberger N, Giraud P, Mousson-de-Camaret B, Montelescaut ME, et al. Mitochondrial encephalomyopathy, lactic acidosis and stroke-like episodes (Melas) associated with a Fahr disease and cerebellar calcifications. Rev Med Interne. 2002;23(12):1027-9.
14. Pfaender M, D'Souza WJ, Trost N, Litewka L, Paine M, Cook M. Visual disturbances representing occipital lobe epilepsy in patients with cerebral calcifications and coeliac disease: a case series. J Neurol Neurosurg Psychiatry. 2004;75(11):1623-5.
15. Ceccaldi B, El Maghraoui A, Mayaudon H, Dupuy O, Eulry F, Bauduceau B. Fahr syndrome and hyperparathyroidism. Presse Med. 1999;28(13):689.

16. Faria AV, Pereira IC, Nanni L. Computerized tomography findings in Fahr's syndrome. Arq Neuropsiquiatr. 2004;62(3B):789-92.
17. Kalampokini S, Georgouli D, Dadouli K, Ntellas P, Ralli S, Valotassiou V, et al. Fahr's syndrome due to hypoparathyroidism revisited: A case of parkinsonism and a review of all published cases. Clin Neurol Neurosurg. 2021;202:106514.
18. Casanova MF, Araque JM. Mineralization of the basal ganglia: implications for neuropsychiatry, pathology and neuroimaging. Psychiatry Res. 2003;121(1):59-87.

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