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A FAHR'S DISEASE CASE PRESENTING WITH DEMENTIA

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ABSTRACT

Aims: Fahr's disease is characterized by a bilateral striopallidodentate calcinosis, related to various neurologic and psychiatric disorders. It is a rare disease which can occur both sporadically or hereditarily. While the clinical symptoms related to calcifications include parkinsonism, dystonia, tremor, chorea, ataxia, dementia and mood disorders, some asymptomatic cases have also been reported. With this study, an overall view of Fahr's disease is aimed, by investigating the 65-year-old patient considering her clinical, endocrinological and radiologic aspects, also utilizing the available literature.

Case report: A 65-year-old female patient with a six-year history of forgetfullness and 3-months history of walking difficulty, unbalance and general reduction of spontaneous movement complaints was hospitalized with parkinsonism pre-diagnosis. Laboratory results indicated primary hyperparathyroidism. CT scans also revealed diffuse bilateral intracranial calcifications. The diagnosis of Fahr's disease was confirmed after clinical investigations and exclusion of other diseases which cause intracranial calcifications.

Conclusion: This case implies the importance of keeping Fahr's disease in consideration in cases with primary degenerative dementia in the foreground and indistinct motor dysfunctions adding subtly to the symptoms, and manifestation of hypocalcaemia.

Key words: Fahr's disease, intracranial calcification, hyperparathyroidism, Parkinson'd disease, dementia

INTRODUCTION

Fahr's disease (FD), also known as bilateral striopalliodentate calcinosis, is a rare condition characterized by bilateral calcification of basal nuclei and it is accompanied by neurologic, cognitive and psychiatric symptoms. Other than basal nuclei, often thalamus, hippocampus, cerebral cortex, cerebellar subcortical white matter and dentate nuclei may also be affected by calcifications.

The disease was first noted by German neurologist Karl Theodor Fahr in 1930 clinically (1), while in 1935 Fritzcher defined it radiologically (2-5). It is usually inherited by an autosomal dominant pattern, although sporadic and autosomal recessive cases had also been reported.

Clinical symptoms usually include parkinsonism, dystonia, tremor, chorea, ataxia, dementia and mood disorders, but it is also known that the disease may be asymptomatic (6).

In this study, a FD case which started with symptoms of dementia and accompanied by movement disorders and hyperparathyroidism is discussed.

CASE REPORT

A 65-year-old female patient, was admitted to our clinics with a 6 weeks history of forgetfulness and 3 months history of walking difficulty, unbalance and spontaneous reduced movement complaints, and was hospitalized with parkinsonism pre-diagnosis. She had hypertension, kidney stones and knee replacement history. Neurologic examination confirmed masked face, disarthritis, bilateral rigidity and bradikinesis. Patient's walking analysis, sensory and motor testing, daily life activity, posture analysis and hand-skill tests were also normal. Other system findings were normal as well.

The emergency cranial computerized tomography (CT) revealed diffuse intracerebral calcification

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(Figure 1). Endocrinology consultation was requested to check up on patient's calcium metabolism. Thyroid ultrasonography results indicated a hypoechogenic solid nodule with cystic areas in the right posterior lobe of the thyroid gland, measuring 11x8 mm. After this, the patient was considered as primary hypoparathyroidic. Cranial magnetic resonance imaging (MRI) proved intracerebral calcifications compatible with FD. In bilateral basal ganglionic level, bilateral periatrial areas, bilateral temporal lobes, periventricular white matter, vermis level and bilateral cerebellar hemisphere dense tumefactive calcification was noted. Mild cerebral cortical atrophy was also present.

Laboratory investigations resulted with a total serum calcium level of 7.7 mg/dL (N: 8.4-10.2), phosphorus level of 5.8 mg/dL (N: 2.3-4.7) and parathyroid hormone (PTH) level of 4.9 pg/mL (N: 14-72).

Biochemistry investigations resulted with a preprandial glucose level of 112 mg/dL (N: 70-105), urea level of 78 mg/dL (N: 15-43), creatinine level of 1.31 mg/dL (N: 0.57-1.11), cholesterol level of 257 mg/dL (N: 0-200), high-density lipoprotein (HDL-C) level of 77 mg/dL (N: 50-60), low-density lipoprotein (LDL-C) level of 148 mg/dL (N: 0-130). Other parameters fell in normal range.

The patient's liver function test results were also normal.

With all these findings taken in consideration, the patient was diagnosed with Fahr's syndrome. Treatment with levodopa-benserazide 125 mg three times a day, pramipexole 0.250 mg three times a day and calcium supplements were administered.

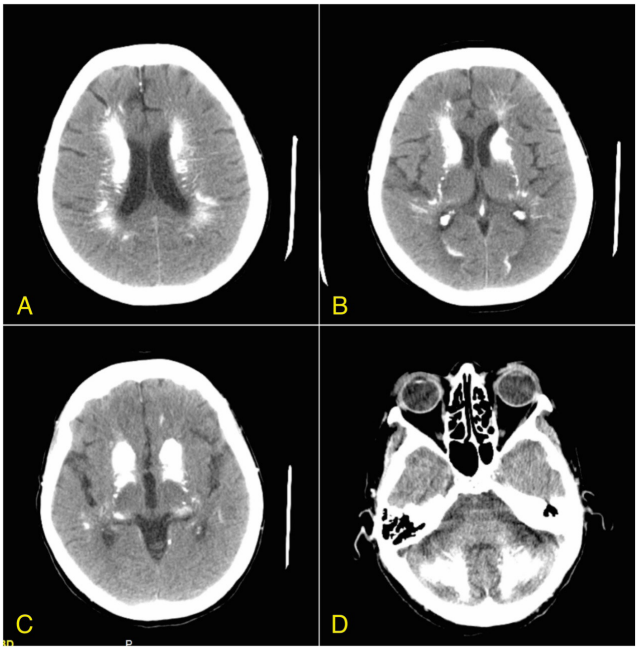

Figure 1: Axial BT section A. Periventricular area B. Caudate nucleus C. Putamen and D. Cerebellum, all including findings compatible with hyperdense calcification.

DISCUSSION

Two different definitions exist: FD and Fahr's syndrome (FS). While FS, a more generic term, is being used for idiopathic cases; FD is related to different causes, mostly metabolism disorders like hyperparathyroidism, but it is also related to developmental anomalies, infections, inflammatory diseases and exposure to toxins and radiation (7-11).

The diagnosis of FD is based on three main components: Bilateral idiopathic non-atherosclerotic calcification of basal nuclei, psychiatric manifestations and extra pyramidal movement disorders (7, 12). For this reason, the exclusion of other factors causing intracranial calcification is crucial during diagnosis. The etiology of intracranial calcifications consist of many different causes (Table 1).

Table 1:Noteworthy diseases in the etiology of intracranial calcifications

Endocrine causes	Hypoparathyroidism – autoimmune (idiopathic) – after thyroidectomy Pseudohypoparathyroidism Secondary hyperparathyroidism
Infections	AIDS After tuberculosis meningitides
Metabolic diseases	Cu metabolism disorders Mitochondrial cytopathies
Vascular causes	Aneurism Hematoma Angioma
Various syndromes	Down syndrome Fahr's syndrome Tuberosclerosis Neurofibromatosis
Neoplasia	Multiple myeloma Metastatic astrocytoma
Fahr's disease	
Other causes	Radiation therapy Anoxia Toxins Physiologic calcifications related to aging

It is possible to arrange the most frequent symptoms and findings of FD under three headlines: Neurologic disorders, neuropsychiatric disorders and movement disorders (Table 2).

Table 2: Most frequent symptoms and findings of FD

Neurologic	Loss of consciousness
	Tetanus
	Seizures
	Epileptic disorders
	Walking disorders
	Talking disorders
	Dementia
	Myoclonus
	Coma
	Paroxysmal choreoathetosis
	Dystonic choreoathetosis
Movement disorders	Clumsiness
	Quick fatigue
	Rigidity
	Hypokinesis
	Tremors
	Ataxia
Neuropsychiatric characteristics	Mood disorders
	Psychosis

Cumming et al. (13) divided FD into two subgroups: Early onset form with psychotic symptoms, and late onset form manifesting with dementia and movement disorders. In our case, complaints of dementia, recently developed walking difficulty and bradikinesis were present, which are compatible with late onset FD, but no psychotic symptoms were available. Another aspect which makes our patient out of the ordinary is while most cases of FD start with extrapyramidal symptoms (14), in our case the first symptom was dementia. While dementia is a common symptom in FD, it is rarely reported when dementia is the only symptom without any extrapyramidal manifestations (6, 15).

Symptoms may occur unilaterally, even though calcifications have bilateral characteristics (16, 17). More diffuse calcifications may cause especially dementia and extrapyramidal symptoms to intensify (18). CT is the more sensitive means for detecting cranial calcifications than direct craniographies or MRI (19, 20).

Low serum calcium and PTH levels and high phosphate levels of our patient is typical for hypoparathyroidism. Hypoparathyroidism is one of the most common causes for FD. Hypoparathyroidism can cause bilateral intracranial calcifications in the basal nuclei, thalamus, cerebral white matter and cerebellum, and it can lead to neurologic disorders like extrapyramidal symptoms and dyskinesia (21).

Endocrine abnormalities, especially parathyroid anomalies are closely related to FD. These are a rare condition called idiopathic hypoparathyroidism which is caused by the absence, fatty degeneration or atrophy of parathyroid glands, secondary hypoparathyroidism which occurs as a complication of a tyroidectomy, pseudohypoparathyroidism which is caused by resistance and non-response to parathyroid hormone in periphery, pseudo-pseudoparathyroidism in which a person is phenotypically similiar to pseudohypoparathyroidism type 1a but is biochemically normal, and similar pathologic conditions (In pseudo-pseudohypoparathyroidism the patient's serum calcium and phosphorus concentrations, and their response to PTH are normal). Hyperphosphatemia and hypocalcaemia allow for calcifications. This explains the cranial calcifications of our patient.

FD is non-treatable for today, management of the disease and treatment strategies focus mostly on symptomatic relief and removal of responsible factors. Normalization of calcium status cure myoclonus and cramps, but it has little effect on mood and parkinsonism (22). However, in our case the antiparkinsonism treatment proved a relatively better result. There is proof which indicates that early diagnosis and treatment revert the calcification process and completely treat the mental functions (10).

This case was considered worthy of publication because it implies the possible differential diagnosis of Fahr's disease in cases which have dementia symptoms progressing slowly like primary degenerative dementia in the foreground, and indistinct motor dysfunction add subtly to symptoms and lastly hypocalcaemia manifestation; and also implies the importance of close follow-ups on these patients.

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