IDIOPATHIC NONARTERIOSCLEROTIC CEREBRAL CALCIFICATION (Fahr's Disease)

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SUMMARY
A case with non-inherited dementia-parkinsonism complex who was found to have diffuse lenticulodentate calcification with normal calcium metabolism is presented. When the literature was reviewed a confusion in the terminology was spotted and discussed in correlation with our case.

Key Words: Cerebral calcification. Dementia. Fahr's disease. Parkinsonism.

INTRODUCTION
The occurrence of bilateral calcification in the basal ganglia associated with hypoparatyroidism, idiopathic or postoperative and pseudohypoparathyroidism is well known (1,2). Two-thirds of the patients with symmetrical calcification of the basal ganglia were found to have either of these pathologies (1). Other causes include toxoplasmosis, encephalitis, tuberous sclerosis, anoxia, idiopathic nonatherosclerotic cerebral calcification (INCC) and familial basal ganglia calcification (1,3,4). Harrington, et al (5) described 24 conditions in association with radiologically identified basal ganglia calcification. When the pathology is lenticulodentate calcification differential diagnosis is between hypoparathyroidism, idiopathic and familial causes (6). A retrospective study from our institution consisting of a review of 7120 CT scans revealed only one case to have an idiopathic cause (7). We recently encountered such a patient with INCC with normal calcium metabolism who presented dementia-parkinsonism complex and would like to present the clinical and radiological features.

CASE HISTORY
A 44-year-old man was seen with a six month history of continuous facial grimacing and dysarthria. His speech was slow and he was trying hard to find appropriate words.

Family history and general examination were unremarkable. On neurological examination he was found to have intellectual deterioration which was later verified by Bender-Gestalt Visual and Motor Coordination Test to suggest organic disturbance. Recent memory and calculation were also severely impaired. Cranial nerve functions were intact except for dysarthria. Power and sensation were normal with downgoing plantar responses. Tendon reflexes were brisk. He also did have mild ataxia. No abnormality concerning extrapyramidal system was observed except a mask face and bradykinesia.

Plain skull x-rays showed calcification in the basal ganglia, crescentic radioopacities deep in the white matter and nodular calcifications in the posterior fossa, all being symmetrical. A CT-scan demonstrated symmetrical conglomerous calcifications in the basal ganglia, periventricular white matter, thalamus and cerebellar dentate nucleus (Fig 1a, 1b).

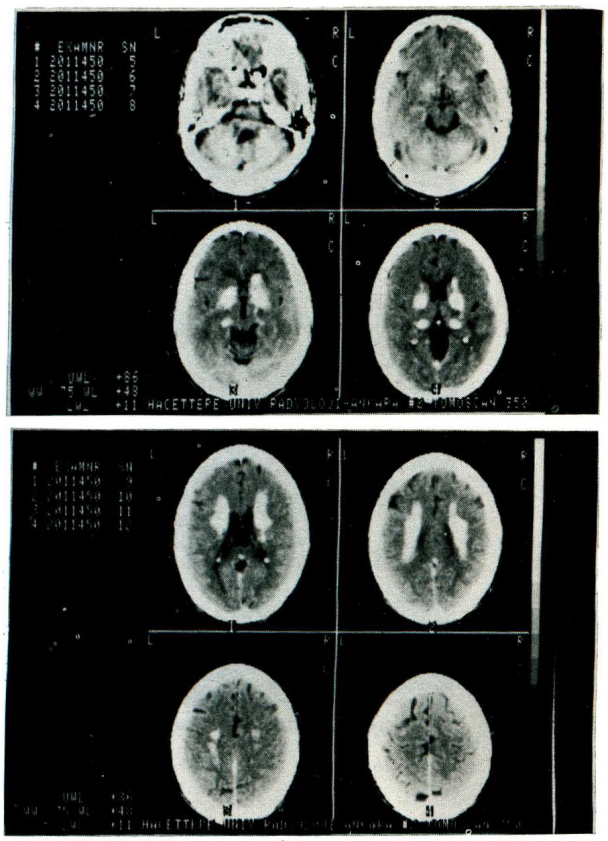

Fig 1a - b: Axial CT-scans showing bilateral calcification in globus pallidus, caudate nucleus, thalamus, dentate nucleus and periventricular white matter.

Hemogram was normal and urinalysis was negative. Blood biochemistry results except for a trigliseride value of 190 mg% (N:25-170) were within normal range. Serum calcium and inorganic phosphate values were 9.8 mg, 10.1 mg (repeated) and 3.9 mg, 4.5 mg per 100 ml respectively. Ionized calcium value was 1.18 mg% (N: 1.16-1.29). Parathormone level was within normal range (0.98 ng/ml [N:0.4-1.4]). Serum magnesium was 2.05 mg% (N:1.88-3). Serum copper and ceruloplasmin values were 98 microgm per 100 ml and 260 U respectively. Serum zinc was also normal (100 microgm per 100 ml) (8).

Triiodothyronin (N:0.52-1.75) and thyroxine (N:4.80-12.8) values were 1.22 and 8.87 respectively. Venereal Disease Research Laboratory (VDRL) test was negative. Serology for toxoplasma (Sabin-Feldman dye test) was negative.

Chest x-ray as well as the x-ray of the hands were normal. No urinary opacities were seen on intravenous pyelograms. An EEG was interpreted as normal.

A lumbar puncture was then performed only to show normal protein and glucose values with no cells. Syphilis tests in the CSF were also negative. CSF copper and zinc values were 12 and 4 microgm per ml respectively both being normal (8).

Plain skull-rays of his two brothers and one sister as well as of his three children were normal.

CLINICAL COURSE

Biperidine 5mg tid was started and he seemed to benefit after the fifth day of the medical treatment. Some objective criteria also existed as the resolution of grimacing and bradikinesia but dementia persisted. The patient is well at 6 months follow-up.

DISCUSSION

Idiopathic nonarteriosclerotic calcification related to vessels in the basal ganglia, dentate nucleus, cerebral and cerebellar white matter is a rare condition generally termed as Fahr's disease. In his original paper 'Idiopathic calcification of the cerebral vessels', Fahr reported a 50-year-old man with symmetric calcification in the basal ganglions, dentate nucleus and cerebral cortex (9) and this was by no means a familial case. In fact, such an abnormality was described as early as 1856 (10) but beared no name until 1930. After Fahr's description, the term Fahr's disease has been a misnomer since some authors used this term for familial calcification cases (3,11,12). Actually, it was Fritzsche (13) in 1935 who described the relationship of intracranial calcification with heredity in his analysis of 3 siblings with clinical symptoms of mental retardation, dysarthria and epilepsy and with symmetrical calcifications in the basal ganglia. Since then only 15 families have been described in the literature with a suggested autosomal dominant inheritance (14,15). Thus idiopathic nonarteriosclerotic cerebral calcification and familial basal ganglia calcification are distinctly different entities. For the sake of clarity INCC is more appropriate to describe our case and many others with normal calcium metobalism and noninherited manner.

Extrapyramidal signs and ataxia dominate the clinical picture of the disease. Seizures and dementia may also accompany. The clinical course is usually progressive and medication is only palliative for a better quality of life.

A recent histopathological study showed that the calcific deposits in INCC were a mixture of glycoproteins, mucopolysaccharides, calcium salts and iron. Local metabolic disturbance of glial cells, especially of oligodendroglial cells was found to be the primary change with subsequent deposition in the capillaries (16). Abnormal metabolism of porpyrin in Fahr's disease was also suggested but has to be excluded since the case reported did have a co-existing pseudohypoparathyroidism (12). Pronicka et al suggested that pathomechanism of hypoparathyrodism and Fahr's disease might be similar. After a complete endocrinologic evaluation of a patient with so-called idiopathic calcification they were able to show a markedly decreased phosphaturic response to parathormone with normal urinary cyclic adenosinomonophosphate response and with no hypocalcemia (17).

In conclusion, in patients presenting with dementia associated with signs of parkinsonism, lenticulodentate calcification might well be the cause and to name the pathology which is crucial, calcium metabolism and inheritance should be investigated.

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