Disruption of the outer retinal layers as the only ocular manifestation of neuronal ceroid lipofuscinosis: case report

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Purpose

To report a case of neuronal ceroid lipofuscinosis type 11 in a young man with low vision.

Methods

Review of the patient's medical record.

Case Report

Male patient, 20 years old, adopted in early childhood, started at the age of 3 with behavioral changes and learning difficulties. At the age of 10, he began to show incoordination, progressive loss of visual acuity and seizures. Clinical and neurological examination showed hypertelorism, preauricular pits, microcephaly, dysarthria, orofacial choreic movements and cerebellar ataxia.

On ophthalmologic examination, preserved extrinsic ocular motility, isochoric and photoreactive pupils, absence of relative afferent pupillary defect. Corrected visual acuity was 20/200 (OD) and 20/100 (OS). Biomicroscopy examination without relevant alterations. Fundus of both eyes (OU) with subtle inferior temporal pallor, with a decrease in ateriovenous caliber. In a database, blue autofluorescence picture is available (image 1).

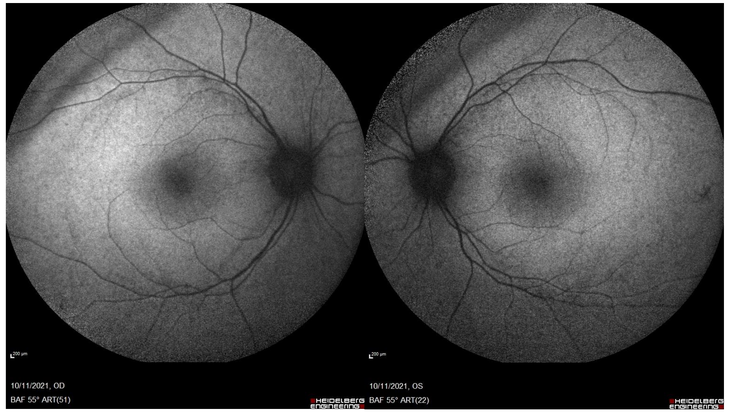

Image 1: Blue autofluorescence picture of both eyes

Performed visual field with diffuse loss of sensitivity (Image 2) and OCT with diffuse loss of the outer retinal layers (Image 3).

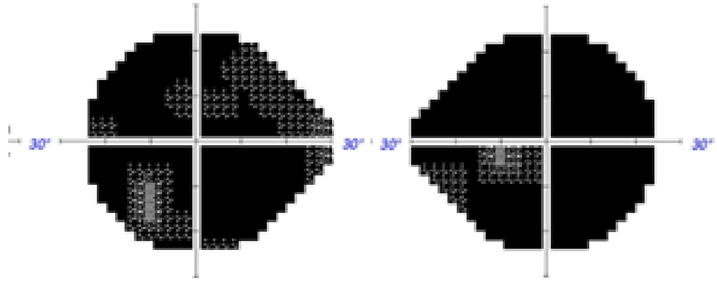

Image 2: Visual field of both eyes, under reliable parameters, demonstrating diffuse loss of sensitivity

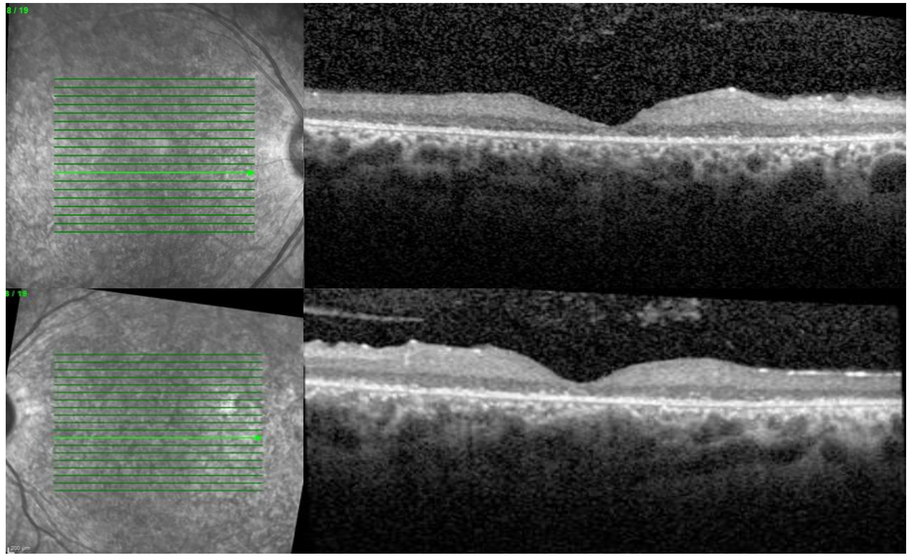

Image 3: Macular OCT of both eyes revealing loss of outer retinal layers.

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After ruling out infectious diseases with negative serological tests, there was a diagnostic suspicion of rod-cone dystrophy.

Full-field ERG (Diagnosys LLC) was recorded following ISCEV standard recommendations, with dark adapted protocol (20 min in the dark) using flashes of white light in two steps (0.01 and 3.0 cd.s/m^2) and a light-adapted protocol (10 min. 30 cd.s/m^2) using flashes of white light (6,500 K; 4 ms) in 2 steps (3.0 cd.s/m^2) and flicker 30Hz (**Image 4**).

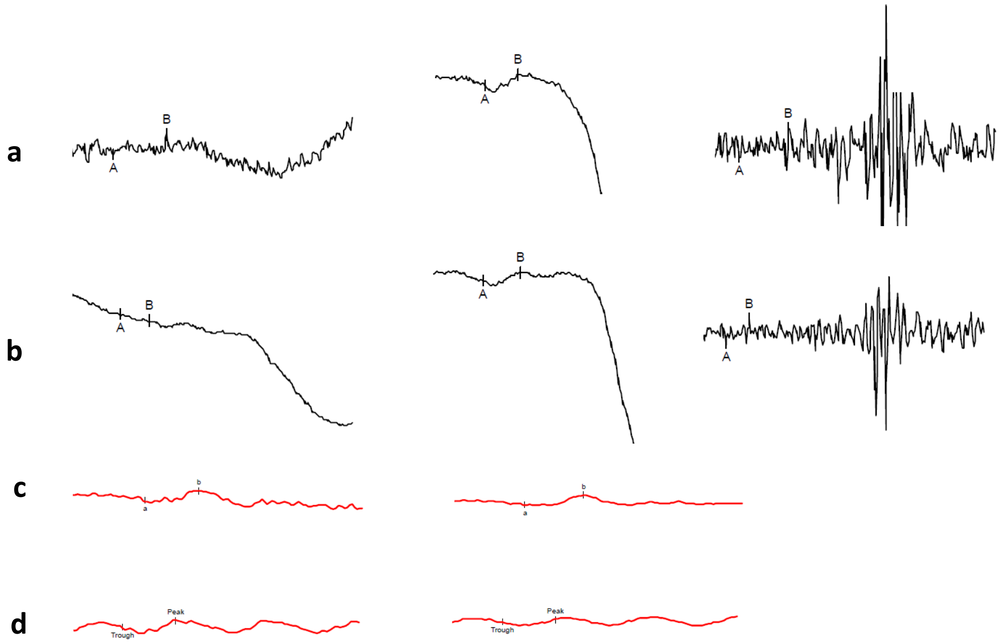

Image 4: ERG results showing decreased responses in all phases tested
(a) Scotopic OD
(b) Scotopic OS
(c) Photopic OU
(d) Flicker OU

Multifocal ERG was also performed, following ISCEV recommendations (**Image 5**).

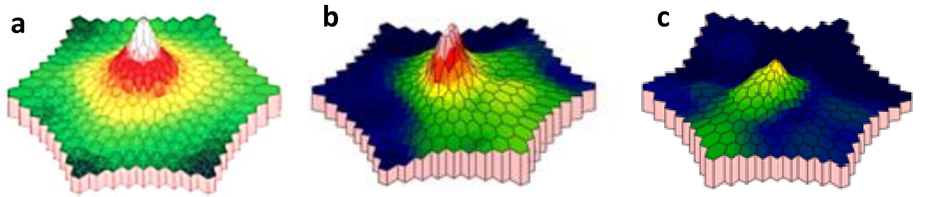

Image 5: Graphic representation of the multifocal ERG performed on the patient. (a) shows a normal result; (b) patient's OD; (c) patient's OS.

Electroretinography (ERG) showed abolished scotopic and subnormal photopic phase on full-field ERG (Image 4) and reduced foveal threshold amplitude in OU on multifocal ERG (Image 5).

The patient also underwent investigation with laboratory, genetic and imaging studies.
Magnetic resonance imaging of the brain showed cerebellar atrophy. Electroencephalogram performed at 18 years old showed moderate disorganization of baseline activity.
Whole exome sequencing identified a homozygous class 4 nonsense variant in the GRN gene (p.I235FS), an alteration associated with neuronal ceroid lipofuscinosis type 11, concluding the diagnosis.

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Discussion

Neuronal ceroid lipofuscinoses (NCL) are a group of genetically determined neurodegenerative diseases characterized by the accumulation of ceroid pigment in lysosomes leading to neurological and organ dysfunctions[1].

To date, 14 distinct types have been described, with geno and phenotypic variability. NCL11 is extremely rare. Pathogenic biallelic variants in the progranulin gene (GRN) are a known cause[2]. Clinically, NCL11 presents in the second decade of life with cerebellar ataxia, epilepsy, retinitis pigmentosa, cognitive decline and visual loss due to retinal dystrophy[3].

NCL 11 is extremely rare and we describe the clinical and laboratory characteristics identified in our patient. The real prevalence of this disorder in the Brazilian population remains unknown and additional studies need to be carried out.

References

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