CLINICAL PRACTICE

Neonatal SCA2 Presenting With Choreic Movements and Dystonia With Dystonic Jerks, Retinitis, Seizures, and Hypotonia

Marcela Amaral Avelino, MD,^{1,*} José Luiz Pedrosa, MD, PhD,² Antonio Orlacchio, MD, PhD,^{3,4} Orlando Graziani Povoas Barsottini, MD, PhD,² Marcelo Rodrigues Masruha, MD, PhD¹

Autosomal-dominant SCAs are a clinically, genetically, and pathologically heterogeneous group of degenerative disorders, mainly affecting the cerebellum and its connections. Although most commonly characterized by progressive cerebellar symptoms, a plethora of so-called nonataxia features may develop and become a diagnostic challenge.

SCA2 is caused by an abnormal expansion of a CAG repeat in *Ataxin-2* (*ATXN2*) gene, located on chromosome 12 (12q24.1). Normal CAG alleles range from 15 to 32 repeats. The disease usually presents with adult-onset progressive cerebellar ataxia, dysarthria, nystagmus, slow saccadic eye movements, and peripheral neuropathy.^{1,2} Childhood onset is uncommon and is frequently associated with larger triplet expansions (>100 repeats) and presents with multisystem involvement beyond the aforementioned neurologic symptoms, such as developmental delay, hypotonia, pigmentary retinopathy, seizures, dysphagia, and early death.^{3–6} Herein, we describe a patient with neonatal-onset SCA2 that presented with choreic movements and dystonia with dystonic jerks, retinitis, seizures, and hypotonia as prominent clinical features instead of ataxia, resembling a global encephalopathy.

Case Report

A 1-year-old Brazilian girl presented to our hospital with motor developmental delay. The patient was born to unrelated Brazilian parents (without known ancestry) at term after an uncomplicated pregnancy. During the neonatal period (first month), she presented hypotonia, dysphagia, and frequent gastroesophageal reflux. Tonic seizures started at the third month of age and temporally resolved with low doses of carbamazepine. Over the subsequent months, the child remained hypotonic with increased feeding difficulties, and involuntary movements

started, characterized by choreic movements and dystonia with dystonic jerks (see Video). After the first year, seizures returned and carbamazepine was replaced by valproate with good response. She never acquired head control or appropriated tonus. There was no obvious dimorphism. The family history was remarkable for a dominant undetermined ataxia on the father's side of the family (Fig. 1). Her father developed ataxia and slow saccadic eye movements at around 30 years of age.

Neurological examination revealed decreased tonus and global decreased tendon reflexes. She did not track to sound, and the parents had a concern about her ability to see and hear. She was unable to reach for objects with her hands as a result of appendicular ataxia. Visual fixation was poor, and erratic eye movements and ophthalmoparesis were observed. Fundoscopy disclosed abnormal retina, with white dots, suggesting retinitis punctata albescens (Fig. 2). Brain MRI showed marked cerebellar and brainstem atrophy. There was mild delayed myelination. General blood tests, screening for inborn errors of metabolism and cerebrospinal fluid analysis, resulted as normal. A genetic test confirmed SCA2, with 104 CAG repeats (normal range: from 15 to 32).

Discussion

SCA2 is the second most frequent SCA subtype worldwide, after SCA3. Symptoms onset usually in adulthood between 20 and 40 years. It is classically characterized by progressive cerebellar ataxia, slow saccadic eye movements, and peripheral neuropathy. The definitive diagnosis of SCA2 is based on genetic testing, when abnormal CAG trinucleotide repeat expansion of the *ATXN2* gene is detected.^{1,2} CAG repeat extension is unstable in intergenerational transmission, showing a tendency to further expansion over successive generations. SCA2 exhibits an

¹Department of Neurology, Division of Child Neurology, Universidade Federal de São Paulo, São Paulo, Brazil; ²Department of Neurology, Ataxia Unit, Universidade Federal de São Paulo, São Paulo, Brazil; ³Laboratorio di Neurogenetica, Centro Europeo di Ricerca sul Cervello (CERC) - Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS) Santa Lucia, Rome, Italy; ⁴Dipartimento di Medicina dei Sistemi, Università di Roma "Tor Vergata", Rome, Italy

*Correspondence to: Dr. Marcela Amaral Avelino, Department of Neurology and Neurosurgery, Universidade Federal de São Paulo, 715 Napoleão de Barros Street. São Paulo, Brazil 04024-002; E-mail: marcelavelino@yahoo.com.br

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Ethics approval: Because this was an observational case study with permission from the patient, a formal review by the institutional review board at our institution was not required.

Ethical statement: Full consent was obtained from the patient's parents before publication.

Relevant disclosures and conflicts of interest are listed at the end of this article.

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Figure 1 Pedigree of the Brazilian family with SCA2 described in this report. The arrow indicates our patient.

Figure 2 Note the large number of white dots (arrow) and the distribution inside the macular arcades with central foveal sparing.

inverse relationship between CAG repeat size and age of onset; this explains the marked anticipation of symptoms onset in approximately 20 years/generation.^{3–6}

Almost all types of movement disorders may be observed in SCAs. The most frequent extrapyramidal signs observed in SCA2 include parkinsonism and dystonia.^{1,2,7,8} However, there is no report of neonatal-onset SCA2 presenting with choreic movements and dystonia with dystonic jerks. Di Fabio et al. described a 4-month-old girl with SCA2 who presented with spontaneous dyskinetic movements.⁵ Additionally, choreoathetosis may be rarely observed in neonatal dentatorubral-pallidoluysian atrophy (DRPLA).⁹

The ocular involvement observed in SCA2 is typically characterized by severe impairment of fast eye-movement component, and saccadic system is much more compromised. Retinal involvement is classically found in SCA7 patients, but not in SCA2. Retinitis pigmentosa has been rarely described in early-onset SCA2 patients; however, to our knowledge, there is no report of SCA2 with the change in retinal pigmentation observed in our patient.^{3–6} In addition, seizures are typical for SCA10 and DRPLA, but not for SCA2. The few reports of SCA2 with seizures were patients with early symptoms onset.^{4,6} We must bear in mind that the following SCAs may have symptoms onset at neonatal period or during the first year of life: SCA7, SCA8, SCA13, SCA27, SCA29, and DRPLA.^{9,10}

In conclusion, this report expands the phenotype of very-early-onset SCA2 (neonatal form) resembling a global encephalopathy, with hypotonia, choreic movements, dystonia with dystonic jerks, seizures, and retinitis. Family history of autosomal-dominant ataxia and marked cerebellar atrophy were crucial to guide the genetic test.

Author Roles

(1) Case Report Project: A. Conception, B. Organization, C. Execution; (2) Genetic Evaluation: A. Organization, B. Execution; (3) Manuscript: A. Writing of the First Draft, B. Review and Critique.

M.A.A.: 1A, 1B, 1C, 3A

J.L.P.: 1B, 1C, 3A, 3B

A.O.: 2A, 2B, 3B

O.G.P.B.: 1B, 1C, 3A, 3B

M.R.M.: 1B, 1C, 3A, 3B

Disclosures

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Supporting Information

A video accompanying this article is available in the supporting information here.

Video. SCA2 patient presenting with involuntary movements, characterized by choreic movements and dystonia with dystonic jerks.