mutations are mild, having resulted in compound heterozygosity associated with a late presenting phenotype.

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Peripapillary Chorioretinal Lacunae in a Girl With 3q21.3 to 3q22.1 Microdeletion With Features of Aicardi Syndrome

Aicardi syndrome is characterized by the classic triad of agenesis of the corpus callosum, seizures, and peripapillary chorioretinal lacunae.1 This disorder occurs exclusively in girls and XXY boys and is presumed to be inherited in an X-linked dominant pattern, although the causative genes involved have not been identified. We examined a girl with a microdeletion on chromosome 3 who was found to have bilateral peripapillary chorioretinal lacunae with other features of Aicardi syndrome.

Report of a Case | A girl was born at 32 weeks’ gestation to a mother with preeclampsia via induced vaginal delivery. At birth, she was noted to have preaxial polydactyly involving her left hand as well as an atrial-septal defect with mild pulmonary valvular stenosis. At age 18 months, she was evaluated for speech and motor delay and staring spells. Examination disclosed a broad flat nasal bridge, epicanthal folds, broad and wide mouth, retromicrognathia, and truncal hypotonia. A chromosomal microarray study revealed a 6-megabase deletion of chromosome 3, spanning from 3q21.3 to 3q22.1.

Ophthalmologic examination showed normal optokinetic responses and reactive pupils with no relative afferent pupillary defect. She had no strabismus, nystagmus, anterior segment anomalies, or refractive error. Retinal examination showed bilaterial peripapillary chorioretinal lacunae. In the right eye, a normal right optic disc was abutted by a cluster of poorly circumscribed chorioretinal lacunae with hyperpigmented borders superotemporally (Figure 1). In the left eye, a dysplastic optic disc was encircled by a cluster of poorly circumscribed de-pigmented chorioretinal lacunae with variably dense fine pigmentation around the borders (Figure 1). The midperipheral retinas showed multiple additional streaky areas of focal retinal pigment epithelial degeneration (Figure 1). Magnetic resonance imaging showed thinning of the corpus callosum, mildly decreased white matter volume with dilation of the posterior aspect of the left lateral ventricle, mild cortical thickening with abnormal deep sulcation involving the right parasagittal lobe, and a cavum septum pellucidum (Figure 2).

Discussion | In 1946, Krause2 first described the ocular findings of Aicardi syndrome in an infant girl with seizures, developmental delay, and gray-white plaques in the retina bilaterally. In 1965, Aicardi et al3 documented the classic findings of this...
syndrome in a series of girls with infantile spasms, absence of the corpus callosum on pneumoencephalogram, and abnormal eye findings (microphthalmia, coloboma, and atrophic chorioiditis). The latter finding corresponds to chorioretinal lacunae, which consist of well-circumscribed, full-thickness defects limited to the retinal pigment epithelium and choroid, with an intact overlying retina that may appear histologically abnormal.1 Subsequent reports documented multiple structural central nervous system abnormalities in Aicardi syndrome including cortical migration anomalies (eg, pachgyria, cortical heterotopia, and polymicrogyria), cysts around the third cerebral ventricle, cerebral hemispheric asymmetry, Dandy-Walker variant, colpocephaly, choroid plexus papillomas, and enlargement of the tectum.4,5 Aicardi syndrome may also be associated with systemic anomalies such as vertebral malformations (eg, fused vertebrae, scoliosis, spina bifida), costal malformations (eg, absent ribs, fused or bifurcated ribs), muscular hypotonia, microcephaly, dysmorphic facies, auricular anomalies, and gastrointestinal tract dysfunction. A constellation of facial anomalies (prominent premaxilla, upturned nasal tip, decreased angle of the nasal bridge, and sparse lateral eyebrows) has also been described in Aicardi syndrome.6

Figure 1. Retinal Photographs

A. High-magnification photographs showing bilateral peripapillary chorioretinal lacunae in the right (A) and left (B) eyes and low-magnification photographs showing multiple midperipheral oblong depigmented areas in the right (C) and left (D) eyes.

Figure 2. Magnetic Resonance Images

A. T1-weighted sagittal magnetic resonance image demonstrating minimal hypoplasia of the corpus callosum (arrow). B. T2-weighted axial magnetic resonance image demonstrating cortical migration anomaly involving the parasagittal right parietal lobe with thickened gyrus (small arrow) abutting the lateral ventricle. There is also bilateral white matter hypoplasia with dilation of the posterior horn of the left lateral ventricle (large arrow) and a cavum septum pellucidum (asterisk).
According to the revised diagnostic criteria,\textsuperscript{6,7} patients can be diagnosed as having Aicardi syndrome when they have 2 of the classic features with 2 other associated findings. Our patient had some clinical features (muscular hypotonia) and neuroimaging features (abnormal corpus callosum, neuronal migration abnormalities) of Aicardi syndrome, but they were not enough to be diagnostic and her facial features did not correspond to those of Aicardi syndrome. Although virtually pathognomonic for Aicardi syndrome,\textsuperscript{1} peripapillary chorioretinal lacunae in girls are seen rarely in other conditions including autosomal dominant microcephaly with lacunar retinal hypopigmentations,\textsuperscript{9} amniotic band syndrome,\textsuperscript{8} oral-facial-digital syndrome,\textsuperscript{10} and oculoauricular syndrome.\textsuperscript{11}

It is hypothesized that Aicardi syndrome arises from a de novo mutation of a gene on the X chromosome.\textsuperscript{4} However, 2 similar cases have been described in patients with a translocation of chromosome 3.\textsuperscript{12,13} Our patient with peripapillary chorioretinal lacunae had a deletion on chromosome 3 that comprised more than 66 genes, none of which have been associated with chorioretinal lacunae. She also had several features of Aicardi syndrome, although she did not meet the current diagnostic criteria. Because our patient was found to have an interstitial chromosomal microdeletion, we recommend that chromosomal microarray testing be performed in girls with chorioretinal lacunae when the neurological and systemic features do not fully correspond to those of Aicardi syndrome.

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COMMENT & RESPONSE

Fundus Autofluorescence Is Not the Best Early Screen for Hydroxychloroquine Toxicity

To the Editor: I was pleased to see pictures of hydroxychlooroquine toxicity in the recent Ophthalmic Images,\textsuperscript{1} as a reminder that the problem still exists. However, some readers may draw an erroneous impression from the caption, which suggests that fundus autofluorescence may “be useful to determine whether patients with macular pigmentary change may continue using hydroxychloroquine.”

The problem is that the image shows “late” toxicity with a visible bull’s-eye, and effective screening nowadays should detect toxic effects well before any visible fundus changes or dark arcuate rings appear on autofluorescence. The early finding in this image is actually the wider hyperfluorescent glow that can be seen before pigmentary damage—but this can be subtle and is less reliable as a primary screening tool. Retinopathy in this patient would have been recognized in fields and on spectral-domain optical coherence tomography long before this autofluorescent bull’s-eye became apparent,\textsuperscript{2,3} and that would have been the optimal time to stop the drug.

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