

was present in 54.5% of patients. Peripheral nerve and muscle involvement is common but not uniformly present in mitochondrial disorders [2].

#### **References.**

1. Packer RJ, et al. *Am J Dis Child.* 1982 Dec;136(12):1057-9.
2. Mancuso M, et al. *Neurol Sci.* 2012 Apr;33(2):449-52.

## **INFECTIOUS DISORDERS**

### **THE RETINA AS A SURROGATE MARKER FOR PEDIATRIC CEREBRAL MALARIA**

Investigators from Malawi-Liverpool-Wellcome Trust Research Program, Malawi; University of Liverpool, UK; Michigan State University, USA; Vancouver General Hospital, Canada; and Ophthalmology Centers in Edinburgh, UK, review the evidence for associations between retina and brain neurovasculature, and the extent to which malarial retinopathy reflects cerebrovascular damage. *Plasmodium falciparum* is the causative organism in the majority of severe malaria cases, particularly in sub-Saharan Africa where children <5 years of age are disproportionately involved. Manifestations of severe pediatric malaria include convulsions, hypoglycemia, hyperparasitemia, coma, and malarial retinopathy. Funduscopic examination reveals white patchy discoloration of the macula, orange discoloration of retinal vessels, retinal hemorrhages with white centers, and papilledema. Associated abnormalities include metabolic acidosis and severe anemia. Duration of illness is short, and most patients either recover or die within 48 hrs. Patients who recover are at risk of neurologic disability and epilepsy.

Sequestration, resulting from binding of parasitized erythrocytes to vascular endothelium, is the hallmark of pediatric cerebral malaria, causing microvascular obstruction in both brain and retina. (MacCormick IJC, Beare NAV, Taylor TE, et al. *Cerebral malaria in children: using the retina to study the brain. Brain* 2014 Aug;137(Pt 8):2119-42).

COMMENTARY. This review illustrates the value of the funduscopic examination in the clinical diagnosis of neurologic disease. Despite some differences, the retinal pathology of microvasculature mimics the cerebral autopsy findings, and retinopathy is a surrogate marker for pediatric cerebral malaria. Both vascular beds are susceptible to sequestration of parasitized erythrocytes, leading to cerebral vascular obstruction, coma, convulsions, and neuropsychological sequelae.

#### **Cerebral Malaria Retinopathy Predictor of Neurocognitive Outcome.**

Investigators at Michigan State University, East Lansing; University of Michigan, Ann Arbor; Blantyre Malaria Project, Malawi; and Liverpool University Hospital, UK, studied the relationship of malaria-specific retinopathy during acute cerebral malaria to neurocognitive sequelae in 49 Malawian children tested 1 to 3 years following illness. Scores on Kaufman (mental processing), and TOVA (inattention and impulsivity) were worse in children with retinal hemorrhages, papilledema, optic disc hyperemia, whitening

of macula and foveal annulus. Achenbach Child Behavioral Checklist (emotional and behavioral) outcomes were not closely associated with retinopathy severity [1].

#### References.

1. Boivin MJ, et al. *Pediatr Infect Dis J*. 2014 Aug;33(8):821-4.

## DISORDERS OF ATTENTION AND BEHAVIOR

### **ADHD, VISUAL SELECTIVE INATTENTION, AND BENIGN ROLANDIC EPILEPSY**

Investigators at Asan Children's Hospital, Seoul, Republic of Korea, performed a retrospective study of the prevalence of ADHD in benign childhood epilepsy with centrotemporal spikes (BECTS) and the factors that affect ADHD or attention impairment in patients with BECTS. Of a total of 198 children diagnosed with BECTS, 74 had neuropsychological examination, and 48 (64.9%) had ADHD. A history of febrile convulsion was more common in patients with ADHD than in those without ADHD ( $p=0.049$ ). Bilateral centrotemporal spikes on EEG were more common in patients receiving ADHD medication than in patients untreated for ADHD ( $p=0.004$ ). Male patients (44/74) with frequent seizures, and patients with sleep EEG with high spike index ( $>40/\text{min}$ ) at diagnosis had significantly lower visual selective attention ( $p<0.05$ ). (Kim E-H, Yum M-S, Kim H-W, Ko T-S. Attention-deficit/hyperactivity disorder and attention impairment in children with benign childhood epilepsy with centrotemporal spikes. *Epilepsy Behav* 2014 Jun 26;37C:54-58).

COMMENTARY. In children with BECTS and ADHD, frequent seizures or interictal epileptiform abnormalities are closely related to impairment of visual selective attention. Previous studies of the relation of attention impairment to epilepsy and ADHD have demonstrated a link between the side of the epileptic EEG focus and the type of learning deficit. A focus in the right hemisphere is associated with impaired visuo-spatial processing [1].

In a study of 30 children with BECTS and 13 with Panayiotopoulos syndrome, only children with BECTS showed a strong tendency toward a rightward bias in attentional orientation. Right rolandic spikes aggravate subclinical reorienting difficulties. These findings provide new evidence for alterations of attentional mechanisms by interictal epileptic activity, which may contribute to learning difficulties [2]. Children with early-onset benign childhood occipital seizures (Panayiotopoulos syndrome) show selective learning disabilities involving visual-spatial memory and other cognitive dysfunctions [3].

#### References.

1. Piccirilli M, et al. *Epilepsia*. 1994 Sep-Oct;35(5):1091-6.
2. Bedoin N, et al. *Epilepsy Behav*. 2012 Sep;25(1):81-91.
3. Germano E, et al. *Epilepsy Res*. 2005 May;64(3):137-50.