

## Cognition in childhood-onset epilepsy

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In this issue of *Jornal de Pediatria*, Sousa-Oliveira et al.<sup>1</sup> report on the cognitive outcomes of children with epilepsy. Over the past several decades, it has become increasingly evident that cognitive dysfunction is an important comorbidity of childhood onset epilepsy and that it must be recognized. The current study adds to our understanding of this issue.

In 1986, Ellenberg et al.<sup>2</sup> reported that the IQ of a population based cohort of children with epilepsy at age 7 did not differ significantly from that of their siblings and that there was no decline between age 4 and 7. While there is still controversy whether there is any cognitive deterioration in most children, it has been increasingly recognized that, while the prognosis for seizure remission is often favorable, that of the cognitive and behavioral morbidities is less so. These comorbidities of epilepsy are significant even in children who are medically controlled. Sillanpaa et al. reported that in a cohort of adults followed prospectively since childhood with childhood-onset epilepsy there was a higher rate of only completing primary education, of being unmarried and not having children and being unemployed compared with population based controls.<sup>3</sup> These results were true even in the subgroup of children with idiopathic/cryptogenic epilepsy who were doing well in terms of being seizure free off medications for many years. The negative impact persisted for many years as even those who were seizure free and off medications were less likely to be driving as adults despite no legal barriers to doing so.<sup>4</sup> More recently Berg et al.<sup>5</sup> described a much higher rate of needing special educational services in a community based cohort of children with epilepsy. Those with medically refractory epilepsy were more likely

to require this. However, children with medically refractory epilepsy are also more likely to have a remote symptomatic etiology,<sup>3,6</sup> which makes the comparison more difficult as these children have brain lesions that may result in impaired cognition independent of their seizures.

Recent studies provide further evidence both for the existence of cognitive deficits at the onset of epilepsy and the impact of seizures on cognition. In the Connecticut cohort, many of the children with epilepsy were identified as cognitively abnormal prior to the onset of their seizure disorder.<sup>5</sup> Fastenau et al.<sup>7</sup> reported in a new onset cohort that

many of these children have neuropsychological deficits already at the time of diagnosis. In a recent study of children with newly diagnosed childhood absence epilepsy, Glauser et al. report that approximately one third of the children had deficits in attention and executive function at diagnosis prior to treatment with antiepileptic drugs and that these deficits persisted even after successful treatment with medications.<sup>8</sup> Similarly, Wirrell et al.<sup>9</sup> report a high rate of cognitive and behavioral problems in adolescents who had absence seizures. The rate was higher in those with medically uncontrolled seizures but was substantial even in those whose seizures were controlled.<sup>9</sup> Finally, Hermann et al.<sup>10</sup> reported changes in cerebral gray and white matter over time in children with epilepsy, which further raises our concerns.

The current study<sup>1</sup> is unusual in that it has substantial numbers of children in all three groups (medically controlled, medically uncontrolled and surgically controlled). This makes the results very interesting as most studies do not include all three groups. However, it is somewhat difficult to compare

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the results across the groups as the medically refractory group has, as expected, a higher proportion of remote symptomatic etiologies than the medically controlled group, which are expected to result in impaired cognition. It is also difficult to compare those with uncontrolled seizures to those with surgically controlled seizures as children with surgically remediable epilepsy are likely to have a more focal discrete lesion than those who are not surgical candidates. These difficulties arise from the differences in the distribution of underlying brain pathologies in the different groups rather than from a flaw in the study. Despite these methodological issues, there are two striking findings in this study. The first is that there was not significant difference between the medically controlled and the surgically controlled groups in terms of mean IQs, while in the normal range, the mean IQs are substantially lower than what one would expect to find in a normal control group. This is consistent with what other studies have found for the medically controlled group<sup>7-9</sup> and reflects the increased need for careful educational screening and intervention even in those children whose seizures are fully controlled. The second is that, as a group, the children with successful surgical outcomes did as well as the medically controlled group. This highlights the importance of intervening early in cases which are medically refractory and have a surgically remediable lesion. Pediatric epilepsy surgery is now being utilized at much earlier stages than previously<sup>11</sup> in an attempt to prevent the exacerbation of the comorbidities in children with medically refractory epilepsy and allow them to function in school during their formative years when the outcome is most modifiable. Favorable outcomes have been reported with early intervention.<sup>12</sup> The current results<sup>1</sup> further emphasize the importance of successful control of seizures whether medically or surgically while highlighting the need for careful attention to the cognitive comorbidities in all children with epilepsy.

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