

Epilepsy and sleep

Several articles in this issue reinforce Aicardi's dictum that in epilepsy, seizures are only the tip of the iceberg.¹ They remind us that epilepsy is a symptom of a brain disorder and that children with epilepsy can have extra needs that may or may not be due to the epilepsy itself. Rightly, there has been increasing emphasis that proper medical management encompasses more than 'just' seizure control. Quality of life measures in childhood epilepsy are still not perfect, but they suggest only a moderate association with seizure control.² Social inclusion, lifestyle restrictions, effects on family life, associated physical impairments, learning and/or behaviour difficulties, and unwanted effects from treatment are all recognized as major factors, as well as seizure frequency and severity. More recently we are finding how prevalent attentional difficulties, including attention-deficit-hyperactivity disorder, are in children with epilepsy and the importance of sleep problems.³

The inter-relationship of sleep and epilepsy is complex. The effects of sleep on epilepsy have been well documented.⁴ For example, in juvenile myoclonic epilepsy, myoclonic and tonic-clonic seizures occur mainly after awakening, sleep deprivation precipitates seizures, and during sleep EEG discharges are rare. In primary generalized tonic-clonic epilepsy, seizure frequency tends to peak at the beginning and end of sleep, with increased EEG discharges during non-rapid eye movement sleep. In frontal lobe epilepsy, seizures are more frequent during sleep and in temporal lobe epilepsy during the day. In West Syndrome, seizure clusters are linked to waking and sleep EEGs show an increase in hypsarrhythmic patterns or a change to a pseudo-periodic pattern. In Landau Kleffner and related syndromes a continued epileptiform discharge during slow wave sleep is associated with loss of cognitive function and behaviour change, including rage attacks. Sudden unexplained death in epilepsy is more common during sleep.⁵ Why these associations occur is still a matter for research, but in diagnostic terms they are useful. They are also relevant to the frequent concern of carers whether their child might be having seizures while asleep.

The effect of epilepsy, and its treatment, on sleep has been less well examined. In West syndrome a loss of normal sleep patterns on the EEG is a worrying feature. Anticonvulsants can affect sleep architecture and sleep efficiency, e.g. phenobarbital, phenytoin, carbamazepine, and benzodiazepines can reduce sleep latency and/or REM sleep, while sodium valproate and lamotrigine have little effect.⁶ More recently, polysomnographic studies have shown disordered sleep in idiopathic epilepsy, which is linked to poorer daytime attention and behaviour.⁷ In this issue Wirrell et al. show that children with epilepsy are at increased risk of sleep problems, such as sleep latency, sleep fragmentation, parasomnias, and daytime drowsiness. Even when seizure-free they have worse sleep scores than unaffected sibling controls. They also found an association with daytime behaviour difficulties such as attentional or social problems. Finally, poorer sleep scores correlated with reduced quality of life scores in the physical, cognitive, social, and behaviour domains.

The link between disordered sleep and epilepsy is also being explored. Poor quality sleep is associated with daytime inattentiveness.⁸ As well as affecting schoolwork and daily life, this could influence seizure control too. In childhood absence epilepsy, increased alertness is associated with fewer seizures, while in Lennox Gastaut syndrome, fatigue exacerbates seizures and some therapies may do so by a similar mechanism. In addition, a significant percentage of children attending a specialized epilepsy clinic had obstructive sleep apnoea.⁹ Behaviour problems, again including attentional difficulties, were more closely linked to sleep disorders than the severity of the epilepsy.

This means that questions about sleep should be part of the clinical assessment of children with epilepsy. Evidence is accumulating that treatment of obstructive sleep apnoea may improve seizure control.¹⁰ Several studies suggest that melatonin may help in epilepsy.¹¹ The effect of a child's epilepsy on their carer's sleep has not been studied, which might also influence behaviour. To paraphrase Hippocrates, a child with epilepsy should spend the day fully awake and the night properly asleep.

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References

1. Aicardi J. (1999) Epilepsy: the hidden part of the iceberg. *Europ J Paed Neurol* **3**: 197–200.
2. Ronen GM, Streiner DL, Rosenbaum P. (2003) Health-related quality of life in childhood epilepsy: moving beyond 'seizure control with minimal adverse effects'. *Health Qual Life Outcomes* **1**: 36.
3. Pellock JM. (2004) Defining the problem: psychiatric and behavioral co-morbidity in children and adolescents with epilepsy. *Epilepsy and Behav* **5** (Suppl.3): S3–S9.
4. Dinner DS. (2002) Effect of sleep on epilepsy. *J Clin Neurophysiol* **19**: 504–13.
5. Opeskin K, Berkovic SF. (2003) Risk factors for sudden unexpected death in epilepsy: a controlled prospective study based on coroners' cases. *Seizure* **12**: 456–464.
6. Guerink EA, Sheth RD, Gidal BE, Hermann BP. (2000) Effects of anticonvulsant medication on sleep architecture. *Epilepsy Behav* **1**: 378–383.
7. Maganti S, Sheth RD, Gidal BE, Hermann BP. (2005) Sleep architecture in children with idiopathic generalized epilepsy. *Epilepsia* **46**: 104–109.
8. Stores G, Wiggs L, Campling G. (1998) Sleep disorders and their relationship to psychological disturbances in children with epilepsy. *Child Care Health Devel* **24**: 5–19.
9. Becker DA, Fennell EB, Carney PR. (2004) Daytime behaviour and sleep disturbance in childhood epilepsy. *Epilepsy Behav* **5**: 708–15.
10. Foldvary-Schaefer N. (2004) Obstructive sleep apnea in patients with epilepsy: does treatment affect seizure control? *Sleep Medicine* **4**: 483–484.
11. Coppola G, Iervolino G, Mastro Simone M, La Torre G, Ruiu F, Pascotto A. (2004) Melatonin in wake-sleep disorders in children, adolescents, and young adults with mental retardation with or without epilepsy: a double blind, cross-over, placebo-controlled trial. *Brain Dev* **26**: 373–376.