

# PEDIATRIC NEUROLOGY BRIEFS

## A MONTHLY JOURNAL REVIEW

J. GORDON MILLICHAP, M.D., F.R.C.P., EDITOR

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Vol. 24, No. 3

March 2010

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### SEIZURE DISORDERS

#### STIMULUS-INDUCED SEIZURES IN SICK NEONATES

Researchers at New York-Presbyterian Hospital, Cornell Medical College, NY, describe 3 (11.5%) sick neonates with stimulus-induced seizure occurring during continuous video-EEG monitoring of a cohort of 26 neonates July-Dec 2007. Duration of video-EEG monitoring ranged from 1-9 days. The underlying brain injury in the 3 infants affected included stroke (n=2) and resolving grade III intraventricular hemorrhage (n=1). Two were full-term neonates and one a 24 week premature. Stroke or hemorrhage followed surgery for congenital heart disorders in 2 infants. Seizures were subclinical in 2 neonates and both clinical and subclinical in 1. Stimuli inducing seizures were physical such as stroking the forehead, changing position, feeding, and endotracheal suctioning. The episodes lasted <1 min. Two infants were neurologically normal at 7 month and 10 month follow-up, and 1, the premature infant with IV hemorrhage, died. This report emphasizes the utility of video-EEG monitoring and the importance of avoiding unnecessary stimuli in neonates with acute neurologic disorders. (Takenouchi T, Yap VL, Engel M, Perlman JM. Stimulus-induced seizure in sick neonates – Novel observations with potential clinical implications. *Epilepsia* Feb 2010;51(2):308-311). (Respond: Toshiki Takenouchi MD, 525 East 68<sup>th</sup> Street, Box 91, New York, NY 10021.E-mail: [tot9005@nyp.org](mailto:tot9005@nyp.org)).

COMMENT. Stimulus-induced or reflex seizures are reported in children and adults but are largely unrecognized in neonates. A lack of inhibitory cerebral pathways in immature brain is suggested as a possible cause of abnormal reactivity to sensory stimuli in the neonate. The infants reported had intracerebral pathology that would increase cortical hyperexcitability. Continuous video-EEG monitoring uncovers subclinical or

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subtle seizures related to sensory stimuli that otherwise would be overlooked. The differential diagnosis includes idiopathic, reflex myoclonic, startle epilepsy (Ricci S et al, 1995), and hyperekplexia with hypertonia and startle reflexes induced by nose tapping, unaccompanied by electrographic epileptic discharges (Dubowitz LMS et al, 1992; Ryan SG et al, 1992).

## PROLONGED QT DURING EPILEPTIC SEIZURES

Researchers at Western General and Royal Hospital for Sick Children, Edinburgh, UK, measured the corrected QT interval before and during seizures in a prospective study of 39 children, 1 month-16 years of age, with various epilepsies. Of a total of 156 seizures 9 were generalized tonic-clonic (5 patients), 34 absences (6 patients), 12 tonic seizures (6 patients), 27 temporal lobe seizures (14 patients), 58 frontal lobe seizures (4 patients), and 16 subclinical seizures (4 patients). Corrected QT during total seizure data compared to total pre-seizure values showed a statistically significant difference ( $p<0.001$ ). Bazett's formula used to compare QT values found that 21 seizures in 9 patients transiently increased their corrected QT beyond normal limits, with a maximum corrected QT of 512 ms during a right temporal lobe seizure. Significant lengthening of corrected QT cardiac repolarization time during some epileptic seizures may have a role in sudden unexplained death in epilepsy (SUDEP). (Brotherstone R, Blackhall B, McLellan A. Lengthening of corrected QT during epileptic seizures. *Epilepsia* Feb 2010;51(2):221-232). (Respond: Dr Ruth Brotherstone, Department of Clinical Neurophysiology, Western General Hospital, Crewe Road, Edinburgh EH4 2XU, UK. E-mail: [ruth.brotherstone@luht.scot.nhs.uk](mailto:ruth.brotherstone@luht.scot.nhs.uk)).

COMMENT. Measurements of QT in individual patients may show lengthening during some seizures, as in this study, whereas mean QT values for grouped data may be normal, as reported in some previous studies. No evidence of QT prolongation was detected in patients receiving antiepileptic monotherapy or polytherapy in a pediatric group (Kwon S et al. *Pediatr Neurol* 2003;30:99-101).

**Cardiac arrhythmias and Seizures.** In a 2-year review of electrographically confirmed seizures in a pediatric epilepsy-monitoring unit, ictal cardiac arrhythmias occurred in 45% of 244 seizures (40% of the patients). Benign respiratory sinus arrhythmia was the most common arrhythmia (in 78% of seizures with arrhythmias and 70% of patients with arrhythmias). Potentially serious arrhythmias including irregular variable arrhythmias and abnormal QRS intervals were seen in 12% of all the patients. (Standridge SM, Holland KD, Horn PS. *Pediatr Neurol* 2010;42:201-205).

**Enhanced QT shortening and persistent tachycardia after generalized seizures** are reported in a study of 25 patients with medically refractory temporal lobe epilepsy undergoing presurgical investigation at Institute of Neurology, Queen Square, London, UK (Surges R et al. *Neurology* Feb 2, 2010;74(5):421-426). Secondly GTCS led to higher peri-ictal heart rate (HR), persistent postictal tachycardia, and decreased postictal HR variability. Abnormal shortening of the corrected QT interval occurred in 17 patients, mainly with secondarily GTCS. Benign cardiac arrhythmias occurred in 14 patients and