**Childhood Sleep Apnea May Affect Memory, IQ**

**BY BETSY BATES**

**Los Angeles Bureau**

**RANCHO MIRAGE, CALIF.** — Obstructive sleep apnea in children is associated with profound deficits in IQ, verbal comprehension, perceptual reasoning, and primary disorder of vigilance, according to preliminary results of a case-control study at the Pediatric Sleep Disorders Center of Johns Hopkins University, Baltimore.

Ann C. Halbower, M.D., medical director of the center, reported that extensive cognitive deficits and cerebral metabolite alterations were powerfully evident in children from inner-city Baltimore who suffered from moderate to severe obstructive sleep apnea (OSA). This is especially true if the parents can provide supporting evidence, such as a videotape or an audiotape.

In children aged older than 3 years with OSA, 86. Children with OSA, 86. Children with OSA had a mean oxygen desaturation time at less than 95% of 70 minutes, compared with 0 for controls. To capture more clearly, intermediate hypnotic events, the oxygen saturation nadir also was studied, and was 75 for children with OSA and 93 for controls, a statistically difference with a significance of 0.0002. The apnea/hypopnea index showed that children in the study had severe OSA, with a mean score of 28.1 compared with 0.3 for controls.

Researchers conducted two forms of magnetic resonance spectroscopy to attempt to pinpoint any cerebral metabolite alterations that might be correlated with respiratory parameters and neuropsychological test results. A global brain assessment involved with general magnetic resonance spectroscopy imaging (MRSI) and a single voxel image tool was used to explore metabolites within the anterior hippocampus on the left side.

Just six children with OSA and six controls have completed these studies. However, preliminary results identified a “very significant” decrease in N-acetylaspartate/choline (NAA/Cho) ratios and choline/creatine (Cho/Cr) ratios in the hippocampal regions of children with OSA compared with the controls.

**Extensive cognitive deficits and cerebral metabolite alterations were evident in children with moderate to severe sleep apnea.**

**BY ROBERT FINN**

**San Francisco Bureau**

**PORTLAND, ORE.** — Polysomnography may be the gold standard in the diagnosis of obstructive sleep apnea, but in children it should be reserved for high-risk patients, Mark A. Richardson, M.D., said at a conference sponsored by the North Pacific Pediatric Society.

In children aged older than 3 years with no underlying condition, a history and a physical exam with findings of adenoids or tonsillar hypertrophy often provide the basis for recommending surgery, said Dr. Richardson, associate professor of Health and Science University in Portland. This is especially true if the parents can provide supporting objective information about the child’s snoring, such as a videotape or an audiotape.

“I think if you have an otherwise healthy patient with a consistent and chronic history of obstruction at night, that’s probably all you really need to have,” Dr. Richardson said. Polysomnography has several disadvantages. It’s expensive, it’s unavailable in some areas, and the experience of being in a sleep lab overnight may affect the child’s normal sleep cycle. The study was also subject to false positives and false negatives, especially when an abbreviated “nap” study is used. Furthermore, polysomnographic results do not correlate well with the behavioral disturbances that about 40% of children with sleep disorders exhibit. Simple snoring and a positive pediatric sleep questionnaire, on the other hand, do correlate with those behavioral disturbances, which include attention-deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder, and primary disorder of vigilance.

“To me, that suggests that somehow we are missing something on the polysomnogram that is important and is also a parietal lobe function that has not received a lot of press,” Dr. Richardson said at a conference on sleep in infancy and childhood sponsored by the Annenberg Center for Health Sciences. Group differences in IQ were mostly explained by sharply defined deficiencies in working memory, nonverbal reasoning, and verbal reasoning among children with OSA.

Magnetic resonance spectroscopy determined that neuropsychological functions most impacted by sleep apnea in adults were not significantly impaired in children with OSA. These included certain executive functions such as problem solving, planning, inhibitory control, sustained attention, and response preparation.

Motor speed and cerebral perceptual/motor timing appeared unaffected as well. When respiratory parameters were assessed, children with OSA had a mean oxygen desaturation time at less than 95% of 70 minutes, compared with 0 for controls. To capture more clearly, intermediate hypnotic events, the oxygen saturation nadir also was studied, and was 75 for children with OSA and 93 for controls, a statistically difference with a significance of 0.0002. The apnea/hypopnea index showed that children in the study had severe OSA, with a mean score of 28.1 compared with 0.3 for controls.

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**Sleep-Disordered Breathing May Lead to Irreversible Cognitive Deficits**

**BY SUSAN VOLKMAR**

**Contributing Writer**

**ATLANTA** — Cognitive deficits in children treated for sleep-disordered breathing may not be totally reversible, Jane F. Gaultney, Ph.D., of the University of North Carolina-Charlotte, and her associates reported in a poster session at a meeting of the Society for Research in Child Development.

Fragmented sleep may impair cognition in children even more than in adults because children are experiencing rapid neurobehavioral development, they said.

In a study of 41 children seen by a pediatric sleep physician, overnight polysomnograms were done and medical histories were taken. Twenty-seven children were diagnosed with sleep-disordered breathing and 14 with sleep-disordered breathing and periodic limb movement. Most were treated with adenosinestilatol.

The children also were given a battery of psychological tests, including one that estimates verbal IQ, on Saturday mornings at the pediatrician’s office. Children were retested by the researchers several months later, after parents reported that their sleep disorder seemed to have resolved.

Verbal IQ was negatively associated with measures of episodes of apnea and hypopnea (events in which breathing is restricted but does not stop completely). It also was negatively associated with the number of awakenings associated with those events and with minimal oxygen saturation during periods of REM sleep, although not with non-REM sleep periods.

The number of arousals associated with apnea or hypopnea significantly explained IQ variance beyond what was explained by minimal oxygen saturation level or the apnea/hypopnea index. This finding raises the question of whether it is the poor gas exchange associated with sleep-disordered breathing or the fragmented sleep patterns as indicated by arousals, which best explained decreased IQ scores, Dr. Gaultney and her associates said.

Apnea and hypopnea indices were obtained by averaging the number of events per hour over total sleep times recorded. A regression analysis was done, and the result was found to be significant. In the 15 children for whom data were obtained before and after treatment, cognition scores did improve, but the result was not statistically significant. This suggests that the deficits in cognition were not reversed.