Children With Epilepsy Show Bone Deficits

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A new study of children with epilepsy has found that their bone mineral density declines steadily relative to controls, starting perhaps even in the first year of treatment.

The study compared 82 children with epilepsy with 32 age- and sex-matched, first-degree cousins, measuring their bone mineral density (BMD) with dual-energy x-ray absorptiometry. The 82 patients were all ambulatory and without any other conditions that might affect bone density, investigators reported. Their ages ranged from 6 to 18 years, with a mean age of 12 years.

The investigators found that the 18 subjects who had had epilepsy less than 1 year had a mean BMD *z* score of 0.23. The 37 subjects who had epilepsy for 1-5 years had a mean BMD *z* score of 0.13. And the 27 subjects who had epilepsy for 6 years or longer had a mean BMD *z* score of 0.06, reported Dr. Raj D. Sheth, director of the comprehensive epilepsy program at the University of Wisconsin, Madison, and colleagues.

By comparison, the control subjects had a mean BMD *z* score of 0.57.

The difference between the mean score of the control group and the mean score of the subjects who had had epilepsy for less than a year did not reach statistical significance; however, the difference between the controls and the other subjects did.

"These findings suggest that as little as 2 years of treatment could result in significant reductions in BMD," Dr. Sheth wrote (Neurology 2008;70:170-6).

The study was not able to investigate the role of specific medications in the bone density loss observed, in part because many of the patients had been on more than one drug at some time in their treatment.

Information from adults suggests medication plays a role in bone density loss, but the cause is probably multifactorial, Dr. Sheth said.

The study did compare subjects with partial epilepsy with those with generalized epilepsy, however. The investigators found that while those with generalized epilepsy for longer than 1 year had a significantly lower mean *z* score than controls, those with partial epilepsy had a mean score that was only slightly lower. The difference was not statistically significant.

Interestingly, the study found that calcium intake for the study subjects was somewhat higher than national averages.

Two patients actually experienced a pathological fracture while the study was underway. The evidence suggests that 40% of fractures that occur in individuals with epilepsy are pathological; among children with epilepsy, it's 20%, Dr. Sheth said.

One of the fracture patients was a 17-year-old female who fractured her clavicle during a seizure and fractured her leg while walking. She had experienced epilepsy for 15 years and her *z* score was –3.5. The other patient had had epilepsy for 12 years and had a *z* score of –2.5. She fractured her arm during a fall.

In an editorial accompanying the study report, Dr. Edwin Trevathan noted that most physicians consider osteopenia and BMD loss to be a problem for white, postmenopausal women, and for patients who smoke, have renal disease, or take corticosteroids (Neurology 2008;70:166-7).

But a previous study found that young adults who have epilepsy have a risk of BMD loss or fracture that is 2-6 times greater than the general population.

"We can probably prevent epilepsy-associated [BMD] loss, and the published data now demand that we make this a priority in epilepsy research and clinical practice," wrote Dr. Trevathan, director of the National Center on Birth Defects and Developmental Disabilities at the Centers for Disease Control and Prevention, Atlanta. "Early intervention shortly after starting treatment for epilepsy among children, adolescents, and young adults should probably be a focus of screening and prevention efforts. Among the elderly with new-onset epilepsy, screening and prevention efforts may need to be started as soon as antiseizure medications are initiated."

Prophylactic treatment with calcium and vitamin D of children with epilepsy may be useful, but the correct dosage has never yet been determined, Dr. Sheth said.

The study was funded in part by an investigator-initiated grant from GlaxoSmithKline Inc., which makes treatments for epilepsy and osteoporosis. Dr. Trevathan previously served as an investigator for a GSK epilepsy treatment. ■