Bone Area Also Affected

Vitamin D from page 1

were considered vitamin D deficient. Among 556 neonates, those whose mothers were vitamin D deficient had lower mean bone mass than did those whose mothers were vitamin D replete, at 119 cm². Mean bone mineral content of babies of vitamin D deficient mothers was also lower at 58 g, compared with 63 g in those whose mothers were replete, Dr. Harvey said at the meeting, which was sponsored by the International Osteoporosis Foundation.

Previous work by Dr. Harvey’s group had suggested that the reduced bone mass in babies whose mothers were vitamin D deficient was mediated by levels of venous umbilical cord calcium (Lancet. 2006;367:16-43). “This finding set us to thinking about placental calcium transport as a key factor,” he said.

Although placental calcium transport has not been fully characterized in humans, it appears that calcium crosses from the maternal circulation by facilitated transporters and is carried across the cytosol bound to calcium-binding proteins, Dr. Harvey explained.

Although calcium taken into fetal circulation across a sodium-calcium exchanger or, more critically, by a series of adenine triphosphate-dependent plasma membrane calcium transporters that are known as PMCA 1 through 4. The result is a positive calcium gradient from the mother to the fetus, he said. PMCA gene expression was measured in placental tissue obtained from 70 healthy deliveries in this cohort within a half hour of birth.

The tissue was frozen in liquid nitrogen, the RNA was extracted using a commercial kit, and quantitative real-time polymerase chain reaction was used to measure the levels of RNA for the PMCA genes. After controlling for beta-actin gene expression, Dr. Harvey said, PMCA3 mRNA expression predicted neonatal whole body bone area, placental weight, and birth weight.

“We have demonstrated that expression of a placental calcium transport gene is associated positively with bone area and mass in the offspring, and we suggest that this may explain at least in part the mechanism whereby the mothers’ vitamin D status influences the neonate’s bone mass,” he said.

“Further elucidation of this process may allow development of novel strategies to optimize childhood bone mineral accrual and to decrease the occurrence of osteoporotic fractures in future generations,” Dr. Harvey said.

Low BMD Predicts Scoliosis Progression in Adolescents

BY NANCY WALSH
New York Bureau

TORONTO — Low bone mineral density in patients with adolescent idiopathic scoliosis is predictive of worsening of the spinal curvature, according to findings from a new Chinese study presented at a world congress on osteoporosis.

Previous studies have shown that adolescent idiopathic scoliosis (AIS) patients have significantly lower bone mass than do age- and sex-matched controls, but it has not previously been determined whether low bone mineral density (BMD) should be added to the list of risk factors for progression, according to Dr. VWY Hung of the department of orthopedics and traumatology, Prince of Wales Hospital, the Chinese University of Hong Kong.

In order to address this, researchers enrolled 324 girls with AIS and 276 controls aged 11-16 years in a prospective study. On recruitment, all had lumbar spine and bilateral femoral BMD measurements using dual energy x-ray absorptiometry (DXA), and age-adjusted z scores were calculated. Patients with scores of –1 or less were considered to have osteopenia, and progression of the spinal curvature was defined as an increase of 6 degrees on any two sequential spinal x-rays.

The hips were defined as concave and convex according to their relation to the convexity of the spine. For example, if the patient had a right thoracic curve, the right hip was defined as the convex-side hip (J. Bone Joint Surg. 2005;87-B:2709-16). Clinical and radiographic assessments were done every 6 months.

Mean age at diagnosis was 13.5 years, and the average initial Cobb angle was 24 degrees. The prevalence of osteopenia at the spine and hip was 27.5% and 23.1%, respectively. Study participants were followed for a mean of 3.8 years.

Data on hip BMD, which is considered more reliable than spinal BMD in adolescents, were available for 318 patients.

On logistic regression analysis, low bone mass at the concave side of the femoral neck was found to be a significant factor for scoliosis progression, with an odds ratio of 2.3. Dr. Hung said that the study was sponsored by the International Osteoporosis Foundation.

Other significant predictors were younger age and prematurity status at diagnosis, lower Riser grade, and a greater initial Cobb angle.

Follow-up BMD measurements done at the time skeletal maturity was reached found that low BMD persisted in 85% of AIS patients. Persistently low BMD at skeletal maturity may result in lower peak bone mass and increased risk for fractures later in life, Dr. Hung said. “This is the first study to show that low bone mass plays an important role in predicting curve progression,” she said. While the cause of low BMD in AIS patients is unclear, some studies have suggested that inadequate calcium intake and insufficient exercise may contribute. These findings suggest that DXA screening might serve as an objective measure to predict curve progression and might also help physicians predict risk.

Giving Vitamin D Cheaper Than Treating Deficiency, Study Finds

BY JONATHAN GARDNER
London Bureau

Treating children of Asian origin with a 2-year course of vitamin D supplementation might reduce the increased rate of rickets, hypocalcemia, and related conditions that are seen in these children.

This conclusion is based on a British analysis of the costs associated with treating children of Asian origin with complications of vitamin D deficiency. The Burnley National Health Service Trust, which serves a population of 242,857 people in northwest England, including many of Asian descent, spent an average of £2,500 ($4,685) per patient. The prevalence of vitamin D deficiencies in the entire Burnley NHS population is one case for every 923 children. Eight were initially seen for other conditions, such as eczema or lower respiratory tract infections. The total treatment cost for the 14 children was £35,073 ($65,918), or £22,205 ($40,019) per patient. The prevalence of vitamin D deficiencies in the entire Burnley NHS population is one case for every 923 children, so preventing a single case of rickets would cost £19.013.80 ($35,734.31). If children got multivitamin drops for 2 years.

But at a prevalence of one case of vitamin D deficiency for every 117 Asian children, the cost to prevent one case of rickets would be £2,410.20 ($4,507.07), almost 100 pounds ($177) less than treating a case of vitamin D deficiency. “We therefore suggest that supplementation of Asian origin for the first 2 years of life might be the economic answer to a growing problem,” they wrote.