

Vitamin D Deficiency Rampant in Pediatric Obesity

Of 217 obese children and adolescents, 55% were deficient in vitamin D, study investigators report.

BY ERIK GOLDMAN
Contributing Writer

OLD GREENWICH, CONN. — Vitamin D deficiency, sometimes quite severe, is common in obese adolescents, according to a recent study by Dr. Margarita Smotkin-Tangorra and colleagues at Montefiore Medical Center, N.Y.

Speaking at a meeting of the Eastern Society for Pediatric Research, Dr. Smotkin-Tangorra, of the department of pediatric endocrinology and diabetes at the medical center, said that 55% of a cohort of 217 obese children and adolescents were deficient in serum 25-hydroxyvitamin D (25-OHD), with blood levels of less than 20 ng/mL; 22% were severely deficient, with serum levels below 10 ng/mL.

Though there are published reports showing correlations between vitamin D deficiency and obesity in adults, there are no prior studies in children or teens. "We know vitamin D deficiency is prevalent in all age groups, including healthy adoles-

cents. In obese adults, we know that it correlates with insulin resistance, progression to diabetes mellitus, metabolic and endocrine problems, and increased risk of cancer. We wanted to see if there were similar correlations in obese kids," she told attendees at the meeting, cosponsored by Children's Hospital of Philadelphia.

The study group included 118 females and 99 males, ranging in age from 7 to 18 years, and with a mean BMI of 32.2 kg/m². In addition to measuring 25-OHD, the researchers also measured blood pressure, total cholesterol, LDL, HDL, triglycerides, liver enzymes, thyroid hormones, fasting insulin, and fasting blood glucose.

They found strong correlations between low vitamin D level and elevated BMI, increased systolic blood pressure, lower HDL, and lower alkaline phosphatase.

The correlation between vitamin D status and BMI was particularly striking. Those patients who were vitamin D deficient had a mean BMI of 36.2, compared

with a mean of 30.6 among patients whose vitamin D levels were sufficient.

The association with systolic hypertension was also noteworthy; vitamin D-deficient patients had a mean systolic blood pressure of 117 mm Hg, while those with sufficient vitamin D had a mean systolic blood pressure of 111 mm Hg. Mean HDL was 40 mg/dL in the vitamin-deficient group, compared with 42 mg/dL in the vitamin-sufficient group.

There was no correlation between vitamin D status and fasting blood glucose or thyroid hormone levels. Insulin sensitivity as indicated by a quantitative insulin sensitivity check index score showed a marginally significant correlation with vitamin D, with the deficient children showing a slightly lower score than the sufficient ones.

Vitamin D deficiency is disturbingly common, even among healthy children. Best current estimates are that roughly 20% of all school-age children are deficient. If Dr. Smotkin-Tangorra's data prove to be representative of obese children nationwide, the problem may be greater than previously imagined, especially given what is now known about the

long-term impact of chronic vitamin D deficiency.

Increased prevalence of deficiency reflects several general trends, most importantly the diminishing quality of children's diets and lack of outdoor exercise. How it fits into the pathophysiology and etiology of obesity is an open-ended question at this point. Lower levels of vitamin D could well be an indicator of poor overall nutritional status. Dr. Smotkin-Tangorra's team did not study blood levels of any other vitamins or minerals, but their research suggests that the more obese a child is, the more likely that the child's overall nutritional status will be poor.

Vitamin D deficiency is one of the few common correlates of childhood obesity that is easy to rectify. "We are routinely supplementing all of our obese kids with Os-Cal, 500 mg, thrice daily, and we are starting to collect data on the outcomes." She advised clinicians working with children and adolescents to stay vigilant for vitamin D deficiency, especially in obese patients, and to supplement with vitamin D and calcium when the levels are low. There's little risk, it is inexpensive, and the potential long-term benefits could be great. ■

Prescribe Exercise, Optimize Nutrition for Kids on Steroids

BY ROBERT FINN
San Francisco Bureau

SAN FRANCISCO — Glucocorticoids and retinoids are important treatment mainstays for a variety of dermatologic conditions in children, but their adverse effects on bone health should make clinicians think twice before prescribing them, Dr. Laura K. Bachrach said at a meeting of the Society for Pediatric Dermatology.

"It's astounding how often this isn't done," said Dr. Bachrach of Stanford (Calif.) University. "Specialists tend to have tunnel vision on their organ of interest. If you're a cystic fibrosis doctor, you watch the lungs and you don't think about vitamin D. If you're a rheumatologist, you may hone in on renal function and forget about other factors."

The first thing to do when a child is prescribed steroids or retinoids is to optimize the child's nutrition. Make sure they're receiving adequate calories, protein, calcium, and vitamin D. In terms of vitamin D, children should have an annual measurement of their 25-hydroxyvitamin D concentration. The current consensus is that an adequate concentration is at least 20 ng/mL.

A multivitamin supplement is simply inadequate for children who have low vitamin D concentrations, Dr. Bachrach said.

Megadoses of oral ergocalciferol (10,000 U/wk for children under the age of 6 and 50,000 U/wk for older children) for 6-8 weeks are usually necessary to restore a child's vitamin D levels.

Prescribing physical activity is also important. This activity should be titrated to the patient. It's especially important to nav-

igate between the twin hazards of immobilization and overuse.

Even children who need wheelchairs should be encouraged to at least stand. At the same time, you don't want children to exercise so much that they greatly increase their risk of fracture. Overexercise can also lead to slow weight gain.

It's also important to address any underlying endocrine disorders in these children. Deficits in sex steroids should be addressed, and in cases of delayed puberty, an endocrinology consult may be in order.

Most drugs for adult osteoporosis are contraindicated or have been inadequately tested in children, Dr. Bachrach said.

Parathyroid hormone can't be used in children because of the risk of osteosarcoma. And while bisphosphonates have been shown to be highly effective in adults, most studies in children have been observational, except in the case of osteogenesis imperfecta. There have been no studies in children with chronic disease and no consensus on duration or dose.

Furthermore, bisphosphonates have both minor and major adverse effects. They can cause fever, myalgia, bone pain, and GI pain or distension. More rarely, they can cause esophageal or oral erosion, delayed bone healing, or osteopetrosis, and there's also a risk of teratogenicity.

Bisphosphonates should be restricted to cases of osteogenesis imperfecta, children with fragility fractures, and randomized, controlled trials. They should not be used for low bone density only, and they definitely shouldn't be used as prophylaxis in children who are getting steroid therapy, she concluded. ■

Interpret Dual-Energy Bone Scan Results in Children With Caution

BY ROBERT FINN
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SAN FRANCISCO — Plain x-rays are insufficiently quantitative to assess a child's bone mineral density, and dual-energy x-ray absorptiometry is usually the best choice, said Dr. Laura K. Bachrach at a meeting of the Society for Pediatric Dermatology.

Dual-energy x-ray absorptiometry (DXA) is fast, precise, safe, and readily available. But interpreting the results can present some challenges to the nonspecialist, said Dr. Bachrach of Stanford (Calif.) University.

"There's often a very inadequate response from the DXA center or nuclear medicine department or the radiologist who prepares the report," Dr. Bachrach said. "[Often they] produce some numbers and throw up their hands and say 'Here, you ordered it, you interpret it.'"

The results will be in units of bone mineral content (BMC) in grams or bone mineral density (BMD) in g/cm², and there will also be one or two standard deviation scores.

Some clinicians make the mistake of relying on the standard deviation T score, but this is particularly inappropriate in children. A T score compares a patient's bone mineral density to that of a healthy young adult. Children with normal bone mineral density will often appear to have abnormally low BMD by that standard.

The z score, on the other hand,

compares the child's result to children of the same age and sex.

It's also important to pay attention to both the make and the model number of the DXA machine. Normative data for one machine should not be used to analyze results from another.

But even a z score is not enough, Dr. Bachrach said. "Usually the children you're ordering the DXA scan on have a chronic illness, and often these illnesses have affected their growth, maturation, and have really slowed things down. These can affect the results. And this is where you may want to get on the phone and talk to your friendly bone-density colleague. There's definitely a tendency to overdiagnose low bone mass, most commonly because of the T score error, but also potentially if you don't take bone size into account."

Dr. Bachrach said that patients frequently call, saying, "My doctor says my child's losing bone." But it's simply not possible to determine that with a single DXA scan. More likely, the child is not losing bone, but he or she is failing to accrue bone.

Additionally, because it's unknown what a given child's fracture threshold is, it's impossible to diagnose osteoporosis on the basis of the DXA scan alone. "We don't want to label children as having osteoporosis just on the basis of a bone density. That's really a clinical diagnosis based upon fractures," Dr. Bachrach said.