SUBSPECIALIST CONSULT

Identify and Treat Vitamin D Insufficiency

Many children and teenagers are not getting enough vitamin D, and this is a common problem.

I started seeing medical consequences years ago. We did a study of breastfed African American infants who developed rickets because they were so deficient in vitamin D (J. Pediatrics 2000;137:153-7). Based on these data, North Carolina Women, Infants, and Children Program clinics started distributing free multivitamin supplements to breastfeeding infants, and now we see fewer cases in our area.

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What is new is that we are seeing the adverse effects of vitamin D deficiency in older kids. We've had vitamin D–deficient teenagers present with seizures, and we see osteoporosis in teenagers. We had one adolescent who broke his hip from just twisting around who was found to have a severe deficiency of vitamin D.

This is a preventable problem. But about 20% of children and teenagers get the recommended amounts of calcium and vitamin D.

Who do you screen for deficiency? We screen in our clinic with one useful question to ask parents and our kids: "How many glasses of milk do you drink a day?" For those who respond one glass or less, we check their serum vitamin D level.

When taking a history, determine if patients take medications that might interfere with vitamin D metabolism. For example, some antiseizure medicines cause vitamin D to break down more quickly. Obviously, if a child has a severe seizure disorder, that individual needs seizure medicine. But you may need to check the vitamin D level and increase supplementation accordingly.

We found 75% of 48 kids with a history of inadequate milk intake had a vitamin D level below 30 ng/mL; 30% of the children had deficient levels (below 20 ng/mL).

The key is prevention. I recommend that infants start drinking vitamin D–fortified milk after they wean off breast milk or formula. We are finding that a tremendous number of kids do not drink milk, and they go directly from the breast or formula to juice and soda. I tell them to drink a glass of milk with their breakfast, lunch, and supper, hoping they will get at least two glasses per day. I accept chocolate milk. It's not ideal, but it's better than no milk at all.

Make sure your patients get adequate calcium in their diet – about 700 mg/day for a young child and 1,200-1,300 mg for an adolescent. Recommend a multivitamin – which typically has a minimum of 400 U of vitamin D – as well as a calcium supplement. This combination is important because vitamin D facilitates absorption of calcium from the gut.

I recommend milk with 1% or less fat. A lot of people believe that whole milk provides more vitamin D, but that is not the case. If you have lactose-intolerant patients, suggest that they drink a soy milk product fortified with vitamin D.

A good way to explain the importance of vitamin D to kids and parents is that we build up our bones until we're about 20. After that, if we live long enough, we're going to slide down the hill – we will all get osteoporosis. But if you've had your milk and followed recommendations, you'll start your slide downward from the top of the mountain.

In addition to those with poor diets, patients with chronic disease, with malabsorption, or who are confined to the indoors are at higher risk for vitamin D deficiency. If they are severely deficient, you will need to use higher doses of vitamin D or refer them to a specialist.

Specialists cannot see all these patients because vitamin D insufficiency is so common. It's becoming like obesity. We need the general pediatrician's help to screen and treat most of these patients. We can help via phone consultation or referral for severely deficient patients, particularly those who experience a seizure or multiple fractures because of their deficiency.

To diagnose a suspected deficiency of vitamin D, order a serum 25-hydroxyvitamin D level. With that you might want to get a calcium and phosphorus level and an alkaline phosphatase assay (a measure of bone formation).

Do not order a 1,25-dihydroxyvitamin D test. It is easily ordered by mistake with electronic test ordering. But the 1,25 form does not reflect true vitamin D sufficiency or insufficiency, and can confuse clinical diagnosis.

I do not recommend bone density measurements (such as dual-energy x-ray absorptiometry, or DXA) because many of these scans can be misread. You want to take a history, get a vitamin D level, and treat. Otherwise, you are just going to run up medical expenses.

No column on vitamin D would be complete without addressing sunlight. Infants need about 30 minutes per week of sunshine if they are wearing only diapers, or 2 hours per week if fully clothed. Because of skin cancer concerns, we recommend sunscreen for people who are outdoors for more than just a short period. If children and teenagers are really out in the summer, when most get exposure, they're using sunscreens that block 95% of the rays. So we have become dependent on diet for our vitamin D, and we're not getting it. ■

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IOM Cautions Against Excess Calcium and Vitamin D

BY HEIDI SPLETE

FROM AN INSTITUTE OF MEDICINE PRESS BRIEFING

WASHINGTON – Daily doses of 600 international units of vitamin D and between 700 and 1,300 mg of calcium are enough for most children and adults in the United States and Canada, according to a report on new dietary reference intakes issued by the Institute of Medicine.

These new dietary reference intakes for calcium and vitamin D should provide "greater assurance that widespread vitamin D deficiency is not a public health problem," Dr. Steven Clinton, a member of the IOM committee that issued the report.

After reviewing national databases on blood levels from the United States and Canada, the committee determined that most people in both countries are currently meeting their needs for vitamin D. Adequate vitamin D was defined as blood levels of at least 20 ng/mL as measured in the United States (50 nmol/L as measured in Canada).

Dr. Clinton, a medical oncologist at Ohio State University, Columbus, predicted that physicians will become more comfortable using recommended dietary allowances to advise patients about calcium and vitamin D intake and noted that vitamin D screening "probably should not be part of routine medical care."

Previous recommendations for vitamin D and calcium intake were defined in terms of adequate intake, which is not the same as recommended dietary allowance (RDA), noted committee member Patsy Brannon, Ph.D., a professor in the division of nutritional science at Cornell University, Ithaca, N.Y. Although the new values might not look much different, "You can't compare the two sets of numbers," she said. The evidence used to determine the new RDAs for calcium and vitamin D was much more comprehensive, especially data from studies conducted within the past 2 years, she said.

While calcium and vitamin D are important for health, more is not necessarily better, the reviewers said.

They cautioned against excessive vitamin D supplementation beyond the RDA, but said supplements can be used in combination with diet to meet the RDAs. "The data are not sufficient to conclude that intakes higher than the recommended values would be beneficial," said A. Catherine Ross, Ph.D., of Pennsylvania State University, University Park.

To reduce the risk of kidney stones, calcium supplements should be used with caution, Dr. Brannon advised.

The IOM reviewers examined about 1,000 published studies and scientific testimonies to determine the levels of calcium and vitamin D needed to maintain health.

Based on their findings, 700 mg/day of calcium is enough for most children aged 1-3 years, and 1,000 mg is appropriate for most children aged 4-8 years. Older children and teens aged 9-18 years need no more than 1,300 mg/day, and most adults aged 19-50 years and men through 70 years need no more than 1,000 mg daily. For women aged 51 years and older and men aged 71 years and older, 1,200 mg of calcium per day is recommended, but more than that is unnecessary.

As for vitamin D, the IOM report states that 600 IU/day meets the needs of almost all children and adults aged 1 year through 70 years, including pregnant and lactating women. For men and women aged 71 years and older, the RDA increases to 800 IU/day to accommodate age-related physical and behavioral changes.

The IOM review committee acknowledged the challenges of fitting sun exposure into the equation when estimating dietary reference intake values for vitamin D because of concerns about skin cancer risk. "At this time, the only solution is to proceed on the basis of the assumption of minimal sun exposure and set reference values assuming that all of the vitamin D comes from the diet," the reviewers wrote.

The report lists an upper level for daily vitamin D intake of 1,000 IU for infants up to 6 months of age and 1,500 IU for infants aged 6- 12 months. The upper levels for children aged 1-3 years and 4-8 years are 2,500 IU and 3,000 IU, respectively. For all other life stages, the upper level is 4,000 IU.

Upper levels for calcium for adults were based on data related to the formation of kidney stones, and the upper levels for children take adolescent growth spurts into account.

The upper level for daily calcium intake for infants aged 0- 6 months and 6-12 months are 1,000 mg and 1,500 mg, respectively. For children aged 1-8 years and 9-18 years, the upper levels are 2,500 mg and 3,000 mg, respectively, for both boys and girls. Adults aged 19-50 years have an upper level of 2,500 mg that drops to 2,000 mg after age 50 years for both men and women. The upper levels of calcium for pregnant and lactating women aged 14-18 years, 19-30 years, and 31-50 years are 3,000 mg, 2,500 mg, and 2,500 mg, respectively.

Read the full report online at www.iom.edu/vitaminD or www.iom.edu/calcium.

The study was sponsored by the federal governments of the United States and Canada. ■