Vitamin D may improve bone health in those taking anti-HIV drug

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Vitamin D may help prevent hormonal changes that can lead to bone loss among those being treated for HIV with the drug tenofovir, according to the results of a National Institutes of Health network study of adolescents with HIV.

Tenofovir is widely used to treat HIV infection. However, the drug causes symptoms that resemble those of vitamin D deficiency ods.od.nih.gov/factsheets/VitaminD-QuickFacts, causing bones to lose calcium and reducing bone density. The study found that large monthly doses of vitamin D reduced blood levels of a hormone that stimulates calcium release from bones.

"What we've found suggests vitamin D could be used to counteract one of the major concerns about using tenofovir to treat HIV," said Rohan Hazra, M.D., of the Pediatric, Adolescent and Maternal AIDS Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), the NIH institute that funds the networks. "People in their teens and twenties may be on anti-HIV treatment for decades to come, so finding a safe and inexpensive way to protect their long-term bone health would be a major advance."

The findings were published online in Clinical Infectious Diseases.

Vitamin D helps the body absorb calcium to build bones. When the body is deficient in vitamin D, levels of a hormone called parathyroid hormone rise. This rise triggers activity that draws calcium from bones.

As a result, the bones become more fragile and can break more easily. Parathyroid hormone also tends to be elevated in people taking tenofovir, whether or not they have sufficient vitamin D.

Because parathyroid hormone levels are elevated in people taking tenofovir in much the same way as they are in people with vitamin D deficiency, the researchers theorized that vitamin D might counteract the bone-depleting effects of tenofovir.

The study was conducted by first author Peter L. Havens, M.D., of the Medical College of Wisconsin and Children's Hospital of Wisconsin, Milwaukee; Dr. Hazra; Kathleen Mulligan, Ph.D., of the University of California at San Francisco; and other researchers affiliated with the Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN) and the International Maternal–Pediatric–Adolescent AIDS Clinical Trials (IMPAACT) Group.

In addition to funding from NICHD, funding was also provided by the National Center for Research Resources, the National Institute on Drug Abuse, and the National Institute of Mental Health.

About 200 18- to 25-year-olds on antiretroviral therapy took part in the study. Study participants included young adults taking tenofovir and those receiving other forms of anti-HIV treatment. Each month, the adolescents and young adults in the study took a 50,000-unit dose of vitamin D or placebo. At the end of the three months, parathyroid hormone levels had fallen about 14 percent among participants taking tenofovir and vitamin D but remained unchanged in participants taking other kinds of anti-HIV medication. However, youth taking tenofovir still had higher parathyroid hormone levels than those on other anti-HIV drugs. The researchers don't know if longer treatment with vitamin D would further reduce parathyroid hormone levels.

The recommended daily dose of vitamin D is 600 units. The authors noted that they observed no adverse effects from the vitamin D treatment during the 3 months of this study.

The researchers are now making plans for a two-year follow-up study to examine the longer-term safety of vitamin D in a similar group of HIV-infected youth taking antiretroviral regimens containing tenofovir, and to determine if the changes in parathyroid hormone result in improvements in bone density.

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