Vitamin D May Protect Bone Health in Tenofovir Takers

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Vitamin D supplementation may help prevent hormonal changes that can lead to bone loss among adolescents and young adults being treated for HIV with tenofovir (found in Viread, Truvada and Atripla) according to a National Institutes of Health (NIH) study published online ahead of print by Clinical Infectious Diseases.

Though the study did not actually explore the effects of vitamin D doses on bone health—other clinical trials have yielded conflicting results in this regard—additional research is planned to evaluate the potential clinical benefits of supplementation in young people living with HIV at risk for tenofovir-associated bone loss.

As Peter Havens, MD, of the Medical College of Wisconsin and his fellow study authors explain, tenofovir is widely used to treat HIV. However, the drug causes symptoms that resemble those of vitamin D deficiency, causing bones to lose calcium and reducing bone density.

The study found that large monthly doses of vitamin D reduced blood levels of parathyroid hormone, an endocrine regulator that stimulates calcium release from bones, potentially weakening them and causing them to break more easily. Normally, when the body is deficient in vitamin D, parathyroid hormone levels increase. Parathyroid hormone also tends to be elevated in people taking tenofovir, whether or not they have sufficient vitamin D.

“What we’ve found suggests vitamin D could be used to counteract one of the major concerns about using tenofovir to treat HIV,” said contributing study investigator Rohan Hazra, MD, of the NIH in an accompanying announcement. “People in their teens and 20s may be on [antiretroviral therapy] for decades to come, so finding a safe and inexpensive way to protect their long-term bone health would be a major advance.”

The study conducted by Havens’ group enrolled 203 HIV-positive adolescents and young adults between ages 18 and 25. All study volunteers were taking antiretroviral therapy; 118 were taking a regimen containing tenofovir, whereas 85 were using other drug combinations.

Study subjects were randomly assigned to receive either a monthly 50,000-unit dose of vitamin D or placebo for a total of 12 weeks.

In addition to marked improvements in vitamin D blood concentrations among all study participants in the active supplement group, parathyroid levels fell by roughly 14 percent among those on a tenofovir-inclusive regimen. This average decrease was statistically significant, meaning that it was too great to have occurred by chance.

No statistically significant decreases in parathyroid hormone levels were seen in study volunteers who weren't receiving tenofovir but were randomized to receive vitamin D. Nor were there any appreciable decreases in parathryroid hormone levels among those who received the vitamin D placebo in the study.

Havens and his colleagues noted that study participants using tenofovir and vitamin D still had parathyroid hormone levels higher than those not receiving tenofovir. Though it is possible that longer courses of vitamin D supplementation may help further decrease parathyroid hormone levels, additional studies are necessary to confirm this.

The researchers reported no important side effects of vitamin D supplementation. Though urinary excretion of calcium tended to increase among tenofovir recipients taking vitamin D, this was not believed to be "clinically significant."

"In summary, in this randomized, double-blind, placebo-controlled trial in HIV-infected youth, high-dose monthly vitamin D supplementation decreased [parathyroid hormone] levels in those on [tenofovir]-containing [antiretroviral therapy] but not in those on regimens not containing [tenofovir]," Havens and his colleagues conclude. "This effect occurred in those with both sufficient and insufficient baseline [vitamin D blood] concentrations. These results suggest that vitamin D supplementation may offset a potential effect of [tenofovir] on regulation of calcium balance and bone metabolism."

According to the accompanying announcement, 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 adolescents and young adults living with HIV taking antiretroviral regimens containing tenofovir, and to determine if the changes in parathyroid hormone result in improvements in bone density.
