

Reduction of risk of acute otitis media in otitis-prone children with vitamin D3 supplementation

Written by Tsilis S. Nikolaos, FEBORL, HNS, Dr Gelis N. Dimitrios, MD, ORL, DDS, PhD - Last Updated Sunday, 15 June 2014 08:47

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The non classic effects of bitamin D



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Vitamin D is well known for its classic osteoprotective role in the maintenance of bone mineral density. However, vitamin D also has an important "non-classic" influence on the body's immune system (immunomodulator) by modulating the innate and adaptive immune system, influencing the production of important endogenous antimicrobial peptides such as cathelicidin, and regulating the inflammatory cascade [1].

It has been demonstrated in multiple epidemiological studies in adults and children that vitamin D deficiency is associated with increased risk and greater severity of infection, particularly of the

respiratory tract.

The exact mechanisms by which vitamin D may improve immune responses to infection is still under Vitamin D supplementation trials of prevention and adjunct therapy for infection are underway. Influencing the immune system and inflammatory cascade, vitamin D may play an important future role in the prevention and treatment of infections **[1]**.

Hypovitaminosis D and susceptibility of infections

Vitamin D is connected with the synthesis of antibacterial peptides and autophagy. Several studies have shown that hypovitaminosis D is associated with the susceptibility and the severity of acute infections on one hand, and with an unfavorable outcome of some chronic infections (such as HIV infection).

Vitamin D3 supplementation improves response to treatment of some viral (such as chronic hepatitis C infection) or bacterial infections (such as pulmonary tuberculosis) **[2]**.

Vitamin D status and clinical course of infections

Vitamin D3 affects both the innate as well as adaptive immune responses. Epidemiological studies have established that vitamin D3 deficiency (levels of 25(OH)D3: 0-20ng/ml) plays an important role in tuberculosis (TB) and viral influenza prevalence as well as susceptibility to active disease in TB. Vitamin D3 status has been associated with the clinical course of HIV infection and drug interaction with anti-retroviral therapy **[3]**.

Due to the endogenous antimicrobial peptides production by vitamin D3, vitamin D3 has been linked to seasonal, epidemic influenza **[4]**.□

Children with vitamin D3 deficiency or insufficiency are in grater risk to suffer of recurrent acute middle ear otitis

It is reported that the levels of 25-hydroxyvitamin D3 may be deficient (0-20ng/ml) or insufficient (21-29ng/ml) in children with recurrent otitis media. After that it justified the co-administration of supplementary vitamin D3 together with conventional treatments in the management of upper respiratory infections such as otitis media [5].

Vitamin D Supplementation Reduces the Risk of Acute Otitis Media in Otitis-Prone Children

[Marchisio P](#) , et al Children with deficient levels or insufficient levels of vitamin D3 and recurrent middle ear infections demonstrated a reduced risk for acute otitis media with vitamin D3 supplementation according the research of [6].

This research included children with recurrent acute otitis media (AOM) who received 1,000 IU of vitamin D3 daily and randomized children who received placebo.

The children with recurrent acute otitis media (AOM) had significantly lower risk of experiencing one or more episodes of AOM (26 incidents versus 38 incidents, $P=0.03$), and the risk of uncomplicated acute otitis media was markedly smaller in the vitamin D group (P

In the everyday pediatric and ENT practice, this means that in children with recurrent otitis media must be measured the levels of the main metabolite of vitamin D3, the 25-hydroxyvitamine D3 [6].

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According to the recent guidelines of the American Academy of Pediatrics it is recommended

prompt antimicrobial treatment for children ages 6 months to 2 years with acute otitis media, with one exception: for children in whom the disease is unilateral and also unaccompanied by severe signs or symptoms, the guideline recommends, as an option, observation without initial antimicrobial therapy [7].

However, that recommendation was based on studies that used diagnostic criteria that were less strict than the current requirements, opening the possibility that some treated children didn't actually have acute otitis media [8].

The randomized study of [Marchisio P](#), et al (2013) in 116 children with a history of recurrent otitis media (≥ 3 episodes in preceding six months, or ≥ 4 episodes in preceding 12 months) were prospectively and blindly randomized to receive oral VD3 1,000 IU/day or placebo for 4 months and whose episodes of acute otitis media were monitored for 6 months

[6]

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Fifty-eight children received placebo and 58 with similar characteristics were treated with VD3. Participants had a mean age of 33.4 months in the placebo group and 34.3 months in the vitamin D group.

Most were white (98.3% and 100%, respectively) and had been breast feeding for 3 or more months (72.4% and 84.1%). All had been vaccinated with the influenza vaccine, and the majority had received a heptavalent pneumococcal conjugate vaccine (82.8% for both groups).

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Mean vitamin D3 blood concentrations were 25.8 ng/mL and 26.5 ng/mL, respectively, which were both below the recommended level of 30 ng/mL,

The average number of episodes of acute otitis media over 12 months prior to the study was roughly five between groups (five versus 4.97), and roughly one-third of the cases were complicated by perforation (36.2% for both).

The number of children experiencing ≥ 1 AOM episode during the study period was significantly lower in the treatment group (26 vs 38; $p=0.03$). There was a marked difference in the number of children who developed uncomplicated AOM (p

The likelihood of AOM was significantly reduced in the patients whose serum VD concentrations were ≥ 30 ng/mL.

At 6-month follow-up, blood vitamin D3 was significantly higher in those treated with supplements versus placebo (36.2 ng/mL versus 18.7 ng/mL, P

There was no significant difference between groups for those whose disease was complicated by perforation.

The oral administration of vitamin D3 was well-tolerated and the number of adverse events was not significantly different between groups (five events with placebo versus six with vitamin D, $P=0.75$) [6].

The simplest and safest way for a child to receive vitamin D3 is the administration of drops of vitamin D3 (cholecalciferol) in olive oil [\[D3-Gelin drops\]](#) . Each drop of [D3-Gelin](#) contains 1000IU of vitamin D3.

However, the level of 25(OH)D needed to prevent infection with various human pathogens has not been defined. In view of increasing bacterial resistance and emerging new pathogens, further research on the relationship of infection to 25(OH)D and other nutritional factors is warranted [\[8\]](#).

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