Serum 25-Hydroxyvitamin D Levels and Risk of Multiple Sclerosis
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This study was performed at the Harvard School of Public Health

FROM ABSTRACT

Context
Epidemiological and experimental evidence suggests that high levels of vitamin D, a potent immunomodulator, may decrease the risk of multiple sclerosis.

Objective
To examine whether levels of 25-hydroxyvitamin D are associated with risk of multiple sclerosis.

Design, Setting, and Participants
Prospective, nested case-control study among more than 7 million US military personnel who have serum samples stored in the Department of Defense Serum Repository.

Multiple sclerosis cases were identified through Army and Navy physical disability databases for 1992 through 2004, and diagnoses were confirmed by medical record review.

Vitamin D status was estimated by averaging 25-hydroxyvitamin D levels of 2 or more serum samples collected before the date of initial multiple sclerosis symptoms.

Results
Among whites, the risk of multiple sclerosis significantly decreased with increasing levels of 25-hydroxyvitamin D. A 50-nmol/L increase in 25-hydroxyvitamin D decreased MS by 41%.

Among blacks and Hispanics, who had lower 25-hydroxyvitamin D levels than whites, no significant associations between vitamin D and multiple sclerosis risk were found.

Conclusion
The results of our study suggest that high circulating levels of vitamin D are associated with a lower risk of multiple sclerosis.

THESE AUTHORS ALSO NOTE:

“Multiple sclerosis (MS) is among the most common neurological diseases in young adults.”

“MS is an autoimmune disorder whereby an unknown agent or agents triggers a T cell–mediated inflammatory attack, causing demyelination of central nervous system tissue.”

The global distribution of MS is a multifold increase in incidence with increasing latitude, both north and south of the equator.

Vitamin D is a potent immunomodulator that can prevent experimental MS in animal models.

“Because food provides little vitamin D, the major source for most people is through skin exposure to sunlight.”

“At latitudes of 42° or more (eg, Boston, Mass), in winter most UV-B radiation is absorbed by the atmosphere, and even prolonged sun exposure is insufficient to generate vitamin D.”

“A protective effect of vitamin D on MS is supported by the reduced MS risk associated with sun exposure and use of vitamin D supplements.”
[Important]

As expected, whites had much higher 25-hydroxyvitamin D levels than blacks.

RESULTS

Multiple sclerosis cases averaged 28.5 years old with an age range between 18-48 years at symptom onset.

“Among whites, there was a 41% decrease in MS risk for every 50-nmol/L increase in 25-hydroxyvitamin D.”

“MS risk was highest among individuals in the bottom quintile and lowest among those in the top quintile of 25-hydroxyvitamin D levels.”

“Adolescence appears to be a crucial exposure period for MS.”

“Among blacks, the overall association between 25-hydroxyvitamin D levels and MS risk was not significant.”

COMMENT

“The risk of MS decreased with increasing serum levels of 25-hydroxyvitamin D.”

“Our results converge with a growing body of evidence supporting a protective role for vitamin D in MS development.”

Vitamin D is a potent immunomodulator, and may reduce MS risk by altering T cells function.

“Nutritional vitamin D status could be key in innate immune response.” **[Important]**

“The relative importance of direct vs vitamin D–dependent effects of UV light at the level of exposure typical of human populations is uncertain, but our previous finding of a lower MS risk among women taking vitamin D

supplements supports a specific role for vitamin D."

"Vitamin D levels earlier in life may be critical in conferring protection for MS."

"Vitamin D supplementation in infancy seems to exert a strong protective effect against the autoimmune disease type 1 diabetes, and vitamin D levels in early childhood could also have an impact on the risk of MS."

Half of white and two thirds of black adults in the United States have 25-hydroxyvitamin D levels below 70 nmol/L. "The best serum 25-hydroxyvitamin D concentrations are between 90 and 100 nmol/L."

"Increasing the vitamin D levels of adolescents and young adults could result in an important reduction in MS incidence. Such an increase could be achieved by using vitamin D supplements." **[Very Important]**

Vitamin D supplementation is safe at levels several-fold higher than 2000 IU/d for adults.

KEY POINTS FROM DAN MURPHY

1) High levels of vitamin D, a potent immunomodulator, decrease the risk of multiple sclerosis.

2) High circulating levels of vitamin D are associated with a lower risk of multiple sclerosis.

3) “Multiple sclerosis (MS) is among the most common neurological diseases in young adults.”

4) “MS is an autoimmune disorder whereby an unknown agent or agents triggers a T cell–mediated inflammatory attack, causing demyelination of central nervous system tissue.”

5) MS increases significantly with increasing latitude, both north and south, of the equator.

6) “A protective effect of vitamin D on MS is supported by the reduced MS risk associated with sun exposure and use of vitamin D supplements.” **[Important]**

7) “Among whites, there was a 41% decrease in MS risk for every 50-nmol/L increase in 25-hydroxyvitamin D.”

8) “MS risk was highest among individuals in the bottom quintile and lowest among those in the top quintile of 25-hydroxyvitamin D levels.”

9) “The risk of MS decreased with increasing serum levels of 25-hydroxyvitamin D.”

10) “Nutritional vitamin D status could be key in innate immune response.” **[Important]**

11) “Vitamin D levels earlier in life may be critical in conferring protection for MS.”

12) “Vitamin D supplementation in infancy seems to exert a strong protective effect against the autoimmune disease type 1 diabetes, and vitamin D levels in early childhood could also have an impact on the risk of MS.”

13) Half of white and two thirds of black adults in the United States have 25-hydroxyvitamin D levels below 70 nmol/L. “The best serum 25-hydroxyvitamin D concentrations are between 90 and 100 nmol/L.”

14) “Increasing the vitamin D levels of adolescents and young adults could result in an important reduction in MS incidence. Such an increase could be achieved by using vitamin D supplements.” **[Very Important]**

15) Vitamin D supplementation is safe at levels several-fold higher than 2000 IU/d for adults.