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Comparison of serum vitamin D level in healthy and with pneumonia children

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Abstract

Background and Objective: Vitamin D (Vit D) has an important role as immunoregulator. Its deficiency is deemed as a risk factor for respiratory system infection. In this study the serum Vit D levels of healthy and with pneumonia children were compared.

Methods: In this prospective case control study, 31 hospitalized children due to pneumonia and 40 healthy children both aged between 6 and 60 months were included. Serum Vit D level in these two groups were measured and compared. P values less than 0.05 considered significant.

Results: There was a significant difference between the two groups regarding "weight for age Z-score", however, no significant difference was found between them with respect to "height for age Z-score" as well as serum Vit D level. The mean serum Vit D level was 30.71 ng/ml and 31.89 ng/ml in case group and control group, respectively (P=0.77).

Conclusion: Our study did not support a straight relation between serum Vit D level and pneumonia. This finding might be due to consumption of supplemental Vit D by most of infants and toddlers in Iran. Further investigation in this area is recommended.

Keywords: Pneumonia, Children, Vitamin D

Introduction

Vitamin D (Vit D) has an essential role in calcium, phosphor and osteogenesis. Vit D deficiency or insufficiency is a common finding throughout the world (1).

Vit D is an immune system regulator and inhibits inflammatory cytokines and induces antimicrobial peptides. Vit D deficiency causes vulnerability to tuberculosis (2). Vit D level is determined by measuring "25 OH Vit D" in blood serum (ELISA or RIA). Serum level less than 30ng/ml is known as Vit D deficiency (3).

Some studies have shown that respiratory infections are less frequent in children who receive supplemental Vit D, and also in the group who fed exclusively with breast and have sufficient Vit D level). Also incidence of pneumonia and mortality due to respiratory infection was higher in children with lower serum Vit D level (4).

In a double blind study giving Vit D supplement prevented exacerbation of chronic obstructive pulmonary disease (COPD) in whom Vit D level was less than 50 nmeol/li (5). In some studies the relation between Vit D insufficiency and increasing risk of viral infections and tuberculosis of respiratory tract has been shown (6-15).

As respiratory infection is an important cause of mortality in developing countries, assessment of this hormone effects in prevention and treatment of respiratory diseases is vital. Considering most studies were on adult population, we compared 25-OH Vit D level of healthy children with those suffering from pneumonia.

Methods

This is a case control study which contains 31 children 6-60 months old hospitalized due to pneumonia and 40 controls. The cases were cho-

sen from children with pneumonia hospitalized in Aliasghar Hospital pulmonology ward with no underlying disease (immune deficiency, chronic cardiopulmonary disorders, anatomical abnormality, neuromuscular disorders, etc). They were children between 6 and 60 months hospitalized due to respiratory signs and symptoms and radiologic finding compatible with WHO pneumonia definition (respiratory rate more than 40 per minute, fever, infiltration in chest radiography). The controlled group consisted of healthy children between 6 and 60 months visited routinely for checking growth and development in Aliasghar Clinic. We received all parents' written consents for the participation of their children. Children weight and height were recorded and "weight and height Z score for age" in both groups were determined according to WHO growth charts. Serum 25-OH Vit D level was measured by "Roche kits" and ng/ml unit. Vit D level more than 30 ng/ml was considered as normal or sufficient and less than 30 ng/ml as insufficient (less than 10 ng/ml as deficient). When Vit D level was insufficient more evaluations were done and Vit D was prescribed.

The results were entered in SPSS v.18 and were analyzed using student t-test. P-value less than 0.05 considered significant.

Results

Serum Vit D level in 15 cases with pneumonia was equal or more than 30 ng/ml (sufficient = 48%) and in 16 cases less than 30 ng/ml (insufficient or deficient= 52%). This level in 18 cases without pneumonia (control group) was more than 30 ng/ml (45%) and in 22 cases of control group less than 30 ng/ml (55%). There was no significant difference between the two groups (P= 0.78). The mean Serum Vit D levels of control and case group were 31.89 ng/ml (SD:16.9) and 30.71 (SD: 17.9), respectively. There was no significant Vit D level difference between the two groups. (P= 0.77).

There were 34 cases (pneumonia) with 10 females and 21 males. In the control group there were 40 cases with 24 females and 16 males. There was a significant gender difference between the two groups (P=0.01). The mean ages of the case and control group were 20.14 and 27.58 months, respectively. There was no significant age difference between the two groups (P=0.77).

The mean weights for age Z-score (w-a-z) in control and case groups were 0.57 (SD: 0.11) and 0.76 (SD: 0.13), respectively. There was a significant w-a-z difference between the two groups (P=0.01).

The mean heights for age Z-score (h-a-z) in the control and case groups were 4.29 (SD: 0.19) and 4.00 (SD: 0.14), respectively. There was not a significant h-a-z difference between the two groups (P= 0.2)

Discussion

The result of this study showed no significant difference of Vit D level between the two groups. This finding does not support Vit D level as a factor for increasing susceptibility to pneumonia in children between 6-60 months. Lack of Vit D insufficiency in the two groups might be due to consumption of supplemental Vit D by most of infants and toddlers in Iran. More investigation considering this factor would be helpful.

In Javadinia and colleagues' study the mean serum level of Vit D was 45.37 ng/ml (16). In another study done by Pletz the mean serum Vit D level was 11.3 ng/ml in viral pneumonia group and 12.9 ng/ml in bacterial pneumonia group. The difference in our study and Pletz can be due to environmental factors like nutritional habits, air pollution, and amount of sun exposure (17).

In a study done in Tehran on children, a significant difference in Vit D level between the case and control groups was not found (16). This is comparable with our study considering the same geographic and weather conditions.

Manaseki et al in Kabul giving supplemental Vit D reported a decrease in frequency and severity of pneumonia (18). In this study Vit D level was not considered as a parameter and without measuring its level, Vit D or placebo was prescribed. There are cultural, economic and geographical differences between Tehran and Kabul that can influence on results.

In a systematic review performed in 2013 Vit D supplement had no effect on resolution time of pneumonia. This systematic review supports our study findings. As in this systematic review there were only two eligible trials (19), more trial studies can be helpful to determine the frequency and severity of pneumonia considering Vit D level in whom that are given supplemental Vit D.

Conclusion

This study did not support a significant difference for Vit D level between two genders in the case and control groups. It seems that Vit D level is gender independent.

Conflicts of interest: None declared.

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