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Comparison of vitamin D level in pneumonia and healthy children

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Abstract

Background and Objective: Vitamin D (Vit.D) has an important role as immunoregulator. Its deficiency is suggested as a risk factor for respiratory system infection. In this study the serum Vit.D level in pneumonia and healthy children will be compared.

Methods: This study is a prospective case control study and contains 31 children between 6 and 60 months old hospitalized because of pneumonia and 40 healthy children between 6 and 60 months old. Serum Vit.D level in these two groups were measured and compared with P value less than 0.05.

Results: There was significant difference between "weight for age" but not in "height for age "Z-score. There was no significant difference between serum Vit.D level in the two groups. The mean serum Vit.D level in case group was 30.71 ng/ml and in control group was 31.89 ng/m.l (P=0.77)

Conclusion: We found no significant difference for frequency of Vit.D insufficiency between the two case and control groups. Maybe it is because of consuming supplemental Vit.D by most of infants and toddlers in Iran. More study with paying attention to this factor can be helpful.

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 phenomenon worldwide (1).

Some studies have shown that respiratory infections are less frequent in children who receive supplemental Vit.D, and also in the group who feed 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 (2).

Vit.D is an immune system regulator. This vitamin inhibits inflammatory cytokines and induces antimicrobial peptides. Vit.D deficiency causes vulnerability to tuberculosis (3). Vit.D level is determined by measuring "Vit.D 25 OH" in blood serum (ELISA or RIA). Serum level less than 30ng/ml is known as Vit.D deficiency (4).

As respiratory infection is an important cause of mortality in developing countries, assessment of the effects of Vit.D level in prevention and treatment of respiratory disease is very important. In this study we compared the Vit.D level between hospitalized children due to pneumonia and healthy children.

Methods

This is a case control study and contains 31 children 6-60 months old hospitalized due to pneumonia and 40 healthy controls. The cases were chosen from kids with pneumonia hospitalized in Aliasghar Hospital pulmonology ward without underlying diseases (immune deficiency, chronic cardiopulmonary disorders, anatomical abnormality, neuromuscular disorders, etc). The cases were the children between 6 and 60 months old 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 controls were healthy children between 6 and 60 months visited routinely for growth and development control in Aliasghar clinic. Their participation in our study was

with their parents' permission. Their weight, length or height were noted and "weight Z score for age" and height Z score for age" in both groups were found to be due to WHO growth charts. Serum vitamin 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 prescribed.

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

Results

In this study we had 34 cases (with pneumonia) including 13 females and 21 males. In the control group we had 40 cases including 24 females and 16 males. There was a significant gender difference between the two groups (P =0.01). The mean age of case group was 20.14 months and the mean age of control group was 27.58 months. There was no significant age difference between two groups (P=0.77).

The mean (SD) weight for age Z-score (WAZ) in control group was 0.57±0.11. The mean (SD) for WAZ in case group was 0.76+0.13. There was a significant WAZ difference between the two groups (P=0.01).

The mean (SD) height for age Z-score (HAZ) in control group was 4.29±0.19 and the mean (SD) HAZ in case group was 4.00±0.14. There was no significant HAZ difference between the two groups (P= 0.2).

The mean (SD) serum Vit.D level of control group was 31.89±16.9 ng/ml and in case group 30.71±17.9. There was no significant Vit.D level difference between the two groups (P= 0.77).

Serum Vit.D level in 15 cases with pneumonia was equal or more than 30 ng/ml (sufficient = 48%) and in 16 cases was 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 was less than 30 ng/ml (55%). There was no significant difference between two groups (P= 0.78).

Discussion

The goal of this study was comparison of serum Vit.D level between the two groups (control and pneumonia). The mean serum Vit. D level of control group was 31.89ng/ml with no significant difference with cases. Thus, Vit.D level was not an important risk factor for pneumonia in children between 6-60 months. Considering other risk factors for pneumonia in future studies can be helpful.

In Javadinia and colleagues' study the mean serum level of Vit.D was 35.37 ng/ml that is very near to this study result (5). In another study 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, sun exposure and season (6).

In a study done at Tehran on children population, there found no significant difference in Vit D level between case and control groups (5). This is comparable with our study considering the same geographic and weather conditions.

In Manaseki-Holland et al's study, administering Vit.D decreased the frequency and severity of pneumonia. The difference between our study result and Manaseki-Holland et al's study can be due to the level of Vit.D. At the latter study, the level of Vit.D was not mentioned (7).

There was no significant difference for frequency of Vit.D insufficiency between two case and control groups. Maybe it is because of consuming supplemental Vit.D by most of infants and toddlers in Iran. More study with attention to this factor can be helpful.

We found no significant difference for Vit.D level between the two genders in case and control groups. Thus, Vit.D level looks to be gender independent.

In a systematic review done at 2013 Vit.D supplement had no effect on resolution time in pneumonia. This systematic review can confirm our study result. At this systematic review there were just two eligible trials. So more trial study can be helpful to determine the relation of Vit.D level and giving supplemental Vit.D with pneumonia and its severity (8).

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