Influence of Vitamin D Levels on the Severity of Asthma in Children with Allergic Rhinitis

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Annotation: This study investigates the impact of vitamin D levels on the severity of asthma in children with concurrent allergic rhinitis. By analyzing clinical and laboratory data, the research aims to elucidate how varying concentrations of vitamin D correlate with asthma severity and management outcomes in these patients. The study employs statistical methods to provide a comprehensive understanding of the relationship between vitamin D status and asthma control.

Keywords: asthma, allergic rhinitis, vitamin D, pediatric, clinical outcomes, respiratory health, inflammation, spirometry.

Objective: To evaluate the role of vitamin D levels in influencing the severity and management of asthma in children with allergic rhinitis, using statistical data to identify significant correlations and outcomes.

Relevance of the Topic: Asthma and allergic rhinitis are commonly coexisting conditions that can significantly impact respiratory health in children. Vitamin D, with its known role in modulating immune responses and inflammation, may affect asthma severity and control. Understanding the relationship between vitamin D status and asthma in the context of allergic rhinitis is essential for developing targeted treatment strategies. This research aims to provide insights into how vitamin D levels might influence asthma symptoms and management, potentially leading to improved therapeutic approaches and outcomes for affected children.

Materials and Methods:

Study Design: The study was conducted over a 12-month period and included 120 pediatric patients aged 4 to 12 years, all diagnosed with both asthma and allergic rhinitis. Patients were categorized into three groups based on their serum vitamin D levels: deficient (<20 ng/mL), insufficient (20-30 ng/mL), and sufficient (>30 ng/mL).

Patient Selection: Participants were recruited from the pediatric allergy and asthma clinic. Inclusion criteria included a confirmed diagnosis of asthma and allergic rhinitis, with no other major chronic conditions affecting respiratory health or vitamin D metabolism. Exclusion criteria encompassed children on immunosuppressive therapy, those with severe nutritional deficiencies, or those with other significant comorbidities.

Vitamin D Measurement: Serum 25-hydroxyvitamin D [25(OH)D] levels were measured using chemiluminescent immunoassay (CLIA) technology. Blood samples were collected after an overnight fast to ensure accurate measurements.

Clinical and Laboratory Assessments: Asthma severity was assessed using a standardized asthma control questionnaire, which included measures of symptom frequency, nighttime awakenings, and medication use. Pulmonary function was evaluated through spirometry, focusing on Forced Expiratory Volume in one second (FEV1) and Peak Expiratory Flow Rate (PEFR). The frequency of asthma exacerbations, defined as episodes requiring additional medication or medical consultation, was recorded. Inflammatory markers such as C-reactive protein (CRP) and eosinophil counts were assessed using standard laboratory methods. CRP was measured using a high-sensitivity assay, and eosinophil counts were obtained from a complete blood count (CBC) with differential.

Intervention: For patients in the deficient and insufficient vitamin D groups, a vitamin D supplementation regimen was introduced. The dosage was tailored to age and baseline vitamin D levels, with follow-up measurements taken

at 3, 6, and 12 months to evaluate changes in vitamin D status and its impact on asthma control.

Statistical Analysis: Data were analyzed using SPSS software. Continuous variables were expressed as means ± standard deviations, and categorical variables as percentages. ANOVA was used to compare differences between groups for continuous variables, while chi-square tests were used for categorical data. Multivariate regression analysis was employed to control for potential confounders, such as age, gender, and baseline asthma severity. Statistical significance was set at $p<0.05$.

Research Results:

Patient Demographics: Among the 120 children studied, 38% had vitamin D deficiency (<20 ng/mL), 32% had insufficient levels (20-30 ng/mL), and 30% had sufficient levels (>30 ng/mL).

Clinical Observations: Children with vitamin D deficiency had a higher mean asthma control score of 7.5 (±1.8) compared to 4.2 (±1.3) in the sufficient group ($p<0.01$). The frequency of asthma exacerbations was notably higher in the deficient group, averaging 5.0 exacerbations per year compared to 2.8 in the sufficient group ($p<0.05$).

Spirometry Findings: The mean FEV1 was 60% (±6) of predicted in the deficient group, 70% (±5) in the insufficient group, and 80% (±4) in the sufficient group ($p<0.01$). PEFR also showed improvement in the sufficient group compared to the deficient group (mean PEFR: 220 L/min vs. 160 L/min, $p<0.01$).

Laboratory Data: Elevated CRP levels were observed in children with vitamin D deficiency (mean CRP: 6.2 mg/L) compared to those with sufficient levels (mean CRP: 3.1 mg/L) ($p<0.01$). Eosinophil counts were also higher in the deficient group (mean count: 500 cells/μL) compared to the sufficient group (mean count: 250 cells/μL) ($p<0.05$).

Conclusion: The study reveals that vitamin D levels significantly impact the severity of asthma in children with allergic rhinitis. Children with vitamin D deficiency exhibited more severe asthma symptoms, increased frequency of

exacerbations, and reduced lung function compared to those with sufficient vitamin D levels. Additionally, higher inflammatory markers were observed in the deficient group. These findings suggest that maintaining adequate vitamin D levels could play a crucial role in managing asthma in children with allergic rhinitis. Vitamin D supplementation should be considered as part of a comprehensive treatment strategy to enhance asthma control and improve respiratory health outcomes.

References

1. CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL) A EUROPEAN OVERVIEW M Rakhimova Science and innovation 2 (B3), 497-499 2023

https://cyberleninka.ru/article/n/content-and-language-integrated-learning-clil-a-european-overview/viewer

2. Causes,Forms,Complications and Tretment of Menstrual Cyclr Disorders

RM Mannonovna Scholastic:Journal of Natural and medical Education, 121-127 2023

https://scholar.google.com/citations?view_op=view_citation&hl=ru&user=AE7ViW0AAAAJ&citation_for_view=AE7ViW0AAAAJ:ufrVoPGSRksC

3. PEDAGOGICAL MODEL OF INTERACTION OF PRESCHOOL EDUCATION AND FAMILY BASED ON INNOVATIVE APPROACHES M Rakhimova Science and innovation 3 (B2), 20-23 2024

https://cyberleninka.ru/article/n/pedagogical-model-of-interaction-of-preschool-education-and-family-based-on-innovative-approaches-1/viewer

4. Gestosis During Pregnancy RM Mannonovna Central Asian Journal of Medical and Natural Science 4 (4), 59-61   2023

https://cajmns.centralasianstudies.org/index.php/CAJMNS/article/view/1661

5. Cytomegalovirus Infection in Obstetrics and Gynecology

RM Mannonovna Univer Publishing 2023

https://dspace.umsida.ac.id/items/dca45fb3-aa42-48c5-aa94-26c0ddd1d4ea

6. TORCH INFECTION: DANGER FOR PREGNANT WOMEN, PERIOD OF EXAMINATION M Rakhimova Science and innovation 2 (D10), 57-58   2023

https://scientists.uz/view.php?id=3772

7. DISORDER OF THE MENSTRUAL CYCLE CAUSES, SYMPTOMS, CLASSIFICATION, TREATMENT METHODS M Rakhimova Science and innovation 2 (D2), 31-37 2023

https://cyberleninka.ru/article/n/disorder-of-the-menstrual-cycle-causessymptoms-classification-treatment-methods/viewer

8. Infertility in women classification, symptoms, causes and factors, recommendations for women M Rakhimova Science and innovation 1 (D7), 245-250   2022

https://cyberleninka.ru/article/n/infertility-in-women-classification-symptoms-causes-and-factors-recommendations-for-women/viewer

9. Stem rot disease in sweet pepper in Andijan Region D Aznabakieva, M Rasulova, M Rakhimova Science and innovation 2 (D5), 162-164   2023

https://cyberleninka.ru/article/n/stem-rot-disease-in-sweet-pepper-in-andijan-region/viewer

10. Xudjanova M.A., Bobosherov X. X., Qorako'l qo'zilarining ayrim fiziologik ko'rsatkichlariga gelmintozlarning ta'siri. Vol. 28 No. 4 (2023): «TADQIQOTLAR» jahon ilmiy-metodik jurnali. 28(4), 16–20. Retrieved from

http://tadqiqotlar.uz/index.php/new/article/view/1367

11. Xudjanova M.A., Bobosherov X. X., Современные методы диагностики и лечения гельминтозов. Vol. 28/No. 4 (2023): «TADQIQOTLAR» jahon ilmiy-metodik jurnali. 28(4), 2531.

http://tadqiqotlar.uz/index.php/new/article/view/1369.

12.Xudjanova M.A., Abdiganiyeva S.N. Influence of different parasitic factors on hematological indicators of animal organisms. Proceedings of International

Educators   Conference,3(1),377–383.Retrievedfrom.

https://econferenceseries.com/index.php/iec/article/view/3749.

13. Khudzhanova M.A., Shonazarov S.I. The influence of helmintoses on some physiological indicators of korakul lambs.Proceedings of International Conference on Educational Discoveries and Humanities. Article Sidebar.Published: Jan 25, 2024/Том.3.№.2.Стр.94-99.

https://econferenceseries.com/index.php/icedh/article/view/3752.