

**ARTICLE TITLE AND
BIBLIOGRAPHIC INFORMATION**

Inverse association between periodontitis and respiratory allergies in patients with type 1 diabetes mellitus. Friedrich N, Kocher T, Wallaschofski H, Schwahn C, Lüdemann J, Kerner W, et al., *J Clin Periodontol* 2008;35(4):305-10.

REVIEWER

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PURPOSE/QUESTION

To evaluate whether an inverse association between periodontitis and atopic allergies could be replicated in a homogeneous subgroup of patients with type 1 diabetes mellitus, and to evaluate whether the strength of such an inverse association is stronger than the association reported in their previous study among patients who do not have diabetes.

SOURCE OF FUNDING

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TYPE OF STUDY/DESIGN

Cross-sectional

LEVEL OF EVIDENCE

Level 2: Limited-quality, patient-oriented evidence

**STRENGTH OF
RECOMMENDATION GRADE**

Not applicable

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Periodontal Disease is Inversely Associated with Respiratory Allergies in Patients with Type 1 Diabetes Mellitus

SUMMARY**Subjects**

Sample size was 170 with approximately 45% female; the study was conducted in the Karlsburg area, Germany; dates of recruitment were December 1997 to December 2000 and respiratory allergies were present in 22 subjects.

Key Exposure/Study Factor

The primary exposure was periodontal attachment loss, which was categorized in different ways.

Main Outcome Measure

Respiratory allergies were present if subjects reported a positive history for either hay fever, allergy, house dust mite (HDM) or asthma.

Main Results

The subjects were categorized in 4 groups according to the quartiles of the percentage of surfaces that exceeded 3-mm attachment loss (AL) as follows: healthy periodontal conditions: 0% to 7.6% of sites with AL greater than 3mm, mild: 7.7% to 27.0% of sites with AL greater than 3 mm, moderate: 27.1% to 54.2% of sites with AL greater than 3mm, and severe: more than 54.2% of sites with AL greater than 3mm. The full model showed that individuals with severe AL (odds ratio [OR] 0.06; 95% confidence interval [CI] 0.01-0.39) and moderate AL (OR 0.14; 95% CI 0.03-0.63), had a lower risk of respiratory allergies compared with subjects with healthy periodontal conditions.

Conclusions

The inverse association between periodontitis and respiratory allergies was significant and stronger in patients with type 1 diabetes mellitus than in their previous study among patients who do not have diabetes.

COMMENTARY AND ANALYSIS

It has been suggested that there is a protective effect of infections against the development of allergies. A number of studies reported that patients with type 1 diabetes mellitus had a higher risk of periodontal disease, as well as lower risk of asthma and eczema. Hence, the authors postulate that there is an inverse association between periodontal disease and allergies, which is expected to be stronger among type 1 diabetic patients. The hypothesis is interesting and significant and the biological plausibility seems well justified.

Patients with type 1 diabetes mellitus aged 17 to 80 years were recruited from the Center of Cardiology and Diabetes in Karlsburg and from surrounding practicing diabetologists. The inclusion criteria were German citizenship and residency in West Pomerania, the Northeastern part of

Germany. It is not clear exactly how the participants were recruited and the response rates are not mentioned.

There is some concern about residual confounding, as the selection of confounders was based on *P* values rather than change in estimate. Multivariate logistic regression models were run. As a preliminary step, the model was fit separately for each possible confounder. Only diabetes duration had a *P* value less than .25 and was included in the multivariable model. Sex, age, and smoking were forced in the model. In the second step, all variables with a *P* value greater than .10 were excluded if the inclusion in the model did not lead to a 10% change in the coefficient of interest. The final model included only age, sex, smoking, and duration of diabetes. The level of control of diabetes, for example, could still be a confounder even if it was not significantly associated with the outcome.

A maximum of 14 teeth were measured on 4 surfaces for periodontal attachment loss. Several different summary variables were computed to assess the associations between different measures of AL and allergies. Percentage of surfaces that exceed 3-mm AL was determined for each subject and categorized into 4 groups according to the quartiles of distribution. The full model showed that individuals with severe AL (OR 0.06; 95% CI 0.01-0.39), moderate AL (OR 0.14; 95% CI 0.03-0.630), and mild AL (OR 0.32; 95% CI 0.09-1.08) had a lower risk of respiratory allergies compared with subjects with healthy periodontal conditions. These results reported in the abstract and text, supposedly refer to Table 2 of the original article, but the numbers presented in Table 2 are somewhat different (OR 0.06 and 0.12); the reason for the inconsistency is not clear. The results were further confirmed analyzing the percentage of surfaces with AL greater than 3 mm as a continuous variable (OR 0.96; 95% CI 0.94-0.99). Subjects were also categorized into 4 groups according to the quartiles of distribution of mean AL. Study results were consistent over numerous definitions of periodontitis. They also assessed caries, but no association between DMFT and respiratory allergies was found.

There was no standardized questionnaire for the ascertainment of hay fever, house dust mites (HDM) allergy, and asthma. Furthermore, the authors had no information about current and past allergic or asthmatic symptoms. Respiratory allergies were classified as present if the subject reported a positive history for hay fever,

HDM allergy, or asthma. Hay fever and HDM allergy were defined according to self-reported answers to the following 2 questions: (1) Do you have any allergies? (2) Which allergies on the following list do you have? Asthma was assessed by the 3 key questions: (1) Have you had wheezing or whistling in the chest during the past 12 months? (2) Have you had this wheezing or whistling when you did not have a cold? (3) Do you take any anti-asthmatic medication at present, eg, tablets, spray, or inhalations? Asthma was defined as a positive response to either questions (1) and (2), or to question (3) alone. Chronic bronchitis was defined as productive cough in the past 12 months for at least 3 months. Subjects with chronic bronchitis were classified as without asthma. As the authors acknowledge, the self-reported assessment of respiratory allergies is a limitation in this study, because of expected misclassification. However, random misclassification generally biases the results towards the null and it is unlikely that the inverse associations could be attributed to misclassification due to self-reports. The authors also mentioned potential recall bias; however it is unlikely that the recall and reporting of allergies is related to the participants' periodontal status.

The biological plausibility seems convincing and in spite of some concerns about potential residual confounding and misclassification, the results do suggest a strong inverse association. However, this is a cross-sectional study and does not prove casual relations, as the authors acknowledge, and additional longitudinal studies are needed to confirm the findings.

Conclusion

There is a strong inverse association between periodontitis and respiratory allergies, which is stronger in patients with type 1 diabetes mellitus.

REVIEWER

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