

Dental Caries in Children with Chronic Idiopathic Urticaria in Israel

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ABSTRACT

Most cases of chronic urticaria in children are idiopathic. Chronic focal infections of the sinuses or oral cavity have been mentioned as a cause of chronic urticaria because of the persistent antigenic stimulation. To investigate whether children with chronic idiopathic urticaria (CIU) have a higher prevalence and total experience of dental caries than other children in Israel, oral examination was performed to determine decay, missing, filled-teeth (DMFT) scores in 25 children with CIU (mean age, 11.76 ± 3.84 years) and 50 children with perennial allergic rhinitis (PAR) (mean age, 12.57 ± 3.29 years). The results of both groups were compared with reference data from another study on 12-year-old schoolchildren in Israel ($n = 762$). DMFT scores were 2.84 ± 3.18 in the CIU group, 1.56 ± 1.77 in the PAR group ($p = 0.07$), and 2.99 ± 2.7 in the reference group ($p = 0.80$). The difference between the PAR and reference groups was statistically significant ($p = 0.001$). Twenty-eight percent of the children with CIU were caries-free, compared with 44% of the children with PAR and 21.2% of the reference group ($p = 0.18, 0.41$, respectively). The difference between the PAR and the reference groups was statistically significant ($p < 0.0001$). In summary, children with CIU have a total caries experience similar to that of the nonselected pediatric population in Israel. Their DMFT score is slightly higher than those in children with PAR, but without statistical significance. The results of this study do not support an association between chronic urticaria and dental caries in children. (Pediatr Asthma Allergy Immunol 2001; 15[1]:43–47.)

INTRODUCTION

CHILDHOOD CHRONIC URTICARIA is a common disorder characterized by the appearance of hives on a continuous or frequently recurrent basis for more than 6 weeks.⁽¹⁾ In some cases, the causative factors are identified, and include infections, drugs, autoimmune thyroid disease, or physical stimuli.^(2–5) In others, the etiology remains obscure.⁽⁶⁾

Chronic focal infections of the sinuses or oral cavity have been mentioned as a possible cause of chronic

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urticaria, but data are sparse.⁽⁷⁻⁹⁾ In addition, chronic oral cavity infections, such as dental caries, gingivitis and periodontal disease, have been linked to other chronic diseases, such as, cardiovascular diseases and atherosclerosis.^(10,11)

The aim of the study was to determine if there is an association between chronic idiopathic urticaria (CIU) and dental caries in children.

PATIENTS AND METHODS

The study population included children referred to the Allergy Clinic of Schneider Children's Medical Center of Israel for the evaluation and treatment of chronic urticaria, or perennial allergic rhinitis (PAR).

Each patient underwent a complete clinical history and physical examination. The state of dental caries was defined according to the sum of decayed, missing and filled-teeth (DMFT) score on oral examination. We used the examination procedure and criteria recommended by the World Health Organization (WHO)⁽¹²⁾; the medical team included two pediatric allergist/immunologist (N.S. and Y.L.) and was supervised by a certified dentist who is specialized in oral pathology (J.K.). The work-up for chronic urticaria included the following: specific tests to exclude physical urticaria, such as ice-cube test for cold-induced urticaria and skin stroking for dermatographism; complete blood count and sedimentation rate; blood chemistry; urine analysis and culture; nasal and throat swabs; chest and sinus X rays; antibody titers for hepatitis B virus, herpes simplex virus, Epstein-Barr virus, cytomegalovirus and mycoplasma; anti-streptolysin antibody, antinuclear factor, serum complement levels, thyroid-stimulating hormone, free thyroxine, and anti-thyroid antibodies. Skin prick tests with food allergens were performed in cases where the clinical history suggested a correlation between exacerbation of urticaria and ingestion of a specific food.

The diagnosis of perennial allergic rhinitis was based upon the accepted signs and symptoms, and the presence in each patient of at least one positive skin prick test to an indoor aeroallergen.

For comparison, a nonselected age-matched pediatric population, which participated in a 1992 Israeli study on dental caries,⁽¹³⁾ served as a reference group.

Statistical analysis

Results are shown as mean $\pm$ standard deviations. To evaluate statistically significant differences between cases and controls for mean continuous parameters (caries index, age), Student's *t*-test was used, and for categorical variables (gender, % caries-free), Chi-square test or Fisher's exact test was used, as appropriate. A *p* value ≤ 0.05 was considered statistically significant.

RESULTS

Twenty-five children referred to our clinic for chronic urticaria had negative findings for an etiology on work-up (including 14/25 with negative skin tests to food allergens) and were included in our CIU group. Age range was 6 to 20 years (1 patient) (mean 11.76 ± 3.84 years). The PAR group consisted of 50 children aged 6 to 20 years (1 patient) (mean 12.5 ± 3.29 years). The reference group included 762 children all aged 12 years. All patients came from the same geographic area. There was no statistically significant difference in mean age between the CIU and PAR groups. Mean DMFT scores were 2.84 ± 3.18 in the CIU group, 1.56 ± 1.77 in the PAR group, and 2.99 ± 2.7 in the reference group. The difference in DMFT score between the PAR and reference groups was statistically significant ($p = 0.001$), and between the CIU and PAR groups, of borderline significance ($p = 0.007$). There was no statistically significant difference in DMFT score between the CIU and reference groups ($p = 0.80$) (Table 1).

Twenty-eight percent of the children with CIU had no dental caries (Fig. 1), compared with 44% in the PAR group and 21.2% in the reference group. Only the difference between the PAR and the reference groups was statistically significant ($p < 0.0001$).

TABLE 1. RESULTS OF TOTAL CARIES EXPERIENCE (MEAN $\pm$ SD)

Group	CIU	PAR	Reference
<i>N</i>	25	50	762
Age (years)	11.76 $\pm$ 3.84	12.57 $\pm$ 3.29	12
DMFT score	2.84 $\pm$ 3.18 ^a	1.56 $\pm$ 1.77 ^b	2.99 $\pm$ 2.7 ^c

CIU, chronic idiopathic urticaria; and PAR, perennial allergic rhinitis.

^a*p* value = 0.07 compared with PAR.

^b*p* value = 0.001 compared with reference group.

^c*p* value = 0.80 compared with CIU.

DISCUSSION

Urticaria is a common disorder in children and adults, with an estimated prevalence in the pediatric population of 2–7%.⁽⁶⁾ The cause of acute urticaria is sometimes evident from a carefully obtained history alone and may be confirmed, in some cases, by appropriate laboratory tests. According to a recent study, etiologic factors in urticaria are more readily identifiable in infants than in children and adults.⁽¹⁴⁾ These authors were able to name a clear or suspected underlying cause in 51/57 (91%) of the infants (age 1–36 months) in their series with acute urticaria. In 12 of them, the urticaria developed into chronic or recurrent urticaria. The main etiology found was viral infection associated with antibiotic therapy in 46/57 (81%).

The causes identified to date in childhood CIU are food allergy, infections, physical factors, and autoimmune thyroid disease.^(1–5) The infections may be viral, streptococcal, parasitic, or spirochetal.^(1–4) Focal infections of the teeth, sinuses, urinary tract, and gallbladder may also play a role.⁽¹⁾ The literature on oral cavity infections in CIU includes only a few case reports.^(7–9) Autoimmune mast cell disease and cancer, mentioned in adult series, are seldom causes in children.^(6,15)

Recently, several studies have described an association between chronic oral cavity infections and systemic disease, such as atherosclerosis and cardiovascular disease.^(10,11) Some researchers have suggested

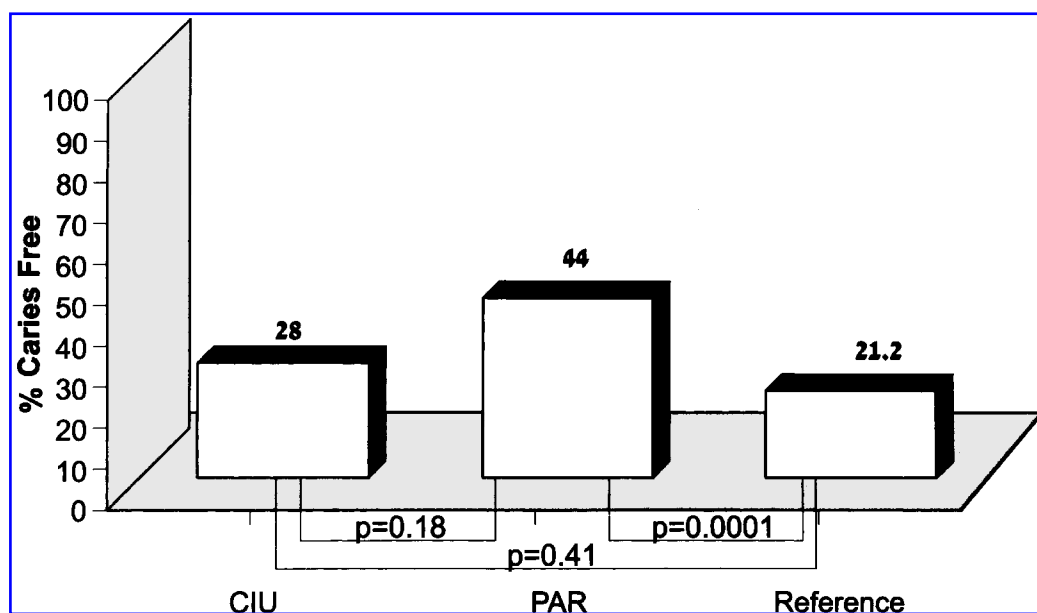


FIG. 1. Prevalence of dental caries.

that the more severe the periodontal disease, the higher the risk of coronary heart disease and stroke.⁽¹⁶⁾ Apparently, periodontal disease induces a biological burden of endotoxins (lipopolysaccharides) and inflammatory cytokines (especially IL-1 β , PGE₂, and TNF- α), which initiate and exacerbate atherogenesis and thromboembolic events.⁽¹⁶⁾ Furthermore, poor oral hygiene and dental caries may also contribute to the host immune reaction against the heat shock protein, which has been associated with atherosclerotic lesions.^(17,18) Heat shock proteins may play an important role in normal and pathological immune reactions and could participate in the pathogenesis of autoimmune processes due to antigenic cross-reactivity.⁽¹⁹⁾

The renewed interest in the possible relationship of chronic oral cavity infections and systemic disease prompted us to investigate whether children with CIU have more dental caries than other pediatric populations.

We compared 25 children with CIU (after an extensive work-up to exclude other possible causes) with 50 children with PAR. Because children with PAR might have chronic mouth breathing and changes in oral cavity pH, we compared both these groups with a same-age reference group from another Israeli study.⁽¹³⁾ The results failed to support an association of chronic urticaria and dental caries in children. Although 28% of the patients with CIU were caries-free compared with 44% of the patients with PAR and 21.2% of the reference group, the differences did not reach statistical significance (Fig. 1). The mean DMFT score in the CIU group was slightly higher than that in the PAR group, with a borderline statistical significance ($p = 0.07$), but it did not differ from the score of the children in the reference group (Table 1). Although there was a wide age range in the CIU group compared with the reference group, we assumed that this factor did not have any impact on the DMFT score, because in general, within the age range of 5 to 18 years, the DMFT score does not change with age.⁽²⁰⁾

We found only one study in the literature that mentioned the presence of dental caries in children with chronic urticaria. Ghosh et al.⁽²¹⁾ found that of 44 children evaluated for urticaria, only 6 (14%) had dental caries. This rate is much lower than the 72% rate of dental caries in the children with CIU in our study. We speculate that the discrepancy is due to the difference in the methods of the oral cavity examination in the two studies.

The surprising finding in our study was that children with PAR had a lower prevalence of dental caries and a lower mean DMFT score than the children in the reference group (Fig. 1 and Table 1). We expected that the chronic mouth breathing associated with chronic nasal congestion in PAR would have led to an increase in oral cavity infections, including dental caries.

The reason for the lower dental caries prevalence and DMFT score in children with PAR compared with the reference group is not clear. One explanation could be that the study of dental caries in the reference group was performed before 1992. The drinking water in Israel has since been fluorinated, resulting in a decline in dental caries prevalence.⁽²⁰⁾ Another speculation is that the TH₂ cytokines excretion by the nasal mucosa in children with allergic rhinitis⁽²²⁾ may in some way be contributory.

In summary, our study findings do not support an association between CIU and dental caries in children. Nevertheless, it is probably advisable to screen children with CIU for any focal infection, including oral cavity infections and dental caries. More surveys in a larger number of children are needed before a final conclusion can be reached.

REFERENCES

1. Twarog FJ. Urticaria in childhood. Pathogenesis and management. *Pediatr Clin North Am* 1983; 30:887-898.
2. Stafford CT. Urticaria as a sign of systemic disease. *Ann Allergy* 1990; 64:264-270.
3. Volonakis M, Katsarou-Katsari A, Stratigos J. Etiologic factors in childhood chronic urticaria. *Ann Allergy* 1992; 69:61-65.
4. Mahmood T, Janniger C. Childhood urticaria. *Cutis* 1993; 52:78-80.
5. Dreyfus DH, Schocket AL, Milgrom H. Steroid resistant chronic urticaria associated with anti-thyroid microsomal antibodies in a nine-year-old boy. *J Pediatr* 1996; 128:576-578.
6. Greaves MW. Chronic urticaria in childhood. *Allergy* 2000; 55:309-320.

7. Tanphaichitr K. Chronic urticaria associated with bacterial infection. A case of dental infection. *Cutis* 1981; 27:653–656.
8. Shelley WB. Urticaria of nine years' duration cleared following dental extraction. A case report. *Arch Dermatol* 1969; 100:324–325.
9. Juhlin L. Recurrent urticaria: clinical investigation of 330 patients. *Br J Dermatol* 1981; 104:369–372.
10. Beck J, Garcia R, Heiss G, Vokonas P, Offenbacher S. Periodontal disease and cardiovascular disease. *J Periodontol* 1996; 67(suppl):1125–1137.
11. Syrjanen J. Vascular diseases and oral infections. *J Clin Periodontol* 1990; 17:497–500.
12. World Health Organization. Oral health surveys—basic methods, 3rd ed. Geneva: WHO, 1987.
13. Zadik D, Zusman SP, Kelman AM. Caries prevalence in 5- and 12-year-old children in Israel. *Commun Dent Oral Epidemiol* 1992; 20:54–55.
14. Mortureux P, L'èauté-Labréze C, Legrain-Lifermann V, Lamireau T, Sarlangue J, Taieb A. Acute urticaria in infancy and early childhood. *Arch Dermatol* 1998; 134:319–323.
15. Hide M, Francis DM, Grattan CEH, Barr RM, Winkelmann RK, Greaves MW. The pathogenesis of chronic idiopathic urticaria. New evidence suggests an autoimmune basis and implication for treatment. *Clin Exp Allergy* 1994; 24:624–627.
16. De Stefano F, Anda RF, Kahn HS, Williamson D, Russel CM. Dental disease and risk of coronary heart disease and mortality. *BMJ* 1993; 306:688–691.
17. Young RA, Elliott TJ. Stress proteins, infection and immune surveillance. *Cell* 1989; 59:5–8.
18. Kleindienst R, Xu Q, Willeit J, Waldenberger FR, Weimann S, Wick G. Demonstration of heat shock protein 60 dispersion and T lymphocytes bearing α/β or α/δ receptor in human atherosclerotic lesions. *Am J Pathol* 1993; 142:1927–1937.
19. Kaufman SHE. Heat shock proteins and the immune response. *Immunol Today* 1990; 11:129–136.
20. Sgan-Cohen H, Katz J, Horev T, Eldad A. Trends in caries prevalence and associated variables among young Israeli adults over 5 decades. *Commun Dent Oral Epidemiol* 2000; 28:234–240.
21. Ghosh S, Kanwar AJ, Kaur S. Urticaria in children. *Pediatr Dermatol* 1993; 10:107–109.
22. Benson M, Strannegard IL, Wennergren G, Strannegard Ö. Low levels of IFN- γ in nasal fluid accompany raised levels of Th₂ cytokines in children with ongoing allergic rhinitis. *Pediatr Allergy Immunol* 2000; 11:20–28.

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