

## FACTORS INFLUENCING THE PRESENT STATUS OF CHRONIC PARANASAL SINUSITIS IN JAPAN

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During a sojourn in North-America and Europe from 1961 to 1962, Dr. M. Okuda, one of the present authors, noted that there are apparent differences in the incidence of paranasal sinusitis between these countries and Japan.

The morbidity rate of sinusitis appears to vary according to the condition of the patient and age, the season of the year and the care with which examination of the patient is carried out. In Japan rhinoscopic examinations for sinusitis were carried out in approximately 10,000 individuals of different ages and environments. The morbidity rate ranged from 3.3 % to 34 %, the mean value being about 10 to 15%. This is roughly 2 to 4 times that seen in Europe and America. If X-ray examination was used as the diagnostic criterion, this figure was doubled.

Twenty five per cent of our outpatients over the past ten years were diagnosed as sinusitis and 63.8 % of our inpatients were admitted for surgical treatment of sinusitis. The extent of the sinusal involvement in each patient also showed variation. A combined affection of the maxillary and ethmoid sinuses was seen in 54.5 % of the cases, pansinusitis in 15 % and an isolated involvement of the maxillary sinus in only 18.5 %. In Europe and America according to my observations the isolated involvement of the maxillary sinus is the condition usually found.

Some investigators have concluded that the majority of sinusitis in the Western nations is of allergic etiology. For this reason we made skin tests in sinusitis patients using some 40 different allergenic extracts including house dust, pollen, dander and foods. At the same time provocation intra-nasal tests using concentrated extracts of the incriminated antigen were done and examination of nasal smears and Prausnitz-Küstner reaction were carried out; 10 % of the patients were positive to both the skin tests and the provocative tests and another 10 % to the skin tests only. Those patients with a positive skin test did not have the common symptoms of nasal allergy such as sneezing, nasal obstruction and watery secretion, but rather a chronic nasal congestion with mucopurulent discharge. The majority of positive reactions were to house dust.

Pathogens residing in the sinusal mucous membranes were investigated. Membrane samples were removed and washed in physiologic saline solution. The

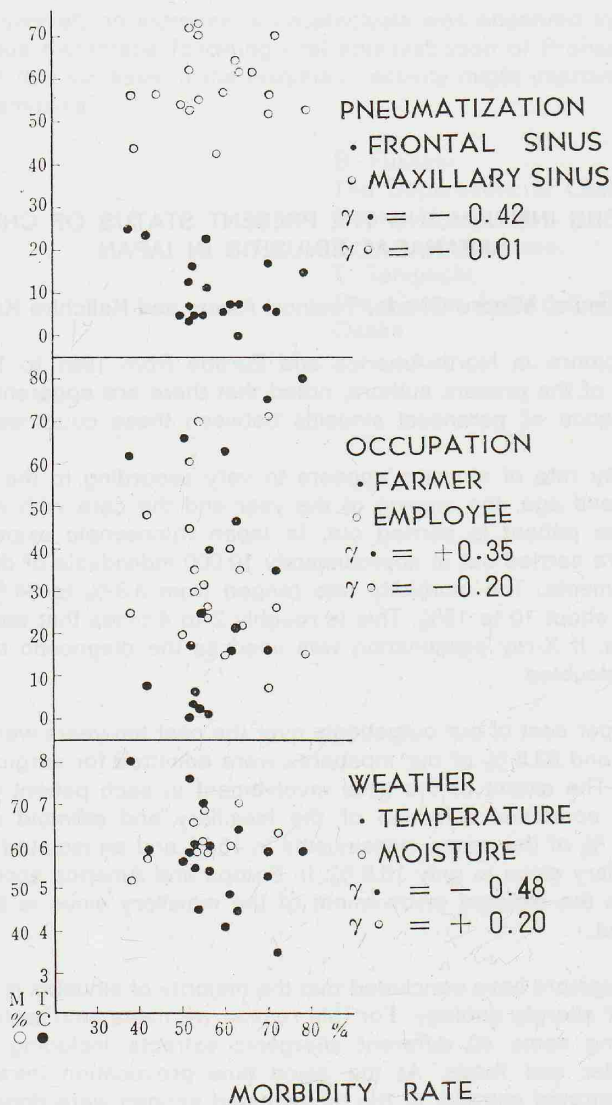


Figure 1. Legend: The morbidity rate of chronic sinusitis as related to weather, occupation and pneumatization.

surface was disinfected by soaping in a 3% phenol solution. They were then carefully macerated and centrifuged. The supernate was smeared on several different kinds of culture media, including blood agar. After 24 hours' incubation, 18 of the 40 cases examined showed bacterial colonies. Most of these were staphylococcus aureus and hemolytic streptococcus. Furthermore, a precipitative reaction between the autogenous bacteria and the diluted super-

nate obtained from the sinus membrane was tried. The reaction was positive in 10 of the 13 cases examined.

In skin tests with 18 different bacterial antigens, an early positive reaction was seen in 40 to 50 % of the sinusitis patients and a delayed positive reaction in 10 to 48.4 %. Paspal, a polyvalent bacterial antigen, also showed a positive skin reaction in 50 % of the same patients. Histologically, there was a high degree of lymphocytic and plasma cell infiltration in the membranes of the patients. These results suggest that 10 % of the sinusitis in Japan is due to inhalent atopic allergy while the other 90 % is due to delayed or bacterial type allergy associated with infection. Treatment in many cases was surgical using the combined method of maxillo-ethmoidectomy because the tissue changes were so extensive and severe that less extensive and thorough operation was contraindicated. It would appear that operations are more adequate and thorough in Japan than in Europe. The removed membranes showed polypoid or cystic degeneration in 55 %, edematous changes in 29 % and fibrous changes in 16 %.

The tissue changes did not correlate with the pathogenic type of sinusitis but rather with the extent of pneumatization of the sinus. The more extensive the development of the sinus, the more extensive was the polypoid change. In the post-operative studies, complete symptomatic relief and disappearance of disease was obtained in 54 % and good improvement in a further 24.4 %. However cyst formation in the operated sinus was not infrequent long after the operation.

The question as to why there are more and severer cases of chronic sinusitis in Japan was studied from the standpoint of pneumatization of the sinuses, the state of nutrition and occupations of the patients, dusts or pathogens in the air, and weather conditions (Fig. 1). In 20 different areas of Chiba Prefecture, where our clinic is located, 1,636 school children were examined with the relation between cases of sinusitis and the factors mentioned above kept in mind. The morbidity rate of sinusitis was lower in the cities than in the rural areas and less in the southern than the northern districts of the prefecture. No definitive data relating sinusitis to occupation was obtained. The morbidity rate appeared to be lower in areas where the winter was comparatively mild. The correlation coefficient of temperature to morbidity rate was -0.48. In addition, the morbidity rate seemed to be greater in cases where the frontal sinus was less well developed.

Far less sinusitis seemed to occur among those children whose diets had ample protein, fat, calcium, vitamins B<sub>1</sub> and B<sub>2</sub>. (Fig. 2).

A dust count was taken from a small glass plate placed on the bedroom floor of each of 94 school children. Dishes of agar medium were also exposed for a constant time in the same rooms, and after 24 hour's incubation, a colony count was taken. There seems to be no relation between the morbidity of sinusitis and the degree of contamination with bacteria or house dust in the individual homes. From the results of the present epidemiologic study, it was

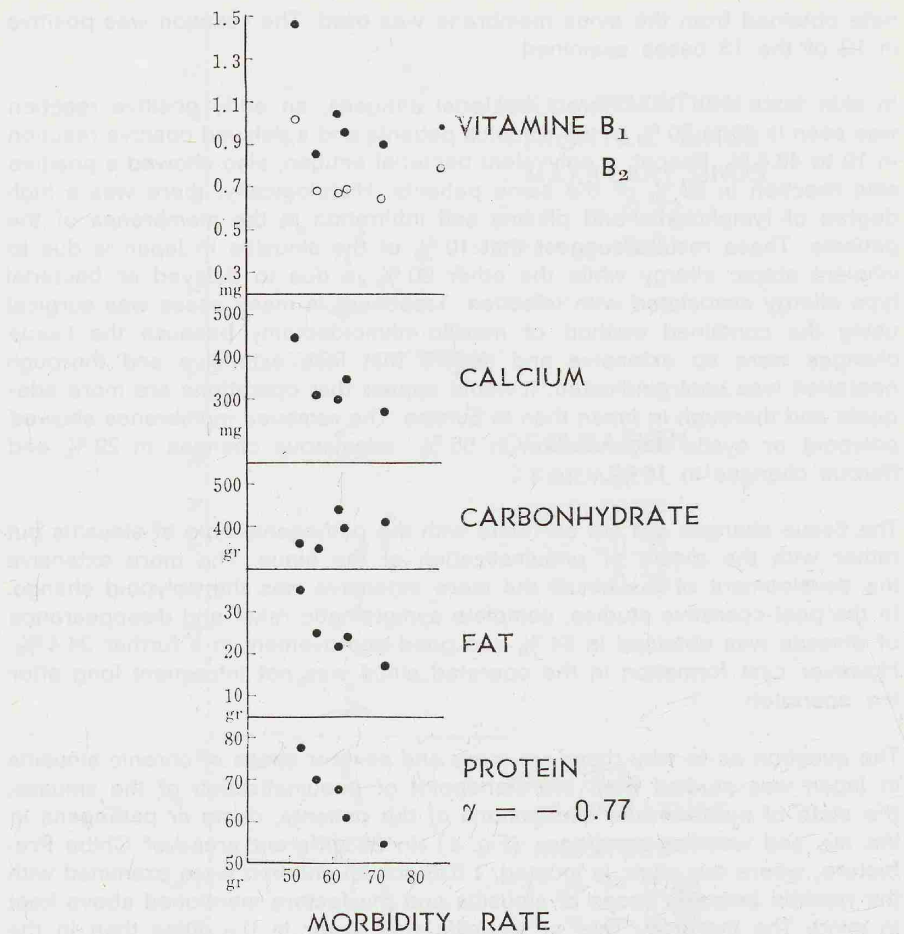


Figure 2. Legend: The morbidity rate of chronic sinusitis as related to diet.

concluded that among the factors presumably involved in the pathogenesis of sinusitis the extent of pneumatization of the sinuses and the nutritional state are the most important. Large sinuses or diets rich in protein, fat and vitamins may be implemental in recovery from acute sinusitis or in the prevention of an acute infection developing into a chronic one. It is noteworthy that there are marked differences in nutritional state and in the development of the sinuses between the Japanese and inhabitants of the Western Hemisphere.

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