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Sinusitis in allergic patients*†

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SUMMARY

Allergy is one of the aetiologic factors in the pathogenesis of sinusitis. To determine its influence on the occurrence of sinusitis the authors studied CT-scans of the sinuses in 59 allergic children and 62 allergic adults. Sinusitis was found in 36 children (61%) and 36 adults (58%). These results were compared with two previous studies consisting of mainly non-allergic children (n=196) and mainly non-allergic adults (n=350). Except for allergy, identical nclusion and evaluation criteria were used. In the previous studies, sinusitis was found in 125 children (64%) and 201 adults (57.5%). According to these results it seems that the prevalence and the extent of sinus mucosa involvement is not determined by aetiology (allergic or non-allergic). Age seems to be of major importance regarding the extent of sinus disease.

Key words: sinusitis, allergy, children, adults, CT

INTRODUCTION

Sinusitis is a common disease in children and adults. In a normal population the prevalence of sinusitis is estimated at 32% in young children, and 5% in adults (Albegger et al., 1979; Bagatsch et al., 1980). When patients with chronic nasal complaints are selected, the incidence of sinusitis rises considerably: results of different studies vary from 43.9% to 75% depending on the inclusion criteria used (Smoldt et al., 1983; De Cleyn et al., 1986; Rachelefsky et al., 1988; Van Der Veken et al., 1989). Many predisposing factors to sinusitis are known. They all alter the function of three elements that are important in the normal physiology of the paranasal sinuses: the patency of the ostia, the function of the ciliary apparatus, and the quality of secretions (Connell, 1983; Slavin, 1988; Wald, 1990). One of these predisposing factors is allergy. Although allergy alters the function of all three elements, its exact influence on the occurrence of sinusitis is not very well known. With this study the authors tried to determine the role allergy plays in the occurrence of sinusitis.

MATERIAL AND METHODS

Selection was made from a group of patients with chronic nasal complaints consisting of chronic rhinorrhoea and/or nasal congestion and/or cough. Only those patients with positive skin test and/or a positive RIST/RAST-test were entered in this study. This resulted in a group of 59 children (32 males and 27 females) and a group of 62 adults (35 males and 27 females). The children were aged between 3 and 15 years (mean age: 9.5 years). The adults were aged between 15 and 55 years (mean age: 30.7 years). In all patients a CT-scan of the sinuses was performed. All CT-scans were evaluated for signs of sinusitis. A grading scale to evaluate the extent of the mucosal swelling was used to define the severity of sinusitis. Depending on the site of the sinus two scales were used:

I. For the maxillary, sphenoidal and frontal sinuses:
grade 0: normal sinus,
grade 1: mucosal swelling of maximally 4 mm,
grade 2: opacity of maximally 50%,
grade 3: opacity between 50% and 75%,
grade 4: opacity of more than 75%
(Grades 1 and 2 were classified as mild sinusitis, grades 3 and 4 as extensive sinusitis)

II. For the ethmoidal sinus:
grade 0: normal sinus,
grade 1: mucosal swelling,
grade 2: total opacity.

The results were compared with two previously performed studies (Clement et al., 1989a, b). They consisted of 196 mainly non-atopic children and 350 mainly non-atopic adults. Except for the presence of allergy, identical inclusion criteria were used (chronic rhinorrhoea, nasal congestion, and cough) as well as identical evaluation criteria for sinus CT-scans.

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Table 1. CT-scan findings of the paranasal sinuses in a population of atopic patients.

	children (n=59)	adults (n=62)
without sinus disease	39%	42%
with sinus disease:	61%	58%
maxillary sinus	83.3%	88.8%
anterior ethmoid	55.5%	44.5%
posterior ethmoid	30.5%	27.7%
sphenoidal sinus	38.9%	11.1%
frontal sinus	13.9%	5.5%

Table 2. Occurrence of sinusitis in allergic children (according to age) and in allergic adults.

age	no sinusitis (%)	mild sinusitis (%)	severe sinusitis (%)
children:			
3-6 years (n=8)	50	0	50
6-9 years (n=19)	37	31.5	31.5
9-12 years (n=14)	35.7	50	14.3
12-15 years (n=18)	38.9	44.5	16.6
adults:			
15-55 years (n=62)	42	45.1	12.9

Table 3. CT-signs of sinusitis in atopic patients: Sinus involvement.

	maxillary sinus	anterior ethmoid	posterior ethmoid	sphenoidal sinus	frontal sinus
adults total group (n=62)	51.6	25.8	16.1	6.4	3.2
children total group (n=59)	51.0	34.0	18.6	24.0	8.5
children 3-8 years (n=19)	37	42	21	31	5
children 8-15 years (n=40)	57	30	17	20	10

RESULTS

In each group (children and adults) male patients had a slight predisposition to sinusitis: 66.6% of the children and 69.5% of the adults with CT-signs of sinusitis were males.

CT-signs of sinusitis were found in 36 children (61%) and in 36 adults (58%). From Table 1 follows that the percentage of involvement of the maxillary sinus, and of the anterior and posterior ethmoidal cells, is similar in the adult and children groups. The percentage of involvement of the sphenoidal and frontal sinus is slightly different in each group.

The age of the patient seems to play an important role on the extent of mucous membrane involvement. Fifty per cent of the youngest children (3-6 years) showed signs of sinus involvement. In this group sinus involvement was always extensive. The occurrence of extensive sinus involvement (grade 3 or 4: see Material and Methods section) decreased with age: 31.5% for children aged 6–9 years, 14.3% for children aged 9–12 years, 16.6% for children aged 12–15 years, and 12.9% for adults. In older patients, extensive sinusitis was found to be less frequent (Table 2).

When sinusitis was present, the maxillary sinus was more often involved than the other sinuses: 51% of all children and 51.6% of all adults showed CT-signs of maxillary sinusitis. This finding only holds for patients older than 8 years. In a selected group of younger children (3-8 years: n=19) the maxillary sinus was no longer the most frequently involved sinus. In this age group the anterior ethmoidal cells were most frequently involved, but the difference compared to the involvement of other sinuses was small. The maxillary sinus showed signs of inflammation in 37%, the anterior ethmoidal cells in 42%, the posterior ethmoidal cells in 21%, and the sphenoidal sinus in 31%. The frontal sinus was not yet developed in most of these younger children. The occurrence of sinus disease is almost equal for the different sinuses in young children, whereas in older children and adults the maxillary sinus was found to be predominantly involved (Table 3).

Neither the severity nor the type of atopy altered the occurrence of sinusitis very much. According to the RAST count and the skin reaction the authors were able to divide the allergic patients into two groups: a first group of patients with a RAST count and skin reaction of less than "++" (19 children and 26 adults), and a second group with a RAST count and skin reaction of more than "+++" (40 children and 36 adults). In the mildly atopic group, 79% of the children and 59.6% of the adults showed CT-signs of sinusitis, and in the severely atopic group 52.5% of the children and 58.5% of the adults. In adults the presence of mild or severe atopy is of no importance with respect to the occurrence of sinusitis. In children there existed a higher percentage of sinusitis in the mildly atopic group.

DISCUSSION

In the allergic patient population the occurrence of sinus involvement as evidenced by CT-scan was found to be 61% in children and 58% in adults. These results were compared with two previous studies (Clement et al., 1989a, b) consisting of two groups of mainly non-allergic children (n=196) and mainly non-allergic adults (n=350), all with chronic nasal complaints. Only 18 out of 196 children were allergic (9%). In the group of 350 adults allergy was found in 41 patients (11.7%). The prevalence of allergy found in these two groups with chronic nasal complaints (9% in children and 11.7% in adults) did not differ much from the incidence of allergy expected in a normal population (i.e., 10–15%; Mygind, 1978; Kay, 1987; Fireman, 1990). Except for allergy, the inclusion criteria as well as the evaluation criteria for the CT-scans of the sinuses were identical with those used in the present study.

In the two previous studies, sinusitis was found in 126 of 196 mainly non-allergic children (64%) and in 201 of 350 mainly non-allergic adults (57.5%). By comparison with the present study (allergic patients), the authors found almost exactly the

same prevalence of sinusitis: 61% in allergic children and 58% in allergic adults. From this we can conclude that in patients with chronic nasal complaints the prevalence of sinusitis remains almost identical, whether the patients are allergic or not.

Analyzing the results of the present study, the authors noted that the severity of atopy had almost no influence on the occurrence of sinusitis. Mildly and severely atopic patients showed sinusitis in 57.6% and 58.5%, respectively, of the adult group, and in 79% and 52.5%, respectively, of the children group. These results show no positive correlation between the severity of atopy and the prevalence or extent of the inflammation of the sinus mucosa. In adults the occurrence of sinusitis was equal for mildly or severly atopic patients. In children, the authors found even more cases of sinusitis in the mildly atopic group.

There was a strong correlation between the age of the patient and the presence of extensive sinusitis. The occurrence of extensive sinusitis decreased from 50% in very young children (3-6 years) to 12.9% in adults. From the study of allergic and non-allergic patients we can conclude that the prevalence and extent of sinus mucosa involvement seems not to be determined by the presence of allergy. One definite factor, however, seems to be of major importance, and this factor is age. Under the age of 8 years, sinusitis seems to be more extensive.

Since the selection of patients was based on the presence of chronic nasal complaints and the authors did not study other possible aetiologic factors besides allergy, it is important to mention that we could not distinguish whether the nasal complaints are the cause or the result of sinusitis.

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