

Screening of allergic rhinitis

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SUMMARY

The author, in an attempt to define the most suitable means for the preclinical diagnosis of allergic rhinopathy, submitted 1620 pupils from seven different state schools to examination. Their parents were asked to fill in a questionnaire through which 370 were considered to be "at risk". All children underwent scratch skin tests: 73 with positive skin reactions also underwent nasal examination, measurement of immunoglobulins in nasal secretion, rhinomanometry, nasal exposition tests, determination of blocking antibodies and radiological examination of the paranasal sinuses. RAST was carried out in 30 cases.

After the analysis of the clinical data, the author came to the conclusion that the tests of nasal conductance and provocation, of mucociliary clearance and determination of blocking antibodies are adequate means for the long term study of allergic rhinitis and for the follow-up of contingent hyposensitization therapy. As far as the preclinical diagnosis is concerned the skin tests and the radiological examination of the paranasal sinuses are to be considered more specific than RAST which, in the population sample taken into consideration, was positive exclusively in those cases that already had a manifest symptom complex.

INTRODUCTION

Considering the increase of the incidence of allergic subjects and bearing in mind the fact that for a certain length of time the atopy remains asymptomatic (Broder et al., 1974; Crifò et al., 1975), the authors undertook an allergologic screening on a group of school children in an attempt to extract from the resultant data the most suitable means for a preclinical diagnosis of this condition. The screening made use of data previously out together in the Rhinology Department of the ENT Clinic at Rome University and of specific results relative to a study carried out between September 1980 and January 1981.

MATERIALS AND METHODS

1620 pupils attending seven state schools (4 primary and 3 secondary) in different districts of Rome and outskirts were examined. A questionnaire was handed out to all the pupils and the parents were asked to fill in the forms in order to classify the social conditions and age groups of the children and to put together a case history for each subject relative to family, physiological and pathological factors.

From this questionnaire, we selected subjects at "allergologic risk", on the basis of one or more positive responses regarding: family history of allergy, chronic rhinitis or single episodes of colds, whether associated or not with conjunctivitis, nasal irritation, sneezing, asthma and to food and/or drugs.

All the children examined, whether "at risk" or not, underwent scratch skin tests in the volar region of the forearm. The authors used inhaling allergens, considered the cause of rhinopathy in our country (Pestalozza et al., 1981), i.e. Graminaeae (*Holcus Lanatus* and *Cynodon Dactylus*), Compositae (*Artemisia Vulgaris*), *Parietaria Officinalis* (P.O.) and *Dermatophagoides* (D.pt.). The children who presented cutipositivity, subsequently underwent 1) nasal examination 2) sampling of nasal secretion for determination of immunoglobulins 3) rhinomanometric and nasal exposition tests 4) determination of blocking antibodies 5) measuring of mucociliary clearance time 6) radiographic examination of the paranasal sinuses and 7) specific immunoglobulin count in 30 subjects by means of Rast. We divided the rhinoscopic findings into three specific groups: 1) hyperemia and/or cyanosis of the mucosa, 2) edema and 3) nasal polyposis. The sampling of nasal secretion for the determination of IgE levels was carried out by inserting small cotton pads of known weight into the nostrils after superficial anesthesia of the mucosa (Deuschl et al., 1977).

The rhinomanometric (Montserratt, 1974) and nasal exposition tests (Crifò et al., 1975; Marullo et al., 1981) were carried out by a R.R.M. (Cottle 2001) and nasal patency was evaluated separately for each nostril before and after stimulation with a gradually increasing amount of allergen (10-200 PNU). The test of Maunsell (1946) allows us to dose the serum levels on the basis of the natural blocking antibodies of each single subject. Mucociliary clearance time was determined by timing the passage of a coloured substance (3% Edicol Orange in bibasic phosphate of Ca) placed in a known quantity at a level with the anterior part of the inferior nasal concha (Passali et al., 1983). At a certain stage, we detected the presence of coloured mucus on the posterior wall of the pharynx, which denoted that mucociliary transport had taken place. The results of X-ray examination of the paranasal sinuses were divided into four groups: normal, opaque sinuses (Grade I), thickening of mucous membrane (Grade II) and polypoid degeneration (Grade III).

RESULTS

According to the data obtained from the questionnaire, 370 subjects were classified "at allergologic risk",: of these children 183 came from primary schools (27 from the country and 156 from urban areas) and 187 from secondary schools (89 from urban and 88 from suburban areas) (Figure 1).

It has to be noted that most of the children "at risk" (245) lived in urban areas whilst there is no substantial difference in "at risk" subjects in primary and secon-

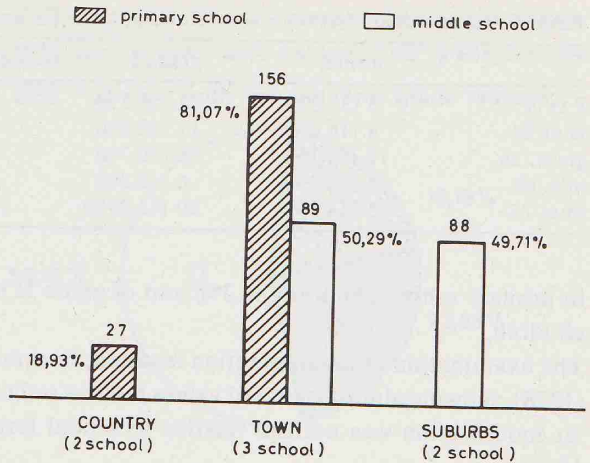


Figure 1. Distribution of subjects considered at "allergologic risk" in relation to the place of origin.

primary schools. As far as the skin tests are concerned, 73 children had positive reactions, whereas only 41 had been classified as being "at risk", 13 of whom showed no clinical symptoms. The same reaction was seen in the remaining 32 subjects not considered "at risk" by the selective criteria used in our questionnaire (Figure 2). The reliability of the findings relative to this questionnaire are, in fact, open to doubt in that interpretation of questions and response criteria were variable. As to the responses to the skin tests, the absence of reaction to the Compositae, both at primary and secondary school levels, is remarkable, though in the mixed forms a reaction to these allergens was almost constantly present. The mixed forms were more frequent in the secondary school children whilst a reaction to Parietaria was found mainly at primary school level. A positive reaction to Gramineae was present in a high percentage of subjects living in urban and suburban areas. Such a reaction was absent in the rural areas where a greater cutipositivity to D.p.t. (80%) was found. As expected, we noticed a higher frequency of normal patterns in children coming from rural areas and grade I lesions in secondary school children from suburban areas. In urban areas there was a manifest prevalence of grade I lesions

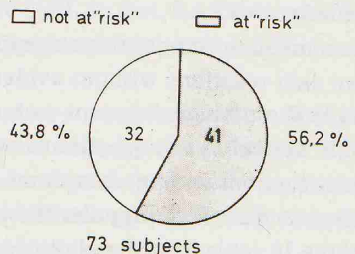


Figure 2. Percentage of subjects with positive skin reactions in relation to allergologic risk.

Table 1. Comparison between sinusal radiological lesions and positive skin reaction.

	normal	grade I	grade II	grade III
P.O. 9	3 (33.3%)	5 (55.5%)	1 (11.1%)	
D.pt 24	4 (16.6%)	11 (45.8%)	6 (25%)	3 (12.5%)
gram. 26	12 (46.1%)	8 (30.7%)	6 (23%)	
mix 14	6 (42.8%)	6 (42.8%)	2 (14.2%)	
total 73	25 (34.2%)	30 (41.09%)	15 (20.5%)	3 (12.5%)

in primary school children (84.3%) and of grade II lesions in secondary school children.

The examination of nasal secretion resulted, in agreement with Mygind's study (1978), showing almost standard values relative to IgA, IgG and IgM. No particular modification was noticed relative to school level and habitat (Wihl et al., 1977).

Rhinorheomanometry and nasal exposure tests revealed a predominance of nasal conductance in primary school children in comparison with secondary school level. Furthermore, a high cutipositivity seemed to correspond to a low threshold of nasal provocation. Level of blocking antibodies was measured in 83.5% of the cases and resulted within the norm (normal values: 0.16 PNU/ml), whereas in the remaining subjects we noticed an increase of 0.8-0.4 PNU/ml. The average duration of mucociliary transport was noticeably longer in middle school children. Sinus X rays were normal in 25 cases, 50% of which were referred to subjects with hay fever, typically seasonal allergy characterized by positive skin reactions to Gramineae and fairly normal radiological findings. Of the remaining 48 subjects, 30 presented grade I lesions, 15 grade II lesions and 3 presented grade III lesions associated with cutipositivity towards *Parietaria* and *D.pt.* (Table 1). Normal radiological findings were more frequent in primary schools, whilst the incidence of grade I lesions was comparable in both primary and secondary school children. Grade II lesions were found in 60% of subjects living in the country; this is possibly related to the greater percentage of positive skin reactions to *D.pt.* As far as children coming from suburban areas are concerned, the percentage distribution for normal values and for grade I and II lesions was practically the same. Grade III lesions were found exclusively in pupils attending urban secondary schools.

It seems important at this stage to point out that 23 of the 45 children with positive skin reactions without evidence of clinical symptoms, showed grade I and grade II radiological lesions and of these 13 - more than 50% - had been considered "at risk" by our questionnaire; therefore only 10 of the children with positive skin reactions without symptoms, but with radiological lesions had not been classified at risk. This supports therefore the validity of screening (Figure 3).

Of the 30 subjects with radiological lesions, only 3 with grade III lesions showed a

- not "at risk" with normal radiological picture
- ▨ not "at risk" with 1st and 2nd grade lesions
- ▩ "at risk" with 1st and 2nd grade lesions

Figure 3. Comparison between grade of sinusal radiological lesion and allergologic risk in 45 subjects with positive skin reaction without clinical symptoms.

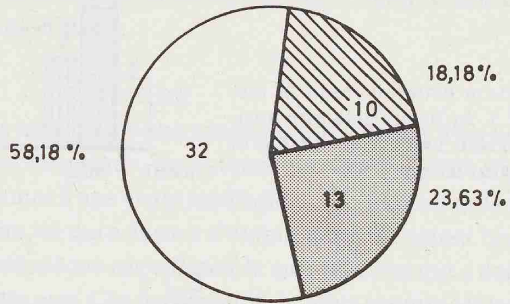
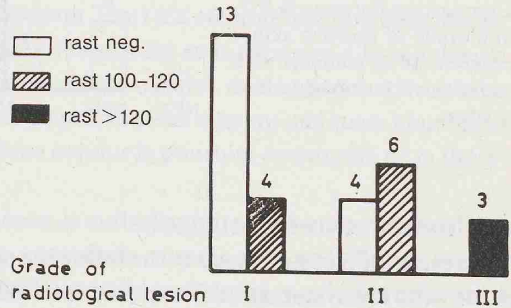


Figure 4. Comparison between result of rast and grade of radiological lesion in 30 subjects with positive skin reaction.



decisively positive reaction to the RAST. In the 10 with grade II lesions, RAST was uncertain in 6 and negative in 4. More than 75% of all subjects with grade I lesions had negative RAST (Figure 4).

The connection between sensitivity to RAST and NPT, and NPT and degree of reaction to skin tests in these 30 subjects can be seen in Figures 5, 6. From the above mentioned data it is evident that there is an excellent correlation between positivity to skin tests and NPT, as well as a fairly good link between RAST, symptom complex and risk factors, cutipositivity and NPT. In fact, RAST was positive exclusively in cases "at risk" with manifest symptoms, strong skin reactions and low threshold of nasal provocation.

Though the above mentioned values of direct or inverse proportionality are, within certain limits, relatively constant, when associated with a reduction of the symptom complex such parameters are not to be considered parallel to that expressed by positivity to skin tests. The radiological findings are the only elements which do not follow this scheme.

Figure 5.
Comparison between result of rast and N.P.T. in 30 subjects with positive skin tests and various grades of radiological lesions.

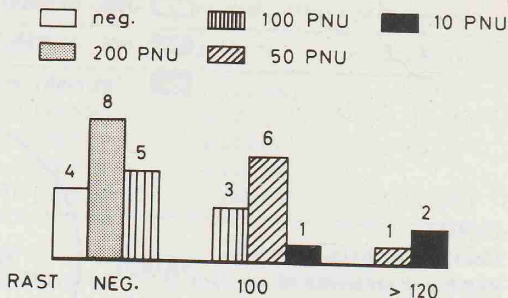
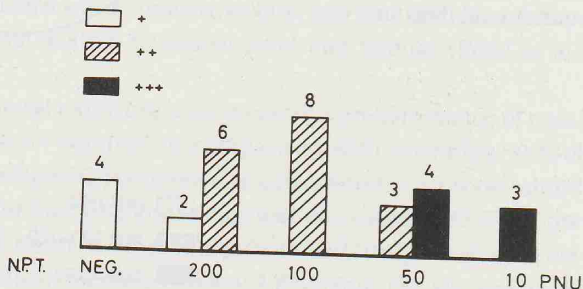


Figure 6.
Comparison between N.P.T. and grade of positive skin reaction in 30 subjects with radiological lesion of various grades.



DISCUSSION AND CONCLUSIONS

The results of this study lead to the following conclusions. Subjects living in rural areas, who are systematically exposed to seasonal allergenic factors, presented a lower incidence of seasonal atopic forms and a higher cutipositivity to D.pt. (80%).

Multiple positive skin reactions were considerably more frequent (24.4%) at secondary school level, whereas the cutipositivity to Parietaria was greater (17.8%) in primary school children. The primary school children, even if allergic to a minor degree, tended to present greater nasal patency, lower average values for mucociliary clearance and fewer radiological abnormalities. These findings suggest that allergic rhinopathy develops over time and indicates that the diagnosis should be made as soon as possible in order to keep the allergen at a distance and apply specific hyposensitization therapy. The results of therapy should be followed up by measuring nasal patency, mucociliary transport and particularly the level of blocking antibodies and nasal provocation threshold, on a long term basis.

In order to obtain an early diagnosis, our study points out that skin tests and standard sinus X-rays are most useful. The results of these tests are fairly well correlated and they seem to be the most appropriate means for defining the preclini-

cal stages of allergic rhinopathy. The hyperergia of the sinusal mucosa shown by radiography seems to demonstrate the subclinical stage more clearly than RAST. The above considerations, far from defining the problems relative to such a diffuse and pleomorphic disease as allergic rhinitis, are only a small contribution to the knowledge of the condition itself.

RÉSUMÉ

Afin d'essayer de repérer les moyens les plus aptes à la formulation d'un diagnostic précoce de la rhinopathie allergique, les auteurs ont soumis 1.620 élèves de sept écoles publiques différentes à une visite médicale. Leurs parents ont été invités à remplir un questionnaire, ce qui a permis d'établir que 370 étaient "en situation de risque". On a pratiqué, à tous ces enfants, la cuti-réaction qui a donné un résultat positif pour 73 d'entre eux. Ces derniers furent alors soumis également à un examen nasal, à la détermination du nombre d'immunoglobulines dans la sécrétion nasale, à la rhinomanométrie, à des tests d'exposition nasale, à la détermination des anticorps bloquants et à un examen radiologique des sinus paranasaux. Le RAST (Radio-Allergo-Sorbent Test) n'a été pratiqué que dans 30 cas. Après l'analyse des données cliniques, les auteurs sont parvenus à la conclusion que les tests de conductance et de provocation nasales, de dégagement du mucus et la détermination des anticorps bloquants sont les moyens adéquats pour l'étude à long terme de la rhinite allergique et pour la poursuite éventuelle de la thérapie d'hyposensibilisation.

Pour ce qui a trait au diagnostic précoce, la cuti-réaction et l'examen radiologique des sinus paranasaux doivent être considérés comme plus spécifiques que le RAST qui, dans l'échantillon de population pris en examen, ne s'est avéré positif que pour les sujets chez qui l'ensemble des symptômes s'étaient déjà manifestés.

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