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IMMUNOGLOBULINS G, A, AND M IN BRONCHIAL ASTHMA

By

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Adult patients with bronchial asthma have normal levels of immunoglobulins G, A, and M (6, 8, 11). One of the problems is how to compare results obtained in different populations as the definition of asthma and the selection of patients often vary. As we had access to a group of clinically well-defined patients with intrinsic or extrinsic asthma, we wanted to investigate the immunoglobulin concentrations of these patients. IgE concentrations have been determined in an extended population with special reference to extrinsic asthma (4).

Since the etiology of intrinsic asthma is still obscure, interest is here focused on this condition. As several of the patients with intrinsic asthma were treated with corticosteroids, the influence of this treatment on the immunoglobulin concentrations was also studied.

PATIENTS

The randomized selection and the characterization of 223 patients with asthma have recently been described (7). The purpose of that study was to make an analysis of asthma from the points of view of allergology, sociology, psychology and psychiatry. The patients were randomly drawn from a population of 1,200 cases of bronchial asthma, who during 1968 were treated as out-patients at the Department of Allergology, Sahlgren's Hospital. All these patients had controls, matched with respect to age and sex using data from the population register in Göteborg.

The patients were classified according to the method proposed by the Congress of Allergology in Oslo in 1966. According to this, asthma is a disease in the air-

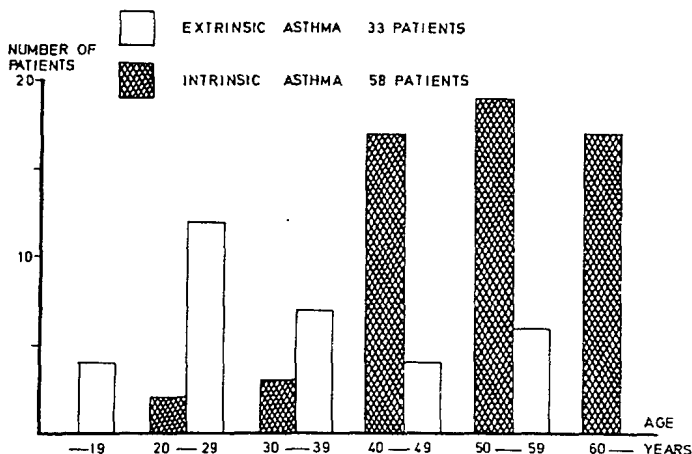


Fig. 1.

Age-distribution in relation to type of asthma for 91 patients.

ways which is characterized by reversible dyspnoe of an obstructive type, with varying duration and severity. Extrinsic asthma is present when the history of asthma is substantiated by positive intracutaneous and inhalation tests.

From this population, another randomized group of 91 patients was drawn. Thirty-three of these patients had extrinsic asthma. Of the remaining 58 patients with intrinsic asthma, 20 had not received treatment, 14 had had periodic or intermittent prednisolon treatment, and 30 had been continuously treated with 5–10 mg of prednisolon for at least one year. The patients were between 16 and 64 years old, and their age-distribution and types of asthma were as shown in Fig. 1. Fifty-seven per cent were female.

Blood samples were drawn without reference to season or seriousness of disease, with the patients in their habitual state of moderate bronchial obstruction.

METHOD

The serum levels of IgG, IgA and IgM were analyzed according to the single radial immunodiffusion technique of Mancini (9) as described by Nilsson (10). Since the now-accepted WHO standard for determination of immunoglobulin concentrations was not available at the time of this study, values are given as mg/100 ml rather than as U/ml. The matched controls and a panel of 50 blood-donors were analyzed for reference purposes. For IgG, IgA, and IgM values, conventional calculations of arithmetic mean and standard deviation

TABLE 1

Mean and Standard Deviation (SD) of IgG, IgA, and IgM in mg/100 ml for 91 Asthmatic Patients, 99 Control Subjects and 50 Blood-donors.

Diagnosis	Number of patients	IgG		IgA		IgM	
		Mean	SD	Mean	SD	Mean	SD
Extrinsic asthma	33	1028	269	166	59.2	91.6	50.1
Intrinsic asthma	58	1150	361	193	101.7	101.5	46.1
Control subjects	99	1246	364	202	75.6	97.6	38.7
Blood-donors	50	1283	263	200	74.8	88.1	27.6

were done. Differences between means were tested with Student's *t*-test. The 0.05 level of significance was used.

RESULTS

Patients with extrinsic and intrinsic asthma had mean levels of 1028 and 1150 for IgG, of 166 and 193 for IgA, and of 92 and 102 mg/100 ml for IgM respectively (Table 1). The mean of the differences between immunoglobulin concentrations of the separate patients with bronchial asthma and their matched controls did not significantly deviate from zero. Patients with continuous prednisolon treatment had significantly reduced IgG concentrations (Fig. 2). Although not significant, this trend was also noted for the group periodically treated with steroids. No such differences were noted for IgA or IgM. No patients were devoid of any of the immunoglobulin classes analyzed. Neither were any extremely high values found. The matched controls had mean concentrations of IgG, IgA and IgM which did not differ from those of the blood-donors.

DISCUSSION

The rather normal IgG, A, and M concentrations observed in patients with extrinsic or intrinsic asthma are consistent with the reports of Kohler & Farr (8) and Johansson (6). Kohler

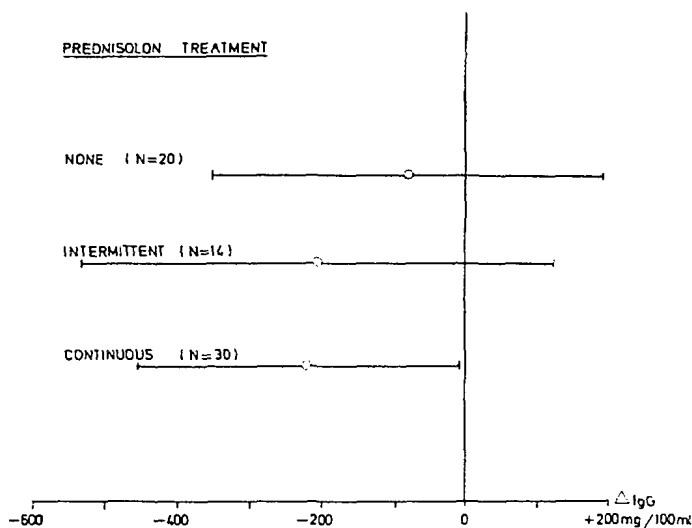


Fig. 2.

Mean difference (and 95 per cent confidence limits) of IgG between 64 patients with intrinsic asthma and their controls in relation to prednisolone treatment.

& Farr also found an increase in IgA with age, and increased IgD concentrations in atopic patients.

Except for individual patients with dysgammaglobulinemia and myeloma, Palma-Carlos & Palma-Carlos (11) did not find significant deviations from normal immunoglobulin levels in patients with extrinsic or intrinsic asthma (17 cases in each group). This was in contrast to eight cases with type 3 allergic alveolitis in which elevated IgG (and IgA) levels were found. Elevated IgG levels in pigeon breeders, who presumably have a type 3 allergic reaction, have also been reported from our clinic (3).

Besides ruling out antibody deficiency syndromes, determinations of IgG, IgA, and IgM concentrations in asthma seem to be of value in diagnosis to distinguish between type 1 and type 3 reactions. If an elevated IgG is a reliable sign of type 3

reactions, speculations about a type 3 mediated allergy playing a part in intrinsic asthma are not supported by our findings.

Patients with intrinsic asthma who were continuously treated with prednisolon had significantly lowered IgG levels, which seemed to be dose-dependent. This may be a co-variable with antibiotic treatment or with the severity of asthma itself. More plausibly, it might be due to a direct effect of corticosteroids on IgG metabolism. It is known that *increased* IgG levels return to normal after corticosteroid treatment (1), but the effect of corticosteroids on normal immunoglobulin levels has not been established (12). Inhibition of antibody formation in rats by prednisolon has been shown (2), as well as increased IgG catabolism in man after administration of 30 mg prednisolon with no increase in circulating levels (5). The clinical consequences of moderate doses of about 10 mg prednisolon a day are uncertain, and do not warrant therapy with immunoglobulins.

The control subjects in Table 1 do not represent the normal population, but are matched pairs with the same age and sex as the *patients*. However, the values for the matched controls were close to those of the blood-donors.

SUMMARY

In an attempt to evaluate the clinical value of immunoglobulin quantitation in patients with asthma, 91 cases with bronchial asthma were randomly selected from a medical clinic for allergic diseases, together with matched controls and blood donors from the city population. Patients with asthma had normal IgG, A, and M, with the exception of decreased IgG in patients undergoing continuous corticosteroid treatment.

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