Trial of a centralized IgE allergy service to general practitioners in a rural area

J. H. PARKER, B.SC, M.SC, MCB, R. M. A. MOORE, MB, B.CHIR, MRCGP, DRCOG
and R. S. E. WILSON, B.SC, MB, CH.B, MRCP

SUMMARY. We describe a pilot study of a community IgE service which serves a large rural area and is centred on the biochemistry laboratory and allergy clinic of a district general hospital. The service has proved useful because in many cases it has made attendance at an outpatient department unnecessary. The results appear to be reliable and have provided the general practitioners with additional knowledge of their patients. Other benefits included the investigation of larger numbers of patients, the performance of fewer skin tests and greater precision in test results because the tests were carried out by one investigator under standard conditions.

Introduction

THE Salop Area Health Authority serves a mainly rural population of about 375,000. The population is scattered and is served by a single district general hospital. About 215,000 people live more than 10 miles from the hospital; about 100,000 live more than 15 miles away. Because of transport costs and inconvenience, general practitioners and patients may avoid or delay outpatient referral. Many patients suffering from allergy fall into this category.

Allergic disorders are common, affecting some 15 per cent of the general population of western countries. Most common are rashes, urticaria, rhinitis, asthma, conjunctivitis and gastro-intestinal upsets. The antibody responsible for the majority of these reactions is reaginic antibody, which is an immunoglobulin of the IgE class. Skin tests and provocation tests are the time-honoured methods for investigating this type of allergy.

In recent years, *in vitro* assays for total serum IgE and for allergen specific IgE (RAST) have been developed. These compare favourably with skin tests (Berg and Johansson, 1974; Berg and Johansson, 1976; Foucard and Johansson, 1976), and provide alternative or additional methods for investigation. As a result it is now possible to assess the atopic status of a large number of patients without their attending an allergy clinic.

Aim

A pilot study was set up to assess the feasibility and acceptability to patients and general practitioners of a centralized *in vitro* allergy testing service with direct referral to the laboratory in association with the consultant in charge of the allergy clinic.

Method

Thirteen general practitioners from seven practices serving a population of about 35,000 were asked to co-operate in the study. Each was asked to send to the biochemistry laboratory a completed patient questionnaire,* 10 ml of clotted blood and a request form stating diagnosis for any patient in whom they wished to investigate the possibility of allergy.

IgE levels in normal human serum are very low in comparison with those of other immunoglobulin types (mean level 95 U/ml or about 0·2 μg/ml). In order to measure such minute amounts of protein it is necessary to use a radio-isotope-labelled immunoassay; reagents were manufactured and supplied by Pharmacia Ltd.

For measurement of total IgE the PRIST (Paper Radio Immuno Sorbent Technique) method was used, and for specific allergen determination the RAST (Radio Allergo Sorbent Technique) method was employed. Both involve the use of small paper discs to which antibody to IgE or a specific allergen is bound. The minimum volume of serum used was 100 μl for

J. H. Parker, Principal Biochemist, Royal Shrewsbury Hospital (North); R. M. A. Moore, General Practitioner, Shrewsbury; and R. S. E. Wilson, Consultant Physician, Copthorne Hospital, Shrewsbury.

*Copies of the patient questionnaire are available from the authors.

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Table 1. Allergen panel.

Pollens	Moulds	Epithelia	Foods	House dust mites
Grass (meadow fescue)	*Cladosporium*	Cat	Egg white	*Dermatophagoides pteronyssinus*
Birch tree	*Aspergillus*	Dog	Milk	
Plane tree		Horse	Wheat	
Weed (plantain)		Cow	Rye	
			Oat	

PRIST and 50 μl per allergen for RAST. The constituents of the allergen panel are shown in Table 1.

As a first step the total IgE was measured. The biochemist and the clinician then reviewed this result and the patient questionnaire before deciding which specific allergen (RAST) should be tested for. When all the results were available they produced a written report, including the clinician's diagnosis and comments where appropriate. A copy was then sent to the referring general practitioner.

At the conclusion of the study a questionnaire was sent to all participating doctors asking them to comment on individual patients and on the service in general.

Table 2. Positive RAST test results.

Grass	52	*Cladosporium*	3
House dust mite	51	*Aspergillus*	2
Cat	29	Wheat	2
Dog	14	Rye	2
Weed	10	Oat	2
Horse	9	Egg white	1
Birch tree	4	Milk	1
Plane tree	3	Cow	1

Results

Blood samples and questionnaires were referred from 13 general practitioners working in seven practices. The total number of patients was 142, of whom 79 were judged to be allergic by a combination of IgE assay, RAST testing and questionnaire. The number of patients investigated by each general practitioner ranged between 38 and two, with an average of about 11.

In 100 patients (70 per cent of the total) there was agreement between the general practitioner's original diagnosis (i.e. allergic or non-allergic) and that suggested by the laboratory investigation; 70 (49 per cent) were judged to be allergic and 30 (21 per cent) non-allergic by both laboratory and general practitioner. In the cases where there was no correlation, 33 (23 per cent) were considered allergic by the general practitioner and non-allergic by the laboratory, and nine (six per cent) were non-allergic by general practitioner diagnosis and allergic on blood testing.

The total number of positive RAST tests (i.e. those having grades of 2 or more) was 186. The test results are set out in Table 2. The general practitioners' response to the concluding questionnaire is summarized in Table 3.

Comments from patients, where received, were

Table 3. General practitioners' view of the allergy service.

	Number of general practitioners	Number of patients	Percentage of total patients
Proved useful	12	137	96
Provided new information	13	103	72
Influenced diagnosis or treatment	8	130	90
Saved investigation time	10	130	90
by eliminating clinic visits and travel	7	51	36
by eliminating skin tests (in surgery or clinic)	10	58	41
other (no waiting for clinic appointments, time saved in psychological cases, clear indications for or against therapy given)	3		
Allowed investigation of a greater number of patients	10		
Led to additional referrals to allergy clinic	0		
Led to requests for more advice about treatment	6		
Requested modifications to patient questionnaire	2		
Preferred to receive results within two to three weeks	9		

favourable. Many liked the idea of a laboratory check for allergy, feeling that it was specific and reliable; some obviously preferred a venepuncture to having skin tests and others were grateful for not having to attend the hospital clinic. One general practitioner who had 38 patients in the trial said that "the majority were very satisfied, even with negative findings". One rural practice has now completely stopped skin testing its patients.

Discussion

The major advantage of laboratory studies over skin testing for detection of allergies is seen in patients with severe skin disease (e.g. eczema, dermographism), in those on antihistamines, and in the elderly where skin tests are unreliable or undesirable. In addition, *in vitro* tests are more reproducible. They can usually be performed reliably by trained technicians, whereas skin tests are reliable only when performed by experienced operators. If, as is often the case, skin tests are done by untrained investigators, the results can be unreliable. In our series, all the laboratory work was performed by one technician.

The major disadvantages of IgE studies are:

1. The cost of reagents.

2. The dangers of interpretation outside the clinical situation: in the absence of a suitable history, diagnosis of allergy can be misleading and incomplete.

3. Elevation of total IgE due to non-atopic causes—among the reported cases are parasitic infections (Johansson *et al.*, 1972), neoplastic disease (Jacobs *et al.*, 1972) (probably due to methodological interference), Hodgkin's disease (Amlot and Green, 1978), rheumatoid arthritis (Grennan and Palmer, 1979), aspergillosis, pulmonary haemosiderosis, IgE myeloma, Wiskott-Aldrich syndrome and other immunodeficiency diseases (Foucard and Johansson, 1976). Of these, probably only parasitic infections are significant; some of the others are rarely found and, provided that the results are interpreted within the clinical situation, misleading conclusions should not be drawn. Furthermore, it is our experience that total IgE levels alone are not reliable indicators of atopic disease. Whenever the clinical suspicion of allergy is present we always proceed to specific RAST investigations regardless of high (or low) IgE results.

This project has investigated the extended use of IgE studies by making them available to general practitioners; a greater number of patients have had the advantage of accurate diagnoses without the disadvantage of having to attend the hospital outpatient clinics. There is little doubt that the most economical way of investigating immediate type allergy is for skin testing to be done in the local surgery. However, many general practitioners feel that they have insufficient time and/or expertise in this type of investigation; as a consequence many patients are not fully investigated, an accurate diagnosis may not be made, and inappropriate therapy may often be given. Our pilot study, carried out in a large rural area centred on a single district general hospital, seems to have offered considerable benefits in this respect. The large majority of general practitioners found the service useful, and in 72 per cent of patients new information was provided. In 90 per cent of patients, diagnosis or treatment was influenced and investigation time was reduced. Ten of the general practitioners stated that the service enabled them to investigate more patients for allergy than would otherwise have been possible.

Costs

The usual avenue for those patients who require further investigation is referral to an allergy clinic. This, however, is an expensive operation; the cost in 1979 of investigating an outpatient at Shrewsbury averaged about £14, but for a new referral (i.e. the type of patient we are considering) the figure was around £50. The cost of transport must be added to this; as in many other rural areas attendance at the central hospital is very expensive both in terms of transport and of time. An additional factor would be the possible loss of working hours and earnings.

It is in the above area that an IgE service can be both more cost-effective and more convenient for the patient. Although the reagents used are unusually expensive for laboratory reagents (cost per patient in 1979 to 1980 was about £8), they do not exceed the cost of outpatient referral. An accurate total cost is difficult to assess, but if we add the average cost of the whole pathology department per patient request (£1·88 in 1979) to the reagent cost, we obtain a figure of about £10 per patient. The staff who provided the service were a junior medical laboratory scientific officer, a biochemist and a consultant physician. The latter is also the consultant in charge of the allergy clinic. Linking the laboratory service to this clinic is a vital precaution in avoiding misinterpretation of results; reporting is done by a consultant with experience in investigating allergic disorders and who has access to the patient's questionnaire and laboratory results. Obviously a full costing exercise would be a major project in itself, but we feel that PRIST and RAST testing is much less expensive overall than a referral to the allergy clinic. In the present study general practitioners felt that by using the IgE service 51 patients had avoided such referral.

In summary, we consider that in rural areas such as ours an IgE service provides a practical and reliable means of investigating allergy and is a useful alternative to skin testing. It allows the investigation of a greater number of patients with fewer referrals to an allergy clinic. This is more convenient for the patient and has saved time in the general practitioner's surgery, in the hospital outpatient department and for the patient. Finally, the service appears to be cost-effective in comparison with an outpatient investigation.

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Address for reprints

Department of Pathology, Royal Shrewsbury Hospital (North), Mytton Oak Road, Shrewsbury SY3 8XH.

Depressive illness in Plymouth

Diagnostic and demographic data were collected from all 2,298 psychiatric hospital admissions for affective illnesses from private households in the city of Plymouth for the six-year period 1970 to 1975 inclusive. Intercorrelations of diagnostic subtypes were performed, together with a multiple regression analysis against spatial and ecological data from the 1971 census. Rate differences were related to the geographic structure of Plymouth. With psychotic illnesses, ecological correlations were low for male and female first admissions and for male readmissions. However, important correlations relating to socioeconomic status, housing tenure and structure, population instability, and other sociodemographic features emerged in varying degrees of specificity for reactive and neurotic illness in males, and for all readmissions in females, largely irrespective of diagnostic subtype. Explanations for the processes underlying these patterns are offered in terms of population structure, particularly the differing vulnerability of age and marital status groups, the referral and diagnostic process, social and physical stresses in the lower socioeconomic groups, and urban drift.

Source: Dean, K. G. & James, H. D. (1980). The spatial distribution of depressive illness in Plymouth. *British Journal of Psychiatry,* **136,** 167-180.