Desensitization Therapy for Children with Bronchial Asthma

A. M. Giurnazi,* E. T. S. Ben Ahmaida,** Z. R. Al-Sherif,* A. M. Al-Sherif,*
A. A. Bouaeshi,*** and A Dau Masaud,****

Abstract:
Bronchial asthma a disease of the airways is one of the most common chronic diseases, affecting about 200 million people of all ages worldwide.
Optimal long-term treatment and regular follow-up in specialized respiratory clinic are essential if the asthmatic children are to lead as normal a life as possible.
This project has been concentrated on study of the affect of immunotherapy as a method for treatment of bronchial asthma and allergic rhinitis, including minimization of chronic asthma symptoms, reducing number of bronchospasm attacks, maintenance of normal lung function and side effects.
The study was performed for (200) patients; periodically visiting the private respiratory clinic. All patients received desensitization therapy in conjunction with inhaled steroid therapy.
The study shows that detection of high level of IgE antibodies is of great value in support of the diagnosis of allergic disease, three hundred and thirty six patients (88%) patients involved in the study, had high levels of IgE antibodies, while 44 (12%) patients had normal levels of IgE antibodies ,For patients with high levels of IgE antibodies, skin test is indicated, there was high incidence of bronchial asthma due to sensitization for house dust mites antigen (88%), while other sensitization for other allergens with small percentages.
A remarkable improvement is recorded in desensitization therapy, normal or near normal lung function was recorded (95.5%).
Immunotherapy is promising method for treating bronchial asthma and allergic rhinitis.

Introduction:
Asthma is a very common and potentially life-threatening illness. Approximately 5% of the population world-wide has asthma and/or other allergic diseases and the frequency is higher in children. It is responsible for millions of school days missed annually. Deaths because of bronchial asthma result from inadequate assessment of the severity of an asthmatic attack and delayed aggressive therapy.[1]
Bronchial asthma is provoked by recurrent respiratory viral infections. Specific allergens such as grass- pollen, house dust mites, olive tree, cereals, cockroaches, animal dander and environmental conditions like cold air, dust and tobacco smoke are known stimulants. Exercise and medications such as non-steroidal anti-inflammatory drugs and beta blockers also trigger attacks of asthma. Gastro-Esophageal Reflux is also an interesting cause of asthma.[1-3]
Diagnosis of bronchial asthma depends on clinical presentation and confirmed by estimation of high level of total serum IgE, skin testing, Radioallergosorbent tests (RAST) and spirometry.[1,3,4]
Management of bronchial asthma includes beta-2 agonist, corticosteroids, mast cell stabilizers, leukotrien modifiers, theophylline, and allergen immunotherapy.
The aim of our study is to identify the most common sensitizing antigen involved in cases of bronchial asthma and other allergic diseases in Libyan children, and to determine the effectiveness of immunotherapy as a definite treatment of bronchial asthma in children or at least long-term control of symptoms and reducing the need for steroid medications and prevention of the unwanted side effects of steroid,[1,3]

Subjects and Methods:
Data were collected from asthmatic patients attending a respiratory private clinic.

*) Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Al-Fateh University For Medical Sciences, Tripoli-Libya.
**) Department of Medical Microbiology and Immunology, Faculty of Medicine, Al-Fateh University For Medical Sciences, Tripoli-Libya.
***) Department of Nephrology, Tripoli Children Hospital, Faculty of Medicine, Al-Fateh University For Medical Sciences, Tripoli-Libya.
****) Department of Pharmacology Faculty of Medicine, Sebha University, Sebha, Libya.

These patients had been under close follow-up and management since 5 years ago. Retrospective information regarding skin testing, clinical response and possible side effects are illustrated and discussed.

Determination of total serum IgE antibody was done in a known private laboratory using ElISA technique.

A total of 360 children between (5-15) years old and from different sex presented to respiratory clinic with symptoms and sings of bronchial asthma and the majority of them have positive family history of allergic diseases. In addition to full clinical examination, investigations included chest x-ray, lung function test and total serum IgE were done. For patients with high levels of IgE antibodies, skin test was performed. Only 248 (78.4%) patients appeared for this test, as illustrated in figure 1, 2**.**



Figure (1). Skin prick testing.[5]

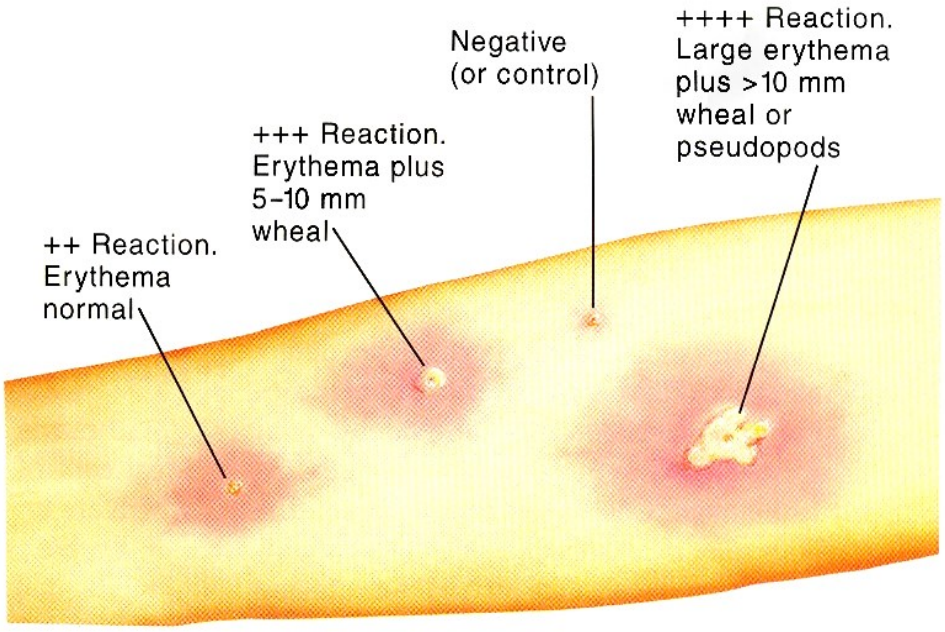


Figure (2): Skin test interpretation.[3]

Selection of desensitization therapy group:
Patients selected for desensitization therapy were those who were allergic to house dust mites, grass pollens and olives pollen.
The patients offered the desensitization therapy according to whether the patient is likely to be compliant and adhere to desensitization therapy i.e. cost, transportation and willing of parents to come for regular visits for the injections for at least 5years.
Desensitization should be performed for those allergic to one or two allergens.
Patients with severe uncontrolled bronchial asthma, or those with severe urticaria or atopic dermatitis and any patient allergic to more than two allergens were excluded from the desensitization therapy.
In the present study, two hundred of the above patients with regular attendance were selected, 120 males (6-14 years) and 80 females (5-15 years).
For patients received desensitization therapy , smaller dose (about 50%) of steroid dose that prescribed for the steroid therapy depended patients were required, and steroid therapy was usually stopped or greatly reduced by the fourth year after commencing desensitization therapy, as illustrated in table. 1.

Results:
Total serum IgE antibody
High level of total serum IgE was recorded in 316 patients (87.5%), while the remaining patients n=44 (12.2%) had normal level of serum IgE antibodies, as illustrated in table2.

Skin testing:
219 patients (88.3%) showed reaction (erythema and wheal > 3mm in diameter) and were considered positive for house dust mites only , 12 (4.83%) of the tested patients were positive for grass pollens only, whereas only six (2.14%) of our patients were positive for both house dust mites and grass pollens, six (2.14%) patients were positive to olives pollen , two (0.8%) patients show positive reactions for olives pollen and cereals , two patients (0.8%) were positive for only cereals. Only one (0.4%) patient included in the study was positive to mould mixture , as illustrated in table 3.
The results demonstrated below is a collection of the last 5 year studies on asthmatic patients received desensitization therapy and steroid therapy.

Skin testing for patients receiving desensitization therapy:
106 male (53%) and 74 female (37%) were positive to house dust mites, 8 male (4%) and 4 female (2%) were positive to grass pollens, 6 male (3%) and two female (1%) were positive to olives pollen , as illustrated in table 4.

Minimization of chronic asthma symptoms (Exercise, Sleep):
Improvement in the reduction of chronic asthma symptoms was recorded, (50%) dose of inhaled steroid used). This was observed by the patients and parents that children have a comfortable sleep, no school absence because of asthmatic attack, daily twice record of PEFR.
A remarkable improvement was recorded the second year of treatment. A number of small attacks were recorded which were treated by immediate increase of the inhaled steroid and use of inhaled salbutamol for 3 days. No major attacks occurred and no hospitalization was needed as illustrated in table 5.

Maintenance of normal lung function:
Spirometry was performed every 3 months for all patient above 6 years of age n=152 (76%).
Normal or near normal lung function was recorded for 144 (95%), by the end of the first year (results not shown).

Table 1: Forms and concentration / puff of inhaled steroid preparations.

Budesonide	100µg ,200µg
Beclomethasone	50µg ,250µg
Fluticasone	50µg ,125µg
Fluticasone with salmeterol	100µg ,250µg

Table 2: Numbers (%) of patients and level of total serum IgE antibody.

Level of serum IgE	Number of patients	% of patient
High level IgE	316	87.77
Normal level IgE	44	12.22

Table 3: Skin testing showing number (%) of patients reacted to different allergens.

Allergen	Number of patients	% of patient
House dust mites only	219	88.30%
Grass pollens	12	4.83%
House dust mites + grass pollens	6	2.14%
Olive pollen	6	2.14%
Cereals	2	0.80%
Olives pollen +Cereals	2	0.80%
Mould mixture only	1	0.40%

Table 4: Number of patients and type of allergen.

Allergen	Males	% of patients	Females	% of patients
House dust mites	53	53%	37	37%
Grass pollens	4	4%	2	2%
Olives pollen	3	3%	1	1%

Table 5: Number of patients who had more than 2 minor attacks of bronchspasm.

Year of treatment	Number of patients
First year	8
Second year	4
Third year	None
Fourth year	None
Fifth year	None

Table 6: Side effects observed in patients.

Side effects	Desensitization group
Oral thrush	12
Laryngitis	6
Pharynigitis/oral thrush	6
Hypertension	None
Diabetes mellitus	None
Growth retardation	None
Others(cushinoid face, acne, hirsturism)	None

Discussion:

The results showed the relationship between the high level of serum IgE antibody and the positive results of skin testing. Most asthmatic children included in this study were allergic to house dust mite (88.3%**)** for which immunotherapy was recommended.

The results showed a remarkable improvement in patients received specific immunotherapy and inhaled steroids, particularly in the third, forth and fifth years of treatment, with attention that in most of the patients, dose of steroid was smaller (50%), and the steroid was stopped by the fourth year after commencing specific immunotherapy.

The results also demonstrated the long-term effect of immunotherapy especially when used for children above 5 years of age as more avoidance of cold, dust, smoke and other allergens can be achieved, also the proper technique of using metered dose inhaler with the aid of volumetric spacer is also another factor of achieving good overall response to treatment.

Whether specific immunotherapy results is a definite treatment of bronchial asthma is to be studied and long follow up of our patients included in this study need to be determined.

Conclusions:

The results indicate that not all the patients who have bronchial asthma have high level IgE but some of them have normal IgE levels ,the incidence of the allergy seems to be more for house dust mites ,attacks were very infrequent and when occurred they were mild and easily controlled , spirometery performance indicates that improvement in lung function in patients received desensitization therapy, side effects occurred in steroid patients were minimal and insignificant.

Recommendations:

Further studies are needed to evaluate current immunotherapy in the following areas:

1- Cost effectiveness.
2- Patient satisfaction.
3- Optimal duration.
4- Long term effect after cessation.
5- Efficacy & safety in children under 3 years of age.

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