MATERIAL AND METHODS

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SELECTION OF CASES

Present study comprised of the patients having
allergic diseases - allergic asthma, allergic rhinitis,
urticaria, food allergy. Selection of cases has been done
from patients attending medical and ENT out patients
department and from patients admitted in medical wards.

Diagnosis was based on detailed history,
clinical examination and relevant investigations. Patients
of both the sexes and of age ranging from 8 to 66 years
were included. Cases belonging to various socio-economic
strata and occupation were included in the study.

Prior to subjecting patients to skin prick test,
they were asked to stop antihistaminics and steroids at
least five days before test, which they were taking. No
alteration in their diet, place of work and surroundings
were made. Following informations were filled in
predesigned proforma (Annexure - I).

HISTORY

History of present illness was outlined on
complaints and their duration, age at which the symptoms
first appeared. Severity and frequency of symptoms were
noted. Relation of occurrence of symptoms with season,
particular months, hour of day, and place (whether at home or at the place of work) were outlined. Any recent change in residence or occupation was noted. History of any sort of animal contact was also asked for.

Any food components after intake of which symptoms used to occur were also asked.

Past history included similar complaints, if present in the past. History of worm infestation, any other medical illness (tuberculosis, upper respiratory tract infection) was recorded.

**HISTORY OF TREATMENT**

This included any drug treatment which patients took. History of any operation (nose or throat operations) was also asked for.

**FAMILY HISTORY**

Thorough clinical, general examination and examination of respiratory, gastrointestinal, cardiovascular and central nervous system was done in each case. In the cases of allergic rhinitis local examination of nose (Rhinoscopy) and throat was done.

**INVESTIGATIONS**

The following investigations were carried out:

1. Total and differential leucocyte count.
2. Haemogram, ESR.
3. Absolute eosinophil count (AEC)

\[ \text{AEC} = \text{TLC} \times \frac{\text{percentage of Eosinophils}}{100}. \]

4. Chest skiagram (to exclude other chest diseases).

5. Stool examination (to exclude TPE).

6. X-ray PNS to exclude sinusitis.

7. Ratio of forced expiratory volume in one second and total vital capacity by Spirometry.

8. Eosinophil count in various secretions, if the clinical condition requires.

ALLERGENS

Desensol (supplied by E. Merck India Ltd.)

Prick test solutions containing aqueous allergen extracts were used. The extracts contain 50% glycerol and are preserved in 0.4% phenol. The range of prick test solution used is mentioned in Annexure-II.

METHOD OF SKIN PRICK TEST (SPT)

The most suitable site for skin testing is the flexor aspect of forearm. If multiple allergens are to be tested in one sitting three rows can be made which are at least 3 cm apart. To avoid difficulty in reading results hairy skin is to be prepared.

The skin is first marked using a felt tip pen. Now one drop of each allergens which are to be tested are put with the tip of plastic knob attached to the cap of desensol bottle. The negative control (saline) is
placed near the top of the arm followed by allergen extracts, usually with the house dust mite extract at the lower end, before the final positive control solution (Histamine). The test sites are kept 4 cm apart.

A sterile lancet is introduced subcutaneously at an acute angle to the skin and shallow lift is made. The lancet is raised for a second before the skin is released. This is repeated for each drop of solution. Lancet is carefully wiped of using cotton wool before using for each solution. Any excess solution remaining on the skin after the prick has been made, is removed by placing a paper tissue over the arm for a moment or two.

The results are read after 20 minutes when positive reaction will appear as an induration surrounded by wheal and flare. Any wheal produced by the negative control must be subtracted from any reactions produced by other allergens before they are assessed. Where both the wheal and flare are only very small that is, the reaction is only mild. This is recorded as (+) against the particular allergen. Where there was a larger reaction but not as large as the positive control the reaction was recorded as (++). Where reaction is similar to or greater than the positive control (Histamine), (+++) is recorded against the particular allergen (Criteria : Desensol booklet).

Alternative criteria to read prick test result has been proposed by Kochar AS, which is as follows :
<table>
<thead>
<tr>
<th>Reaction</th>
<th>Symbol</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>(-)</td>
<td>No reaction or equal to control.</td>
</tr>
<tr>
<td>One plus</td>
<td>(+)</td>
<td>Erythema ≤21 mm in diameter.</td>
</tr>
<tr>
<td>Two plus</td>
<td>(++)</td>
<td>Erythema ≥21 mm with no wheal.</td>
</tr>
<tr>
<td>Three plus</td>
<td>(+++)</td>
<td>Wheal with surrounding erythema.</td>
</tr>
<tr>
<td>Four plus</td>
<td>(+++++)</td>
<td>Wheal with pseudopods and surrounding erythema.</td>
</tr>
</tbody>
</table>

When a permanent record of the skin test reaction is required, the wheals can be closely encircled by a felt tip pen and a piece of clear adhesive tape is applied to the test site. Thus an image of the reaction can be taken on the tape which can then be placed on patient's record card.

Any contraindications for the test are not documented, except when there is history of any anaphylactic reaction in that case histamine is injected with caution. Blood should not be drawn during testing. These solutions are not used for intradermal testing as per manufacturer's advice.

Adverse reactions are rare, large local reactions if occur normally subside in short time. In unlikely event of a severe general reaction, a tourniquet is applied to the upper arm proximal to the site of skin test that has caused the reaction, and 0.3 ml of adrenaline injection (1:1000) is injected around and beneath the site of test and 0.3 ml of such solution is injected subcutaneously.
PROCEDURE OF IMMUNOTHERAPY

This is performed to hyposensitize those patients who have been shown to be sensitive to allergens as a result of case history and skin prick testing.

Desensol aqueous allergen extracts are used for specific hyposensitization. They are prepared from different allergenic materials of the human environment. Phenol (0.4%) is added as preservative. The extracts are standardized according to the weight : volume ratio of native material to the extraction fluid (for example - 1 + 99 = 1% w/v).

The composition of each treatment set is determined from the case history and reaction observed after skin tests. Thus each treatment set is individually formulated.

Initial treatment set is consist of 4 vials of 4.5 ml each.

Strength 1 : $1 + 24999$ (0.004% w/v).
Strength 2 : $1 + 2499$ (0.04% w/v).
Strength 3 : $1 + 249$ (0.4% w/v).
Strength 4 : $1 + 49$ (2% w/v).

If person is sensitive to mite or insect, a ten fold dilution as compared to above strength is used.

Maintenance treatment set of one vial of 4.5 ml containing extract of above mentioned strength 4 is used.
ADMINISTRATION AND DOSAGE

Aqueous allergen extracts are rapidly absorbed after injection. Course of hyposensitization treatment is given in quick succession and dose is slightly increased each time. The interval between the two successive injections is two-three days. It is never more than 7 days. In tailoring dosage individual tolerance is also seen. If there has been a gap of more than 7 days between two injections, the dose given at next injection is not increased. In case of maintenance course, the initial schedule is repeated before restarting maintenance therapy.

Dosage scheme is shown in Annexure - III.

PRECAUTIONS

1. Injections are given in sterile condition. Patients must not have heavy meals before and should not perform heavy exercise after injection.

2. Injections are given at the extensor surface of upper arm 3 inches above olecranon as tourniquet can easily be applied.

3. Injections are never given I/V and patients are watched for 1/2 an hour after injection.

4. Every course of hyposensitization treatment is initiated with the lowest dose of the lowest concentration.
5. Patients who are sensitive to seasonal allergens the injections are given preseasonally and course is completed before that particular allergen becomes airborne. For perennial allergens course may be commenced at any time of year.

6. Maintenance therapy for perennial allergens is consist of repeating the top dose achieved at seven day intervals. An attempt is made to extend the injection interval to 10-20 days. This schedule may be followed for one year.

Where seasonal allergens are involved it is recommended that hyposensitization be started sufficiently before the season and the schedule should be carried out preseasonally for three successive years.

7. Immunotherapy is not instituted in acute infections, acute severe asthma and pregnancy.

8. Recommended emergency kit should have:
   a. Tourniquet  
   b. Adrenaline  
   c. Hydrocortisone  
   d. Oxygen mask  
   e. Injectable antihistaminics  
   f. Aminophylline ampoules  
   g. Plasma expender (Dextran)