

# **Allergy Overview**

## **Definition of Allergy**

A cascade of symptoms that occurs in sensitized individuals as a result of histamine and other chemical mediators being released through immunologic mechanisms to a substance that in and of itself is not harmful. The symptoms that occur may be harmful to the individual and even have the potential to be life threatening at times.

## **Scope**

Current conservative estimates are that allergy affects approximately 25% to 30% of the general population in the United States. Roughly 50 to 100 million people are affected with expenditures to treat it reaching the billions of dollars annually.

## **Symptoms**

The symptoms that occur in allergy are a result of histamine and other chemical mediators (messengers) being released after an antigen (or allergen) and antibody (reactive immune system protein - IgE) interaction with a mast cell (immune system cell present in most tissues). The symptoms are generally inflammatory in nature and are often chronic. Most patients recognize that itchy, watery eyes and sneezing are allergy symptoms. However chronic fatigue associated with sinus headaches may not be recognized by the patient as allergy.

## **Common Diagnosis**

Allergic Rhinitis (nose inflammation and congestion as a result of allergy), Allergic Bronchitis (cough as a result of allergy), and Allergic Dermatitis (rashes and hives due to allergy) are some of the more common diagnoses that are made. However, any -itis condition can have allergy as its causative factor.

## **Allergy Overview (cont.)**

### **Treatment**

Only the patient or the patient's caregiver can truly make an appropriate decision about what treatment or treatments are used for a particular individual. There are four primary approaches to treating allergy symptoms.

- 1) Do nothing and live with the symptoms
- 2) Avoid the causative factor (if it can be identified)
- 3) Medications (antihistamines, etc.) to treat the symptoms
- 4) Immunotherapy/also known as IT (shots or drops that are made based on individual test results which are designed to re-educate the immune system not to react to the causative allergens)

Patients that have significant symptomatology may need all the above treatment approaches in order to remain comfortable and well.

### **Purpose and Indications for Immunotherapy**

The purpose of immunotherapy is to decrease the patients' sensitivity to allergy causing substances that the patient is unable to avoid in hopes of stopping or lessening the symptoms caused by these exposures. Immunotherapy is not a substitute for avoidance of known allergens or for the appropriate use of symptom relieving medications, but is used as a supplement to these measures in an effort to effect a change in the patients' overall response. Allergy immunotherapy (shots and drops) have been shown to lead to the formation of blocking antibodies (IgG) and a reduction over time of reactive (IgE) antibodies which may allow the patient to have exposure to the offending allergens with fewer symptoms. Quality immunotherapy can only be given if documented allergy to unavoidable allergens can be demonstrated by In-Vivo (skin testing) or In-Vitro (RAST, ImmunoCap, ELISA, etc.) means to which the patient is known to be symptomatic after exposure. The effective dosage for immunotherapy is a highly individualized amount of the specific allergen(s) initially based on their individual reactivity level as determined by the test method that is used.

## **Allergy Overview (cont.)**

### **Efficacy of Immunotherapy**

Improvements in the patient's symptoms will not be immediate with the onset of immunotherapy. If the correct allergens have been identified and included in the treatment at appropriate levels, then a patient should begin to see improvement in their condition within a 3 to 6 month time frame. However, it may take 12 to 24 months before the full benefit of immunotherapy can be seen. Generally, an effective immunotherapy program is maintained for 3 to 5 years or longer before IT is stopped. Approximately 90% of the patients on high dose immunotherapy are able to note significant improvement in their symptoms. This means that their symptoms are substantially reduced, but they may not be totally eliminated.

### **Immunotherapy Procedure**

The initial goal of any immunotherapy program is to find a safe starting point to begin. This safe starting point is established by the initial allergy testing (In-Vitro or In-Vivo) and by a vial safety challenge with the formula specifically designed for that individual patient based on the test. Vial safety challenges are required for subcutaneous immunotherapy vials (SCIT), but have been determined not to be necessary for sublingual immunotherapy (SLIT) vials. The beginning doses are intentionally started at a low concentration of the allergen for safety reasons and are gradually increased on a regular basis until the strongest effective dose (therapeutic and/or maintenance dose) is attained. SCIT doses may be given 1-2 times per week during the build up phase. Therapeutic doses will vary from individual to individual, but usually with contain more concentrated dilutions of the allergens being treated. Keeping a patient on a regular schedule lessens the likelihood of adverse reactions and allows the patient to get to an effective treatment dose sooner.

## **Allergy Overview (cont.)**

### **Treatment Duration**

With a tailored and specific approach to immunotherapy dosing, a patient will generally see improvement in their symptoms in 3 to 6 months and be at a maintenance dose within a year. It may take longer if the patient has reactions or does not maintain a regular dosing schedule. Patients need to be committed to the process. If the patient is not able to dedicate the time needed to the process, then immunotherapy should not be started. If it is started and the patient is haphazard in their commitment to the program, then IT should be stopped for the patient's safety and typical medical management should be used instead.

### **Complications**

Administering immunotherapy is a relatively safe medical procedure, if it's done correctly. However, there are some substantial risks which the physician and the patient need to be fully aware of when embarking on an immunotherapy program. Risk is inherent because a substance that the patient is known to be reactive to is being administered to the patient in ever increasing doses. This may result in a systemic and possibly life threatening reaction by the patient that requires an immediate response by the healthcare provider. Some of these reactions are described below:

- 1) Local reactions: These are fairly common and are usually confined to a small area around the injection site. They cause a blanched raised area (a hive) with erythema (redness), general swelling, and itching. An eraser tip size to upwards of a quarter size hive is considered acceptable, although doses may be maintained or even decreased one level when this occurs depending on experience and knowledge of the individual patient. This size reaction is effectively treated with ice application and Benadryl cream. It is usually gone by the next day.

## **Allergy Overview (cont.)**

### **Complications (cont.)**

- 2) Large local reactions: These generally indicate that one of the ingredients of the injection are at a dilution stronger than necessary for optimum results. They are characterized by an area of erythema larger than a half dollar (50mm), which is accompanied by induration, and often lasting more than 24 hours. While this type of reaction is bothersome, it does not usually correlate with a systemic response. In fact, a systemic reaction can occur with no local response preceding it. To determine the problem allergen, it may be necessary to separate the allergen ingredients into separate injections so that the problem allergen can be identified. Treatment that is guided towards a maximally tolerated symptom-relieving dose will result in these types of reactions periodically. This should not detour the physician from working to achieve symptom relief, but all efforts should be made to eliminate this reaction and keep the patient comfortable.
  
- 3) An increase in the patient's symptoms can occur at times as a result of a therapeutic injection. If this occurs in the early phases of immunotherapy, it must thoroughly be evaluated, as the first few doses are rarely strong enough to create a positive or negative response. Many patients will complain of an increase in symptoms two or three days after their injection, but this is more likely a result of exposure and a return of their normal symptoms. If an actual flare up of symptoms occurs in a relative short time after an injection, than this may indicate a true systemic reaction. Should this occur, then a check to be sure the vial's formulation is correct is advisable as is a reduction in the dosage. If this problem continues, then re-testing may be advisable as well as is the possible abandonment of immunotherapy as a treatment for this individual.

## **Allergy Overview (cont.)**

### **Complications (cont.)**

- 4) If a generalized rash/hives and/or facial swelling (angioedema) occurs, this may be the first sign of a more serious systemic reaction (anaphylaxis) and should be treated aggressively. The time of onset is crucial in determining if the allergy injection was the trigger for this response. If this reaction occurs within minutes of the injection, epinephrine and antihistamines should be administered. Reducing the dose to a previous lower non-reactive level is the first step in resolving this issue. If the reduced dose doesn't cause a reaction, than a slower escalation may be considered if continued advancement is deemed necessary. It is possible that the lowered dose is the patient's optimum and maintenance dose.
- 5) Anaphylaxis – a severe rapidly occurring life threatening reaction characterized by a rapid pulse, (except in patients taking a beta-blocking drug), hot flushed skin, urticaria, falling blood pressure, increased respiratory secretions, nasal congestion, hoarseness, cough, and wheezing. If this is not treated aggressively with epinephrine, antihistamines, and steroids; it could progress to anaphylactic shock and death. The unending concern of the prudent practicing allergist is the possibility of anaphylactic shock. There is minimal risk of this in treating inhalant allergy when test methods that quantify the patient's allergy are utilized.
- 6) Anaphylactic Shock – a sudden and life threatening collapse of the patient's vascular system as a result of massive amounts of fluid moving from the vascular system into the interstitial spaces, low blood pressure, unconsciousness, and potential death. This can occur within just a few minutes of an injection, but fortunately is extremely rare.

## **Allergy Overview (cont.)**

### **General Comments**

The reactions described above are not always predictable and may occur after the first few injections the patient receives or after the patient has been on treatment, even maintenance, for some time. All generalized reactions that occur require immediate evaluation and medical treatment to prevent their progression to a more serious event. All patients should receive appropriate advice and treatment for these reactions. A thorough discussion between the prescribing physician and the patient as to whether the patient should continue immunotherapy after any severe reaction.

### **Post-Injection and/or IT Dose Observation**

All patients on immunotherapy must have an epinephrine auto-injector and know how to use it. Every patient that is receiving an immunotherapy dose within the confines of the office providing the treatment should be required by the office to remain under medical observation for a minimum of 30 minutes after the dose has been administered. Please keep in mind that the dose received during a vial safety test, even though it may seem small, it may be significant enough to cause a major reaction in some patients. If a reaction does occur then the time of observation may be significantly longer. If a reaction occurs after they have left the office, the patient should be instructed to use their Epi-Pen and to go to the nearest medical facility that is capable of treating an allergic emergency. If a patient is not able to wait the required 30 minutes, then they should not be given an injection that day. If a patient is consistently unable to stay for the required observation period, then IT should stop.