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## **Medication Allergy Simplified**

### **Introduction**

Adverse reactions to medications are common. They are divided into **predictable adverse reactions**, which account for more than 75% of adverse medication effects and **unpredictable adverse reactions** which account for the rest. Predictable adverse reactions are understood based on known pharmacological properties of medications and can potentially be avoided by reading medication literature carefully. Examples of predictable adverse reactions include Overdose (liver failure from taking too much Tylenol or NSAIDs), Side effects (sedation from Benadryl or palpitations and insomnia from Sudafed), Secondary or indirect effects (yeast infections from using antibiotics) and Medication interactions (simultaneous use of erythromycin and theophylline or digoxin make blood levels of the later to go up).

Unpredictable adverse reactions to medications on the other hand depend on known and unknown genetic and immunological factors in a given patient and may not always be preventable. Examples include ringing in the ears after taking a single tablet of aspirin, anemia after taking certain medications in patients with G6PD deficiency (an enzyme deficiency affecting red blood cells in people of Mediterranean descent) or sudden development of allergy to penicillin after using it for many years without any problem.

### **Medication Allergy**

Development of medication allergy depends on previous exposure to a medication or related medications. Following such exposure the immune system of the patient is sensitized to the medication. Following second or subsequent exposure to the same or related medications, immunologically mediated tissue injury takes place. This can take four forms- Immediate development of itching, rash, hives, swelling or anaphylaxis (type 1), drop in the number of different blood cells or kidney damage over days or weeks into treatment (type 2), skin rash, swelling, joint pain and swelling, swollen lymph nodes or appearance of protein in the urine 7-10 days into treatment (type 3) or measles-like rash late during treatment (type 4). The original exposure may be obvious (prior history of taking penicillin or sulfa based medications) or may not be obvious. Examples of the later include patients who developed penicillin allergy from exposure to penicillin in cow's milk from cows which were treated for mastitis with penicillin or women who developed allergy to certain anesthesia medications from previous exposure to certain cosmetics.

### **Allergic vs pseudoallergic reactions**

Aspirin and NSAIDs cause **pseudo-allergic or anaphylactoid reactions** (hives, swelling and asthma) by causing overproduction of leukotrienes (inflammation inducing chemicals) in some people. X-ray dyes and narcotic pain medications cause acute allergic reactions by directly

(without the need for an allergic IgE antibody) activating complement (a group of proteins in the blood) and or certain cells in tissues (mast cells). Some blood pressure medications (ACE inhibitors or Angiotensin receptor blockers) can cause swelling of different parts of the body by less well understood mechanisms. These reactions can occur the very first time after using such medications. Skin testing is not useful in the diagnosis of such reactions.

## **Diagnosis**

Adverse reactions to medications are often diagnosed by taking very detailed history from the patient. This includes nature of adverse reaction, time interval between taking the medication and the onset of symptoms, medication dose, what other medications the patient was taking (prescription and OTC), history of prior exposure to the same or similar medications and presence of other allergic disorders (hay fever, asthma, eczema and allergy to foods, latex, insects or medications) in the patient or other family members.

Physical examination may reveal presence of hives, rash, itching, skin or mucus membrane blisters, swelling of different body parts, skin peeling, swollen lymph glands, swollen and painful joints enlarged liver, jaundice, abnormal findings on auscultation over lungs or heart and or presence of blood, eosinophils and protein in the urine.

If the history or examination suggests possible adverse reaction to a medication, your doctor may stop the suspected medication to assess its impact, and or order further testing including blood count, liver and kidney function tests, Chest x-ray, and or urinalysis. In some special situations, allergy skin testing and medication challenge studies may be warranted under specialist medical supervision. However it should be emphasized that allergy skin testing is not available for many medications at this time.

## **Treatment and prevention**

Avoiding the offending medication and related medications is all that is required in most situations. In certain special and exceptional situations medication desensitization is possible and is required. Medication allergy is more common in some families and patients. Such people should avoid unnecessary exposure to medications (antibiotics for example) unless clearly required (throat culture positive for strep for example) and complete full course of treatment when prescribed. Frequent and intermittent use of antibiotics can cause more antibiotic allergies. Regular hand washing, frequent use of hand sanitizers, taking yearly influenza vaccination and other required vaccines and avoiding sick people may help prevent development of frequent infections and the need for antibiotics. Adhering to instructions from your pharmacist or doctor is important. Regular clinical and or laboratory monitoring is indicated for patients starting new medications. Keeping careful documentation of events and immediate reporting to your doctor of any adverse reactions will lead to better diagnosis and better outcome for you.

### ***About the author:***

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