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Review Article

A review on drug induced hypersensitivity reactions

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Article History	Abstract
Received on: 05-08-2010 Revised on : 22-08-2020 Accepted on : 15-09-2020	This article is focused mainly on the role of the remote presence robot in health care facilities. This article has a view of the advantages, disadvantages, objectives, uses of RPRT in health care settings, and in different departments, and precautions to be taken while using RPR. In recent decades the usage of remote presence robots has been used in many clinical settings like ICU, emergency departments, medical, surgical, neurological units, and operating rooms. Remote presence robot technology RPRT, is an advanced robotics device technology that enables health care professionals to provide real-time clinical services to patients. This has been increasing in both outpatient and inpatient settings. RPRT in medical education can teach the professional curriculum to students in an interactive way as teachers do. RPR can even enable teachers to teach and interact with students remotely. The world's first hospital to introduce remote presence robots in the university of California, Los Angeles in its neurosurgery intensive care unit. The application of RPRT will increase doctor access for patients, families, and hospital staff in clinical care settings.
Keywords Hypersensitivity reactions, Allergic reaction; Cutaneous Test; Adverse Drug Reaction; Predictable And Unpredictable response.	
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Introduction

Drug induced hypersensitive mechanisms are not accurately described, adverse drug reactions are develops in a liable or sensitive patients when exposure to certain drugs. These are divided as pharmacological adverse drug reactions (type A) and hypersensitive reactions (type B). The hypersensitive reactions are further grouped into immediate type and delayed type, based on speed of onset, duration and type of immune response. Hypersensitivity reactions are not considered as a major problem in so many cases due to its unpredictable character until the drug is retail and given to a large number of people. The need of preclinical and clinical trials before the drug is marketed has become evident [1,2].

Incidence and prevalence related to hypersensitivity induced by drugs are inadequate data. Adverse effect's 10-20% of clinical patients and over 7% of general population, the toxic or harmful response to a particular

drug that is administered in a standard dose by a proper route for the sake of disease prevention. The hypersensitivity occurs in a patient often leads to prescribe of alternative drugs. Which may had less effective or more cost or may undesirable from patients and health care provider's perspective [3].

Some drugs which cause hypersensitivity reactions are;



Figure 01: Representing the images of capsules and tablets dosage forms

- Anti-thyroid drugs
- Penicillins and Cephalosporins
- Olanzapine
- Antipsychotic tranquilizers
- Allopurinol
- Isoniazid
- Navirapine
- Trimethoprim
- Dapsone
- Atenolol
- Sulphonamides
- Anticonvulsants
- Abacavir

Table 01: Showing the classification of drug induced hypersensitivity reactions [4,5]

Type Of Hypersensitivity	Mechanisms	Prototypical Disorders	Histopathological Lesions
1) Anaphylactic(type1) hypersensitivity	Production of IgE antibodies - immediate release of vasoactive amines and other mediators from mast cell; later recruitment of inflammatory cells	Anaphylaxis; allergies; bronchial asthma	Vascular dilation, edema, smooth muscle contraction, mucus production, tissue injury, inflammation
2) Antibody-mediated(type2) hypersensitivity	Production of IgG, IgM -binds to antigen on target cell or tissue- phagocytosis of targeted cell by activated complement or Fc receptors; recruitment of leukocytes	Autoimmune hemolytic anemia; goodpasture syndrome	Phagocytosis of cells; inflammation; in some disease , functional derangements without cell or tissue injury
3) Immune complex-mediated (type3) hypersensitivity	Deposition of antigen-antibody complexes – complement activation – recruitment of leukocytes by complement products and Fc receptor – release of enzymes and other toxic molecules	Systemic lupus erythematosus; some forms of glomerulonephritis ; serum sickness; Arthus reaction	Inflammation, necrotizing vasculitis
4) Cell-mediated (type4) hypersensitivity	Activated T-lymphocytes – (1)release of cytokines, inflammation and macrophage activation;(2) cell-mediated cytotoxicity.	Contact dermatitis; multiple sclerosis; type 1 diabetes; tuberculosis	Perivascular cellular infiltrates; edema; granuloma formation; cell destruction

Clinical Manifestation

The following are the clinical manifestations of drug induced hypersensitivity reactions [3]

- Fever, Wheezing, itchy or watery eyes, Swollen lymph nodes, inflammation of internal organs.
- Breathing problem due to constriction of airways
- Low blood pressure, abdominal cramps, loss of consciousness
- Anaphylaxis
- Maculopapular lesions with distribution on fingers toes, and soles (serum sickness)
- Urticarial (direct mast cell stimulation)
- Erythematous, Purpura (thrombocytopenia)
- Exanthematous or morbilliform eruption originates on trunk.
- Papulovesicular, scaly lesion (contact dermatitis)
- Blistering lesions with mucous membrane involvement (stevens-johnson syndrome or toxic epidermal necrosis)

- Eczematous rash in sun exposed areas (photoallergic reaction)
- Solitary circumscribed erythematous raised lesion (fixed drug eruption).

Pathogenesis Of Drug Hypersensitivity

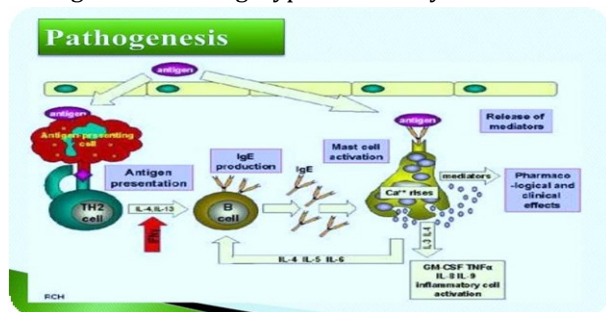


Figure 02: Representing the Pathogenesis of Drug Hypersensitivity [5].

Clinical Diagnosis

Different diagnostic methods involved in screening of drug induced hypersensitivity [5,6]

- Determination of the patients concomitantly taken drugs. Considerations of drug interactions.
- Dermatologic testing and skin biopsy
- Types of reaction (non-allergic versus allergic) occurs due to drugs
- IgE and other lab tests like in vitro lab testing and in vivo cutaneous tests for example: leukotriene release test, basophil activation test.
- Genetic testing HLA test.
- Determination of the time interval from drug intake to onset of action

Treatment

If hypersensitivity reactions occurs due to medicines immediately stop taking the triggering drug, is essential in all allergies and it is a better option. Some medications use to treat hypersensitivity such as, glucocorticoids helps to prevent rashes due to drugs, Cyclosporine is used to treat toxic of epidermal necrosis. Immediate reactions treated with antihistamines and epinephrine. Delayed reactions are usually treated with glucocorticoids. Some new technologies are invented to treat the different hypersensitivity that new term is "Pharmacogenomics" (is study of how genes affect a person's response to drugs. This combines pharmacology and genomics) [6,7].

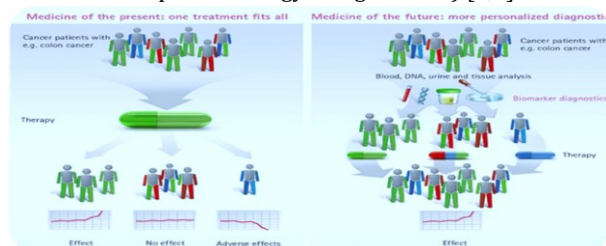


Figure 03: Representing the treatment plan for Drug Hypersensitivity Reactions [6].

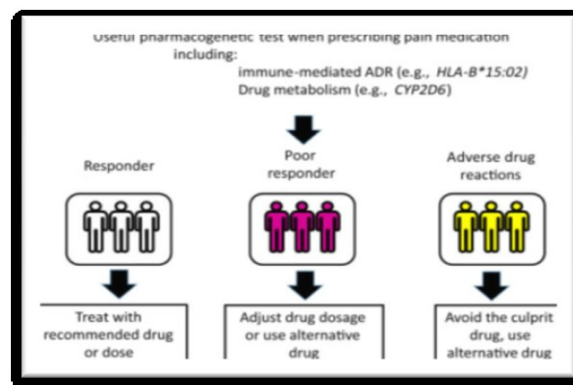


Figure 04: Representing the Pharmacogenetic test when prescribing pain medicate [7]

Risk Factors

- Risk factors for Drug induced hypersensitivity [5,7]
- Route of administration
- Cross sensitization
- Degree of exposure
- Nature and character of drug
- Age and sex in host
- Genetic factors
- History of previous medication etc.

Conclusion

Drug induced hypersensitivity is a frequent phenomenon, but often present a challenge for clinical practicing physicians. It is highly variable with respect to frequency and severity. DHRs include immediate and delayed responses are both potentially life threatening. The drugs pharmacological nature depends patients health conditions. All the factors reason for the hypersensitivity reactions

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