
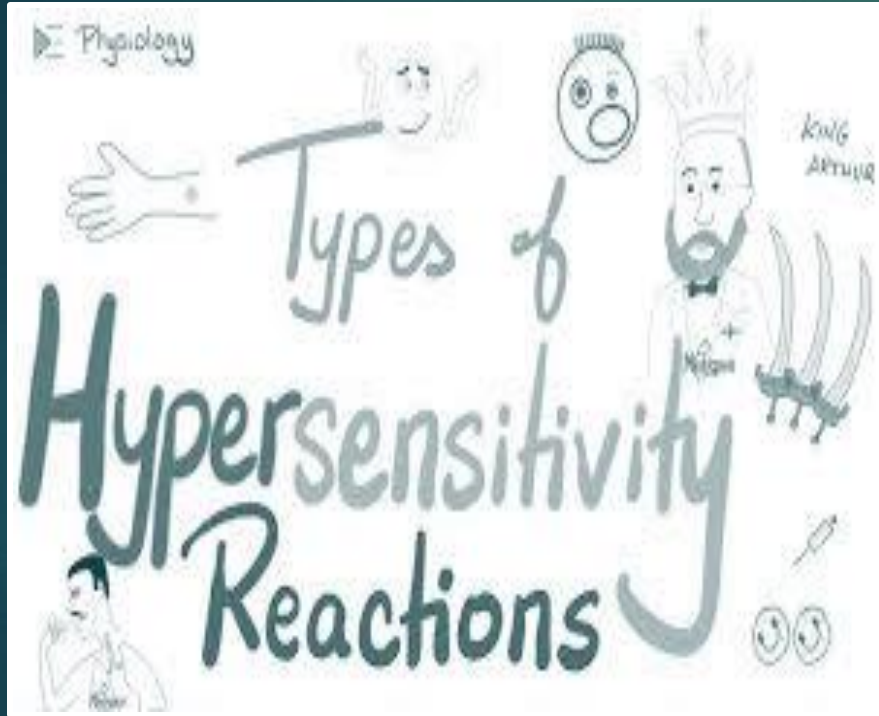


# **ANAPHYLAXIS**

## **“The NIGHTMARE”**

**DR. SHAKHAWAT HUSSAIN NAHID**  
**TRAINEE MEDICAL OFFICER**  
**DEPARTMENT OF ANAESTHESIA**

- 
- ▶ Hypersensitivity (or allergic) reactions are exaggerated immunological responses to antigenic stimulation in previously sensitized persons.
  - ▶ The antigen, or allergen, may be a protein, polypeptide, or smaller molecule.



A=Allergic

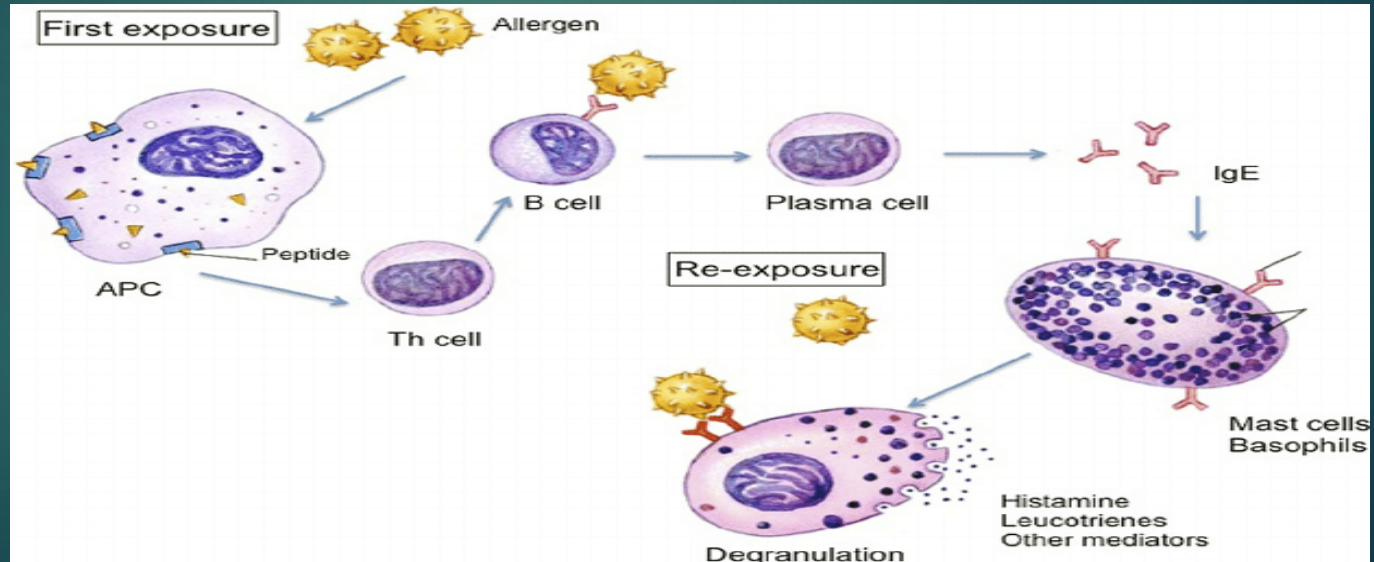
C=Cytotoxic

I=Immune Complex mediated

D=Delayed

# Mechanism of Type-I hypersensitivity

- ▶ Type I reactions involve antigens that cross-link IgE antibodies, triggering the release of inflammatory mediators from mast cells.

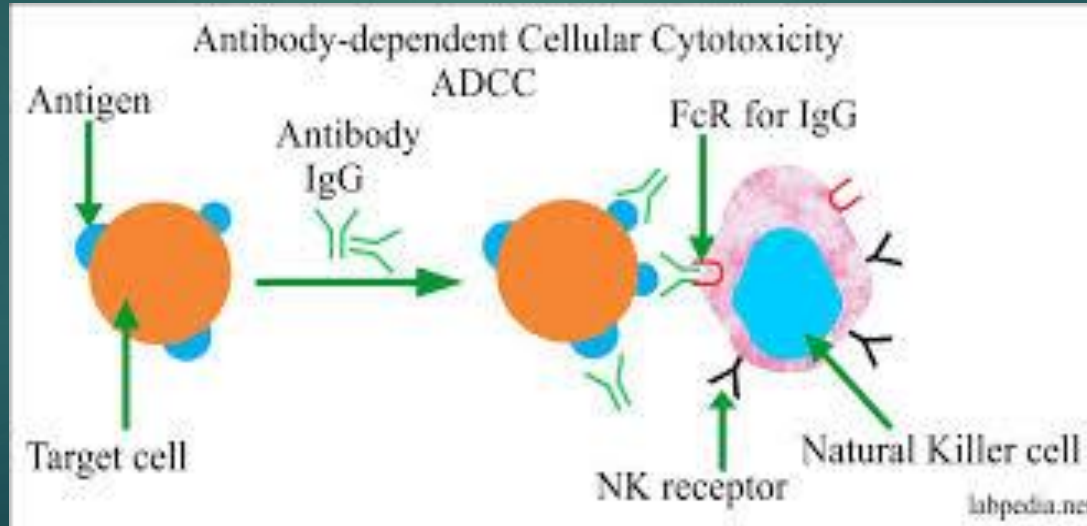


# Examples of Type-I (immediate) Hypersensitivity

- ▶ Atopy
- ▶ Urticaria
- ▶ Angioedema
- ▶ Anaphylaxis

# Mechanism of Type-II hypersensitivity

- ▶ In type II reactions, complement-fixing (C1-binding) IgG antibodies bind to antigens on cell surfaces, activating the classic complement pathway and lysing the cells.

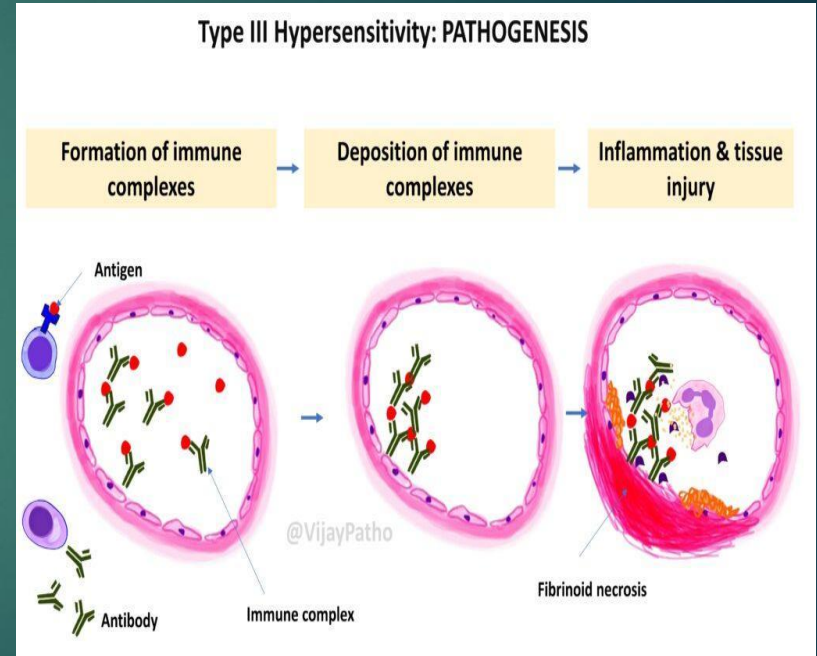


# Examples of Type-II (cytotoxic) Hypersensitivity

- ▶ Hemolytic transfusion reactions
- ▶ Autoimmune hemolytic anaemia and
- ▶ Heparin-induced thrombocytopenia
- ▶ Graft rejection

# Mechanism of Type-III hypersensitivity

- ▶ Type III reactions occur when antigen–antibody (IgG or IgM) immune complexes are deposited in tissues, activating complement and generating chemotactic factors that attract neutrophils to the area. The activated neutrophils causes tissue injury by releasing lysosomal enzymes and toxic products.





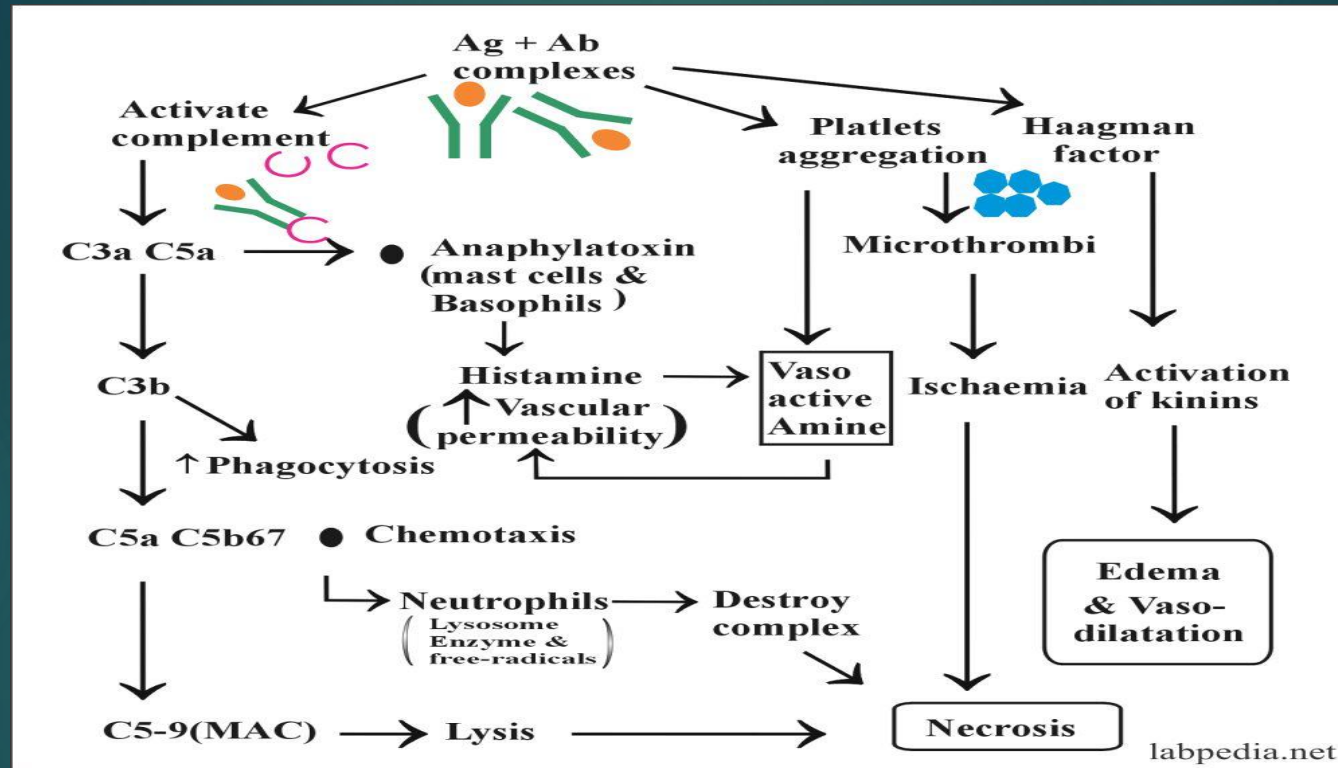


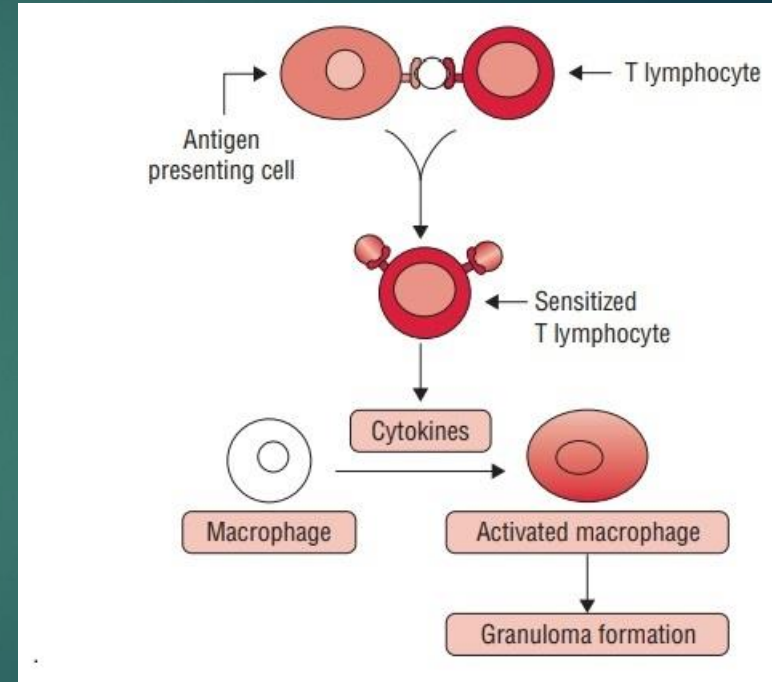
FIGURE: Mechanism of type 3 hypersensitivity

# Examples of Type-III (immune complex) Hypersensitivity

- ▶ Serum sickness
- ▶ Acute hypersensitivity pneumonitis
- ▶ Rheumatoid arthritis
- ▶ SLE

# Mechanism of Type IV hypersensitivity

- ▶ Type IV reactions, often referred to as delayed hypersensitivity reactions, are mediated by CD4+ T lymphocytes that have been sensitized to a specific antigen by prior exposure.




# Examples of Type-IV (delayed) Hypersensitivity


- ▶ Contact dermatitis
- ▶ Tuberculosis
- ▶ Histoplasmosis
- ▶ Schistosomiasis
- ▶ Chronic hypersensitivity pneumonitis

# Anaphylactic Reactions



- ▶ **Anaphylaxis is an exaggerated response to an allergen (eg, antibiotic) that is mediated by a type I hypersensitivity reaction**
- ▶ The syndrome appears within minutes of exposure
- ▶ characteristically presents as acute respiratory distress, circulatory shock, or both.
- ▶ Death may occur from asphyxiation or irreversible circulatory shock.

- 
- ▶ The most important mediators of anaphylaxis are histamine, leukotrienes, basophil kallikrein (BK-A), and platelet-activating factor. They increase vascular permeability and contract smooth muscle.
  - ▶ H1-receptor activation contracts bronchial smooth muscle, whereas H2-receptor activation causes vasodilation, mucus secretion, tachycardia, and increased myocardial contractility.

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- ▶ BK-A cleaves bradykinin from kininogen; bradykinin increases vascular permeability and causes vasodilation and contracts smooth muscle.
  - ▶ Activation of Hageman factor can initiate intravascular coagulation.

**SIGNS & SYMPTOMS**  
**ANAPHYLAXIS**



Organ System	Sign and symptom
CVS	Hypotension, tachycardia, arrhythmias
Pulmonary	Bronchospasm, cough, dyspnea, pulmonary/ laryngeal oedema, hypoxia
Dermatological	Urticaria, angioedema, pruritus



# Causes of anaphylactic reactions

Anaphylactic reaction against polypeptide	Venoms Airborne allergens Foods Enzymes Heterologous serum Latex
Anaphylactic reaction against hapten carrier	Antibiotics Local anesthetics Disinfectants

# Anaphylactoid reactions



- ▶ Anaphylactoid reactions resemble anaphylaxis but do not depend on IgE
- ▶ Antibody interacts with antigen
- ▶ A drug can directly release histamine from mast cells (eg, urticaria following high-dose morphine sulfate) or activate complement by IgG

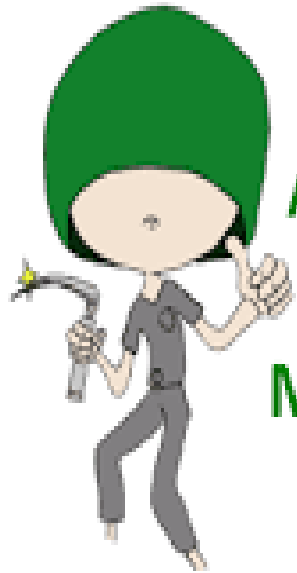
# Causes of anaphylactoid reactions

- ▶ Opioid
- ▶ Hypnotics
- ▶ Muscle relaxants
- ▶ NSAID
- ▶ Protamine
- ▶ Dextran
- ▶ Idiopathic

# Diagnosis and treatment



- ▶ Serum tryptase measurement is helpful in confirming the diagnosis of anaphylactic reaction.
- ▶ Treatment must be immediate and tailored to the severity of the reaction



## Anaphylaxis Crisis Management

- ▶ Discontinue drug administration
- ▶ Administer 100% Oxygen
- ▶ Epinephrine
- ▶ Consider intubation
- ▶ Intravenous fluid bolus
- ▶ Diphenhydramine
- ▶ H<sub>2</sub> Receptor antagonist
- ▶ Steroid

# Allergic Reactions to Anesthetic Agents

- ▶ True anaphylaxis due to anesthetic agents is rare; anaphylactoid reactions are much more common.

Risk factors associated with hypersensitivity to anesthetics include

- ▶ Female gender
- ▶ H/o Atopy
- ▶ Preexisting Allergies
- ▶ Previous Anesthetic exposure

# Allergies to Antibiotics



- ▶ Many true drug allergies in surgical patients are due to antibiotics, mainly  $\beta$ -lactam antibiotics, such as penicillins and cephalosporins.
- ▶ Although 1% to 4% of  $\beta$ -lactam administrations result in allergic reactions, Cephalosporin cross-sensitivity in patients with penicillin allergy is estimated to be 2% to 7%,

# Latex Allergy



- ▶ The severity of allergic reactions to latex-containing products ranges from mild contact dermatitis to life-threatening anaphylaxis.





A 25 years healthy female was admitted in obstetric department for emergency LUCS less fetal movement.

After giving inj. Cefuroxime (0.5ml subcutaneously) as test dose in ward, patient developed hypotension, dysrhythmia, respiratory distress and desaturation

ANY GUESS?



**THANK YOU**

ANY QUESTION?

