

Anaphylaxis-A Fatal Medical Emergency

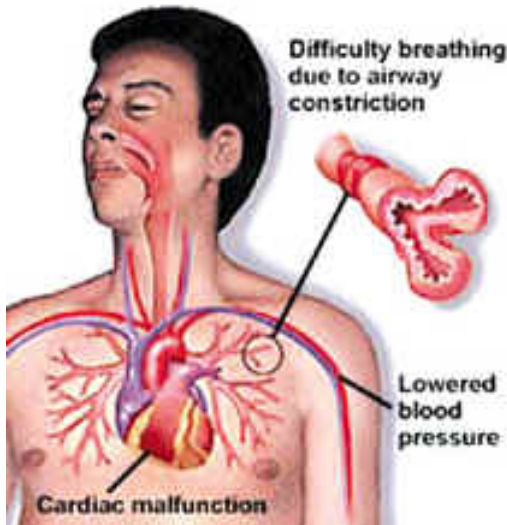
Venugopalan P.P, Chief, Emergency Medicine, MIMS, Calicut

Allergy and Anaphylaxis are nightmares not only for dental doctors, but also for all healthcare providers. Very often the result will be fatal. Therefore it is of utmost important to know about the practical issues related to anaphylaxis and its clinical management.

What is anaphylaxis?

Anaphylaxis is a severe systemic allergic reaction characterized by multi system involvement, including skin, airway, vascular system and gastrointestinal tract.

In severe cases there may be complete airway obstruction, cardio vascular collapse and even death.



Types of Anaphylaxis

There are two types of reactions

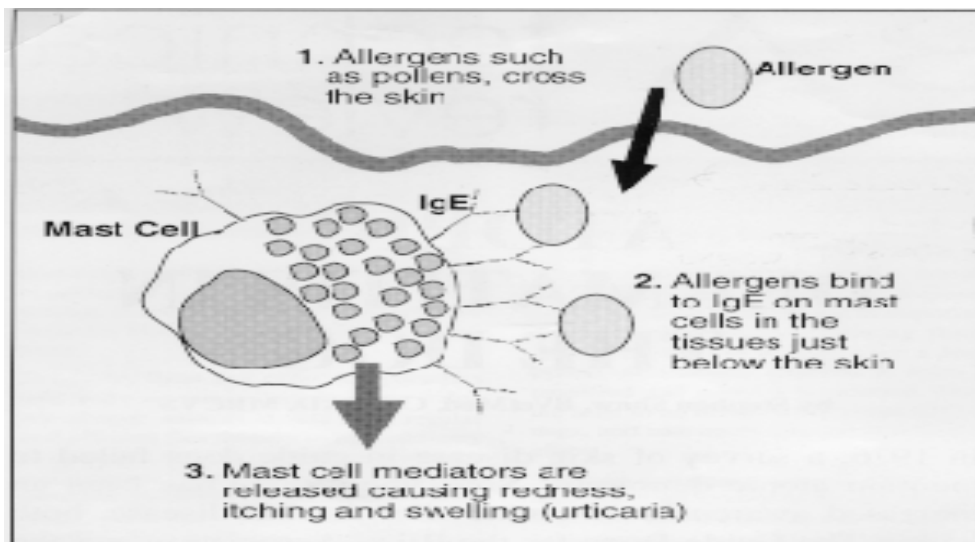
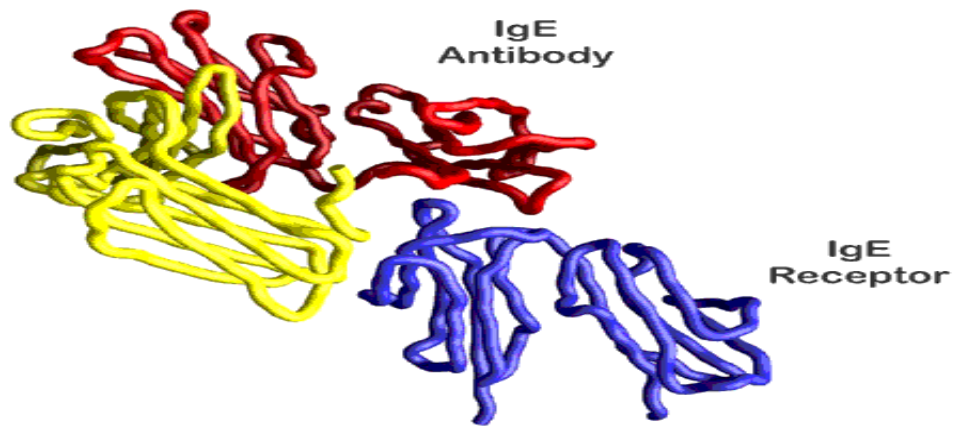
- ❖ Classic anaphylaxis
- ❖ Anaphylactoid reactions

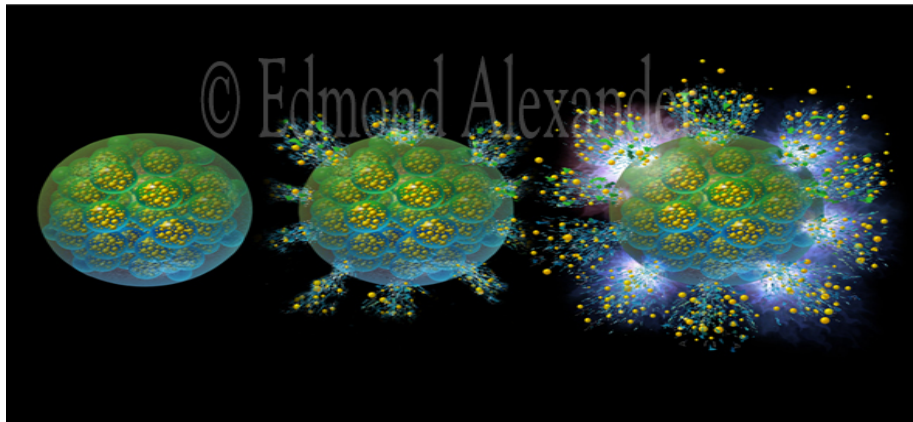
Classic forms – This is a hypersensitivity reaction mediated by Antibody immunoglobulins like IgE, IgG.

Anaphylactiod reactions – They are presented with similar clinical syndrome, but are not immune mediated.

How does it happen?

Prior sensitization to an allergen has invariably occurred, producing antigen-specific immunoglobulin. Subsequent re-exposure to this allergen provokes the anaphylactic reaction, as the inciting allergen binds to Antigen-specific IgE on basophils and mast cells. These cells release mediator like histamine, leukotrienes, prostaglandins, thromboxanes and bradykinin. These agents cause increased mucous membrane secretions, increased capillary permeability and fluid leak. It also produced decrease tone in vasculature and increased tone in bronchioles





GRANULATING MAST CELL
 Mast cell overstimulation through allergic response results in excessive histamine release.
 For Hill's Science Diet™, © Edmond Alexander

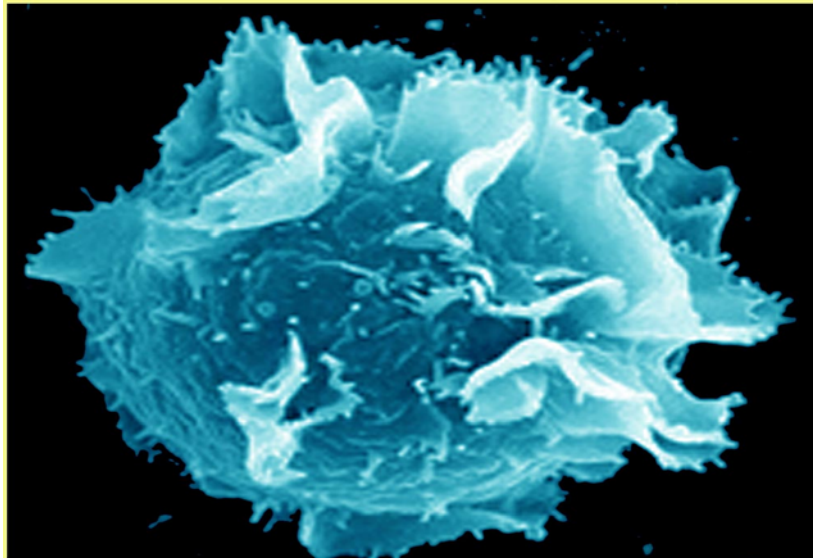
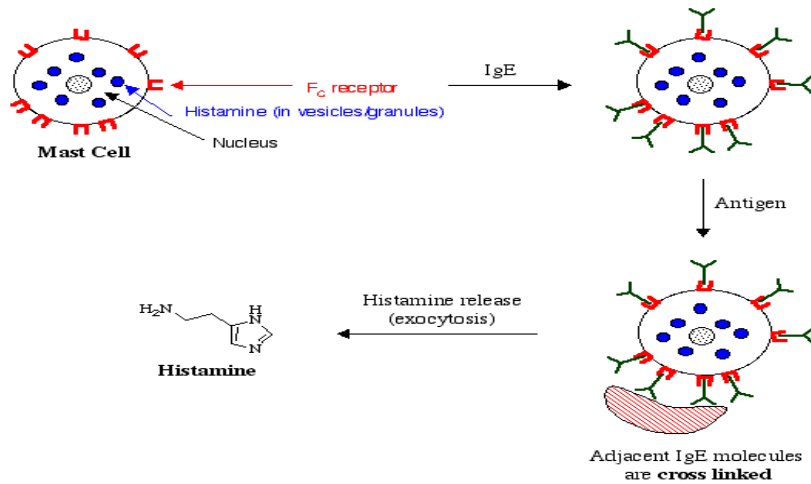


Fig -Mast cell bursting in anaphylaxis and releasing Histamine



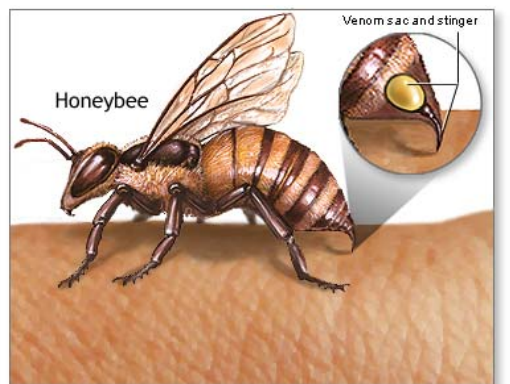
What are the common Allergens?

- I. Drugs
 - a. Antibiotics
 - b. Aspirin
 - c. NSAID
 - d. IV contrast agent

- II. Glove, Bladder catheter



- III. Stinging insects
 - a. Hymenoptera (membrane winged insects)
 - b. Ants
 - c. Bees
 - d. Wasps
 - e. Yellow jackets



ADAM

IV. Food

- a. Peanuts
- b. Tree-grown nuts
- c. Sea food
- d. Wheat



What about local Anesthetics?

Anaphylactic reaction following local anesthetics like Lignocaine is very rare. But the preservatives used in preparation may cause such reactions.

How will you recognize anaphylaxis?

Look for symptoms like

- H/o exposure to allergen [In some cases ,there may not be a clear history of exposure]
- Hypotension
- Broncho spasm
- Upper airway obstruction
- Pulmonary edema
- Angio Odema
- Generalized edema
- Pruritus
- Rash
- Vomiting
- Diarrhea
- Abdominal pain



Normal appearance



Severe allergic reaction
(anaphylaxis)



Photo credit: Carita Övelius

What are the conditions that mimic anaphylactic presentations?

- Anxiety / Panic disease
- Asthma
- Bronchospasm /Laryngeal edema due to inhalation of irritant gases
- Foreign body airway obstruction
- Hypovolemia
- Vasovagal episode
- Cardiogenic shock

Fainting and Anaphylaxis: clues, which may help you, tell the difference (this guide is not perfect; you need an expert if in doubt.)		
	Anaphylaxis	Fainting
Colour	Pink, typically	Pale, typically
Pulse	Fast, usually	Slow, usually
Blood pressure	Can remain low lying down	Normal when lying down
Other features which may be present	Nettlerash Swelling Difficulty breathing Tummy pain or diarrhoea	The person has probably fainted before. (Some people do faint, others don't]

Which lab test will help to diagnosis anaphylaxis?

In emergency situation no biochemical investigation are required to commence treatment.. Failure to identify and to appropriately treat anaphylaxis can be fatal.

How will you manage anaphylaxis?

THE 4 STEPS!!



❖ Step 1: Initial assessment and Management

Support ABC – Basic life support

Airway
Breathing
Circulation

Establish –

- Intravenous Line (IV line is the life line)
- O2 administration (Use high flow)
- Monitor (Pulse, Blood Pressure, Respiration, EKG, SPO2)

Control airway with Endotracheal tube in severe airway obstruction

❖ Step 2: Drugs

What drug?

The drug of choice is Epinephrine in all cases with systemic reactions especially hypotension, airway swelling, breathing difficulty

(Histamine is the major culprit in anaphylaxis and Epinephrine is the physiological antidote to it)

Epinephrine –

Preparation – 1ml in 1 ampoule with 1 in 1000 dilution. That means 1ml = 1mg

Dose – 0.3 – 0.5mg ie 0.3 – 0.5ml intramuscular route (Lateral Thigh or Gluteus muscle or Deltoid)

Repeat in every 15 – 20minutes if there is no clinical improvement

Pediatrics dose – 0.01mg/kg

If anaphylaxis appears to be severe with immediate life threatening manifestation give intravenous Epinephrine



How to give Intravenous Epinephrine?

Take 1ampoule Epinephrine and add 9cc of Normal Saline to make a solution of 1 in 10,000 dilution. Then administer 1 ml (0.1 mg) slowly over 5 minutes intravenously.

Assess the response and signs of systemic reaction. Repeat the 0.1 mg dose every 3-5 minutes until an adequate response in pulse and blood pressure is observed.

Alternatively set an IV infusion at rate of **1-4 microgram/** minute may prevent the need to repeat Epinephrine injections frequently.

EPIPEN- Preloaded self injectable epinephrine pens are available for those patients who have recurrent anaphylactic reactions.



❖ **Step 3: Aggressive fluid resuscitation**

What fluid ? How much?

Give isotonic crystalloid (Normal saline) if symptoms are present and do not respond rapidly to Epinephrine. A rapid infusion of 1-2 L or even 4 Liter may be needed initially

Special situation

1. Patient on Beta blockers – Poor responders to Epinephrine , may be required Glucagon. 1-2 mg IV every 5 minutes . Ipratropium inhalation is also recommended.
2. Vasopressin - May be useful in severely hypotensive patients.
3. Angioedema – Hereditary angioedema is a differential diagnosis of the anaphylaxis. Require C 1 esterase inhibitor replacement concentrate if available or Frozen Plasma may be used.
4. ACE (Angiotensin converting enzyme) inhibitor reactive angioedema is another differential diagnosis, require early airway management.

What are the other drugs to support therapy ?

1. H1 blocker – Antihistamines (Eg – 25-50 mg of Diphenhydramine IV)
2. H2 blocker - Like Ranitidine 150 mg (Oral / IM /IV)
3. Inhaler Beta adrenergic agents - Give as inhaler
 - ❖ Albuterol if bronchospasm is a major feature
 - ❖ Ipratropium may be useful in patient on beta blockers

4. Corticosteroid - Infuse high dose of steroids early in the course of therapy. Beneficial effects are delayed at least 4-6 hours

❖ **Step 4: Observation & Disposal**

Patient who responds to therapy require observation because symptoms may recur in some patients (up to 20 %) in 8 hours (Biphasic response) despite an intervening asymptomatic period.

A patient who remains symptom free for 4 hours after treatment may be discharged.

Conclusion

The management of anaphylaxis includes early recognition, anticipation of deterioration and aggressive support of airway, oxygenation & ventilation and circulation. Prompt, aggressive therapy may succeed even if cardiac arrest develops.

References:

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4. www.Circulationaha.org

ANAPHYLAXIS MANAGEMENT

FLOW CHART

