Anaphylaxis

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Anaphylaxis

- Acute multi-system severe type I hypersensitivity reaction.
- Potentially life-threatening reaction , often explosive in onset , with symptoms ranging from mild flushing to upper airway obstruction with or without vascular collapse.

Anaphylaxis

- %1 ,to15% of the population can be considered "at risk" for having an anaphylactic reaction if they are exposed to one or more allergens .
- Of those people who actually experience anaphylaxis, up to 1% may die.

Risk factors

- Age (adult>children)
- Gender (female>males)
- Rout of administration (parentral >oral)
- Exposure to allergen (recent>remote)
- Atopy
- Systemic mastocytosis

Concomitant Disease

- Asthma and other chronic respiratory disease
- Cardiovascular disease
- Systemic mastocytosis or monoclonal mast cell activating syndrome
- Allergic Rhinitis and eczema
- Depression ,Cognitive dysfunction , Substance misuse

Drugs

- *B*-Adrenergic blockers
- Angiotensin Converting Enzyme inhibitor
- Sedative , Antidepressant, Narcotics , Recreational drugs , Alcohol may decrease the patients ability to recognize triggers and symptoms

Anaphylaxis

- Anaphylaxis can be divided into "true anaphylaxis" and "pseudo-anaphylaxis" or "anaphylactoid reaction".
- The symptoms, treatment, and risk of death are the same; however, "true" anaphylaxis is caused by degranulation of mast cells or basophils mediated by immunoglobulin E (IgE), and pseudo-anaphylaxis occurs without IgE mediation .

Biphasic anaphylaxis

- Biphasic anaphylaxis is the recurrence of symptoms within 72 hours with no further exposure to the allergen.
- It occurs in between1- %20 of cases depending on the study examined. It is managed in the same manner as anaphylaxis.

Anaphylactic shock

- Anaphylactic shock is anaphylaxis associated with systemic vasodilation which results in low blood pressure .
- Associated with severe bronchoconstriction to the point where the individual is unable to breathe.

Pseudoanaphylaxis

- The presentation and treatment of pseudoanaphylaxis is similar to that of anaphylaxis.
- It however does not involve an allergic reaction but is due to direct mast cell degranulation.
- This can result from morphine, radiocontrast, aspirin and muscle relaxants.

IgE mediated Anaphilaxis

- Proteins:
  - Food (Peanuts seafood, eggs, milk)
  - Allergen extract
  - Inhalant allergen (pollen ,cat dander)
  - Hymenopetra venom (bee stings)
  - Vaccines
  - Antisera
  - Hormons ,enzymes
- Haptens (antibiotics penicillin)

Complement mediated anaphylaxis

- Cuprophane dialysis membrane
- Blood product
- Radiocontrast dye

Disturbance of leukotriene metabolism

- Asprin
- Non steroidal anti-inflammatory drugs

IgG mediated metabolism

- High molecular weight dextran
- Humanized monoclonal antibody

Pseudo anaphylaxis

- Radiocontrast media
- Opiate
- Anesthetics :curare deriative
- Vancomycin (red man syndrom)

Mast cell and basophil-derived mediator

- Histamine
- Proteoglycan (heparin,condrotin sulfate)
- Neutral protease:tryptase
- Leukotrienes:c4 ,d4
- Prostoglandin:D2

Signs and symptoms

- Anaphylaxis can present with many different symptoms due to the systemic effects of histamine release.
- These usually develop over minutes to hours .
- The most common areas affected include:skin-respiratory-gastrointestinal-heart and vascular-central nervous system .

Skin

- Skin involvement may include generalized hives, itchiness, flushing, and swelling of the lips, tongue or throat.

Respiratory

- Respiratory symptoms may include shortness of breath, wheezes or stridor, and low oxygen .

Gastrointestinal

- Gastrointestinal symptoms may include crampy abdominal pain, diarrhea, and vomiting.

Cardiovascular

- Due to the presence of histamine releasing cells in the heart coronary artery spasm may occur with subsequent myocardial infarction or dysrhythmia.

Nervous system

- A drop in blood pressure may result in a feeling of lightheadedness and loss of consciousness .
- There may be a loss of bladder control and muscle tone, and a feeling of anxiety and "impending doom.

Causes

- Anaphylaxis can occur in response to any allergen .
- Common triggers include insect bites or sting, foods, medication and latex rubber.

Food

- Many foods can trigger anaphylaxis .
- The most common are peanut, tree nuts, shellfish, fish, milk, and egg.

Medication

- Any medication may potentially trigger anaphylaxis. The most common to do so include antibiotics (β-lactam antibiotics), aspirin, ibuprofen, and other analgesics.
- Some drugs (polymyxin, morphine, x-ray contrast and others) may cause an "anaphylactoid" reaction (anaphylactic-like reaction) on the *first exposure* a ot eud yllausu si sihT . toxic reaction, rather than the immune system mechanism that occurs with "true" anaphylaxis .

Venom

- Venom from stinging or biting insects such as Hymenoptera or Hemiptera may induce anaphylaxis in susceptible people.

Pathophysiology

- Anaphylaxis is a severe, whole-body allergic reaction. After an initial exposure "sensitizing dose" to a substance like bee sting toxin, the person's immune system becomes sensitized to that allergen .
- On a subsequent exposure "shocking dose", an allergic reaction occurs. This reaction is sudden, severe, and involves the whole body.

Pathophysiology

- Type I hypersensitivity, anaphylaxis is triggered when an antigen binds to IgE antibodies on mast cells, which leads to degranulation of the mast cells.
- These immune mediators cause many symptoms, including common symptoms of allergic reactions, such as itching, hives, and swelling .
- Anaphylactic shock is an allergic reaction to an antigen that causes circulatory collapse and suffocation due to bronchial and tracheal swelling.

Pathophysiology

- The IgE antibodies, can trigger anaphylaxis. Production of IgE antibodies may persist for months, even in the complete absence of the allergen .
- These IgE antibodies associate with a receptor on the surface of mast cells. If the antibody binds to its specific antigen, then the antibody triggers degranulation of the mast cell.

Pathophysiology

- Mast cells become the major effector cells for immediate hypersensitivity and chronic allergic reactions.
- They contain large granules that store a variety of mediator molecules including the vasoactive amine, histamine .
- Histamine causes dilation of local blood vessels and smooth-muscle contraction . Activation is achieved only when IgE, bound to the high-affinity Fcε receptors (FcεR1).

Diagnosis

- Anaphylaxis is diagnosed with high likelihood based on clinical criteria. These criteria are fulfilled when any one of the following three is true:
- -1Symptom onset within minutes to several hours of allergen exposure with involvement of the skin or mucosal tissue and any of the following:
- Hives, itchiness, or swelling of the airway;plus
- Respiratory difficulty or Low blood pressure .

Diagnosis

- 2-Any two or more of the following symptoms within minutes to several hours of allergen exposure: a. Involvement of the skin or mucosa b. Respiratory difficulties c. Low blood pressure d .Persistent Gastrointestinal symptoms(crampy abdominal pain , vomiting)
- 3-Low blood pressure within minutes to several hours after exposure to known allergen (infant and children >30% drop and in adult 30% drop or BP<90 mm hg)

Diagnosis

- Apart from its clinical features, blood tests for tryptase (released from mast cells) might be useful in diagnosing anaphylaxis.
- Allergy testing may help in determining what triggered the anaphylaxis .
- In this setting, skin allergy testing (with or without patch testing) or RAST blood tests can sometimes identify the cause.

DDX

- Vasovagal syndrome
- Bradycardia not tachycardia
- Pallor rather than flashing
- No pruritus , urticaria,angioedema, upper respiratory obstruction .
- Nausea but no abdominal pain

DDX

- Globus hytericus
- No clinical and radiologic evidence of upper respiratory obstruction
- No flushing , urticaria , pruritis,
- hypertension , abdominal pain

DDX

- Angioedema and c1INH deficiency
- Prior history of c1 INH deficiency
- No flushing, pruritus, bronchospasm or hypotension
- More gradual onset

DDX

- Serum sickness
- No upper respiratory obstruction or hypotension
- Fever , arthralgia , lymphadenopathy
- slower onset

DDX

- Mastocytosis
- NO upper respiratory obstruction
- bronchospasm uncommon
- Urticaria pigmentosa often present
- Slow onset of attack
- Chronic low grade symptomatology between attacks

DDX

- Carsinoid syndrom
- No upper respiratory obstruction
- No urticaria or angioedema
- slower onset of attack
- Cutaneous stigma including telangectasiases on upper trunk
-

DDX

- Scombroid syndrom
  - History of ingestion of suspect fish
  - Oral burning,tingling,blistring,
  - Peppery taste after ingestion
  - Emesis common
  - Episod may last days

Prevention

- Immunotherapy with Hymenoptera venoms is effective against allergies to bees, wasps, hornets, yellow jackets, white faced hornets, and fire ants.
- The greatest success with prevention of anaphylaxis has been the use of allergy injections to prevent recurrence of sting allergy .
- Venom immunotherapy reduces risk of systemic reactions below 3%

Acute management

- 1-vital signs
- 2-CPR
- 3-Epinephrine S.C or IM 0.3-0.5mL 1/1000
- 0.01 mg/kg up to 0.5 mg IM in lat thigh
- 4-If cardiovascular shock infuse 10mL 1/100000 epinephrine over 10 min
- 5-Endotracheal intubation
- 6-Maintenance of circulation volume
- 500-2000mL/h normal saline or ringer lactate 30 cc/kg in 1st hour

Acute managment

- 7-Maintenance of blood pressure dopamin 2-20 microgram/kg/min
- 8-Antihistamin
- H1 antagonist Cetirizine 0.25/kg up to 10 mg po (diphenhydramin25-50mg iv over 5-10min
- H2 antagonist cimetidine IM afterH1 blocked

Acute managment

- 9-Bronchodilator (inhaled or nebulized B2 agonist and theophylline 4-7mg/kg iv infusion
- Methyl prednisolone 1-2 mg /kg up to 125mgIV
- 12-Education at discharge
- Post emergency management
- Cetirizine or Loratadin 5-10 mg for 3 days Optional : oral prednisolone 1mg /kg daily for 3 days

Management

- Anaphylaxis is a medical emergency which may require resuscitation measures such as airway management, supplemental oxygen, large volumes of intravenous fluids, and close monitoring .
- Administration of epinephrine is the treatment of choice with antihistamines and steroids often used as adjuncts.
- A period of in hospital observation for between 6 and 24 hours is recommended for people once they have returned to normal due to concerns of biphasic anaphylaxis.

Epinephrine

- Epinephrine (adrenaline) is the primary treatment for anaphylaxis with no absolute contraindication to its use.
- Epinephrine improves airway patency, improves blood pressure, and may be life-saving .

Epinephrine

- A dose of 0.3) gµ300 mL adrenaline injection 1 in1000 (may be appropriate for immediate self-administration.The dose is repeated if necessary at 5- minute intervals according to blood pressure, pulse and respiratory function .
- If necessary, it can also be given intravenously using dilute solution. Epinephrine autoinjector is provided for self-prescription.

Intravenous fluids

- Anaphylaxis can lead to massive losses of intravascular fluids. Thus large amounts of intravenous fluids maybe required.

Steroids

- Corticosteroids, are unlikely to make a difference in the current episode of anaphylaxis, but may be used in the hope of decreasing the risk of biphasic anaphylaxis. How effective they are at achieving this, however, is uncertain.

treament

- People prone to anaphylaxis are advised to have an "allergy action plan", and parents are advised to inform schools, etc., of their children's allergies and what to do in case of an anaphylactic emergency. The action plan usually includes use of epinephrine auto-injectors, the recommendation to wear a medical alert bracelet, and counseling on avoidance of triggers .

treament

- Immunotherapy is available for certain triggers to prevent future episodes of anaphylaxis .
- A multi–year course of subcutaneous desensitization has been found effective against stinging insects while oral desensitization is effective for many foods.