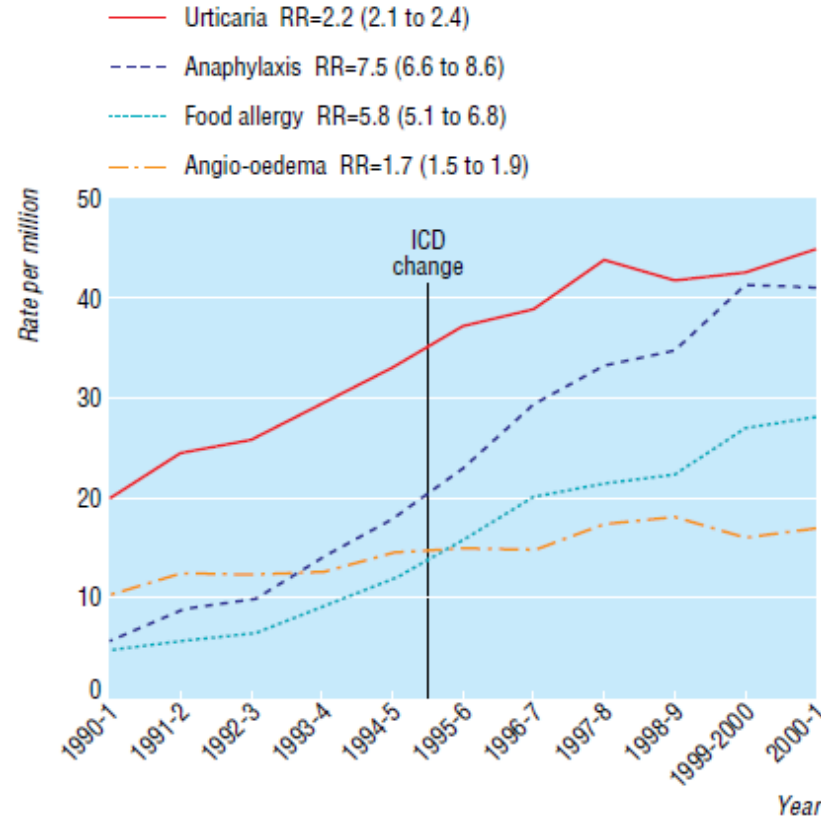


Anaphylaxis



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Why are we worried about anaphylaxis?



Outcome of severe anaphylaxis is fatal in 0.65–2% of cases.
In Sri Lanka it is around 10-20%.

A 52 year old consultant in Colombo is a known patient with ant venom anaphylaxis. He once had a very severe reaction following a 'kadiya' bite and was given adrenalin and saved.

9 years after this episode he again is stung by a 'kadiya' and develops an acute urticarial generalised rash and is rushed to a private hospital. He develops difficulty in breathing.

The MO in the ETU is trying to give him a hydrocortisone injection IV. The MO also instructs the nursing officer to get an antihistamine injection ready. The consultant asks about adrenalin. The MO doesn't want to give it because he doesn't think the consultant needs it.

Q: Who is right?

Box 1. Clinical criteria for the diagnosis of anaphylaxis

Anaphylaxis is highly likely when any one of the following three criteria are fulfilled:

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue or both (e.g. generalized hives, pruritus or flushing, swollen lips-tongue-uvula).

And at least one of the following:

- a. Respiratory compromise (e.g. dyspnoea, bronchospasm, stridor, hypoxia).
 - b. Cardiovascular compromise (e.g. hypotension, collapse).
2. Two or more of the following that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):
 - a. Involvement of the skin or mucosal tissue (e.g. generalized hives, itch, flushing, swelling).
 - b. Respiratory compromise (e.g. dyspnoea, bronchospasm, stridor, hypoxia).
 - c. Cardiovascular compromise (e.g. hypotension, collapse).
 - d. Persistent gastrointestinal symptoms (e.g. crampy abdominal pain, vomiting).
 3. Hypotension after exposure to known allergen for that patient (minutes to several hours):

Hypotension for children is defined as systolic blood pressure <70 mmHg from 1 month to 1 year [<70 mmHg + $(2 \times \text{age})$] from 1 to 10 years, and <90 mmHg from 11 to 17 years.

Source: EAACI position paper, 2007

Warning signs

- Pruritus: particularly on the palms, feet and head, may be an early sign of impending anaphylaxis.
- Progression to anaphylaxis can occur in the absence of cutaneous manifestations
- Most worrying sign in children is bronchospasm and upper airway obstruction
- Hypotension and shock are less common as early manifestations of anaphylaxis in childhood

AGE-RELATED FACTORS*



Infants
Cannot describe
their symptoms



**Adolescents and
young adults**
Increased risk-taking behaviors



Labor and delivery
Risk from medications
(e.g. antibiotic to prevent
neonatal group B strep infection)



Elderly
Increased risk of fatality from
medication or venom-triggered
anaphylaxis

Many early signs of anaphylaxis may not be clear in infants: vomiting or loose stools after feeding, crying, dysphonia after a crying spell, flushing

Teenagers and young adults: forgetting their allergy especially when going out with friends.

Anaphylaxis during pregnancy: fatality in baby and permanent CNS damage

Elderly: concurrent disease and drugs

Early recognition of anaphylaxis

- flushing,
- facial edema,
- urticaria, itching,
- swelling of the mouth or throat,
- wheezing, dyspnea, or other signs



Elevate the feet
and lie down the
patient.

Adrenalin IM

Route

- **IM:**
 - adrenaline is rapidly bio available, with peak concentrations occurring within 10 min of administration
 - has a much better safety profile and longer-lasting action than intravenous adrenaline
- **IV:** In severe anaphylaxis **refractory to IM** adrenaline or in cardiovascular collapse.
 - IV adrenaline should be give with BP (ideally invasive) and continuous cardiac monitoring
 - danger of inducing a hypertensive crisis or ventricular arrhythmia.

Dose

IM:

- 1:1000 adrenaline (1 mg/ml) should be used at a dose of 0.01 ml/kg body weight
- maximum single dose 0.5 mg (0.5ml of 1:1000) in an adult or 0.3mg in a child
- can be repeated at short intervals (every 5–10 min) until the patients condition stabilizes.
- Administered with a 21G, 1 ½ inch needle, mid anterolateral aspect of thigh

IV:

- 1: 10000, by slow IV injection
- **Extreme caution**

If adrenalin administered too late...

- Increased fatality
- encephalopathy because of hypoxia and/or ischemia
- Biphasic anaphylaxis

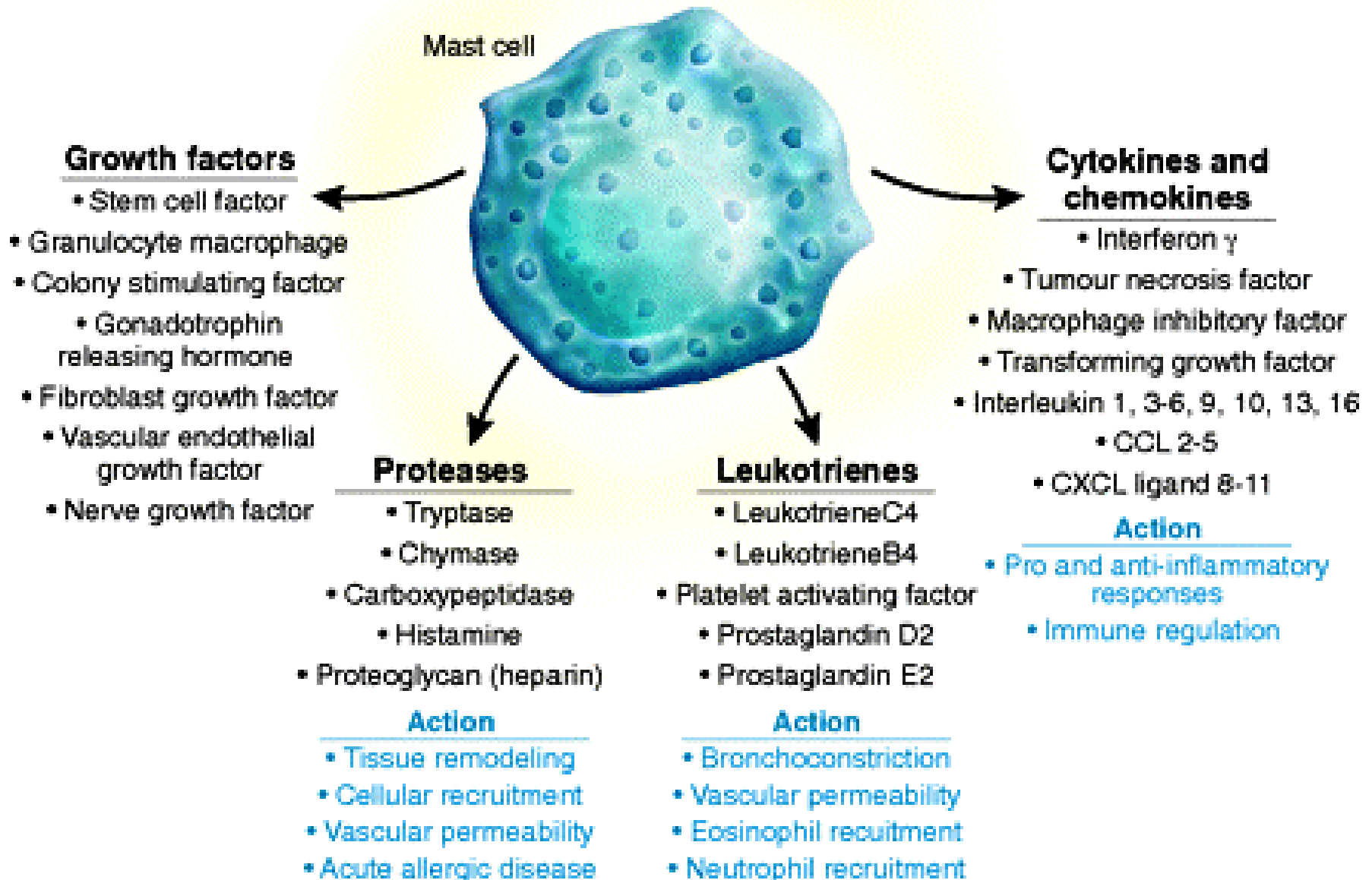
Side effects of adrenalin

- **At therapeutic doses**
 - Pallor
 - Tremor
 - anxiety, palpitations, dizziness
 - Headache
- **Over dose (usually after IV administration)**
 - ventricular arrhythmias
 - hypertensive crisis
 - Pulmonary oedema

Antihistamines: H1 receptor blockers

- relieve itching, flushing, urticaria, angioedema, and nasal and eye symptoms
- However, there is no evidence of their efficacy in anaphylaxis (Cochrane review, 2007)
- Some guidelines say do not use: potential harmful CNS effects such as somnolence and impairment of cognitive function

MEDIATOR RELEASE AND PHYSIOLOGICAL REACTIONS OF MAST CELL DEGRANULATION



Glucocorticoids

- IV should not be considered as a first-line treatment for anaphylaxis.
- They do not act fast enough
- Their efficacy in reducing the risk of late-phase reactions has not been fully proven
- Some guidelines do not recommend their use because it might delay giving adrenalin

If urticaria and angioedema only...

- Oral antihistamines
- If a known asthmatic: inhalation or nebulization with β_2 agonist
- Observe for 4 hours (can subsequently progress to anaphylaxis)

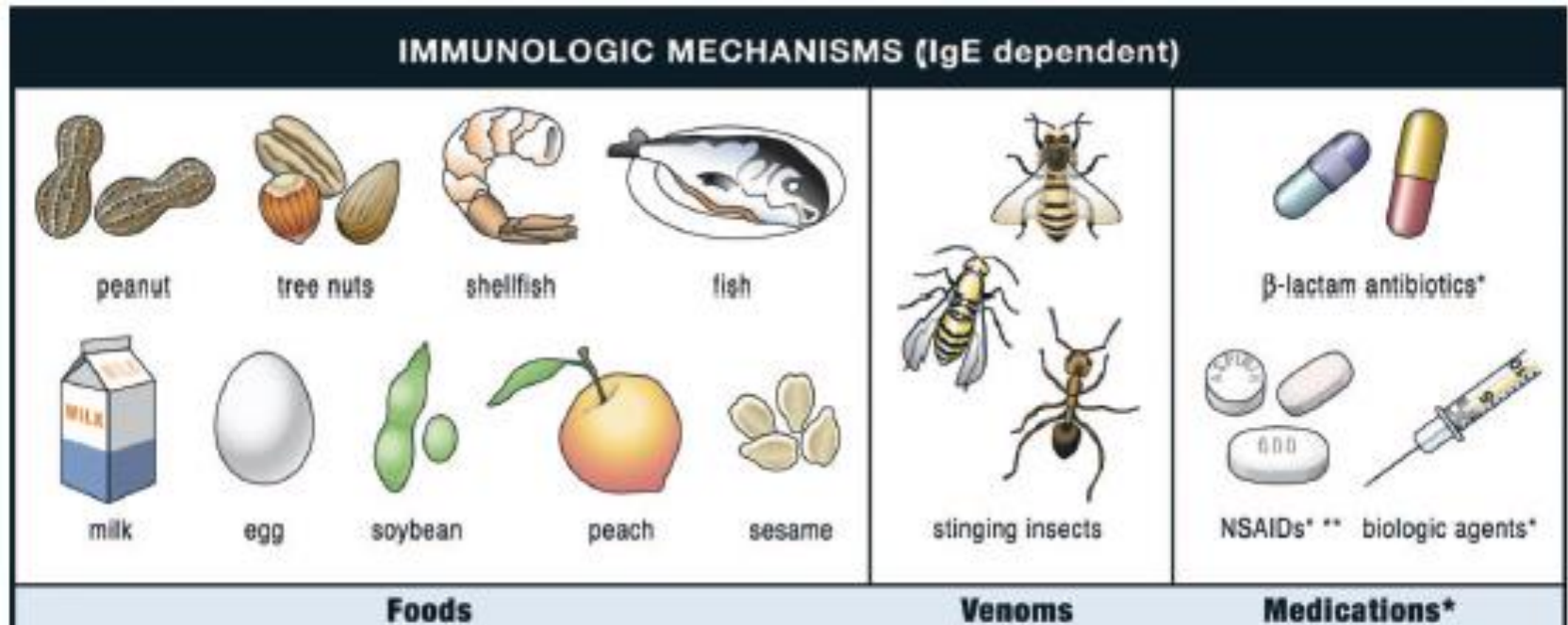
14 year old Tharindi is a known patient with allergy to beef. However, she accidentally eats a samosa thinking that it was a vegetarian product when later her father found out it had beef.

Within 10 minutes of eating the samosa, she develops abdominal pain and then vomiting. She then gets urticaria. They had visited a friends place at Padukka, so she is taken to that hospital and when they get close by, she faints.

At Padukka hospital, she is given hydrocortisone IV, oxygen and urgently transferred to Homagama. On the ways she get very bad and her whole body get swollen. On admission to Homagama, her BP was unrecordable. Adrenalin was given there. The patient took 1 hour to completely recover.

Could Tharindi been managed better? Or is this the ideal management?

Triggers of anaphylaxis



The three main triggers are: food, insect stings and drugs.

Main causes of food related anaphylaxis throughout the world



Anaphylaxis to food was rare 3 decades ago. But now accounts for 33.2-56% of anaphylaxis reactions.

Anaphylaxis due to allergies to insect venom



Wasp and bees are the commonest types of insects causing anaphylaxis in temperate climates.



In Sri Lanka it is the Kadiya.
No data on incidence in SL.

What are the risk factors for anaphylaxis?

- Individuals who have previously experienced anaphylaxis
- Asthma: most fatal reactions occur in asthmatics
- Severity of the allergy
- Age and physiological factors
- Alcohol

Severity of the allergy

- 1905 the first food allergy associated death was reported: baby re-challenged with cows milk
- Death following inhalation of steam from shrimp and milk powder cooking was reported (1988)

Mediators of anaphylaxis

- Histamine: acts through H1-4 receptors
- Heparin
- Tryptase: directly activates complement
- PAF:
 - decreases coronary blood flow
 - myocardial contractility
 - activates neutrophils and eosinophils
 - vasodilation (through NO)
 - causes fluid leakage

NONIMMUNOLOGIC MECHANISMS (Direct mast cell activation)



Physical factors

(e.g. exercise, cold, heat, sunlight)



Ethanol



Medications*

(e.g. opioids)

High osmolar contrast material trigger anaphylactoid reactions in around 10% while low osmolar contrast media in only 1%.

How do you find out the cause of anaphylaxis?

- Skin prick tests
 - should ideally be done 3-4 weeks after the episode.
 - should be retested in 1 month again if negative
- In vitro tests: measuring specific IgE levels
- Challenge/provocation test

Summary

- Incidence of anaphylaxis is increasing everywhere
- Commonest causes are food and drugs
- Many factors may influence the outcome of anaphylaxis