

Anaphylaxis: Recognition and Management

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Disclosures

- I have received honorarium from the following:
- CE in Italy
- Heidelberg Engineering
- Review of Optometry

Case in Point

- ▶ 66 year old white male presents to office for follow up of acute PVD 2 months ago
- ▶ Meds: Norvasc, Lotril, Allopurinol, Pacerone
- ▶ All: NKDA
- ▶ Ophthalmic history:
 - Acute PVD X 2 months, no holes or tears
 - NS Grade I OU
- ▶ Returns for DFE, tech dilates patient

Case in Point

- ▶ You enter the exam room, and notice patient's head tipped to the right, chin down, eyes closed.
- ▶ Shallow breathing
- ▶ Multiple erythematous papules on forearms and face
- ▶ What do you do???

Anaphylaxis

- ▶ Serious and rapid allergic reactions involving more than one part of the body which, if severe enough, can kill.
- ▶ Word originated from animal studies where prophylaxis from toxic agents was attempted by administering repeated doses of toxin to animal
 - Second dose often resulted in death
- ▶ "ana"phylaxis = opposite of prophylaxis

Anaphylaxis

- Commonly affects:
 - Respiratory system
 - Circulatory system
 - Skin

Anaphylaxis

- Definition:
 - An acute hypersensitivity reaction resulting from sensitization following a prior exposure to the causative agent.
 - Mediated by IgE
 - Requires a previous exposure

Anaphylaxis-Many Faces

- The allergic reaction is mediated by the release of mast cells, basophils and other recruited inflammatory cells. (IgE)
- The signs and symptoms of anaphylaxis begin from a few minutes post exposure to a few hours
- Usually reaches peak severity 5-30 minutes post exposure

Common Causes: Anaphylaxis

- ▶ Food
 - Especially nuts and seafood/shellfish, milk, eggs
- ▶ Drugs
 - Penicillins, anesthetics, ASA, narcotics, NSAID's
- ▶ Latex
 - Gloves, catheters etc
 - Common in health care workers
 - Cross reactivity with bananas, kiwi, figs, avacados

Common Causes: Anaphylaxis

- ▶ Insect bites
 - Bees, wasps, ants, spiders
- ▶ Idiopathic/Anaphylactoid
 - reactions result in mediator release, but not mediated by IgE
 - Contrast media, whole blood, serum
 - Narcotics and NSAIDS
 - Similar signs and symptoms

Common Causes: Anaphylaxis

- ▶ Exercise induced anaphylaxis
 - Rare. Most common in females < 30
 - Can be induced at all levels of activity
 - Urticaria is common
 - Certain foods and pollens may be linked as co-etiology

Incidence in US

- ▶ Up to 15% of US population 'at risk', but clear statistics not available
- ▶ Fatal anaphylaxis is rare
 - Approximately 500-1000 cases per annum US (estimated)
- ▶ Frequency of anaphylaxis is increasing as number of allergens is increasing

How do we avoid this?



Sliding Down the Slippery Slope

- ▶ Anxiety is relatively common
- ▶ Patients report they 'feel funny'
 - Onset can be minutes after ictus
 - Dizzy, faint (blood pressure dropping)
- ▶ Wait....Stop....What does this also sound like?
 - Vaso-vagal response

Vaso-Vagal Response

- ▶ Vagus nerve
 - Parasympathetic innervation to the heart
 - Decreased rate
 - Decreased perfusion
 - Decreased cardiac output
 - ▶ Feeling of lightheadedness, faint
 - Parasympathetic outflow elsewhere:
 - ▶ Sweaty palms
 - ▶ GI cramps

Vaso-Vagal Response

- ▶ What happens to the patient with V-VR in chair?
 - The three P's
 - ▶ Perspire
 - ▶ Pass Out
 - ▶ Pee

Recognize the Cascade

- ▶ Identify the symptoms
- ▶ Identify the disease
- ▶ Make sure you're dealing with anaphylaxis
 - Review case #1
 - Review Vaso-Vagal Response

Signs and Symptoms of Anaphylaxis

- ▶ Urticaria
- ▶ Pruritis
- ▶ Localized or diffuse swelling
- ▶ Flushing of the skin
- ▶ Nausea
- ▶ Vomiting
- ▶ Dizziness
- ▶ Weak or thready pulse
- ▶ Airway constriction

Signs and Symptoms

► Urticaria

- "Hives," is characterized by pruritic, white or erythematous, nonpitting edematous plaques.
- These plaques change in size over time and may coalesce to form larger "giant wheals."
- Result of capillary vasodilation followed by transudation of fluid



Signs and Symptoms

► Localized or diffuse swelling

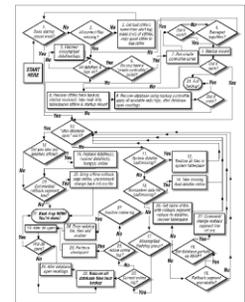
► Angioedema

- accumulation of transudate in the deeper layers of skin and subcutaneous tissues, resulting in the development of thick, firm plaques.
- Typically involve the larynx, lips, tongue and gastrointestinal mucosa, although they may form anywhere on the skin.

Angioedema



Urticaria and Angioedema: Simple



The Slippery Slope

- Anxiety
- Patient feels funny (dizziness, nausea, lightheaded)
- Dermatological involvement
 - >90% of anaphylactic reactions demonstrate dermatological involvement
 - Urticaria
 - Angioedema
- My tongue feels like it is swelling!

The Slippery Slope (cont'd)

- Tachypnea
- Tachycardia
- Decreased blood pressure
- Airway obstruction
- Syncope with airway obstruction is medical emergency

Pathophysiology

- ▶ Urticaria, angioedema etc are produced by release of chemical mediators, including:
 - Histamine
 - Leukotriene C4
 - Prostaglandin D2
 - Tryptase
 - Kinins
 - TNF alpha

Pathophysiology

- ▶ Mediator release is precipitated when:
 - Antigen binds to antigen specific IgE
 - ▶ Antigen specific IgE is already attached to previously sensitized basophils and mast cells
 - Mediator release is almost instantaneous when antigen binds

Pathophysiology

- ▶ Mediator release results in:
 - Increased mucous secretion
 - Increased bronchial smooth muscle tone
 - Airway edema
 - ▶ Resultant respiratory difficulty
 - Decreased vascular tone
 - Increased vascular permeability
 - ▶ Cardiovascular collapse

Histamine Release

- ▶ Is widespread and system wide
- ▶ Results in:
 - Widespread peripheral vascular dilation
 - Increased capillary permeability
 - Marked loss of plasma from the circulation
- Circulatory shock
- ▶ Death is usually due to circulatory shock

Circulatory Shock

- ▶ Significantly increased vascular dilation, with fixed amount of blood and plasma = **decreased blood pressure**
- ▶ Increased vascular permeability = increased extravascular fluid retention (angioedema) = **further drop in BP**
 - ▶ Decreased BP is same as VVR

Circulatory Shock

Baroreceptors in the carotid arteries sense dropping blood pressure and increase sympathetic innervation to the heart

Heart rate increases to increase core circulatory perfusion

- ▶ Pulses are weak (fluid loss) and thready (no significant push from the ventricles) as decreased peripheral resistance occurs

Circulatory Shock

► Decreased perfusion to core circulation

- Hypoxia
- Anoxia
- Organ system failure/shutdown
- Neurological O₂ deprivation
- Myocardial ischemia
- Coma
- Death



Treatment Goals: ABC's

- A is for AIRWAY
 - Make sure the airway is open
 - Reposition, head back, supine, mouth open
- B is for BREATHING
 - Can't breathe with restricted airway
 - Pulseox >91%
 - Endotracheal intubation or cricothyrotomy
- C is for CIRCULATION



Treatment Goals: ABC's



ABC's also for Meds

- A is for ADRENALINE (EPINEPHRINE)
 - Stimulates alpha and beta adrenergic receptors
 - Reduces further mediator release from mast cells and basophils
- B is for BENADRYL
 - Only works after patient is becoming stabilized
 - IM/IV
- C is for Corticosteroids
 - Help after stabilization

Epi-Pens

- Administers 0.3 mg epinephrine (Epi-Jr = 0.15 mg epi)



Pre-Hospital Care

- Take your own pulse first!



Pre-Hospital Care

► Mild to Moderate Anaphylactic Reaction

- Patient in supine position
- PO (?) or IM antihistamine (H1...benadryl)
- May be all that is needed, but if cutaneous involvement, then....
- 0.3 to 0.5 cc epinephrine 1:1000 SC/IM
- Assess airway

Pre-Hospital Care

► Severe Anaphylaxis

- Call 911 immediately
- Initiate above therapy plus:
- Recheck airway patency
 - Laryngeal or orolaryngeal edema
- Ventilate with valve/bag/mask apparatus until meds take effect
- Repeat epinephrine 0.3-0.5 cc IM/SC
 - 2-3 times at 15 minute intervals

Pre-Hospital Emergency Care

► Severe Anaphylaxis

- Cryothyrotomy
- Establish IV line with large caliber to handle large fluid volumes
- Initiate CPR if needed

► Keep a crash cart on hand

► Enroll in ACLS course



Recognize Urticaria!



Questions???

