Anaphylaxis in the Clinic: Are you prepared?

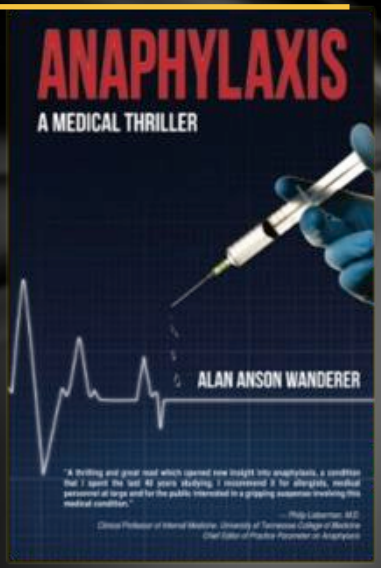
Dewey Hahlbohm, PA-C, AE-C

Thanks Dr. Mike Zacharisen for your help

Conflict of Interest: none

Have you read this book?

A. Yes
B. No
C. I can't remember
D. I only watch movies



Objectives:

- Causes of allergic reactions seen in the office setting
- Recognizing signs and symptoms
- Respiratory symptoms common/serious
- Appropriate management

Your Anaphylaxis Experience

A. I have not witnessed or treated a pt with anaphylaxis
B. I have witnessed/treated anaphylaxis and felt comfortable and confident
C. I have witnessed/treated anaphylaxis and felt a little uncomfortable.
D. I have personally experienced anaphylaxis!

Case 1

22 y/o male drank “fruit juice”

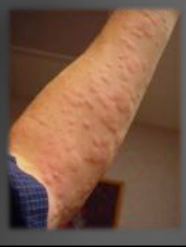
Within 20 min: nausea and abdominal pain

Itching then hives over neck, back, axillae, groin

Flushing, lip swelling and labored breathing.

He walks into your clinic!

Movie: “Hitch”



What do you do?

A. Ask him to sit in the waiting room and fill out paperwork.

B. Obtain a detailed history & check vital signs.

C. Administer Benadryl 50 mg orally

D. Administer epinephrine and oxygen

E. Administer oral prednisone

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Case 2

A 6 y/o has sore throat, fever, abdominal pain and exudate on tonsils. Rapid Strep+ You administer Penicillin IM.

Within 10 min., itching and mild cough. Ten min. later, hives and vomiting.

You should:

A. Administer cetirizine and call 911

B. Administer loratadine and ranitidine

C. Administer epinephrine SQ and Benadryl

D. Administer epinephrine IM and oxygen

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Anaphylaxis

What is Anaphylaxis?

Clinical definition:

- Systemic allergic reaction
- 2 or more organ systems involved
- Dramatic and unanticipated
- Rapid in onset (min. to hours) after likely trigger
- Medical emergency---life threatening!

- Anaphylactoid
- Pseudoanaphylaxis

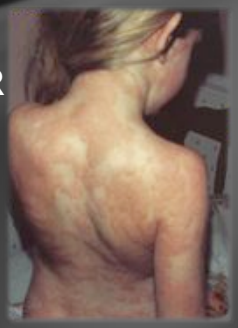
} no longer used

Anaphylaxis: Early Signs & Symptoms

Are not always outwardly obvious in early stages

Within moments, minutes or hours:

- Shortness of breath, cough, wheezing (40-60%)
- Hives/swelling (85-90%), flushing (55%)
- Oropharyngeal swelling
- Lightheadedness and CV (30-35%), ↑ HR
- Vomiting other GI (25-30%)
- Feeling of "impending doom"
- Other: DIC, seizure (1-2%)



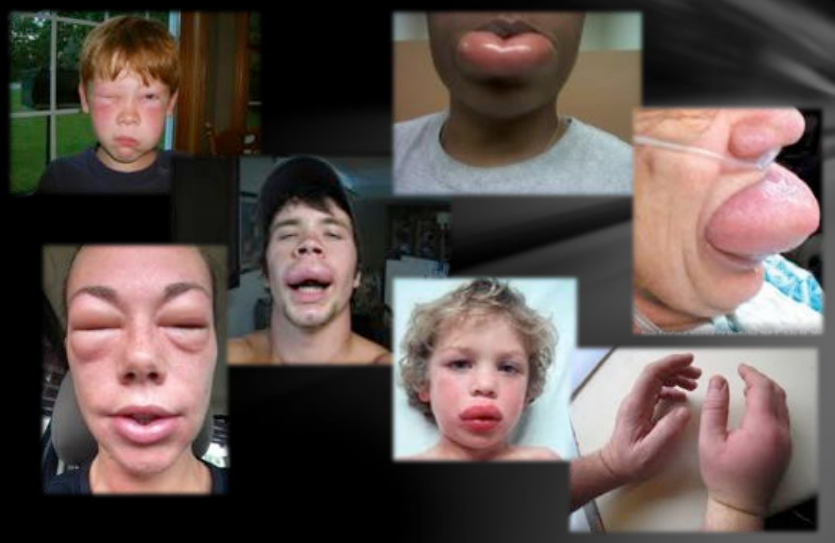
Anaphylaxis: Early Signs & Symptoms

In MY experience…(mostly allergy injections)

Within minutes…

- Sneezing
- Throat clearing
- Facial flushing
- Cough
- Itching of palms, soles, and axillae

Angioedema

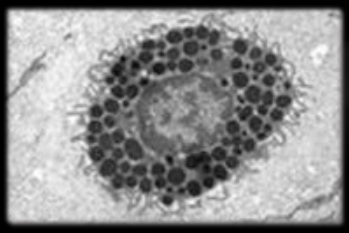


Anaphylactic triggers at a clinic:

Clinic walk in:	Administered in clinic:
Food (most common)	Antibiotics (Pen 1:2500)
30% of fatalities	ASA, NSAIDs (1:50,000)
Venom	Vaccines 1: 1 million
Exercise	Biologicals (Xolair): 0.2%
Idiopathic	Blood transf: 1:20k-400k U
	Allergy injection 1:150
	Latex (1% of population)

Many Mediators Cause Anaphylactic Symptoms

- Leukotrienes
- Prostaglandins
- Kinins



- Platelet activating factor (PAF)
- Interleukins
- Tumor necrosis factor (TNF)
- Histamine

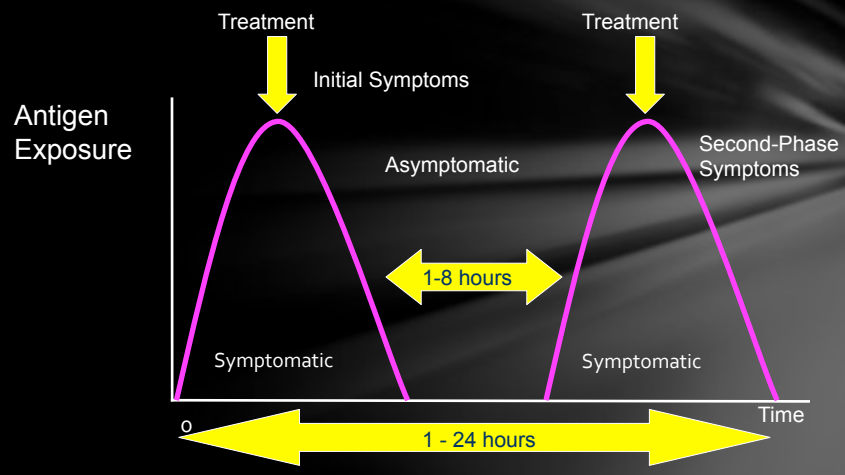
Patterns of Anaphylaxis

Uniphasic: symptoms resolve within minutes or hours after treatment and do **not** reoccur

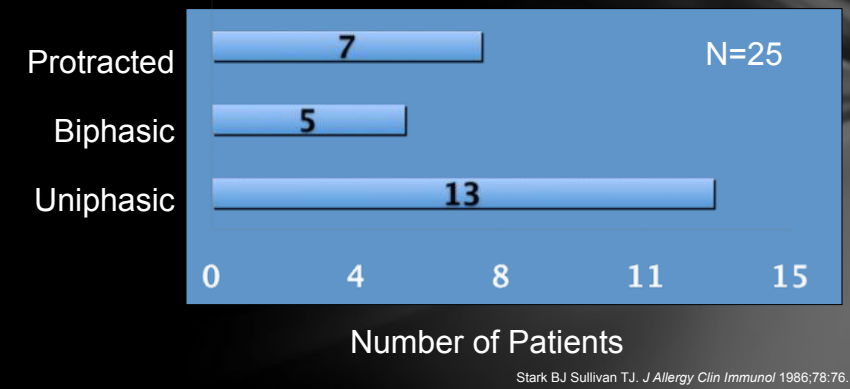
Biphasic: symptoms reoccur 1-24 hrs after resolution of symptoms

Protracted: symptoms continue for hours or days

Biphasic Anaphylaxis

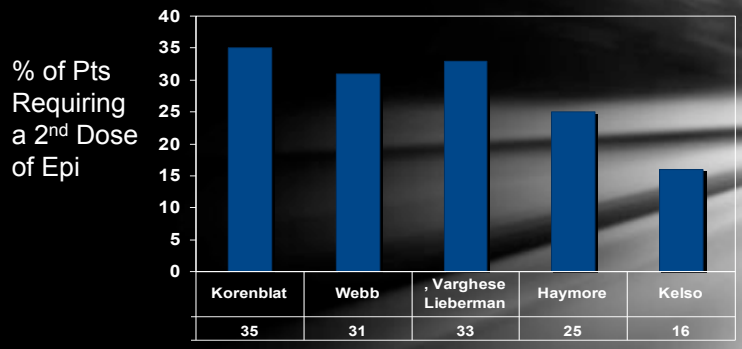


Number of Pts Experiencing Anaphylaxis Subtypes



Stark BJ Sullivan TJ. *J Allergy Clin Immunol* 1986;78:76.

Frequency of the Need for Two Injections Regardless of Cause



% of Pts Requiring > 1 Dose of Epinephrine During Anaphylactic Reaction

Korenblat P et al. Allergy Asthma Proc. 1999;20:383-6;
Webb L et al. J Allergy Clin Immunol. 2004;S240;
Varghese M et al. AAAAI 2006;
Haymore BR et al. Allergy Asthma Proc. 2005;26:361-5.

Median Time to Respiratory or Cardiac Arrest

FOODS → 30 min

VENOMS → 15 min

IATROGENIC REACTIONS → 5 min

Pumphrey RS. Clin Exp Allergy. 2000;30(8):1144-50

Patients at Risk

- Prior history of anaphylaxis!
- Asthma
- Meds: beta-blockers
- Cardiovascular disease
- Mastocytosis
- Older age, insect stings, iatrogenic
- Pt who do **not** perceive these risk factors

Survey Question:

Your office/clinic:

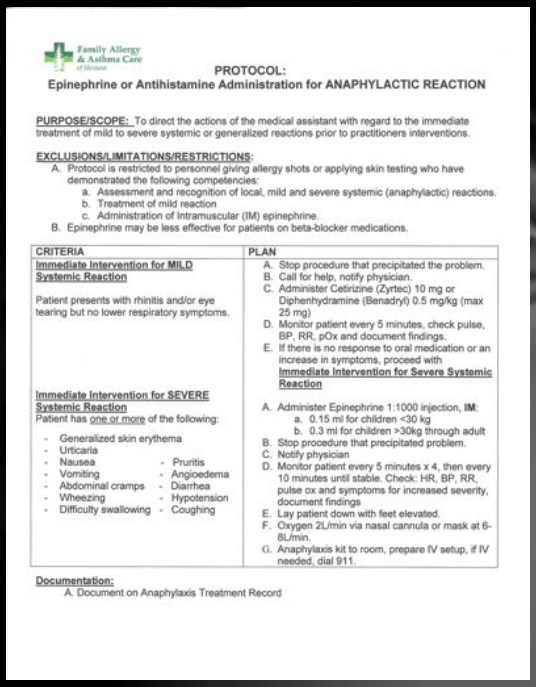
A. has an Anaphylaxis Protocol and we have had reactions in our office

B. has an Anaphylaxis Protocol but we have NOT had any reactions.

C. does NOT have a protocol but we have had reactions

D. Does NOT have a protocol and thank goodness no one has had a reaction!

Anaphylaxis Protocol



Family Allergy & Asthma Care of Arizona

PROTOCOL:
Epinephrine or Antihistamine Administration for ANAPHYLACTIC REACTION

PURPOSE/SCOPE: To direct the actions of the medical assistant with regard to the immediate treatment of mild to severe systemic or generalized reactions prior to practitioners interventions.

EXCLUSIONS/LIMITATIONS/RESTRICTIONS:
A. Protocol is restricted to personnel giving allergy shots or applying skin testing who have demonstrated the following competencies:
   a. Assessment and recognition of local, mild and severe systemic (anaphylactic) reactions.
   b. Treatment of mild reaction
   c. Administration of Intramuscular (IM) epinephrine.
B. Epinephrine may be less effective for patients on beta-blocker medications.

CRITERIA	PLAN
Immediate Intervention for MILD Systemic Reaction Patient presents with rhinitis and/or eye tearing but no lower respiratory symptoms. **Immediate Intervention for SEVERE Systemic Reaction** Patient has one or more of the following: - Generalized skin erythema - Urticaria - Nausea - Vomiting - Abdominal cramps - Wheezing - Difficulty swallowing - Pruritis - Angioedema - Diarrhea - Hypotension - Coughing	A. Stop procedure that precipitated the problem. B. Call for help, notify physician. C. Administer Cetirizine (Zyrtec) 10 mg or Diphenhydramine (Benadryl) 0.5 mg/kg (max 25 mg) D. Monitor patient every 5 minutes, check pulse, BP, RR, pOx and document findings. E. If there is no response to oral medication or an increase in symptoms, proceed with **Immediate Intervention for Severe Systemic Reaction** A. Administer Epinephrine 1:1000 injection, **IM**: a. 0.15 ml for children <30 kg b. 0.3 ml for children >30kg through adult B. Stop procedure that precipitated problem. C. Notify physician D. Monitor patient every 5 minutes x 4, then every 10 minutes until stable. Check: HR, BP, RR, pulse ox and symptoms for increased severity, document findings E. Lay patient down with feet elevated. F. Oxygen 2L/min via nasal cannula or mask at 6-8L/min. G. Anaphylaxis kit to room, prepare IV setup, if IV needed, dial 911.

Documentation:
A. Document on Anaphylaxis Treatment Record

Anaphylaxis Kit

Equipment

Stethoscope
BP cuffs
Pulse oximeter
Tourniquet
Syringe and needles
Jet nebulizer
IV board, oral airway

Medications

Epinephrine: 1:1000 MDV
Oxygen
Diphenhydramine 50 mg/mL IM/ IV
Cetirizine syrup (1 mg/mL)
Raniditine 150 mg oral
Cimetidine 300 mg IV/IM
Albuterol 0.083% for nebulizer
Ipratropium 0.02% for nebulizer
Solumedrol 125 mg IV
IVF (NS or LR): 1 L bag

Anaphylaxis: Acute Office Treatment

Epinephrine IM (0.15-0.5 cc)

Recline and elevate legs

Oxygen

Antihistamines (H1, H2)

- Diphenhydramine IV or IM (0.5, 1, 1.5)
- Cimetidine 300 mg IM or IV slowly (20-40 mg/kg)

IV Fluids: "wide open"

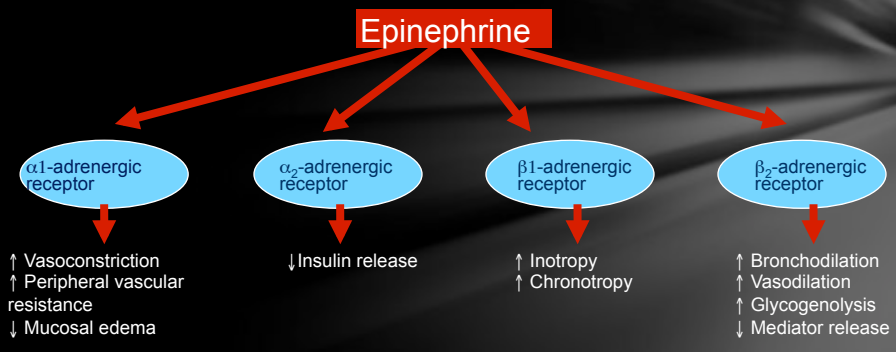
Albuterol nebulizer

Steroids: IV or po

Aminophylline 5 mg/kg, Methylene blue*, Glucagon 1 mg IV, IV pressors

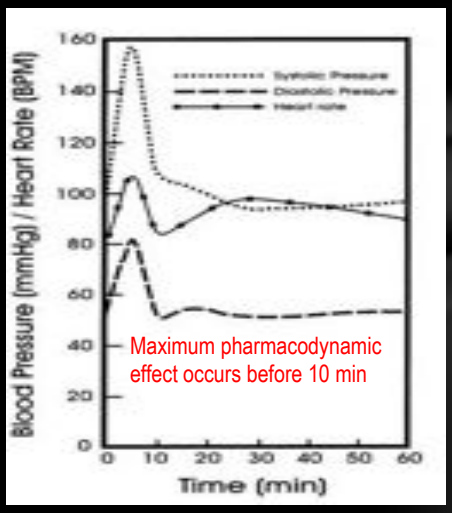
*1.5 mg/kg (120 mg) bolus of 4% infused, followed by 1 hr of continuous infusion of another 120 mg diluted in dextrose 5% in water

Actions of Epinephrine: Antagonize Effects of All Mediators



Simons KJ, Simons FER. *Curr Opin Allergy Clin Immunol*. 2010;10:354-361.

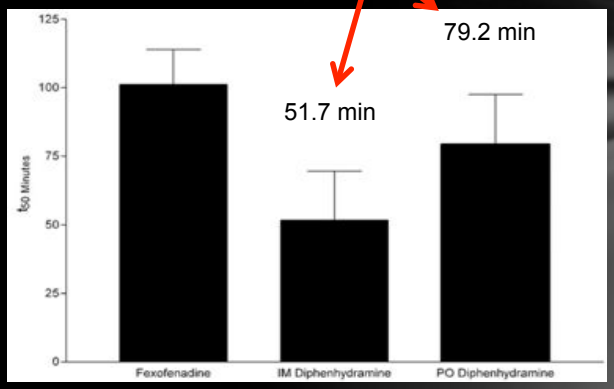
Epinephrine IM: Time to Onset



Adapted from Simons FER, et al. *J Allergy Clin Immunol.* 1998;101:33-37.

Antihistamines: Time to Suppression

Time to 50% suppression



Fexofenadine Diphenhydramine

Jones DH, et al. *Ann Allergy Asthma Immunol.* 2008;100(5):452-456.

H2-Blockers in Anaphylaxis

H2-antihistamines for treating anaphylaxis with and without shock: systematic review.

BACKGROUND: Although H2-antihistamines are often given for anaphylaxis, uncertainty about effectiveness.

OBJECTIVE: To assess benefits & harms of H2-antihistamines in treating anaphylaxis.

METHODS: Systematic review of randomized controlled trials/quasi-randomized controlled trials comparing H2-antihistamines with placebo or no intervention in pts with anaphylaxis.

RESULTS: Failed to identify any eligible studies for inclusion in systematic review.

CONC: Well-designed randomized controlled trials investigating the role of H2-antihistamines in anaphylaxis treatment are urgently needed.

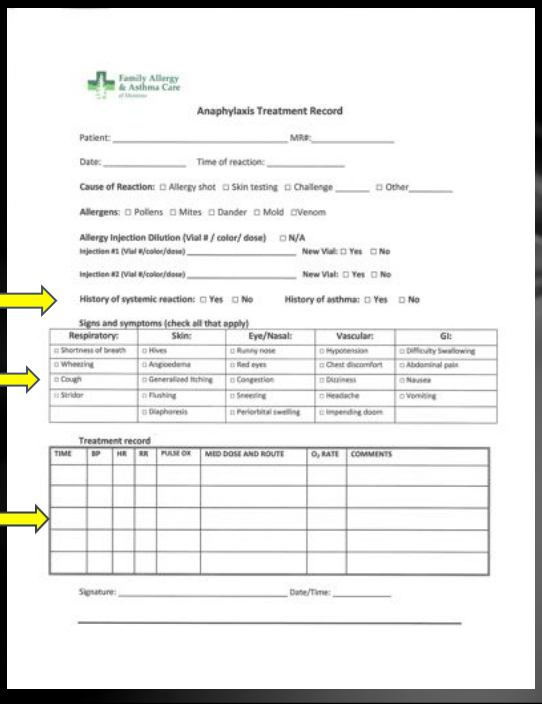
Ann Allergy Asthma Immunol. 2014 Feb;112(2):126-31.

Anaphylaxis Treatment Record

Hx of asthma or previous anaphylaxis

Signs & symptoms

VS, Med doses and times



Family Allergy & Asthma Care

Anaphylaxis Treatment Record

Patient: _____ MR#:_____

Date:_____ Time of reaction: _____

Cause of Reaction: □ Allergy shot □ Skin testing □ Challenge _____ □ Other_____

Allergens: □ Pollens □ Mites □ Dander □ Mold □Venom

Allergy Injection Dilution (Vial # / color/ dose) □ N/A

Injection #1 (Vial #/color/dose)_____ New Vial: □ Yes □ No

Injection #2 (Vial #/color/dose)_____ New Vial: □ Yes □ No

History of systemic reaction: □ Yes □ No **History of asthma:** □ Yes □ No

Signs and symptoms (check all that apply)

Respiratory:	Skin:	Eye/Nasal:	Vascular:	GI:
□ Shortness of breath	□ Hives	□ Runny nose	□ Hypotension	□ Difficulty Swallowing
□ Wheezing	□ Angioedema	□ Red eyes	□ Chest discomfort	□ Abdominal pain
□ Cough	□ Generalized itching	□ Congestion	□ Dizziness	□ Nausea
□ Stridor	□ Flushing	□ Sneezing	□ Headache	□ Vomiting
	□ Diaphoresis	□ Periorbital swelling	□ Impending doom	

Treatment record

TIME	BP	HR	RR	PULSE OX	MED DOSE AND ROUTE	O_2 RATE	COMMENTS

Signature: _____ Date/Time: _____

Anaphylaxis: Factors that intensify reaction

Presence of asthma

Underlying cardiac disease

Concomitant therapy with:

- Beta blockers
- MAO inhibitors
- ACE inhibitors

Delay in administration of Epi/or SQ

Anaphylaxis: Outcomes

	Prognosis	
Factor	Poor	Good
Dose of Antigen	Large	Small
Onset of symptoms	Earlier	Later
Initiation of treatment	Late	Early
Route of exposure	Parenteral	Oral
Beta blocker	Yes	No
Presence of underlying disease	Yes	No

Anaphylaxis: Differential Diagnosis

- Vasovagal syncope (low HR)
- Anxiety with hyperventilation or globus hystericus
- Vocal cord dysfunction
- Seizure
- Factitious

Anaphylaxis: Differential Diagnosis (cont)

- Aspiration
- Primary Cardiac Event: MI, arrhythmia
- Pulmonary embolism
- Systemic mastocytosis
- Hereditary angioedema (no hives!)

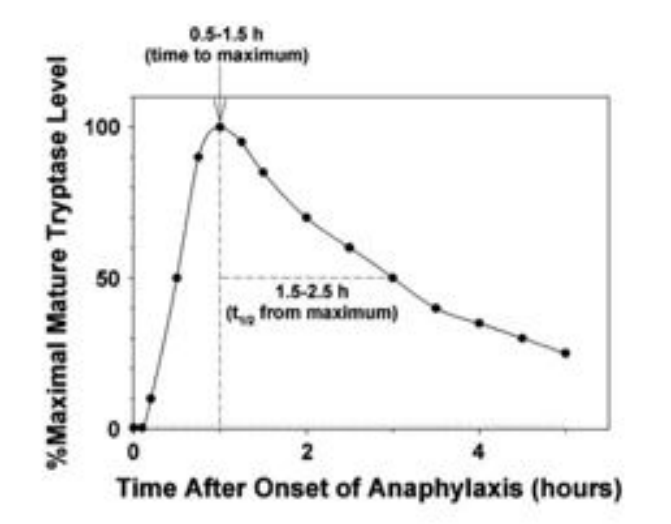
Anaphylaxis Evaluation

ER	*Allergy Office*
History	Detailed History
Exam	Exam
Serum tryptase	Serum IgE (preferred)
CBC	Skin testing
ECG	Baseline serum tryptase
Chest x-ray	

Serum Tryptase Level:

Normal is <11.4 ng/mL

May not increase in food-induced anaphylaxis!



Which statement about Anaphylaxis is **true**?

A. A second episode of anaphylaxis will be worse than the first
B. Antihistamines can adequately treat anaphylaxis
C. Epinephrine is dangerous especially in elderly
D. Epinephrine is a drug of abuse in schools
E. The more rapid the onset of anaphylaxis, more likely to be severe

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Anaphylaxis: Management

Avoidance/Education

Medication

- Epinephrine
- Antihistamine
- Corticosteroids

Medical ID bracelet

Written Anaphylaxis Action Plan

Avoid beta-blockers

Pre-treatment protocols

Specific Treatment (VIT)

Case 1

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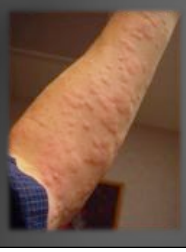
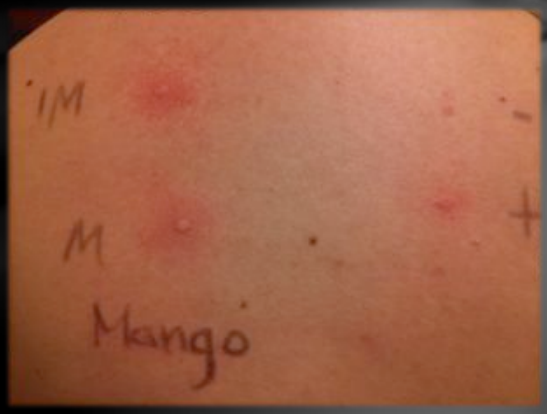


Case 1: Mango Anaphylaxis

Treated with: Epi IM x 2, oxygen, Benadryl IM, Prednisone and observed. Rapid response!

Additional History:
Drank mango juice
Skin test: + mango



Case 2: Penicillin Anaphylaxis

A 6 y/o with Strep pharyngitis with immediate Penicillin reaction.

Treatment:

- Epinephrine IM
- Benadryl IM then po every 6 hours
- Zantac bid x 1 week
- Solumedrol IV and prednisone taper over 1 wk
- Sent to ER and observed overnight.

Take Home Messages

- Have an Anaphylaxis Plan/Protocol
- Practice the Plan!
- Have a "Crash cart" or "box"
- Epinephrine IM & Oxygen: preferred treatment
  - Don't delay!
  - May require ≥2 doses of Epi due to severity
- Antihistamines don't treat anaphylaxis!
- Order Serum Tryptase soon!

http://www.aaaai.org/practice-resources/statements-and-practice-parameters/practice-parameters-and-other-guidelines-page.aspx

The diagnosis and management of anaphylaxis 2010

ER diagnosis and management of anaphylaxis 2014

Questions?

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