ANAPHYLAXIS ALGORITHM

0-5 min

Recognition of anaphylaxis:

Acute onset of signs and symptoms involving *two or more systems*:

Skin and mucosa

- Pruritis/urticaria/erythema/flushing/angioedema/conjunctival erythema
- Itching of lips, tongue, palate, external auditory canals

Respiratory

- Nasal itch, congestion, rhinorrhea, sneezing
- Throat itching and tightness, dysphonia, hoarseness, stridor, dry staccato cough
- Tachypnea, SOB, chest tightness, deep cough, wheeze/bronchospasm, hypoxemia

Cardiovascular

- Tachycardia, bradycardia, other arrhythmias
- Hypotension, presyncopal/syncopal
- Chest pain
- Urinary and fecal incontinence
- Altered LOC

Gastrointestinal

- Abdominal pain, nausea, vomiting, diarrhea, dysphagia

OR

Persistent hypotension as the only symptom

Initial Management:

- Remove offending agent
- ABCDE's and vital signs
- Oxygen Therapy - Keep saturation levels at 94% or greater
- Continuous Cardiac Monitoring
- If Hypotensive, Position patient
  - Supine with legs elevated
  - Left lateral position for pregnant women
  - If respiratory distress and/or vomiting, semi-recumbent
  - If hypotensive, position patient:
- **IM EPINEPHrine (1 mg/mL)** every 5 to 15 min. intervals PRN
  - **Adult Dose: 0.5 mg IM** in anterolateral thigh
  - **Pediatric Dose:** weight based dosing (see table below)
- Vital signs q 5 min X 4; if stable, then q 15 min X 1 hour

- **Give first 2 to 3 doses of EPINEPHrine by IM route (not as an IV/IO bolus).**
- **For IV/IO EPINEPHrine – follow the IV monograph**
- **If patient is on β-blocker, consider glucagon**

Repeat IM EPINEPHrine every 5 min as needed
DO NOT DELAY IM EPINEPHrine ADMINISTRATION

Persistent symptoms after 1st dose of IM EPINEPHrine

1-5 min

Respiratory symptoms

- Sitting position
- Administer high flow O2, consider need for intubation

Epinephrine nebulization If stridor or upper airway obstruction

Nebulize salbutamol if wheeze/lower airway obstruction

Hypotension or poor perfusion/decreased LOC:

- Supine position **(Do not sit up)**
- Secure large bore IV or IO access
- Bolus push: Ringers lactate/0.9% Sodium Chloride
  - Children: 20mL/kg boluses as needed
  - Adults: 500 - 1 liter boluses as needed

5-10 min

No improvement - give 2nd dose of **IM EPINEPH**rine

Secure IV/IO if not already done

Respiratory symptoms:

- Repeat nebulized epinephrine (upper airway/stridor) or salbutamol (lower airway obstruction/bronchospasm)
- Prepare for difficult airway obstruction
- If history of asthma, consider steroids early

Hypotension or collapse

- 2nd bolus push of Ringers Lactate or 0.9% Sodium Chloride
- Prepare for possible epinephrine infusion.

IF NOT RESPONDING

- **Reconsider your diagnosis of anaphylaxis**
- **Consider risk factors for resistant anaphylaxis**

Consider alerting HSC Paediatric ED

10-20 min

No improvement - give 3rd dose of **IM EPINEPH**rine

Respiratory symptoms:

- Consider 3rd nebulized **EPINEPH**rine or salbutamol
- Proceed with intubation if no improvement

Hypotension or collapse

- Consider starting **EPINEPH**rine infusion (see box below)

Consider alerting HSC Paediatric ED

10-20 min

If no improvement with IM EPINEPHrine, consider:

- **EPINEPH**rine IV/IO infusion:
  - **Adults:** 0.1 mcg/kg/min and increase every 2 to 3 minutes by 0.05 mcg/kg/min until MAP greater than 70 mmHg
  - **Pediatric patients:** 0.1 to 1 mcg/kg/minute. Titrate every 2 to 5 minutes to desired effect (based on minimum systolic blood pressure). **The lower limit of acceptable is Systolic BP (sBP) = 70 + (2 x age in years)**

For persistent anaphylaxis symptoms or on beta blockers

- **Glucagon bolus:**
  Adults: 1-5 mg IV over 5 minutes
  Pediatrics: *0.02-0.03 mg/kg* (max dose 1 mg) IV over 5 minutes;
- **Adults/Pediatrics:** May be followed by infusion of 0.3-0.9 mg/hr, titrated to clinical effect (not weight based)

NB: If airway at risk, strongly consider intubation in order protect the airway due to emesis from glucagon

For persistent/refractory hypotension

- **Norepinephrine infusion:** start at 0.05 – 2 mcg/kg/min IV/IO; titrate to MAP of 70 mmHg for adults and desired sBP for pediatric patients

DISPOSITION

- If symptoms settle quickly and has **EPINEPHrine auto injector:** can be discharged home early (i.e. within 1 hour of symptoms clearing).
- If moderate symptoms, observe for at least 4 to 8 hours
- Severe anaphylaxis: admit to ICU for monitoring for at least 24 hours
- **All patient must have appropriate dosed EPINEPHrine auto injector on discharge**
- All patients to receive education regarding indications and how to **use EPINEPHrine auto injector before discharge**
- **Leave department with written Patient Action Plan for Anaphylaxis** (CLI.5110.SG.009.FORM.02)

NOTES

Weight (kg)	EPINEPHrine 1 mg/mL
Less than 20	0.15 mg (0.15 mL)
20 to 30	0.3 mg (0.3 mL)
Greater than 30	0.5 mg (0.5 mL)

EPINEPHrine is the only medication shown to:

- Prevent death if given early for anaphylaxis
- Prevent the biphasic reaction in anaphylaxis

CAUTION!

Administering EPINEPHrine

Give EPINEPHrine dose by INTRAMUSCULAR route only

If no improvement after 3 doses or more of IM EPINEphrine, consider EPINEphrine IV (acceptable to continue with IM EPINEphrine)

Do not give boluses of 1 mg/mL EPINEphrine unless indicated for advanced life support

Potentially Difficult Airway:

Prepare equipment and personnel for difficult airway intubation while giving epinephrine neb for upper airway obstruction

Differential Diagnosis of Anaphylaxis

- Acute generalized urticaria and/or angioedema
- Acute asthma
- Vasovagal syncope
- Vocal cord dysfunction
- Panic attack/anxiety attack
- Foreign body aspiration
- Mast cell activation syndromes
- Basophilic leukemia
- Carcinoid syndrome
- Non-allergic angioedema
- Red man syndrome (vancomycin)

THE FOLLOWING MEDICATIONS ARE NOT RECOMENDED DURING ACUTE ANAPHYLAXIS:

Antihistamines:

- ***NOT LIFE-SAVING*** – takes too long to act (1 to 3 hours)
- diphenhydramine has potential to hypotension and altered level of consciousness
- if ongoing urticaria once acute phase controlled, **cetirizine is** suggested over diphenhydramine

Corticosteroids

- ***NOT LIFE-SAVING*** – takes hours to have an effect (4 to 6 hours)
- No evidence for preventing biphasic reaction
- Consider early if known asthmatic with predominant bronchospasm