Saudi MoH Protocol for Adult and Pediatric Management of Anaphylaxis

(Version 1.2) December 28th, 2020

Disclaimer: This is a living guidance that is subject to change as more evidence accumulates. It will be updated regularly and whenever needed. The guidance should be used to assist healthcare practitioners select the best available management in case of anaphylaxis shock.

- Anaphylaxis is a serious systemic hypercreativity reaction that is usually rapid in onset and may cause death. Severe anaphylaxis is charactered by potentially life-threatening compromise in airway, breathing and/or the circulation, and may occur without typical skin features or circulatory shock being present. *(World Health Organization International Classification of Diseases 11th Edition)*
- It is **mandatory** for healthcare providers to report all administration errors, all serious adverse events, cases of Multisystem Inflammatory Syndrome (MIS), and hospitalized or fatal cases following medication administration to the Saudi Food and Drug Authority (SFDA) via: https://ade.sfda.gov.sa/. Also record the allergy in the patient medical record and system.
- It is **mandatory** that vaccination/medication administration sites are equipped with Cardiopulmonary Resuscitation (CPR) carts and the availability of immediate treatment management and medications.

- **Management of Anaphylaxis:**
  - Appropriate medical treatment must be immediately available in the event an acute anaphylactic reaction occurs.
  - Removal of the inciting cause, if possible (eg, stop infusion of a suspect medication).
  - Epinephrine (1 mg/mL preparation) is the first option in the management of anaphylaxis.
    - Adults: Give 0.3 to 0.5 mg intramuscularly (IM) in the mid-outer thigh and can be repeated every 5 to 15 minutes as needed.
    - Pediatric:
      - Infant under 10 Kg: 0.01 mg/kg IM in the mid-outer thigh can be repeated every 5 to 15 minutes as needed.
      - 10 – 25 Kg: 0.15 mg IM in the mid-outer thigh can be repeated every 5 to 15 minutes as needed.
      - >25 – 50 Kg: 0.3 mg IM in the mid-outer thigh can be repeated every 5 to 15 minutes as needed.
      - > 50 kg, maximum is 0.5 mg per dose IM in the mid-outer thigh can be repeated every 5 to 15 minutes as needed.
  - If evidence of impending airway obstruction form angioedema, immediate intubation should take place by the most available expert to avoid airway trauma.
  - Place patient in recumbent position, if tolerated and elevate lower extremities.

- Give 8 to 10 L/minute oxygen via facemask or up to 100% oxygen, as needed.
- Treat hypotension with rapid infusion:
  - Adult: 1 to 2 liters intravenous (IV) normal saline, repeat as needed.
  - Pediatric: 20 mL/kg IV normal saline. Re-evaluate and repeat fluid boluses (20 mL/kg), as needed.
- For bronchospasm resistant to IM epinephrine, give Albuterol (salbutamol)
  - Adult: 2.5 to 5 mg of in 3 mL saline via nebulizer, or 2 to 3 puffs by metered dose inhaler. Repeat, as needed.
  - Pediatric: 0.15 mg/kg (minimum dose: 2.5 mg) in 3 mL saline inhaled via nebulizer. Repeat, as needed.

- **Adjunctive Therapies of Anaphylaxis:**
  - Continuous noninvasive hemodynamic monitoring and pulse oximetry monitoring should be performed.
  - Urine output should be monitored in patients receiving IV fluid resuscitation for sever hypotension or shock.
  - For reliving urticaria and itching, consider giving cetirizine:
    - Adult: 10 mg IV (given over 2 minutes)
    - Pediatric:
      - 6 months – 5 years: 2.5 mg IV (given over 2 minutes).
      - 6 – 11 years: 5 – 10 mg IV (given over 2 minutes).

    OR diphenhydramine:
    - Adult: 25 to 50 mg IV (given over 5 minutes).
    - Pediatric: 1 mg/kg (max 40 mg IV, over 5 minutes).
  - Consider giving famotidine:
    - Adult: 20 mg IV (given over 2 minutes).
    - Pediatric: 0.25 mg/kg (max 20 mg IV, over at least 2 minutes).
  - Consider giving methylprednisolone:
    - Adult: 125 mg IV.
    - Pediatric: 1 mg/kg (max 125 mg) IV.

- **Treatment of refractory symptoms of Allergic Reactions:**
  - All patients on epinephrine require continuous noninvasive monitoring of blood pressure, heart rate and function, and oxygen saturation**.**
  - For patients with inadequate response to IM epinephrine and IV saline, consider epinephrine infusion:
    - Adult: beginning at 0.1 mcg/kg/minute by infusion pump. Titrate the dose continuously according to blood pressure, cardiac rate and function, and oxygenation.
    - Pediatric: 0.1 to 1 mcg/kg/minute. Titrate the dose continuously according to blood pressure, cardiac rate and function, and oxygenation.
  - Some patients may require norepinephrine or dopamine should be given by infusion pump, with the dose titrated continuously according to blood pressure and cardiac rate/function and oxygenation.
  - Patients on beta-blockers, give glucagon for adult patients 1 to 5 mg IV over 5 minutes, followed by infusion of 5 to 15 mcg/minute. (rapid administration may cause vomiting). Need to hold beta-blockers.

- **Patient counseling**
  - Patients who experience anaphylaxis after the first dose should be instructed not to receive additional doses.
  - Patients should be referred to an allergist-immunologist for appropriate work-up and additional counseling.
  - Home medications:
    - Diphenhydramine
      - Adult: 25 – 50 mg orally every 6- 8 hours for 2 days
      - Pediatric:
        - 2 – 6 years: 6.25 mg every 4 – 6 hours for 2 days
        - 6 – 12 years: 12.5 - 25 mg every 4 – 6 hours for 2 days
    - Epinephrin pen when needed

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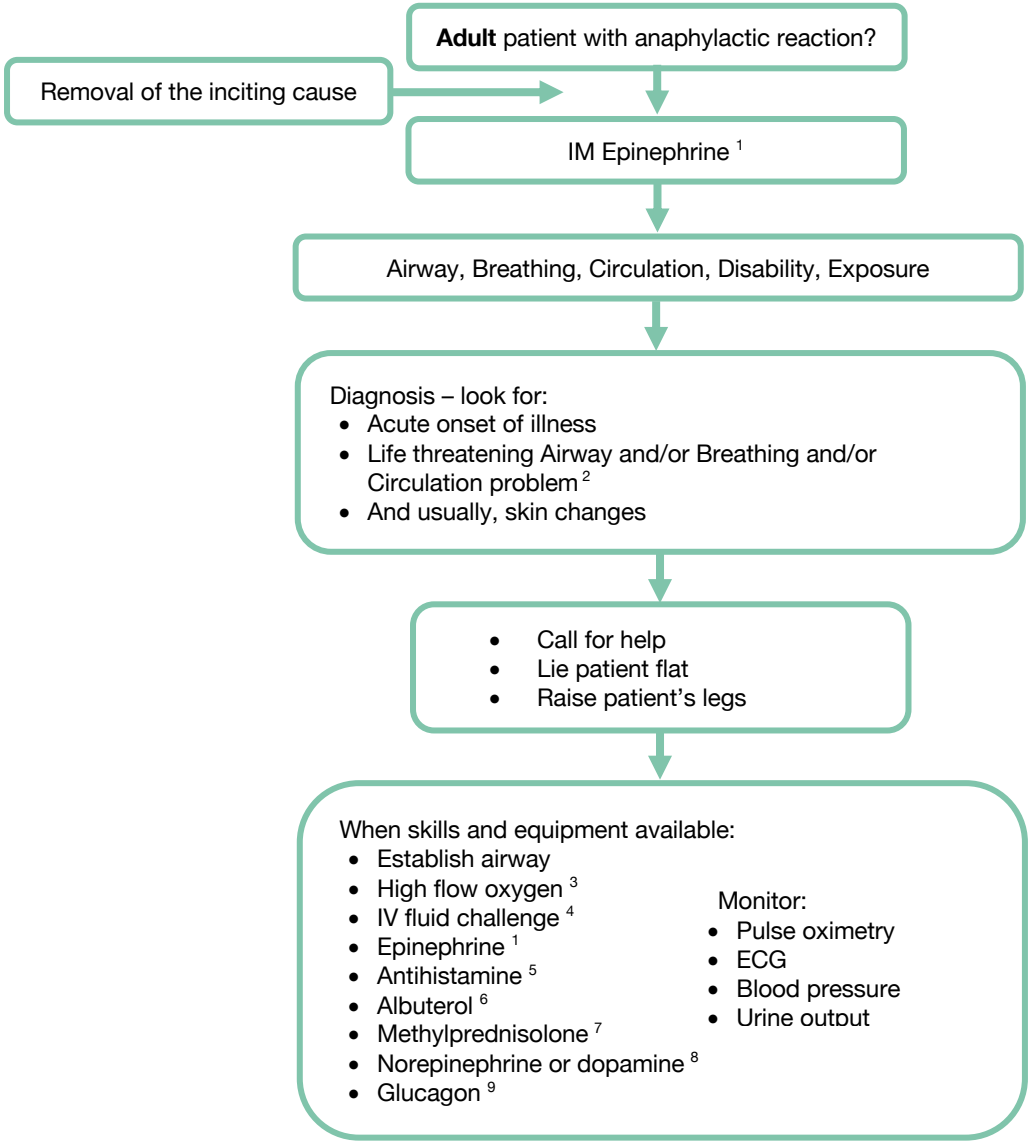

[1] Epinephrine:
- IM doses of 1:1000 (0.3 to 0.5 mg repeat every 5 to 15 minutes as needed
- IV given (inadequate response to IM epinephrine and IV saline) and titrate (beginning at 0.1 mcg/kg/minute)

[2] Life-threatening problems:
- Airway: swelling, hoarseness, stridor
- Breathing: rapid breathing, wheeze, fatigue, cyanosis, $SpO_2 < 92\%$, confusion
- Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma

[3] Oxygen give 8 to 10 L/minute oxygen via facemask or up to 100% oxygen, as needed.

[4] IV fluid challenge:
- 1 to 2 liters IV normal saline, repeat as needed
- Stop IV colloid, if this might be cause of anaphylaxis

[5] Antihistamine: (reliving urticaria and itching)
- cetirizine 10 mg IV (given over 2 minutes) or diphenhydramine 25 to 50 mg IV (given over 5 minutes)
- famotidine 20 mg IV given over 2 minutes

[6] Albuterol (salbutamol): (For bronchospasm resistant) 2.5 to 5 mg in 3 mL saline via nebulizer, or 2 to 3 puffs by metered dose inhaler. Repeat, as needed.

[7] Methylprednisolone 125 mg IV

[8] Norepinephrine or dopamine with the dose titrated continuously according to blood pressure and cardiac rate/function and oxygenation

[9] Glucagon 1 to 5 mg IV over 5 minutes, followed by infusion of 5 to 15 mcg/minute (For patients on beta-blockers)

- Patients who experienced airway compromise, requirement of high doses of epinephrin, history of Coronary Artery Disease, history of bronchial asthma, or patients on beta blockers/angiotensin converting enzyme inhibitors → should be observed for 6 hours prior to discharge
- If patient did not improve, consider ICU admission.

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Pediatric patient with anaphylactic reaction?

Removal of the inciting cause

IM Epinephrine [1]

Airway, Breathing, Circulation, Disability, Exposure

Diagnosis – look for:
- Acute onset of illness
- Life threatening Airway and/or Breathing and/or Circulation problem [2]
- And usually, skin changes

- Call for help
- Lie patient flat
- Raise patient's legs

When skills and equipment available:
- Establish airway
- High flow oxygen [3]
- IV fluid challenge [4]
- Epinephrine [1]
- Antihistamine [5]
- Albuterol [6]
- Methylprednisolone [7]
- Norepinephrine or dopamine [8]

Monitor:
- Pulse oximetry
- ECG
- Blood pressure
- Urine output

[1] Epinephrine:
- IM doses of 1:1000 in the mid-outer thigh can be repeated every 5 to 15 minutes as needed.
  - Infant under 10 Kg: 0.01 mg/kg
  - 10 – 25 Kg: 0.15 mg
  - >25 – 50 Kg: 0.3 mg
  - 50 kg, maximum is 0.5 mg per dose
- IV given (inadequate response to IM epinephrine and IV saline) and titrate (0.1 to 1 mcg/kg/minute)

[2] Life-threatening problems:
- Airway: swelling, hoarseness, stridor
- Breathing: rapid breathing, wheeze, fatigue, cyanosis, SpO_2 < 92%, confusion
- Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma

[3] Oxygen give 8 to 10 L/minute oxygen via facemask or up to 100% oxygen, as needed.

[4] IV fluid challenge:
- 20 mL/kg IV normal saline. Re-evaluate and repeat fluid boluses (20 mL/kg), as needed
- Stop IV colloid, if this might be cause of anaphylaxis

[5] Antihistamine: (reliving urticaria and itching)
- cetirizine given over 2 minutes).
  - 6 months – 5 years: 2.5 mg IV
  - 6 – 11 years: 5 – 10 mg IV
- OR diphenhydramine 1 mg/kg (max 40 mg IV, over 5 minutes)
- OR famotidine 0.25 mg/kg (max 20 mg IV, over at least 2 minutes)

[6] Albuterol (salbutamol): (For bronchospasm resistant) 0.15 mg/kg (minimum dose: 2.5 mg) in 3 mL saline inhaled via nebulizer. Repeat, as needed.

[7] Methylprednisolone 1 mg/kg (max 125 mg) IV.

[8] Norepinephrine or dopamine with the dose titrated continuously according to blood pressure and cardiac rate/function and oxygenation

- Patients who experienced airway compromise, requirement of high doses of epinephrin, history of Coronary Artery Disease, history of bronchial asthma, or patients on beta blockers/angiotensin converting enzyme inhibitors → should be observed for 6 hours prior to discharge
- If patient did not improve, consider ICU admission.

References:

1. Ring, J., Beyer, K., Biedermann, et al.,.(2014). Guideline for acute therapy and management of anaphylaxis: S2 Guideline of the German Society for Allergology and Clinical Immunology (DGAKI), the Association of German Allergologists (AeDA), the Society of Pediatric Allergy and Environmental Medicine (GPA), the German Academy of Allergology and Environmental Medicine (DAAU), the German Professional Association of Pediatricians (BVKJ), the Austrian Society for Allergology and Immunology (ÖGAI), the Swiss Society for Allergy and Immunology (SGAI), the German Society of Anaesthesiology and Intensive Care Medicine (DGAI), the German Society of Pharmacology (DGP), the German Society for Psychosomatic Medicine (DGPM), the German Working Group of Anaphylaxis Training and Education (AGATE) and the patient organization German Allergy and Asthma Association (DAAB). Allergo journal international, 23(3), 96–112. https://doi.org/10.1007/s40629-014-0009-1
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