Case Study

- A 14-year-old girl presents in severe respiratory distress to the emergency department. Her past medical history includes seasonal induced asthma and a peanut and tree nut allergy. She has not been taking her preventer. Shortly after eating biscuit in the school cafeteria, she began complaining about diaphoresis followed by throat tightness, wheezing, and dyspnoea. The school nurse called an ambulance. No medications were administered and the patient did not have an adrenaline (epinephrine) auto-injector prescribed by her allergist. Her mother also arrived and thinks that it is probably her asthma flare-up.

This scenario is for education purposes only and should not be taken as medical advice.
Note that this scenario was adapted from BMJ Best Practice.
Asterisk (*) is used to provide further explanation in case you are someone who prefer to understand "WHY."

Examination: DRSABCDE

- A: Cannot talk, angioedema, laryngeal oedema
- B: Tachypnoea, O2 of 92%, audible wheezing
- C: Tachycardia, hypotensive, peripherally cool, thready pulse and prolonged capillary refill time
- D: **A**CVPU - Patient is still alert. No medications other than ventolin.
- E: Urticarial rash. No other potential allergens such as wasp sting.

- **Q: What are the most pressing issues and how would you manage them?**

Initial management

- **Q: What are the most pressing issues and how would you manage them?**
  - ABC and E of ABCDE should be managed.
  - A: Cannot talk, angio-oedema, laryngeal oedema, stridor
    - IM 1:1000 adrenaline in anterolateral thigh* with basic airway manoeuvres and if no response in 5 minutes, please repeat.
    - Always give adrenaline first then asthma medicine if asthma and anaphylaxis are both on top differentials since anaphylaxis is more deadly.
  - B: Tachypnoea, O2 of 92%, audible wheezing
    - Give oxygen and consider salbutamol
    - LAY PERSON FLAT - do NOT allow them to stand or walk**
  - C: Tachycardia, hypotensive, peripherally cool, thready pulse and prolonged capillary refill time
    - Two wide-bore IV cannulas
    - Sodium chloride 0.9% 20mL/lg IV boluses
    - Continue monitoring for hypotension (metaraminol or other vasoconstrictor may be considered in severe hypotension)
  - D: **A**CVPU - Patient is still alert. No medications other than ventolin.
  - E: Urticarial rash. No other potential allergens such as wasp sting.
    - Non-sedating oral antihistamines can treat skin symptoms once the patient has been stabilised***

- **Q: What investigation would you order to confirm the diagnosis of anaphylaxis?**

** "IM" because injection of 1:1000 adrenaline into VEIN can lead to CARDIAC ARREST*
Anterolateral thigh location allows high plasma concentration of adrenaline.
On exam and in real life, knowing dose (1:1000) is critical as it can be confused with dose used for cardiac arrest which is 1:10,000 solution.
*** Position is CRITICAL because standing/change in posture can lead to reduction of venous return and precipitate cardiac arrest.*
**** Non-sedating oral antihistamine such as cetirizine is preferred over sedating oral antihistamine because in case of biphasic reaction, use of sedating antihistamine can cloud if their loss of consciousness is due to biphasic reaction or sedating antihistamine.*

Investigation

- Anaphylaxis is clinical diagnosis, thus mast cell tryptase is not always necessary.
- Mast cell Tryptase was ordered but it is pending.
  - Note that mast cell tryptase only stays elevated for 6 hours after the onset of symptoms.
    - Thus, record accurately on the test tube the time of the start of symptoms and the time the sample was taken
  - Note that anaphylaxis is a clinical diagnosis and investigation should not delay its immediate management.
- **Q. The patient is now stable after two IM adrenaline and ED has many patients in waiting area. This patient has been in ED <u>for 2 hours.</u> What are the next step?**

Further management

- **Q. The patient is now stable after two IM adrenaline and ED has many patients in waiting area. This patient has been in ED <u>for 2 hours.</u> What are the next step?**
  - **Monitor patients for at least 2 more hours and discharge.**
    - **Patients with anaphylaxis should be observed for at least 4 hours after the presentation due to risk of biphasic reaction – Anaphylaxis can come back within 6-24 hours even after IM adrenaline and following stabilization.**
    - **12-lead ECG/continuous monitoring**
  - **Discharge patients with medical record highlighting suspected allergen to avoid, anaphylaxis action plan for home, school and EpiPens.**

Important considerations

- ICU and specialised Pediatrics team should be notified ASAP of patient arrival due to risk of acute deterioration and difficult airway

- Risk factors for Fatal Anaphylaxis
  - Significant **delay in adrenaline** and/or appropriate medical services
  - **Poorly controlled asthma**
  - **Adolescence**
  - Pre-existing cardiac/respiratory conditions
  - Known allergy to nuts, shellfish, drugs, and insect stings

Reference

- https://bestpractice.bmj.com/topics/en-gb/3000099/management-recommendations
- https://www.rch.org.au/clinicalguide/guideline_index/anaphylaxis/
- https://www.allergy.org.au/hp/anaphylaxis/first-aid-for-anaphylaxis
- https://next.amboss.com/us/article/rq0f-S?q=anaphylaxis#t21XjT0
- https://www.racgp.org.au/afp/2012/june/anaphylaxis-recognition-and-management
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5895478/#:~:text=The%20use%20of%20sedating%20antihistamines,requirement%20for%20adrenaline%20(epinephrine).