

PCCL Session: Summary Report and Resources

PCCL session topic: “Severe Biphasic Anaphylaxis – When Treatment Doesn’t Work (Then Does, Then Doesn’t)”

Date: May 17th, 2024.

Learning objectives:

- Options for severe anaphylaxis when initial treatments (Intramuscular (IM) epinephrine, steroids) aren’t effective.
- Indications for intubation... and what to do if you can’t.
- How to optimize ventilation once an airway is established.

Case Presentation: 16-year-old male who is “Adult size”; with a history of a known peanut allergy, autism spectrum disorder and asthma. At 20:10: The patient ate packaged cookie without listed ingredients and developed an immediate allergic reaction: abdominal cramping/diarrhea, Shortness Of Breath (SOB), and oral angioedema with drooling. The patient’s brother administered EPIPEN at home ~20:30 (first time). The patient arrived by private vehicle to ED 21:25 with mother and brother. No previous use of EPIPEN or anaphylaxis. Noted to be on steroids recently and using Ventolin for rescue suggesting poorly controlled asthma.

In this ER there is a triage-based RN driven delivery of first dose IM epinephrine in the case of anaphylaxis. Although this patient was not retreated at triage (as he had already received an IM dose at home), this program allows for rapid epinephrine delivery in the ER.

Vital signs: HR 99, BP 130/72, RR 18 and saturations of 98% on room air at presentation

Patient was managed with:

- 1) Epinephrine IM 0.5mg (0.5ml of 1 mg/ml solution)
- 2) Methylprednisolone 125mg IV
- 3) Diphenhydramine 50 mg IV
- 4) Famotidine 20 mg IV
- 5) Salbutamol 5mg nebs prn

At 21:55 RN identified deterioration: HR 155, O₂ sats 97% with significant diaphoresis, tripod positioning and saying “I can’t breathe.”

Next steps:

RT was called to the bedside.

IV epinephrine infusion was initiated and IV MgSO₄

Decision made to move patient to resuscitation room and prepare to intubate.

Anesthesia called for anticipated difficult airway, unable to leave OR x 15 minutes.

2nd/3rd Emergency Physician involved for assistance and Pediatrics called, en route.

Rapid decline en route to resuscitation bay: HR 70->60->50->40, O2 80->70..., "Silent Chest" and rapid loss of consciousness:

Ketamine pushed urgently.

Grade 1 View, +gag so rocuronium pushed - ETT placed after adjustment of stylet.

HR 57->150, O2 17->97% with manual bagging

Unable to be placed on ventilator due to high pressure requirements so bagged 6/min.

Continuous Ventolin via ETT

Epinephrine IV infusion continued, decreased rate secondary to hypertension.

Second dose rocuronium given to aid in ventilation.

Changed sedation from propofol to ketamine for added bronchodilation effect.

Improvement in bronchospasm, able to be placed on ventilator.

Pediatrician at bedside shortly after intubation and arranged for rapid transfer BCCH PICU.

Key concepts/outcomes:

Immediate IM epinephrine administration is the most important intervention There are NO absolute contraindications for IM epinephrine in anaphylaxis. The adjuncts of methylprednisolone, diphenhydramine, and famotidine do not have any significant effects in the acute phase and SHOULD NOT DELAY giving repeated doses of IM epinephrine or starting an IV epinephrine infusion.

Rapid and definitive airway management is essential if there are signs of respiratory failure.

In the MOST SEVERE patients, such as an unconscious anaphylaxis patient requiring bag valve mask support, the AMAX4 algorithm would apply (see resources below):

A – Adrenaline - 1mcg/kg *intravenously* push dose every 30 seconds to 10 minutes or cardiac arrest dose

M - Muscle Relaxant - First and only attempt at laryngoscopy must be best attempt

A - Airway – ETT - With cuff to successfully oxygenate - high airway pressures. Mask and LMA unsuitable

X - Xtreme Care - Xtreme obstructive ventilation, Xtra bronchodilators as required, Xtra vasopressors/volume as required, X Pneumothorax

4 Minutes - Max 4 minutes until definitive airway and ventilation (oral ETT or FONA (Front of Neck Airway)) to avoid brain injury.



Although IV bolus epinephrine is not utilized in most anaphylaxis pathways, it is because they are referring to more typical patients with anaphylaxis. The IV bolus epinephrine is appropriate in a patient in extremis.

Resources:

AMAX4 | Just a routine resuscitation – This is the story of an Australian ER physician whose son died from anaphylaxis despite resuscitation given the time frames of the care that was provided. His website provides education and a treatment algorithm for severe anaphylaxis.

2023-02-09Anaphylaxis-Algorithm FINAL v2.0.pdf (trekk.ca)

The resources shared throughout this session are for reference purposes only. Please consult your health authority leaders for guidance on adoption and use of these resources within your local context.

The advice provided during the PCCL sessions is not intended to replace the clinical judgment of the healthcare providers who are with the patient. While PCCL sessions may suggest recommendations, the final decisions regarding a child's care and treatment should always rest with the healthcare professionals involved in their care at both the referring and receiving centres.

If you need additional in the moment support refer to the Provincial Real Time Virtual Support Pathways on CHBC website