

SPA Peds crisis checklist scenario – ANAPHYLAXIS

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Scenario Overview

Name of Scenario: Post-induction anaphylaxis

Learning Objectives of Scenario:

Cognitive:

1. Describe the differential diagnosis for severe cardiopulmonary compromise post induction
2. Outline the clinical features of anaphylaxis
3. Prioritize pharmacologic management of anaphylaxis
4. Discuss postoperative management of successfully managed intraoperative anaphylaxis

Technical:

1. Demonstrate appropriate dosing and use of epinephrine for treatment of anaphylaxis
2. Demonstrate the use of PALS guidelines for resuscitation
3. Effectively manage anaphylaxis in a simulated setting

Behavioral:

1. Rapid analysis of necessary cohorts/skillsets available – call for help if additional staff needed
2. Effective team communication during a code situation: identification of team leader, assignment of roles, and closed-loop communication

Patient Description:

A 3-year-old, 15 kg boy is scheduled for reduction of bilateral inguinal hernias. He is allergic to ampicillin / clavulanic acid.

Medications: none

Surgical and Social History: non-contributory

Baseline Vital Signs: T 36.7C, HR 88, BP 112/76, RR 16, SpO2 100%

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Baseline Lab Values: None

Target Trainees (Learners): Pediatric anesthesia providers

Confederates Needed: Anesthesiologist performing handoff/ later comes in if help is called for, surgeon, circulating nurse.

Anticipated Duration:

Scenario Time: 10-15 minutes

Debriefing Time (typically 2-3x scenario length): 30-45 minutes

Scenario Set-up

Pediatric High Fidelity Simulation Manikin, Toddler size, simulated rash on mannequin's torso

Room Configuration (set up): Standard pediatric operating room set-up

Society for Pediatric Anesthesia PediCrisis Manual

[http://www.pedsanesthesia.org/wp-](http://www.pedsanesthesia.org/wp-content/uploads/2018/03/SPACriticalEventsChecklists.pdf)

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Equipment Needed: anesthetic machine, anesthetic drug cart, airway equipment, standard drugs in syringes or in drug cart including propofol, rocuronium, epinephrine, hydrocortisone, diphenhydramine

At the start of the scenario, the patient will be on the OR table, intubated, and mechanically ventilated. ASA standard monitors will be in use. The scenario will start after induction but prior to draping. An IV is infusing a crystalloid solution. A rash is visible on the torso.

Scenario Logistics

Expected Scenario Flow:

State	Patient Status	Learner Actions	
Baseline	Stable immediately post induction T 36.7 C, HR 88, BP 112/76 RR 16 SaO ₂ 100%	Enters room, receives handoff from confederate. Surveys patient/setup/Vs. Speaks to surgeon.	
Deterioration	Just after confederate anesthesiologist leaves the OR: 36.7 C, HR 138, BP	Auscultate for bronchospasm, check circuit. Tell surgeon differential: pneumothorax,	Surgeon asks, "What's going on?" If anaphylaxis is not considered, the

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	74/41 Sat 86% PIPs increase, wheezing can be heard on auscultation.	bronchospasm, malpositioned ETT, anaphylaxis. Consider anaphylaxis and treat with epinephrine in appropriate doses. If participant treats appropriately, skip 'Arrest' section and go to 'Stabilizes' section instead.	circulating nurse points out the rash to the learner while patient deteriorates to eventual cardiac arrest.
Arrest	T 35.4C HR 54 BP palpable, SaO ₂ unreadable	Calls for help, initiates PALS. Gives epinephrine as part of PALS resuscitation.	Surgeon attempts to distract from the beginning of the resuscitation by asking if this will delay his room. The circulator facilitates by calling for help, obtaining the crash cart, and forcing the learner to be specific in requests.
Stabilizes	T 36.0C, HR 112 BP 108/69 SaO ₂ 100%	Continue treatment of anaphylaxis with IVF and epinephrine, initiate antihistamine and steroids, send serum tryptase	
PostOp Management		Continue surgery? Offer to discuss with family. Need for PICU?	If learner doesn't initiate post op discussion after stabilizing, surgeon will.

The scenario begins in the operating room after induction of anesthesia with propofol and rocuronium and intubation. The anesthesia team is preparing for a caudal block.

Learner now enters the room: Anesthesia confederate in the room hands off to a relieving anesthesia provider ('hot seat' anesthesiologist) **just after intubation**. (premedication with oral midazolam, smooth inhalational induction, surgeon asked for paralysis, so rocuronium 0.5 mg/kg was administered to facilitate endotracheal intubation with size 5 cuffed ETT). Antibiotics have yet to be given.

The confederate anesthesiologist has to quickly run to the ED to attend to his sick mother. The surgeon now requests that the hot seat anesthesiologist perform a caudal block. Within seconds after the confederate anesthesiologist leaves, the child develops tachycardia and increased peak inspiratory pressures. The BP decreases significantly. The scenario progresses to desaturation, severe hypotension and finally PEA.

The surgeon asks, "What is going on?". The hot seat anesthesiologist must think of the differential diagnosis, auscultate for bronchospasm, look for any displacement or obstruction of ETT and consider anaphylaxis. If the hot seat anesthesiologist is struggling to identify the cause, the circulating nurse notes the rash on the patient's body.

The surgeon tries to distract the anesthesiologist by telling him to "hurry up because he has a long list of patients for the day."

The scenario may progress to pulseless electrical activity (PEA) and resuscitation based on PALS guidelines.

The surgeon asks for possible differential diagnosis. The hot seat anesthesiologist gives differential diagnosis – e.g., pneumothorax, equipment issue, bronchospasm, malpositioned ETT and anaphylaxis. The surgeon asks about further management – e.g., further work-up, speak with family, need for transfer to the PICU, whether to continue with the procedure and required lab work up (e.g., serum tryptase, etc.).

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Expected Interventions from the Participants:

Call for help, crash cart, secure the airway and adequately ventilate initiation of PALS, formulation of differential, treatment with intravenous fluids, and epinephrine as primary management. Secondary management with steroids and anti-histamines.

Expected Endpoint of the Scenario:

Recognition and treatment of ANAPHYLAXIS or patient deterioration

Distracters within Scenario:

Attending surgeon frequently interjecting/distracting the anesthesiologists

Optional Challenges for Higher Level Learners:

If ANAPHYLAXIS is recognized and treated early, can prompt the learners to deal with PEA, further management issues: disposition, to remain intubated or not, should surgery be continued

Roles of Participants/Trainees:

The learner receiving the handoff will be in the hot seat. When he/she calls for help, 1 other learner will be called upon to assist.

Roles of Confederates (if applicable): Leave the room after a hurried sign-out as his mother is sick in the ED.

Attending surgeon: His or her role is to be disruptive and distract the learner from focusing on the patient

Circulating nurse: assist in calling for help, getting the crash cart, forcing the learners to be specific in their requests

Debriefing Points: As above

Scenario Support Materials, Pre and Post Tests, Evaluations

Reference List:

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2. Meng J, Rotiroti G, Burdett E, Lukawska JJ: Anaphylaxis during general anaesthesia: experience from a drug allergy centre in the UK. Acta Anaesthesiol Scand. 2017; 61(3):281-289. doi: 10.1111/aas.12858.
3. Johnston EB et al. Pediatric anaphylaxis in the operating room for anesthesia residents: a simulation study. Paediatr Anaesth. 2017 Feb; 27(2):205-210. doi: 10.1111/pan.13052.
4. Dewatcher P, Mouton-Faivre C, Emala CW et al. Anaphylaxis and Anesthesia Controversies and New Insights. Anesthesiology 2009; 111:1141-50

Pre-test: None

Post-test: None

Evaluations: standard