Pediatric Anticholinergic Toxidrome

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## Curriculum Outline

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2. Description of Curriculum

Course Overview
This course teaches learners to recognize and manage pediatric anticholinergic toxicity and its complications, seizures and cardiac dysrhythmia.

The course is simulation based with an integrated team communication focus.

The learners will identify the signs and symptoms of anticholinergic toxidrome, learn its antidote and learn that repeated doses of the antidote may be necessary in managing anticholinergic toxicity.

The learners should recognize the seriousness of the situation and recruit a full resuscitation team. The primary complications for the team to recognize and manage are seizures and cardiac dysrhythmias.

Educational Rationale on How the Course Generalizes to Real-Life Circumstances

There are many types of drugs and botanicals with anticholinergic effects. These include diphenhydramine, tricyclic antidepressants, antihistamines scopolamine, jimson weed and belladonna alkaloids. The prevalence of anticholinergic drugs in many over-the-counter preparations make them a common element in many homes. Accidental and suicidal overdoses with these drugs are common, particularly in early childhood. Recreational poisonings with anticholinergic botanicals are common in adolescents. 1,2

The goal of this course is to provide the learner with an opportunity to manage a life threatening pediatric anticholinergic overdose, where the correct steps need to be taken in a limited period of time.

Key elements include the primary survey (including exam of the pupils), eliciting critical history (potential medication/ingestion exposures), recognizing the need to call for team assistance early in an event, recognizing and treating a cardiac dysrhythmia, and recognizing and treating anticholinergic toxicity.

Duration of Training Session: 1 hour
Frequency of Course: 3 times per year
Number of Trainees per Session: 3 to 5
3. Target Trainees

Primary: Pediatric and emergency medicine residents, fellows, faculty and nurses

Secondary: N/A
4. Prerequisite Knowledge and Skills

**Required background knowledge:**
- Signs of seizures
- Recognition of widened QRS complex
- Toxidrome of anticholinergic toxicity
- Antidote to anticholinergic toxicity: physostigmine
- Previous introduction to essential crisis resource management/communication skills i.e.: TeamSTEPPS (See Appendix A)

**Required background skills expected in trainees prior to receiving training in the target course:**
- Primary survey (Airway, Breathing, Circulation, Disability, Environment)
- Secondary survey (Head to toe exam)
- Correct use of a defibrillator
5. Goals and Objectives

Goal 1: Recognition and Management of Seizures
The learner will improve skills in recognition and management of seizures in a safe and professional manner. (ACGME Competencies: Medical Knowledge, Patient Care, Interpersonal and Communication Skills, Professionalism, System-based Practice, Technical skills)

Objective 1a - Initial patient assessment
The learner will be expected to discuss what s/he would look for in an initial history and physical examination (primary survey) of a patient presenting to the emergency department.

Objective 1b - Appropriate monitoring
The learner should be familiar with and apply basic monitoring standards for a patient with a seizure (CR monitors, pulse oximetry, blood pressure, and temperature). S/he should obtain a patient weight.

Objective 1c - Equipment setup
The learner should be able to set up the equipment required to treat a patient with seizures: oxygen, airway support, IV access, seizure medications.

Objective 1d - Identification of seizures
The learner should identify signs of a generalized tonic-clonic seizure: tonic-clonic movement, airway obstruction, ineffective respiratory effort.

Objective 1e - Technical skills
The learner should provide airway and breathing support (position, suction, oxygen, potential nasal airway or bag-mask ventilation) and anti-seizure medication (benzodiazepines).

Goal 2: Recognition and Management of Cardiac Dysrhythmia
The learner will improve skills in recognition and management cardiac dysrhythmias in a safe and professional manner. (ACGME Competencies: Medical Knowledge, Patient Care, Interpersonal and Communication Skills, Professionalism, System-based Practice, Technical skills)

Objective 2a - Equipment setup
The learner should be able to set up the equipment required to treat a patient in potential cardiac failure: IV access, defibrillator, resuscitation medications.

Objective 2b - Identification of cardiac dysrhythmia
The learner should identify signs of cardiac dysrhythmia: prolonged QRS complex progressing to pulseless ventricular tachycardia.

Objective 2c - Technical skills
The learner should apply the defibrillator pads/paddles correctly and defibrillate the patient while following safety protocol.
5. Goals and Objectives

**Goal 3: Recognition and Management of Anti-cholinergic Toxidrome**
The learner will recognize and treat an anti-cholinergic toxidrome in a safe and professional manner. *(ACGME Competencies: Medical Knowledge¹, Patient Care², Interpersonal and Communication Skills³, Professionalism⁴, System-based Practice⁵, Technical skills⁶)*

**Objective 3a - Recognition of anti-cholinergic toxidrome¹,²**
The learner should identify physical exam findings consistent with anti-cholinergic toxidrome: anhidrosis, hyperthermia, nonreactive mydriasis, delirium, and urinary retention.

**Objective 3b - Management of anti-cholinergic toxidrome¹,²**
The learner should identify treatment measures for anti-cholinergic toxicity: benzodiazepines and physostigmine.

**Objective 3c - Appropriate monitoring¹,²,³**
The learner should recognize the need for ongoing monitoring (CR monitors, pulse oximetry, blood pressure, and temperature), due to the potential of recurrent cardiac dysrhythmias.

**Goal 4: Team Training and Communication Skills**
The learner will become more skilled in the management and leadership of emergency personnel including physicians, nurses, and ancillary personnel. *(ACGME Competencies: Interpersonal and Communication Skills³, Professionalism⁴, System-based Practice⁵, Technical skills⁶)*

**Objective 4a - Team training³,⁴,⁵,⁶**
The learner will be exposed to a full-scale high-fidelity simulation using a human patient simulator in which the learners are faced with a life threatening emergency due to respiratory failure. The team will be expected to brief at the beginning of the scenario, huddle during the scenario and debrief after the scenario.

**Objective 4b - Communication skills³,⁴,⁵,⁶**
The learner will be required to direct available resources to manage respiratory failure and anticholinergic toxicity. S/he will coordinate, direct and communicate with a resuscitation team using directed call-out and check-back.
1. Environmental Set Up
   - Set-up the room, as close as possible, to the hospital setting the learners are used to. Try to re-create the location, look, and feel of their “home” patient care environment.
   - Place SimBaby in a gown, diaper, etc, to maximize realism.

2. Pre-Simulation Introduction
   - Share the “basic assumption.” We believe each of you is intelligent, well-trained, want to do their best and want to improve.
   - Share the “goals.” This is an opportunity for us to practice patient care and team dynamics in a safe, supportive environment.
   - We will be practicing patient care, with the help of a (i.e. SimBaby) patient simulator. Review the simulator capabilities: where monitors can be applied, where to auscultate for breath sounds or heart sounds, where to look/feel for clinical findings (breathing, pulses, pupils, etc) where procedures can be performed (IV, IO, bag valve mask, endotracheal intubation).
   - Review supplies available: location of resuscitation equipment, monitors, defibrillator, discuss that if additional equipment or resources are desired, request should be made to facilitator.
   - Review safe use of defibrillator.
   - Review: If equipment malfunctions or is missing, please continue with the simulation as you would in a real patient case.
   - Review: We recognize that this is a “simulated” environment; please do your best to act as you would in a real patient environment/case.
   - Review: Discuss principles of team dynamics/management for your hospital environment.
   - Review expectations of team leaders and members, taking time to plan before a patient arrives (brief) and taking a moment to “get the team on the same page” (huddle) during their care for better coordination of the team.

3. Debriefing
   - Debriefing Tools (See Appendix B).
   - Remember: Have the participants step away from the simulator either into a different space (chairs in a circle or separate room).
   - Remind participants that this is a “confidential” opportunity to discuss and ask questions, please try to avoid personal critiques and refrain from discussing individual performances outside of the simulator environment. (i.e. “I noticed Jennifer and Suzan placed their hands in different places for bag mask ventilation. I’m concerned that bag-mask ventilation wasn’t maximized. Can someone show us? “This is a constructive question. “Sara, it looked like you were suffocating the patient when you were bagging.” This could put a participant on the defensive and shut down discussion).
7. Common Errors and Prevention Strategies

Common errors observed in trainees and strategies for helping address the errors.

a. **Failure to recognize seizures.**
   
   **Strategy:** Review signs of generalized tonic-clonic seizures: tonic-clonic movements, depressed mental status, potential airway obstruction and ineffective respirations.

b. **Failure to treat seizures.**
   
   **Strategy:** Review antidote to seizures: Benzodiazepines.
   - Lorazepam or diazepam 0.1 mg/kg IV/IO
   - Diazepam 0.5 mg/kg PR

c. **Failure to recognize cardiac dysrhythmia.**
   
   **Strategy:** Review signs of cardiac dysrhythmia and impending cardiac arrest: widened QRS complex, progression poor perfusion, altered mental status, progression to non-perfusing rhythm (i.e. ventricular tachycardia without a pulse).

d. **Failure to recognize anticholinergic toxidrome.**
   
   **Strategy:** Review signs of anticholinergic toxicity:
   - "Red as a beet" = cutaneous vasodilation
   - "Dry as a bone" = anhidrosis
   - "Hot as a hare" = anhydrotic hyperthermia
   - "Blind as a bat" = nonreactive mydriasis
   - "Mad as a hatter" = delirium; hallucinations
   - "Full as a flask" = urinary retention

e. **Failure to treat anticholinergic toxidrome.**
   
   **Strategy:** Review antidote to anti-cholinergic toxidrome: physostigmine 0.01-0.03 mg/kg/dose, max 2mg, may repeat after 5 min. Indicated: Pure anticholinergic overdose with severe symptoms (i.e.: delirium, agitation, hyperthermia, urinary retention). Contraindicated: Tricyclic antidepressant or mixed agent overdose

f. **Inefficient teamwork**
   
   **Strategy:** Review need to *brief* (discuss team roles) prior to a critical situation and *huddle* (ad-hoc planning during a crisis to re-establish situation awareness) during a crisis.

g. **Inefficient communication: lack of call-out**
   
   **Strategy:** Review importance of directed communication: “Survey MD- What’s the airway status?”

h. **Inefficient communication: lack of check-back**
   
   **Strategy:** Review use of closed-loop communication:
   - Tm Leader- “Give Physostigmine 0.2 mg IV”.
   - Med Prep RN-“Physostigmine 0.2 mg IV”.
   - Tm Leader- “That’s correct”.


Pediatric Anticholinergic Toxidrome
7. Common Errors and Prevention Strategies

**General strategies to solve the problems**

- Increase knowledge base: assigned reading, lectures, TeamSTEPPS
- Debriefing focused to re-evaluate critical thinking and structure planning of actions
- Teaching points based on errors
- Regular simulation training to avoid previous mistakes
8. Cognitive Training

Key methods for delivering cognitive training include the following:

- Seizure Teaching Points Handout (See Appendix C)
- Pulseless Ventricular Tachycardia Teaching Points Handout (See Appendix C)
- Anticholinergic Toxicity Teaching Points Handout (See Appendix C)
9. Skill Training

Participants:
Doctor #1: Team Leader
Doctor #2: Airway Physician
Doctor #3: Survey Physician
Nurse #1: Medication Administration Nurse
Nurse #2: Documenting or Circulating Nurse
Instructor 1: Attending PEM or EM physician (Facilitator)
Instructor 2: If a 2nd instructor is available, cast them as “grandma,” available to answer questions. If a 2nd instructor isn’t available, the facilitator can play the role of grandma as well.

To begin:
- All physicians and nurses will be read the Prelude outside the simulation area.
- The team (doctors and nurses) will have 2 minutes to brief.
- The team will then be read the triage history outside the simulation area and then be permitted to enter the “patient’s room”.
- The “grandma” should be available to answer questions.

Prelude: Introductions and Brief
0-2 minutes, start timer.

Introduction:
The communication nurse consult line just received a phone call from a grandmother. Her 15 month old granddaughter has been very fussy and won’t stop crying. She’ll be here in 2 minutes. You have 2 minutes to organize your team. (Scenario Algorithm, See Appendix D)

(Give the team 2 minutes to brief).

Triage history:
Rebecca, a 15 mo old girl was in good health this morning and spent the day at her grandmother’s house. She has not been sick. Since 1:30p she’s been increasingly fussy, crying “nonstop” for the past 2 hours.

Grandma is available to answer questions. (NAME) will be playing the role of grandma.

(The team can now enter the simulation room to meet the patient).
9. Skill Training

**Act 1: Anticholinergic Toxidrome**

**2-4 min**

**Triggers:**
- **Start:** 2 minutes from start of scenario
- **End:** 4 min from start of scenario

**Additional History and Medical Information if asked:**

Rebecca: 15 mo girl. Dropped off at grandma’s this morning. She’s been increasingly fussy, inconsolable, now crying non-stop, and felt “warm”, for the past 2 hours. If REALLY asked, she was playing alone for about 10 min (3 hours ago) when grandma had an important email to write. Rebecca had access to the bedrooms and bathroom while grandma was at her computer.

**Chief Complaint:** Agitation, crying

**History:** She has not been sick (no cold, cough, or fever). She spent the day at her grandmother’s house.

**PMH:**
- Healthy, no medical problems
- Immunizations up to date

**Medications:**
- Rebecca is on no medications
- If asked, Grandma on diabetes medication, arthritis and allergy medications (Benadryl).

**Social:**
Lives with mom; cared for by grandma.

**No allergies.**

**Initial Examination (becomes available with appropriate monitors, evaluation):**

- **Rhythm**
  - sinus tachycardia, with a widened QRS complex
- **HR**
  - 180 bpm
- **BP**
  - 110/75
- **Sat**
  - 93%
- **RR**
  - 31/min
- **Temp**
  - 38.6

**Appearance:** Flushed, agitated, crying.

**Respiratory:** Crying, no stridor. Clear breath sounds bilaterally.

**Circulation:** Dry skin. Cap refill 3 seconds. 1+ pulses.

**Neuro:** 6mm pupils bilaterally, minimally responsive to light. Agitated, thrashing around.

**Additional:** No signs of trauma
9. Skill Training

Act 2: Seizure
4-8 minutes

Triggers: Start- 4 minutes from start of scenario
End- 30 seconds after Physostigmine or Benzodiazepine given or
8 minutes from start of scenario

Physical Examination:
Rhythm  sinus tachycardia, with a widened QRS complex
HR  200 bpm
BP  135/90
Sat  ramps down to 78% on room air over 1 min
RR  ramps down to 10/min over 1 min, followed by apnea of 20 sec x4 over 2 min
Temp  38.9

If requested:
Appearance: Stiff, tonic-clonic movements (seizure).
Respiratory: Shallow breathing, with upper airway obstruction. Breath sounds equal bilaterally.
Circulation: Face flushed, skin hot and dry. 1+ pulses.
Neuro: 7mm pupils bilaterally, unresponsive to light. No response to painful stimuli.
Additional: No signs of trauma

Potential interventions/responses:
If requested: Oral airway is available, but makes patient vomit if attempted.
If requested: Nasal airway is available, overcoming upper airway obstruction. Addition of BMV allows easy ventilation of patient, oxygen saturations increase to 96%.
If requested: BMV is available, allowing ventilation if airway properly positioned.
If requested: IV access obtained on first attempt.
If requested: Benzodiazepines available:
Lorazepam or diazepam 0.1 mg/kg IV/IO
Diazepam 0.5 mg/kg PR
If requested: Physostigmine available.
Physostigmine 0.01-0.03 mg/kg/dose, IV max 2mg, may repeat after 5 min.
If requested: Intubation equipment available.
If requested: Rapid sequence intubation medications available: atropine, midazolam, etomidate, rocuronium, and succinylcholine.
If requested: glucose 85

*** If team reaches end of this act (total of 6 min in this act) without either administering physostigmine or benzodiazepines, proceed to Act 3.
***If team uses RSI (sedates and paralyzes) then intubates patient, proceed to Act 4.
***If team administers either physostigmine or benzodiazepine, proceed to Act 4.
9. Skill Training

**Act 3: Pulseless Ventricular Tachycardia**

**8-12 minutes**

**Triggers:**
- Start: 8 min into scenario WITHOUT benzodiazepine, physostigmine, or sedative/paralytic given.
- End: defibrillation or 12 minutes from start of scenario

**Physical Examination:**
- **Rhythm:** wide complex ventricular tachycardia
- **HR:** 220 bpm
- **BP:** 85/66
- **Sat:** ramps down to 70% over 1 min
- **RR:** ramps down to 10/min over 1 min
- **Temp:** 38.6

**If requested:**
- **Appearance:** No tonic-clonic activity. Unresponsive.
- **Respiratory:** No independent breathing. No upper airway obstruction. Clear breath sounds bilaterally, if ventilated.
- **Circulation:** No pulse. CR 5 seconds.
- **Neuro:** 3mm pupils bilaterally, sluggish response to light.
- **Additional:** No signs of trauma.

**Potential Interventions, if requested:**
- If requested: X-ray enroute for evaluation.
- If requested: Defibrillator available. Dose: 2J/kg (Subsequent doses 4J/kg)
- If requested: Additional benzodiazepine/physostigmine available for administration.
- If requested: Toxicology/Critical care en route for consultation.
- If requested: glucose 85

*** If team reaches end of this act (total of 4 min in this act) without defibrillating, proceed to Act 4.
*** If defibrillates, proceed to Act 4.
9. Skill Training

Act 4: Resolution

12-14 minutes

Triggers: Start- defibrillation or 12 minutes into scenario
End- 2 minutes in Act 4 or 14 minutes into scenario

Physical Examination:

- **Rhythm**: sinus
- **HR**: 165
- **BP**: 115/66
- **Sat**: ramps up to 96% over 1 min
- **RR**: ramps up to 26/min over 1 min
- **Temp**: 38.6

If requested:

- **Appearance**: No seizure activity. Slight movement of arms/legs.
- **Respiratory**: Clear breath sounds bilaterally.
- **Circulation**: Capillary refill 3 seconds. 1+ pulses.
- **Neuro**: 3mm pupils bilaterally, responsive to light.
- **Additional**: No signs of trauma.

End scenario and proceed to debrief.
10. Equipment Set-up

Simulation environment preparation

Before each simulation, ensure the anticipated resuscitation equipment is available for the team’s use. Preferably located within 6 feet of simulator.

Resources

- PALS reference cards, material
- Patient Weight Estimator
- Pediatric Resuscitation Medication references (i.e.: Broeslow tape, reference cards)
- Documentation forms (Code Blue forms)

Universal Precautions

- Staff gowns
- Gloves
- Mask and face shields
- Teaching crash cart & Backboard
- Teaching Defibrillator

Medications

- Adenosine
- Amiodarone
- Atropine
- Benzodiazepine
- Etomidate
- Fentanyl
- Ketamine
- Lidocaine
- Midazolam
- Normal Saline/Lactated Ringers
- Physostigmine
- Rocuronium
- Succinylcholine
- Epinephrine 1:10,000

Equipment

- Simulator in hospital gown, on bed
- Monitor – NIBP, HR, RR, Oxygen saturation, temp
- BP cuff, HR monitor leads, O2 sat probe, defibillator cables
- Oxygen hook-up on wall or cylinder
- Bag-mask system, multiple size masks
- O2 Mask, simple or non-rebreather
- Suction
- Thermometer
- Temperature probe
- Nasal, oral airways, multiple sizes
10. Equipment Set-up

**Equipment Cont’d**

- Shoulder roll
- Endotracheal tubes - 3.0, 3.5, 4.0, 4.5, 5.0, stylets
- Laryngoscope, Miller and Mac blades, multiple sizes
- Co2 colorimeter
- Stethoscopes
- IV/Angiocaths, various sizes
- IO needles, 2 sizes
- Gauze, Tape
- IV tubing
- IV pumps, pressure bags
- Syringes, multiple sizes
- Bedside blood sample processors: glucose, lytes, gases
### 11. Assessment Methods

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Appendix A: TeamSTEPPS References

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<tr>
<td>Adaptability</td>
<td>The ability to adjust strategies and altering a course of action in response to changing conditions (internal and external).</td>
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<td>Brief</td>
<td>Discussion prior to start that assigns essential roles, establishes expectation, anticipated outcomes, and likely contingencies.</td>
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| Call-Out            | A tactic used to communicate critical information during an emergent event.  
  a. Team member alerting others that they arrived at the scene. *(Example: Nurse or anesthesiologist entering room saying, Nurse is Here, etc)*  
  b. Request for data/information and Response to the Request. *(Example: “We have a SD, please call for help” – “I am calling Pediatrics, Anesthesia & another Nurse.”)*  
  Helps the team prepare for vital next steps in patient care.                                                                                         |
| Check-Back          | A communication strategy that requires a verification of information. The sender initiates the message; the receiver accepts it and restates the message. In return, the sender verifies that the re-statement of the original message is correct or amends if not. *(Example: “Please give suprapubic pressure” – “suprapubic pressure being given in the oblique direction from the mother’s left” – “That’s correct”)* |
| CUS                 | Signal phrases that denote “I am Concerned, I am Uncomfortable, This is a Safety Issue.” When spoken, all team members will understand clearly not only the issue but the magnitude of the issue. *(Example: I am concerned that you are reapplying the vacuum extractor in this diabetic patient after three pop offs.)* |
| Debrief             | Brief, informal information exchange session designed to improve team performance and effectiveness.                                                                                                         |
| DESC Script         | A technique for managing and resolving conflict. **Describe** the specific situation or behavior; provide concrete data. **Express** how the situation makes you feel/what your concerns are. **Suggest** other alternatives and seek agreement. **Consequences** should be stated in terms of impact on established team goals; strive for consensus. |
| Huddle              | Ad hoc planning to re-establish Situation Awareness; designed to reinforce plans already in place, and assess the need to adjust the plan. *(Example: Ms Jones has a shoulder dystocia and McRoberts has failed. I am going to attempt to extract the posterior arm. Please stop the suprapubic pressure.)* |
| I’M SAFE            | A checklist to determine both your coworkers’ and your ability to perform safely: I = Illness; M = Medication; S = Stress ‘ A = Alcohol and Drugs; F = Fatigue; E = Eating and Elimination.                                           |
| SBAR                | A framework for team members to structure information when communicating to one another. When a new member enters the room, someone **SBARs** the person by communicating critical information that requires immediate attention and action concerning a patient’s condition. **S** = Situation (What is going on with the patient?) **B** = Background (What is the clinical background or context?) **A** = Assessment (What do I think the problem is?) **R** = Recommendation (What would I do to correct it?) |
| Shared Mental Model | An organizing knowledge structure of relevant facts and relationships about a task or situation that are commonly held by team members.                                                                              |
| Situation Awareness | The ability to identify, process, and comprehend the critical elements of information about what is happening to the team with regards to the mission. It’s knowing “What is going around you” and “What is likely to happen next”. |
| Situation Monitoring| The process of actively scanning and assessing elements of the situation to gain information or maintain an accurate awareness or understanding of the situation in which the team functions.                          |
| Two-Challenge Rule  | Assertively voicing concern at least two times to ensure it has been heard. *(Example: “Doctor the head has been out for 5 minutes” – NO response – “Doctor the head has been out for 5 minutes, should we consider cephalic replacement and cesarean section?”)* |
| CROSS-MONITORING    | Validating or challenging a team member’s action or assessment. *(Example: Team Member A: I think this is X. Team Member B: I agree or I actually think this is Y.)*                                                                 |

Pediatric Anticholinergic Toxidrome
“Simulation creates the opportunity to debrief.”

We believe that the focus of each simulation should be the DEBRIEF. The simulation creates the opportunity for us to examine our medical management, team dynamics, and communication skills. It allows us to talk about the challenges we faced in a safe environment and improve the way we care for patients as a team.

Framework for debriefing:
Each debrief should consist of 3 components:

- Introduction
- Discussion of Medical Management
- Discussion of Crew Resource (Team) Management

1) Introduction

This “sets the stage” for debriefing and creates expectations.
What you might say:
- This is an opportunity to reflect and learn, improve our medical care, team work, and communication.
- Everyone should be able to ask questions and share their feelings.
- Once you leave this session, we encourage open discussions of the concepts you learn, but ask you to keep specifics about the scenario and individual’s performances within these walls.

2) Medical Management

This portion of the discussion focuses on the medical aspects of the case. It’s usually more comfortable to begin with these “facts”.
What you might say:
- Let’s begin by discussing medical management.
- What did you think was wrong with the patient? Can someone summarize what happened in this scenario for us?
- What signs led you to think this?
- What information/resources could have helped guide your decision making.

3) Crew Resource/Team Management

This portion of the discussion focuses on how the team worked together. It can be emotionally charged and difficult to discuss without feeling “personal”. The challenge is to try to generalize specifics into themes, i.e.: “Will someone start chest compressions?” This order wasn’t DIRECTED at a specific individual. That’s a common communication problem. Both the team leader and members may have been unsure of who was/should do it. A DIRECTED order would be “Jennifer, please start CPR”. Then the entire team knows who should/will do it.
Appendix B: Debriefing Overview

What you might say:
- How did you function as a team?
- What did your team do well?
- What could your team have done differently?

4) Summarizing
   - This is your opportunity to ensure the key learning points are highlighted
   - Try to choose approximately 3 take-home medical management and team management points.
     
     **Medical management examples:**
     (a) This was a case of pediatric anticholinergic toxicity leading to pulseless ventricular tachycardia.
     (b) Signs of anticholinergic toxicity include anhidrosis, hyperthermia, nonreactive mydriasis, delirium, and urinary retention.
     (c) Signs of anti-cholinergic cardiac dysrhythmias include: prolonged QRS, prolonged QTc intervals, and non-perfusing rhythms i.e. pulseless ventricular tachycardia.
     (d) **Team management examples:**
     (e) Recognize need for a full resuscitation team when a patient develops respiratory failure.
     (f) Delegate and maintain specific team member roles to ensure coordinated team functioning.

**General Facilitator Goals:**
- Try to facilitate the TEAM’s discussion (avoid dominating the conversation)
- Ask open ended questions (avoid yes/no questions)
- Discuss the performance (not the individual)
### Seizure Teaching Points
1. **Recognize Generalized Tonic-Clonic (GTC) Seizure and Status Epilepticus**
   a. *GTC* = bilateral, uncoordinated, tonic & clonic movement, depressed mental status
   b. *Status* = >30 min continuous or no return to baseline with recurrent seizure activity
2. **Consider full differential of seizures**
   a. CNS trauma, CVA, infection, underlying seizure disorder
   b. Electrolyte/glucose/metabolic abnormality/hypoxia/hypercarbia/ingestion/toxin/med change
3. **Treat Status Epilepticus**
   a. **Step 1:** **Support ABC’s**- oxygen, position, suction, BMV, IV access, may need to escalate respiratory support to ETT intubation
   b. **Simple Airway Maneuvers**
      i. Use head tilt-chin lift to open the airway --- NOT to be used if there is concern for c-spine injury
      ii. Use jaw-thrust maneuver to open the airway if there is c-spine injury concern
      iii. Suction nose and oropharynx
      iv. Improve positioning of patient with shoulder roll
   c. **Step 2:** Seizure medications- first line (may need repeated doses)
      v. Valium 0.5 mg/kg PR
      vi. Lorazepam 0.1 mg/kg IV/IO
   d. **Step 3:** Seizure meds- second line (may need both if refractory)
      v. Fosphenytoin/Phenytoin 15-20 mg/kg IV/IO load
      vi. Phenobarbital 15-20 mg/kg IV/IO load

### Pediatric Pulseless Arrest Teaching Points
1. **Start BLS:** CPR, check for pulse with CPR
2. **Give oxygen,** as soon as available
3. **Attach monitors,** defibrillator as soon as available
4. **Confirm rhythm:** ventricular tachycardia and pulselessness
5. **Provide defibrillation/shock ASAP**
   a. Do not synchronize if no pulse
   b. Manual: 2 J/kg
   c. AED: >1 year of age
      i. Use pediatric system if available for 1-8 years
6. **Resume CPR immediately,** give 5 cycles of CPR (approx 2 minutes)
7. **Check rhythm- Shockable? (VF or VT)**
8. **Continue CPR while charging defibrillator**
9. **Give shock**
   a. Manual: 4 J/kg
   b. AED: >1 year of age
      i. Use pediatric system if available for 1-8 years
10. **Resume CPR immediately,** check for pulse with CPR
11. **Give epinephrine**
    a. IV/IO: 0.01 mg/kg (1:10,000; 0.1 ml/kg)
    b. Endotracehal tube: 0.1 mg/kg (1:1,000; 0.1 ml/kg)
    c. Repeat epinephrine every 3-5 minutes that patient remains in pulseless VT
12. **Give 5 cycles of CPR total**
13. **Check rhythm- Shockable? (VF or VT)**
14. **Continue CPR while charging defibrillator**
15. **Give shock**
   a. Manual: 4 J/kg
   b. AED: >1 year of age
      i. Use pediatric system if available for 1-8 years
16. **Resume CPR immediately,** check for pulse with CPR
17. **Consider antiarrhythmics**
Appendix C: Learner Handouts

A. Amiodarone 5 mg/kg IV/IO OR
B. Lidocaine 1mg/kg IV/IO OR
C. Magnesium 25-50 mg/kg IV/IO, max 2 grams for torsades de pointes

18. Give 5 cycles of CPR total
19. Return to step 7

Defibrillation
**EVERYONE should review their defibrillator skills**

a. Paddles / Pads:
   i. gel pads can improve conduction
   ii. DON’T use saline or alcohol pads to “conduct”: you will burn yourself, the patient or start a fire
   iii. Large paddles or pads = >10kg or > 1yr old
   iv. Small paddles or pads < 10 kg or <1 yr
b. Defibrillation
   i. Use this if you don’t have a pulse!
   ii. Do not synchronize (there is nothing to synch with the- the heart is a mess- no organized rhythm)
   iii. Higher dose electricity
   iv. 1st dose = 2 J/kg
   v. 2nd dose (and all subsequent doses) = 4 J/kg

Anticholinergic Teaching Points

Anticholinergic agents include:
- H1 receptor antagonists like Diphenhydramine
- Plants like Jimson weed and deadly nightshade
- Many other drugs, such as tricyclic antidepressants, have anticholinergic properties but are not purely anticholinergic drugs.

Anticholinergic toxidrome:
- “Red as a beet” = cutaneous vasodilation
- “Dry as a bone” = anhidrosis
- “Hot as a hare” = anhydrotic hyperthermia
- “Blind as a bat” = nonreactive mydriasis
- “Mad as a hatter” = delirium; hallucinations
- “Full as a flask” = urinary retention

Treatment options:

Hyperthermia:
- Aggressive cooling with ice water bath or evaporative techniques
- Benzodiazepines to decrease muscle activity

Agitation:
- Benzodiazepines first line
- Phystostigmine second line

A word or two about phystostigmine:
Phystostigmine is a cholinesterase inhibitor and therefore increases acetylcholine concentrations. It can be useful in a PURE anticholinergic overdose. However, its use can cause bradycardia, heart blick, seizures and bronchospasm. **Use with caution.** Consult your local poison center and/or toxicologist **BEFORE** giving it if possible.
Appendix D: Scenario Algorithm

**SCENARIO TIMELINE**

**Prelude:**
- Start Timer: 0-2 min.
- Introduction and triage history provided outside the simulation room

**Act 1: Anticholinergic Toxidrome 2-4 min.**
- Triggers: Start 2 min into scenario
- End 4 min into scenario
- **Rhythm:** sinus tachycardia with a widened QRS complex
- **HR:** 180 bpm
- **BP:** 110/75
- **SAT:** 93%
- **RR:** 31/min
- **Temp:** 38.6°C

**Act 2: Seizure 4-8 min.**
- Triggers: Start 4 min into scenario
- End:
  - 30 sec after physostigmine or benzodiazepine is given, proceed to Act 4
  - 8 min into scenario no physostigmine, benzodiazepine or RSI, proceed to Act 3
- **Rhythm:** sinus tachycardia with a widened QRS complex
- **HR:** 200 bpm
- **BP:** 135/60
- **SAT:** ramps down to 78% on room air over 1 min onwards
- **RR:** ramps down to 10/min over 1 min, followed by apnea of 20 sec x 4 over 2 min
- **Temp:** 38.9°C

**Act 3: Pulseless Ventricular Tachycardia 8-12 min.**
- Triggers: Start 8 min into scenario WITHOUT physostigmine, benzodiazepine or RSI, (sedative/paralytic) given
- End: defibrillation or 12 min into scenario
- **Rhythm:** wide complex ventricular tachycardia
- **HR:** 220 bpm
- **BP:** 85/66
- **SAT:** ramps down to 70% over 1 min
- **RR:** ramps down to 10/min over 1 min
- **Temp:** 38.6°C

**Act 4: Resolution 12-14 min.**
- Triggers: Start after defibrillation or 12 min into scenario
- End: 2 min into Act 4 or 14 min into scenario
- **Rhythm:** sinus
- **HR:** 165 bpm
- **BP:** 115/66
- **SAT:** ramps up to 90% over 1 min
- **RR:** ramps up to 25/min over 1 min
- **Temp:** 38.6°C

**VITAL SIGNS**

**FACILITATOR INFORMATION**

- **Allow team to brief outside the simulation room**
- **If requested, additional history/exam available**
- **If requested, additional history/exam available**
- **If requested, additional history/exam available**
- **If requested, additional history/exam available**
- **If requested, additional history/exam available**
- **If requested, additional history/exam available**
- **If requested, glucose 85**
- **If requested, X-ray or consultants en route**
Appendix E: Pediatric Anticholinergic Toxidrome Medical Management Form

Pediatric Anticholinergic Toxidrome
Medical Management

This checklist identifies core medical management skills. It’s hard to discuss more than 3 of these during one debriefing session. We recommend selecting 2-3 of these issues to focus on. We’ve identified critical teaching objectives of this curriculum with a “*”. Depending on your learners, you may need to adjust your teaching focus to match their needs.

### Assessment of ABCDE’s

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a Initial patient assessment</td>
<td>□ Done Well □ Needs Work</td>
</tr>
<tr>
<td>1b Appropriate monitoring</td>
<td></td>
</tr>
</tbody>
</table>

Specific comments: ______________________________________________________
________________________________________________________________________
________________________________________________________________________

What did you think of the assessment of the ABCDE’s? What could you do differently?

### Obtaining significant history

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a Initial patient assessment</td>
<td>□ Done Well □ Needs Work</td>
</tr>
</tbody>
</table>

Specific comments: ______________________________________________________
________________________________________________________________________
________________________________________________________________________

What’s in a SAMPLE history? Signs and symptoms, Allergies, Medications, Past Medical History, Last meal, Events. What made you think/not about potential exposures/ingestions?

### *Recognition of cardiac dysrhythmia

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2b Identification of cardiac dysrhythmia</td>
<td>□ Done Well □ Needs Work</td>
</tr>
</tbody>
</table>

Specific comments: ______________________________________________________
________________________________________________________________________
________________________________________________________________________

Discussion Points: What signs of cardiac dysrhythmia did you see? widened QRS, poor perfusion, eventual pulselessness. What would have helped you identify them sooner?

### Management of cardiac dysrhythmia

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a Equipment set-up</td>
<td>□ Done Well □ Needs Work</td>
</tr>
<tr>
<td>2c Technical skills</td>
<td></td>
</tr>
</tbody>
</table>

Specific comments: ______________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix E: Pediatric Anticholinergic Toxidrome Medical Management Form

Discuss Points: What did you think about in managing cardiac dysrhythmia? (CPR, defibrillation). What could you have done differently?

*Recognizing anticholinergic toxicity

Obj 3a- Recognize anti-cholinergic toxidrome

☐ Done Well ☐ Needs Work

Specific comments: ________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

Discuss Points: What are the signs of anticholinergic toxicity? - anhidrosis, hyperthermia, nonreactive mydriasis, delirium, and urinary retention

*Managing anticholinergic toxicity

Obj 3b- Manage anti-cholinergic toxidrome

Obj 3c- Appropriate monitoring

☐ Done Well ☐ Needs Work

Specific comments: ________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

Discuss Points: What’s the antidote for anticholinergic toxicity? (Physostigmine 0.01-0.03 mg/kg/dose IV, max 2m, may repeat after 5 minutes).

During this session, even if you didn’t treat the seizures or the underlying overdose, the patient improved. In real life we’d expect seizures to continue if not treated with benzodiazepines, and anticholinergic toxidrome (agitation, delirium, tachycardia, hyperthermia) to worsen/continue if not treated with benzodiazepines or physostigmine.
### Appendix F: Pediatric Anticholinergic Toxidrome Crisis Resource Management Form

**Pediatric Anticholinergic Toxidrome**  
**Crisis Resource Management Evaluation**

This checklist identifies core teamwork and communication skills. It’s hard to discuss more than 3 of these during one debriefing session. We recommend selecting 2-3 of these issues to focus on. We’ve identified critical teaching objectives of this curriculum with a “*“. Depending on your learners, you may need to adjust your teaching focus to match their needs.

#### Recognize Emergent Situation and Call for Help  
*Obj 4a- Team training*

<table>
<thead>
<tr>
<th>□ Done Well</th>
<th>□ Needs Work</th>
</tr>
</thead>
</table>

Specific comments: ____________________________________________________________  
____________________________________________________________________________  
____________________________________________________________________________

*Discussion Points:* What helped you recognize this was an emergent situation and call for more help? What hindered you?

#### Leader Identified  
*Obj 4a- Team training*

<table>
<thead>
<tr>
<th>□ Done Well</th>
<th>□ Needs Work</th>
</tr>
</thead>
</table>

Specific comments: ____________________________________________________________  
____________________________________________________________________________  
____________________________________________________________________________

*Discussion Points:* What helped the leader be effective? What hindered having clear leadership?

#### Roles Delegated/Maintained  
*Obj 4a- Team training*

<table>
<thead>
<tr>
<th>□ Done Well</th>
<th>□ Needs Work</th>
</tr>
</thead>
</table>

Specific comments: ____________________________________________________________  
____________________________________________________________________________  
____________________________________________________________________________

*What helped/ hindered delegation/maintaining roles?*

#### *Directed Messages*  
*Obj 4b- Communication skills*

<table>
<thead>
<tr>
<th>□ Done Well</th>
<th>□ Needs Work</th>
</tr>
</thead>
</table>

Specific comments: ____________________________________________________________  
____________________________________________________________________________  
____________________________________________________________________________

*Discussion Points:* How were orders given- “Into the air” or directed at specific individuals? What did that impact you? How could they be delivered more effectively?
## Appendix F: Pediatric Anticholinergic Toxidrome Crisis Resource Management Form

### *Closed Loop Communication*

*Obj 4b- Communication skills*

<table>
<thead>
<tr>
<th>Specific comments:</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
</table>

Discussion Points: describe closed loop communication

### *Team Coordination/Situation Awareness*

*Obj 4a- Team training*

<table>
<thead>
<tr>
<th>Specific comments:</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
</table>

Discussion Points: How did team members “get on the same page”? Did the team “brief” before the patient’s arrival to plan? Did the team “huddle” during the scenario to regroup and ensure a common assessment/plan of action? How? What could you have done?

### Recognize Limitations

*Obj 4a- Team training*

<table>
<thead>
<tr>
<th>Specific comments:</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
</table>

Discussion Points: What did you think about your ability to “complete all your tasks”? What could have been done?
## Appendix G: Simulator Evaluation Form

### Simulation Session Evaluation Form

| Facilitator: ______________________________ | Date: ______________ |
| Case Presented: __________________________ |

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This simulation case provided is relevant to my work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. The simulation case was realistic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. This simulation case was effective in teaching basic resuscitation skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. This simulation case was effective in teaching case-specific management skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The debriefing after the case was useful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Can you list/describe 1 or more ways this simulation session will change how you do your job?

Comments:


