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Pediatric Toxidrome Simulation Curriculum: Jimson Weed Toxicity

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Abstract

Introduction: Jimson weed is a poisonous plant containing tropane alkaloids that can cause anticholinergic toxicity. Recognition of anticholinergic toxidrome is important for prevention and management of potentially life-threatening complications of severe toxicity, including dysrhythmia and seizure. **Methods:** Designed for pediatric emergency medicine (PEM) fellows, this simulation featured a 15-year-old female presenting to the emergency department (ED) with agitation and hallucinations. The team was required to perform a primary survey of the critically ill patient, recognize anticholinergic toxidrome from jimson weed intoxication, and treat complications of severe anticholinergic toxicity. Learners practiced critical resuscitation skills such as management of generalized tonic-clonic seizure, endotracheal intubation, synchronized cardioversion, and external cooling measures. A debriefing guide and participant evaluation forms were utilized. This simulation was created as both an in-person and a virtual simulation experience to accommodate COVID-19 social distancing guidelines. **Results:** Seventeen PEM fellows completed this simulation across three institutions (two in person, one virtual). Using 5-point Likert scales (with 5 being the most relevant or effective), participants rated the simulation as relevant to their work ($M = 4.8$, $SD = 0.5$) as well as effective in teaching basic resuscitation skills ($M = 4.7$, $SD = 0.5$), management of generalized tonic-clonic seizure ($M = 4.8$, $SD = 0.5$), and treatment of ventricular tachycardia with appropriate interventions ($M = 4.6$, $SD = 0.5$). **Discussion:** This simulation scenario allows pediatric medicine trainees in the ED to practice recognition and management of anticholinergic toxicity and its severe complications secondary to jimson weed ingestion.

Keywords
Anticholinergic Toxicity, Seizure, Toxidrome, Ventricular Tachycardia, Emergency Medicine, Medical Toxicology, Pediatric Emergency Medicine, Simulation

Educational Objectives

By the end of this activity, learners will be able to:

1. Perform a primary survey of a critically ill pediatric patient.
2. Describe the presentation of a pediatric patient with jimson weed intoxication/anticholinergic toxicity.
3. Implement initial management and stabilization of a pediatric patient in a generalized tonic-clonic seizure.
4. Treat wide QRS tachycardia in the setting of anticholinergic toxicity using appropriate Pediatric Advanced Life Support interventions.
5. Initiate external cooling interventions to address hyperthermia.
6. Demonstrate closed-loop communication and specific team roles in a resuscitation.

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Introduction

Children presenting to the emergency department (ED) with altered mental status and/or seizure require rapid intervention and thorough evaluation due to a broad differential diagnosis for this clinical presentation. An important consideration in these cases is toxic ingestion. Health care providers who care for acutely ill children must be able to quickly recognize and treat rare but potentially life-threatening poisonings, including anticholinergic toxicity.

According to the Toxicology Investigators Consortium 2020 Annual Report, anticholinergic toxidromes were the second most commonly reported toxidrome.[1] A variety of medications have anticholinergic effects, including diphenhydramine and other antihistamines, antidepressants including tricyclic antidepressants, and antipsychotics. While less common, plants such as jimson weed are also an important cause of anticholinergic toxicity as they are readily found throughout much of the United States. While the majority of jimson weed poisonings are accidental ingestion by children less than 5 years of age, it is also used recreationally by adolescents and adults. Per the 2018 National Poison Data System Annual Report, there were 620 reports of poisoning with anticholinergic plants, with 62% of poisonings occurring in patients age 5 years or less and 11% in patients age 6-19 years.[2-4] Anticholinergic toxicity from plants such as jimson weed presents an additional diagnostic challenge compared to that caused by prescription or over-the-counter medications, as it is unlikely to be discovered when asking the patient's family or caregiver about the patient's medications and other medications at home. Thus, maintaining a high index of suspicion of a toxic ingestion is key for patients with altered mental status in order to provide appropriate treatment for this potentially fatal condition.

Simulation is an ideal instruction method for this topic given the low incidence of plant-induced anticholinergic toxicity and the need for timely recognition and management of its potentially life-threatening complications. This provides a platform for participants to utilize the Pediatric Advanced Life Support (PALS) algorithms to manage stable and unstable wide complex tachycardia, provide acute management of seizure with respiratory failure with benzodiazepine and endotracheal intubation, and manage hyperthermia with external cooling interventions.

While there are other anticholinergic simulation resources in *MedEdPORTAL*, none address jimson weed, nor do they include management of hyperthermia, a potential complication of anticholinergic toxicity.[3,4] Additionally, although prior case provide the sources of poisoning early on, our scenario offers minimal contributory history and challenges participants to diagnose anticholinergic toxicity based on clinical examination. We also describe implementation of both in-person and virtual simulations, providing an option for those who choose to run the simulation remotely. This scenario was developed as part of a collection of simulations of pediatric toxic ingestions and may be used in series with these other publications or independently.[3,5-11]

Methods

A group of pediatric emergency medicine (PEM) physicians and pediatric residents developed this scenario for use in the education of PEM fellows. Seventeen PEM fellows from three fellowship programs at academic pediatric medical centers participated in the simulation from January 2021 through April 2021. Three simulation sessions were completed, two in person and one virtually. We designed the case to provide an opportunity for learners to practice a systematic primary survey of a critically ill patient and to educate them on the presentation of a pediatric patient with severe anticholinergic toxicity from jimson weed.

The scenario required participants to demonstrate rapid patient assessment, develop a broad differential diagnosis, initiate evaluation based on their differential diagnosis, and provide critical interventions including acute management of a new-onset generalized tonic-clonic seizure, respiratory arrest, and recognition and management of an abnormal cardiac rhythm through application of the correct PALS algorithm.[12] Additionally, the learners practiced critical PEM resuscitation skills including endotracheal intubation, synchronized cardioversion, and initiation of external cooling measures.

There were no prerequisite requirements for learners prior to participating in the case. Familiarity with the general presentation and management of anticholinergic toxicity, familiarity with the PALS algorithm, and prior simulation and resuscitation experience may have been helpful in successfully completing the simulation but were not required. This simulation activity was most beneficial for PEM physicians and other providers who might encounter pediatric patients with toxic ingestion in their clinical environment.

We included the following supplemental materials for instructors in preparation for this case: the simulation scenario (Appendix A), a simulation environment preparation checklist (Appendix B), the ECGs and postintubation chest X-ray necessary for the case (Appendix C), a teamwork and communication glossary (Appendix D), debriefing materials and guide (Appendix E), a critical actions checklist (Appendix F), a participant evaluation form (Appendix G), and additional learning materials on jimson weed intoxication to review with learners as needed (Appendix H).

Equipment/Environment

At the two in-person sites, we conducted the simulation scenario in an ED examination room with a high-fidelity, adult-size manikin. The simulation could also be run in other settings, such as a simulation laboratory, and could be performed using a low-fidelity manikin, with the facilitators providing vital signs and exam findings. At the third site, the simulation was conducted remotely using Zoom due to the institution's pandemic-related social distancing policy.

Equipment and medications typically found in an ED environment were available (Appendix B has the recommended list). ECG printouts and a printout of a postintubation chest X-ray (Appendix C) were given to participants if requested. Vital signs were displayed on monitors. They could also be written or reported verbally in a low-fidelity environment. Physical exam findings were described to the participants as they performed primary and secondary surveys if unable to be simulated on the manikin. Generalized tonic-clonic movements could also be described to participants at the appropriate stage of the simulation if using a low-fidelity manikin.

For the remotely conducted simulation session, both the instructor and participants utilized the virtual platform. The instructor played the part of a parent who provided medical history when asked. Participants viewed the vital signs on their smartphones via the Simpl simulated patient monitor app (simplsim.com) and verbalized in detail all actions that would traditionally be performed on a high- or low-fidelity manikin. When requested, physical exam findings, diagnostic images, ECG, and lab results were provided in the chat box for all participants to view.

Personnel

The simulation scenario could accommodate approximately five to seven learners per session. We conducted the simulation sessions with PEM fellows who took on interdisciplinary roles, including nurses, physicians, respiratory therapist, ED technician, or pharmacist. Ideally, participants filled the roles of at least three physicians and three nurses (Appendix A), with any additional participants playing other interdisciplinary roles as above. The session could also be run with a true interdisciplinary team, with participants taking on their respective roles; however, staffing constraints did not allow this during implementation. The facilitators were PEM attendings with expertise in simulation and debriefing.

Implementation

The scenario (Appendix A) began with a 15-year-old female brought from home by emergency medical services because of agitation and concern for fever. The ED team was promptly called to the bedside due to her significant agitation. The facilitator or an embedded participant, if available, played the role of the patient's parent. The parent provided the history that the patient had been acting strangely for the past several hours, specifically stating that she had been swatting at things in front of her and had appeared flushed and warm since arriving home after spending time with a new group of friends. We provided additional history when requested by participants. The vital signs listed in the case scenario were provided to the participants via a simulated monitor once one of the participants had placed the patient on a cardiorespiratory monitor. We reported the results of the primary and secondary surveys as they were completed by the participants. At the participants' request, ECGs (Appendix C) were provided; these demonstrated widened QRS.

The manikin was then made to shake, simulating a generalized tonic-clonic seizure. This could be described to participants in a low-fidelity environment. After appropriate management of the seizure with benzodiazepines, the monitor showed decreasing oxygen saturation in the setting of respiratory failure and depressed mental status. Once the patient was intubated, a postintubation chest X-ray (Appendix C) was provided on request. The cardiac rhythm on the simulated monitor continued to show wide complex tachycardia. We then alerted participants to the patient's worsening perfusion (increased capillary refill time) while continuing to have a pulse. The participants were required to identify wide complex tachycardia with a pulse and poor perfusion and to manage it with synchronized cardioversion per the PALS algorithm.

After the management of the patient's dysrhythmia, we alerted participants to the continued rise in the patient's temperature. This ideally prompted the participants to initiate external cooling measures. Also at this point, if it had not already been done, the participants could consider administration of physostigmine for management of anticholinergic toxicity. The facilitators provided the laboratory values for requested diagnostic tests throughout the scenario. A complete list of medications, equipment, and other supplies available during the simulation, as well as further details on preparation of the simulation environment, is available in Appendix B.

For the remote virtual simulation, the facilitator and learners logged onto Zoom. As with the in-person simulation, the participants assigned themselves to specific roles prior to the start of the case (Appendix A). The facilitator introduced the patient verbally by providing the history of the present illness in Appendix A. As with the in-person simulation, additional history was provided only when asked for by the participants. Physical examination findings were vocalized and included in the chat box by the facilitator when asked for by the participants (e.g., "How do the lungs sound on auscultation?", "Are the pupils dilated or constricted?", "What is the capillary refill time?"), similar to the way some examination findings must be vocalized even with a high-fidelity manikin. Any clinical changes were provided by the facilitator as the scenario progressed.

The patient's vital signs displayed on Simpl were shared on the facilitator's screen for the learners to view throughout the case. ECGs and chest radiographs (Appendix C) were displayed on the facilitator's screen when requested by the participants. Since participants were unable to demonstrate actions on a physical manikin, they verbalized procedures (e.g., "I am providing ventilation with a bag-mask-valve bag," "I am using a 6.5 endotracheal tube to intubate the patient," "I am delivering 25 J by cardioversion"). The participants were expected to demonstrate closed-loop communication with their team leader for actions to be considered completed (e.g., team leader: "[Airway physician], please place a nonrebreather mask on the patient." Airway physician: "I am placing a nonrebreather mask on the patient with 15 L of oxygen, [team leader]."

The facilitators were provided with a teamwork and communication glossary (Appendix D) that was utilized during debrief to establish shared language when discussing teamwork and communication skills. A debriefing framework (Appendix E) was available for the facilitators to help them give formative and actionable feedback during the debriefing session following the simulation. An instructor notes column was provided for facilitators to make notes in during the simulation for use in the debrief. A critical actions checklist (Appendix F) was available to assess learners during the simulation and to refer to during debriefing. A slide deck reviewing information about jimson weed, as well as anticholinergic toxicity in general, was reviewed during debrief (Appendix H). The slide deck could also be sent to the participants after the session for their review.

This simulation scenario was typically completed within an hour. Prebrief and debrief were allocated 15-20 minutes each, and the simulation was allocated 20 minutes. During prebrief, the learners were oriented to the simulation manikin and equipment that would be available during the simulation. For the virtual simulation, the time allocation was the same. Learners were provided with the environment preparation checklist (Appendix B) during this time to orient them to the equipment available to use during the virtual simulation. During prebrief, learners were oriented to the app-based vital signs monitor and other virtual simulation specifics, including the instructor's role and utilization of the chat box.

Debriefing

After participants completed the simulation scenario, they discussed the case in a debriefing session with their facilitators. We first asked participants to share their reactions to the case and then opened the discussion to observations, concerns, and comments. We utilized Appendix E, which provided debriefing goals and a debriefing framework specifically tailored to the case, to help guide discussions around learning objectives, medical management, teamwork, and communication skills.[12] We also provided a formative assessment of learner management via a critical actions checklist (Appendix F) that could be used to provide verbal or written feedback to participants if desired.

Assessment

The critical actions to be completed by the team at various steps were described in the simulation scenario (Appendix A). We identified these critical actions according to what constituted ideal patient care, including meeting general standards of care for management of status epilepticus, respiratory failure, management of dysrhythmia according to the appropriate PALS algorithm, and hyperthermia.[12,13] Facilitators functioning as embedded participants were provided with prompts to help guide the team should any important steps needed for progression of care be missed. The simulation was not stopped for missed actions, and the critical actions list was used to help debrief afterward.

After completion of the scenario, participants were asked to evaluate the case to assess how their experiences aligned with the educational goals. Participants were provided with paper surveys to fill out immediately after completion of the simulation. Participants were asked to rate on 5-point Likert scales the quality of the simulation scenario and debrief session (1 = *strongly disagree,* 2 = *disagree,* 3 = *neutral,* 4 = *agree,* 5 = *strongly agree*) and their confidence in knowledge and skills related to the scenario's learning objectives (1 = *very unconfident,* 2 = *unconfident,* 3 = *neutral,* 4 = *confident,* 5 = *very confident*). The survey also included open-ended questions about how the simulation might change the way participants did their jobs and how the simulation could be improved, as well as additional space for other comments. Similar learner comments were grouped together to help identify key themes and key takeaway points.

Results

Surveys were voluntarily completed by all 17 PEM fellows participating across three institutions for a 100% survey response rate. Overall, the scenario was well received and rated highly by the participants for being relevant to their work ($M = 4.8$, $SD = 0.5$) and effective in teaching basic resuscitation skills ($M = 4.7$, $SD = 0.5$; Table 1). Additionally, the participants felt that the debriefing session was a safe environment ($M = 4.9$, $SD = 0.4$) and promoted reflection and team discussion ($M = 4.9$, $SD = 0.4$). After the simulation scenario, the participants rated their confidence in performing a primary survey of a critically ill pediatric patient ($M = 4.9$, $SD = 0.3$) and managing a generalized

Table 1. Participant Agreement With Statements Related to Experience After the Simulation Scenario ($N = 17$)

Statement[a]	*M* (*SD*)
This simulation case provided is relevant to my work.	4.8 (0.5)
The simulation case was realistic.	4.5 (0.8)
This simulation case was effective in teaching basic resuscitation skills.	4.7 (0.5)
The debrief created a safe environment.	4.9 (0.4)
The debrief promoted reflection and team discussion.	4.9 (0.4)

[a]Rated on a 5-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*).

tonic-clonic seizure in a pediatric patient ($M = 4.8$, $SD = 0.5$; Table 2) highly.

When participants were asked whether they could list/describe one or more ways this simulation session would change how they did their job, their responses fell into the following themes: team dynamic during resuscitation; management of anticholinergic cardiac toxicity; resuscitating an acutely ill, undifferentiated patient; and utilizing available resources (Table 3). In response to the question on ways to improve the scenario, the main theme from the group that completed the scenario remotely was a desire for in-person simulation (e.g., "In person would be more realistic" and "Can't wait until we can meet in person"). General participant comments included the following: "Great sim! Loved it" and "Great case."

Discussion

This simulation scenario allows learners to practice the diagnosis and management of anticholinergic toxicity related to ingestion of jimson weed, a plant found in many parts of the United States. Simulation was selected as the educational modality for this learning session because it offers a medium for learners to practice teamwork and communication skills with a safe space

Table 2. Participant Agreement With Statements Related to Confidence After the Simulation Scenario ($N = 17$)

Learner Task[a]	*M* (*SD*)
Perform a primary survey of a critically ill pediatric patient	4.9 (0.3)
Describe the presentation of a pediatric patient presenting with jimson weed intoxication	4.4 (0.5)
Manage a generalized tonic-clonic seizure in a pediatric patient	4.8 (0.5)
Treat widened QRS in the setting of anticholinergic toxicity	4.5 (0.7)
Treat ventricular tachycardia with a pulse and poor perfusion using appropriate Pediatric Advanced Life Support interventions	4.6 (0.5)
Initiate external cooling interventions to address hyperthermia	4.5 (0.5)
Demonstrate teamwork and communication skills	4.6 (0.5)

[a]Rated on a 5-point Likert scale (1 = *very unconfident*, 2 = *unconfident*, 3 = *neutral*, 4 = *confident*, 5 = *very confident*).

Table 3. Themes Obtained From Responses to the Question "Can You List/Describe One or More Ways This Simulation Session Will Change How You Do Your Job?"

Theme	Representative Quotes
Team dynamic during resuscitation	"Clearly define leadership role." "Be loud when communicating."
Management of anticholinergic cardiac toxicity	"Bicarb early for wide QRS with ingestion." "Consider bicarb for wide QRS intoxication." "Give sodium bicarb early in wide complex tachycardia."
Resuscitating an undifferentiated, acutely ill patient	"Discuss differential diagnosis but commit to decision." "Broadening differential."
Utilizing available resources	"Grab the PALS card!" "Always carry my PALS card."

Abbreviation: PALS, Pediatric Advanced Life Support.

for debriefing and reflection. Seventeen PEM fellows participated in this simulation scenario at three different sites, allowing us to adjust it after iterations as needed in response to learner feedback. For example, participants during the first session commented that the initial heart rate seemed too low for the scenario. The vitals were revised for future sessions to better reflect the patient's condition. One site utilized a virtual simulation format due to pandemic-related social distancing requirements, demonstrating that this simulation can be adapted to be implemented remotely. Given the relaxing of social distancing requirements and feedback from the virtual simulation group, the in-person session may be preferred; however, in resource-limited settings, the virtual simulation may be a more cost effective and accessible modality.

The participants reported that the simulation was relevant and effective in teaching basic resuscitation skills. They also reported high levels of confidence related to the session's learning objectives after participation. Participant comments focused on the utility of sodium bicarbonate for widened QRS complexes, knowledge that is relevant in intoxications beyond jimson weed.

Given that a number of *MedEdPORTAL* publications have used Likert scales for similar simulation scenarios,[3,5-11] we opted to follow a similar model; however, the Likert scale has several limitations, including a tendency for acquiescence bias in which participants generally agree with the statements provided. In addition, a participant's confidence with the learning objectives does not necessarily reflect aptitude or internalization of these learning points. Assessment of future simulation cases could be enhanced by directly testing a participant's knowledge on key learning objectives through a postparticipation quiz. Additionally, the learners were asked to report their confidence with knowledge and skills related to the sessions only after participation. We now use retrospective pre/post surveys to allow participants to report how their confidence has changed through participation without distributing a presurvey that might prime them for the case. A further limitation is that participants were limited to PEM fellows, who filled the various interdisciplinary roles during the scenario. Having a truly interdisciplinary team participate in the simulation, each participant performing their usual roles within the health care team, would maximize realism and reinforce role-specific skills and knowledge.

The virtual simulation was limited due to the participants being unable to perform procedures or actions on a physical manikin (e.g., placing monitor leads, providing ventilation, exposing skin, etc.) as well as the difficulty in replicating the dynamic of an in-person setting. However, while in-person simulation may be the preferred method, virtual simulation can be a potential substitute in a resource-limited setting or when in-person simulation cannot be done.

This simulation scenario was easily incorporated into the standard PEM fellow education schedules at three institutions. Given learner feedback, we anticipate continuing to implement the scenario as part of the simulation-based curriculum. Considering the burden of pediatric anticholinergic toxicity in resource-limited settings, the scenario could be adapted for learners in other settings using a virtual simulation platform.

Appendices

A. Simulation Case.docx

B. Environment Checklist.docx

C. Images.pptx

D. Simulation TeamSTEPPS Glossary.docx

E. Debriefing Materials.docx

F. Critical Actions Checklist.docx

G. Simulation Session Evaluation Form.docx

H. Didactic Slides.pptx

All appendices are peer reviewed as integral parts of the Original Publication.

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References

1. Spyres MB, Aldy K, Farrugia LA, et al; Toxicology Investigators Consortium Study Group. The Toxicology Investigators Consortium 2020 annual report. *J Med Toxicol*. 2021;17(4):333-362. https://doi.org/10.1007/s13181-021-00854-3
2. Gummin DD, Mowry JB, Spyker DA, et al. 2018 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 36th annual report. *Clin Toxicol (Phila)*. 2019;57(12):1220-1413. https://doi.org/10.1080/15563650.2019.1677022
3. Reid J, Mazor S, Kim S. Pediatric Toxidrome Simulation Curriculum: anticholinergic toxidrome. *MedEdPORTAL*. 2010;6:8350. https://doi.org/10.15766/mep_2374-8265.8350
4. Beaver B, Wittler M. Toxic ingestion/acute tricyclic antidepressant (TCA) ingestion. *MedEdPORTAL*. 2015;11:10227. https://doi.org/10.15766/mep_2374-8265.10227
5. Akhavan AR, Burns R, Stone K, Reid J, Mazor S. Pediatric Toxidrome Simulation Curriculum: liquid nicotine overdose. *MedEdPORTAL*. 2018;14:10735. https://doi.org/10.15766/mep_2374-8265.10735

6. Burns C, Burns R, Sanseau E, et al. Pediatric Emergency Medicine Simulation Curriculum: marijuana ingestion. *MedEdPORTAL*. 2018;14:10780. https://doi.org/10.15766/mep_2374-8265.10780
7. Hartford E, Thomas A, Keilman A, et al. Pediatric Toxidrome Simulation Curriculum: bupropion overdose. *MedEdPORTAL*. 2019;15:10846. https://doi.org/10.15766/mep_2374-8265.10846
8. Del Rosso C, Thomas A, Hardy N, et al. Pediatric Toxidrome Simulation Curriculum: lidocaine-induced methemoglobinemia. *MedEdPORTAL*. 2021;17:11089 https://doi.org/10.15766/mep_2374-8265.11089
9. Reid J, Mazor S, Kim S. Pediatric Toxidrome Simulation Curriculum: cholinergic toxidrome. *MedEdPORTAL*. 2012;8:9117. https://doi.org/10.15766/mep_2374-8265.9117
10. Burns R, Reid J, Mazor S. Pediatric Toxidrome Simulation Curriculum: salicylate toxidrome. *MedEdPORTAL*. 2014;10:9913. https://doi.org/10.15766/mep_2374-8265.9913
11. Reid J, Mazor S, Kim S. Pediatric Toxidrome Simulation Curriculum: opioid toxidrome. *MedEdPORTAL*. 2010;6:8299. https://doi.org/10.15766/mep_2374-8265.8299
12. Topjian AA, Raymond TT, Atkins D, et al; Pediatric Basic and Advanced Life Support Collaborators. Part 4: pediatric basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2020;142(16)(suppl 2):S469-S523. https://doi.org/10.1161/CIR.0000000000000901
13. Su M. Anticholinergic poisoning. In: Erickson TB, Ahrens WR, Baum CR, Ling LJ, eds. *Pediatric Toxicology: Diagnosis & Management of the Poisoned Child*. McGraw-Hill; 2005:219-223.

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