

Hypothermia SIM Case

Section 1: Case Summary

Scenario Title:	Hypothermia
Keywords:	hypothermia, unresponsive, substance
Brief Description of Case:	Assessment and treatment of a patient presenting with hypothermia and altered LOC after being found unresponsive outside on a cold spring day, patient wearing minimal clothing.

Goals and Objectives	
Educational Goal:	To demonstrate the management of hypothermia patients presenting with altered mental status.
Objectives:	By the end of the scenario, the participants will: <ul style="list-style-type: none">• Demonstrate assessing patients per emergency framework (including primary assessment, head-to-toe examination, and history taking).• Identify and manage treatment for signs and symptoms associated with hypothermia, including the use of rewarming strategies.• Identify and manage treatment for signs and symptoms of impending airway collapse, hypotension, and arrhythmias associated with hypothermia.• Discuss modifications to the bradycardia ACLS pathway in the context of hypothermia.

Learners, Setting and Personnel				
Target Learners:	<input type="checkbox"/> Junior Learners		<input type="checkbox"/> Senior Learners	
	<input type="checkbox"/> Staff			
	<input checked="" type="checkbox"/> Physicians	<input checked="" type="checkbox"/> Nurses	<input type="checkbox"/> RTs	<input checked="" type="checkbox"/> Inter-professional
	<input type="checkbox"/> Other Learners:			
Location:	<input type="checkbox"/> Sim Lab		<input checked="" type="checkbox"/> In Situ	
	<input type="checkbox"/> Other:			
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 0			
	Sim Techs: 1 (if able)			

Scenario Development	
Date of Development:	April 20, 2020
Scenario Developer(s):	Francis Tenorio Adapted from Hoelscher, D., and Eyck, R. T. (2013). Accidental hypothermia simulation. https://doi.org/10.15766/mep.2374-8265.9522 Based on a case from October 17, 2019 at St. Paul's Hospital emergency department.
Version Number:	1



Hypothermia SIM Case

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: John Lee		Age: 58	Gender: Male	Weight: Unknown, ~50kg	
Presenting complaint: Found unresponsive on the sidewalk of Oppenheimer Park. He is wearing minimal clothing and was found by bystanders. No drugs paraphernalia was found in the area. One bystander states they knew the man and said he was last seen normal last night. He is difficult to rouse. One dose of 0.4mg naloxone has been administered prior to arrival by EHS with no effect. O2 saturations are difficult to read; appeared to be 74% on room air, was administer non-rebreather mask (at 15L), and now saturations are 94%. EHS was unable to get a temperature on the patient.					
Temp: 30.2 degC <u>Note: Oral & Axillary temps will not work</u>	HR: 34	BP: 85/43	RR: 10	O ₂ Sat: 94%	FiO ₂ : 15L NRB
Cap glucose: 5.2			GCS: (E V M) Open Eyes to Pain – 2 Incomprehensible Sounds – 2 Withdraws from Pain – 4		
Triage note: Found unresponsive, 74% on room air. Narcan tried x1, no effect. Direct to trauma room.					
Allergies: No known drug allergies					
Past Medical History: Hypertension			Current Medications: None listed in Cerner		

Hypothermia SIM Case

Section 2B: Extra Patient Information

A. Further History	
Looking in Cerner for John Lee, you find that the patient has a history of previous substance use overdose (typically heroin/fentanyl).	

B. Physical Exam	
<i>List any pertinent positive and negative findings</i>	
Cardio: Bradycardia Normal S1/S2	Neuro: Pupils 4mm bilaterally, sluggish reactivity
Resp: Coarse bilateral crackles Decreased to bases	Head & Neck: No injuries noted
Abdo: Soft, non-tender, non-distended	MSK/skin: Cold skin, pallor Cap refill > 3 seconds
Other:	

Hypothermia SIM Case

Section 3: Technical Requirements/Room Vision

A. Patient
<input checked="" type="checkbox"/> SimMan 3G
B. Special Equipment Required
<ul style="list-style-type: none">• Rectal thermometer• Airway equipment• Fluid warmer / Level-One rapid infuser• Bair hugger• Warmed fluids
C. Required Medications
<ul style="list-style-type: none">• Simulated resuscitation medications (epinephrine [cardiac bolus, ampoules], atropine, etc.)
D. Moulage
<ul style="list-style-type: none">• Cold skin
E. Monitors at Case Onset
<input checked="" type="checkbox"/> Patient not yet on monitor
F. Patient Reactions and Exam
<p>Patient does not verbalize or voice anything, other than moaning with pain. Eyes only open to pain. Patient does not respond verbally or with moans to interventions.</p>

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts
Not Applicable

Hypothermia SIM Case

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: Sinus brady HR: 34 BP: 85/43 RR: 10 O ₂ SAT: 94% 15LNRB T: 30.2°C	GCS 8 (2 / 2 / 4) Unresponsive	<u>Expected Learner Actions</u> <ul style="list-style-type: none"> <input type="checkbox"/> Performs ABC assessment <input type="checkbox"/> Initiates IV catheter <input type="checkbox"/> Initiates fluid bolus <input type="checkbox"/> Places patient on Bair Hugger <input type="checkbox"/> Initiates warming on patient (Level One)warm IV fluids to 42 degrees 	<u>Modifiers</u> <u>Triggers</u> - After 5 minutes	Temperature is only obtainable with a core temperature method (rectal, esophageal, foley) Note that ECMO will not be available as a rewarming strategy for this scenario.
2. Rhythm: Sinus brady with 20 second episodes of 2nd degree AV block, recurrence every 2-3 minutes HR: <30 BP: 79/38 O ₂ SAT: dropping down to 85-90% on 15LNRB		<u>Expected Learner Actions</u> <ul style="list-style-type: none"> <input type="checkbox"/> Initiate vasopressors with chronotropic effect (e.g. epinephrine IV infusion) Review concentration of epi drip and correlation with the concentration on the IV pump <ul style="list-style-type: none"> <input type="checkbox"/> Prepares for endotracheal intubation 	<u>Modifiers</u> - If a warming modality has been used for more than 5 minutes, T increases to 32 degC, and episodes of 2 nd degree AV block should terminate <u>Triggers</u> - After 10 minutes, END - IF no warming modality has been used by 10 minutes, proceed to V Fib arrest.	Bradycardia ● The pulse diminishes with every drop in core body temperature ● Occurs as the result of decreased spontaneous depolarization of the pacemaker cells in the heart ○ NOTE: This bradycardia will not respond to atropine ■ Osborn (J) Waves ● Look at the junction of the QRS complex and ST segment ● Typically appears with a core body temperature below 32 degrees Celsius ■ Prolongation of PR, QRS, and QTc (think - everything gets cold and slows down)



Hypothermia SIM Case

				<p>Bradycardia management: ● Bradycardia is physiologic in hypothermia ○ Don't need to start pacing unless the temperature is >32 degrees Celsius and the patient is hypotensive ○ Avoid transvenous approaches to unstable bradycardia - transcutaneous approaches are less irritating to the cold heart ● Transvenous cardiac pacing is hazardous for bradydysrhythmias in hypothermia. ○ External pacing may be worth trying in the rare setting of profoundly disproportionate bradycardia. Transcutaneous pacing has been used to facilitate continuous arteriovenous rewarming in perfusing patients by raising the systolic blood pressure above 60 mm Hg. Other active rewarming techniques do not require specific pressure gradients.</p> <p>REF: https://canadiem.org/wp-content/uploads/2018/01/CC-EP-</p>
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Hypothermia SIM Case

				<p>140-Accidental-Hypothermia-Ch.-132-Rosens-9th-Ed.-.pdf</p> <p>Given that both defibrillation and cardiac medications are less effective in severely hypothermic patients and that there may be concern of toxicity from accumulating doses of cardiac medications in hypothermic patients, it may be helpful to reference the European Resuscitation Council Guidelines which state that for patients under 30°C it is reasonable to:</p> <ul style="list-style-type: none"> • Attempt 3 shocks then defer further attempts at defibrillation until the patient is over 30°C • Withhold epinephrine or anti-arrhythmic until the patient is warmed to 30°C <p>A reasonable compromise would be to give 3 shocks, 3 doses of cardiac meds then defer further interventions until core temperature > 30</p> <p>Reference: Misch, M., Helman, A. CritCases 12 – Accidental Hypothermia and Cardiac Arrest. Emergency Medicine Cases. http://emergencymedicinecases.co</p>
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Hypothermia SIM Case

				<p>m/accidental-hypothermia-cardiac-arrest. Published January, 2019.</p> <ul style="list-style-type: none">• No clear consensus on administering antiarrhythmics - probably safer not to. ◦ The ideal approach to ventricular dysrhythmias in the hypothermic patient has not been well studied. Lidocaine and propranolol have minimal hemodynamic effects during hypothermia. Their efficacy in the treatment of ventricular dysrhythmias appears limited. ◦ The efficacy of amiodarone is not supported either ◦ In hypothermia, at least one Group 1 antidysrhythmic agent, procainamide, increases the incidence of VF. Another drug in the same group, quinidine, can prevent VF during induced profound hypothermia and during cardiac manipulation at 25°C to 30°C (77°F–86°F)• AHA ACLS guidelines: “It may be reasonable to consider administration of a vasopressor during cardiac arrest according to the
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Hypothermia SIM Case

				standard ACLS algorithm concurrent with rewarming strategies (Class IIb, LOE C)” (Hoek 2010)
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