



Patient Simulation

MEDICAL EMERGENCIES: HYPOTHERMIA

Instructor Information

Review the scenario with the patient or set up appropriate actions using a simulation system. Instructors may use each checkbox to indicate that the learner has requested an informational item regarding a given scene or patient feature. This simulation involves an 8-year-old male patient who was outside and became lost in the woods. The patient has been found by a search group, and you have been dispatched to the scene to care for the child.

Patient Information and Dispatch

Position: Found supine in heated vehicle
Moulage: Patient appears blue, cold to touch.
Props/additional personnel: N/A

Dispatch: You are dispatched to the scene of a search for an 8-year-old male who became lost during a snowstorm. It is the middle of winter and the outside temperature is 23°F (-5°C). The time is 0200.

Or

Hospital hand-off: An 8-year-old male arrived by EMS to the ED on a winter morning with an outside temperature of 23°F (-5°C). First responders report the patient is unconscious and breathing.

Initial Observations

SCENE ASSESSMENT

A search team member notifies you that they have found the child. Upon arrival, you find the patient inside a heated vehicle. The patient is unconscious and breathing.

Medical devices: None

WMD/odors/fumes: None

Cultural/social: None

Communication: Patient is unable to effectively communicate.

CARDINAL PRESENTATION/CHIEF COMPLAINT: Unconscious in vehicle

PEDIATRIC ASSESSMENT TRIANGLE

Appearance: Unconscious

Work of breathing: Slow and shallow; unable to see accessory muscle use due to winter clothing.

Circulation: Cyanotic skin



PRIMARY SURVEY

X (eXsanguinating hemorrhage): No bleeding noted.

A (Airway management and cervical spine stabilization): Patent

B (Breathing): Slow and shallow. Lung sounds are clear.

C (Circulation): No radial pulses. Carotid pulses are slow.

D (Disability): Obtunded, GCS = 4 (E2, V1, M1)

E (Expose/environment): No trauma noted when removing cold, wet clothing from patient.

FIRST IMPRESSION: QUICK OR NOT QUICK (circle or underline one)

LIFE THREATS

Life threats identified: Altered mental status, bradycardia

Life threat management: Provide oxygen. Remove cold, wet clothing. Begin warming patient.

Transport decision/disposition: Transport to closest appropriate facility; treat in ED. Treat as “Quick.” Do not delay transport to the ED for continued treatment.

Discussion Points

- Discuss the findings and physiologic effects of your primary assessment and how they relate to the patient’s condition.
- Define treatment options for the patient presentation.
 - Focus on warming the patient. Airway and breathing should be monitored for changes during the warming process. Breathing should be maintained using a BVM with supplemental oxygen.
- Identify transportation options. Are there pediatric facilities nearby or will aeromedical resources be requested? Is weather a factor in transportation?
- Ensure that the students assessed scene hazards with an understanding of environmental emergencies and proper treatment.

VITAL SIGNS

HR: 58

SPO₂: 80% on room air

RR: 12

BP: 64/44

Temp: 86°F (30°C)

ETCO₂ waveform: 31 mm Hg

4-lead ECG: Sinus bradycardia

Detailed Assessment

HISTORY

Onset: Hours in the snow

Palliation/provocation: Unknown

Quality: Unknown

Radiation: Unknown

Severity: Unknown

Time: Hours (unknown exactly how long)

Signs and symptoms: Unresponsive, cold to touch

Allergies: NKDA

Medications: Adderall XR

Past medical history: ADHD

Last meal: Dinner last night at 6 pm

Events preceding: Was out playing and became lost during a snowstorm

Risk factors: ADHD

SECONDARY SURVEY

Head: Unremarkable, no trauma noted

Eyes: PERRL and sluggish

Ears: Tips of ears are dark.

Nose: Tip of nose is dark.

Throat: Unremarkable

Chest: Equal chest rise with slow respirations. Lung sounds are clear. **Heart sounds:** no murmur.

Abdomen: Soft and nontender with no guarding or bruising. Bowel sounds are hypoactive.

Extremities: Cold to touch; no distal pulses present.

Other: Skin is cyanotic.

DIAGNOSTICS

Blood glucose: 88 mg/dL (4.9 mmol/L)

Weight: 66 lbs (30 kg)

Labs: N/A

Potential Diagnosis by Body System

Respiratory: Negative

Cardiovascular: **Cardiogenic shock, hypovolemic shock**

Gastrointestinal: Negative

Renal/Urinary: Negative

Reproductive: Negative

Endocrine/Metabolic: **Hypoglycemia**

Environmental: **Hypothermia**

Musculoskeletal/Integumentary: **Frostbite**

Neurologic: **Traumatic brain injury**

Toxicology: **Toxic exposure**

Infectious: **Sepsis**

REFINE DIFFERENTIAL DIAGNOSIS

Life threatening: Yes

Critical: Yes

Nonemergent: No

ONGOING MANAGEMENT:

Reassess: Discuss what reassessments will be performed and how often.

Refine diagnosis: Discuss with students.

Modify treatment: Discuss modified treatment options with students.

Patient disposition: Transport; treat in ED.

TREATMENTS/CRITICAL ACTIONS

Airway/breathing: Oxygen therapy via bag-valve mask (BVM) with warm, humidified oxygen, if available.

Circulation: Cardiac monitor, IV therapy, IV fluid bolus with warm fluids. Discuss triggers for dysrhythmias.

Discuss early warming techniques: remove wet clothing, provide warm blankets, and set heat high in vehicle.

Life threats managed: Discuss with students.

- Basic: Oral adjunct, oxygen, ventilatory support
- Advanced: Cardiac monitor, IV therapy, IV fluid bolus with warmed fluids

Transport decision (for prehospital): Determine transport time to facility.

- Emergent or nonemergent?
- Air or ground?

Destination: Transport to closest appropriate facility.

Teaching Points

1. Ask the students to discuss their physiologic goals for this patient and how they achieved them.
2. Ask the students to identify the “red flags” that indicated the patient’s condition was deteriorating and discuss.
3. Discuss with the students what the greatest life threat was with this patient.
4. What is a priority for this patient? Respiratory support or warming with fluids?
5. Should you consider a spinal cord injury for this patient? Why or why not?
6. Discuss with the students the three different types of hypothermia and the best treatment for each.
 - a. Mild: 93–95°F (35–36°C)
 - b. Moderate: 86–93°F (30–34°C)
 - c. Severe: < 86°F (< 30°C)
7. Ask the students to discuss the potential risks and benefits of their treatment alternatives.
 - a. Discuss rapid rewarming versus slowly rewarming patient.
8. Recognize and discuss multiple diagnoses and note that more than one can be accurate for a given patient.
9. Discuss cold water drownings and how they differ from warm water drownings.
10. Disposition
 - a. Admitted to ICU for monitoring.
 - b. Discharged after 48 hours of observation.

Take-Home Points/Critical Actions

- Ensure ventilatory assistance with positive-pressure ventilation with adequate oxygen. Use warm, humidified oxygen if possible.
- Ventilatory support should help increase the overall vitals (HR and BP). However, it is important to obtain vascular access and to provide a fluid bolus to assist with increasing both the HR and BP. Warmed fluids should be used for severe hypothermia.
- Initiate rewarming measures for hypothermia.

