Climate and Health Responder Course for Health Professionals

February 9th, 2022
Facilitators: Aaron Rosenblum and Dr. Emily Sbiroli
Panelist: Hayley Blackburn, Pharm.D
Learning Objectives

1. Describe the impacts of heat stress on physiology.
2. Explore the role of heat early warning systems and other measures in preventing negative health outcomes.
3. Describe how certain medications might aggravate climate-related exposures, such as extreme heat and proper handling of medications in heat waves.
4. Explain the roles and responsibilities of various members of the care team in providing care, especially in a post disaster setting (high volume of patients during a heat wave).
Patient Case
Patient Case Summary

HPI:
- 45 y/o M brought in by medics confused, sweating, and found outside his apartment

PMHx:
- DM, HTN, HLD

Social Hx: smoker 1PPD, lives alone (top story)

Allergies: Penicillin (rash)

Medications:
- Zestoretic (lisinopril/HCTZ) 20/25mg QD
- Metformin 1000mg BID
- Lantus 20 U QHS
- Metoprolol 25mg BID
- Gabapentin 300mg TID
- Seroquel 50mg nightly

Physical Exam:
- Vital signs:
  - HR 132, BP 85/54, RR 32, O2 sat 97% room air, blood glucose 250

  General: mildly obese male, ill appearing, moaning incomprehensibly
  HEENT: Normocephalic, atraumatic, dry mucous membranes, PERRL
  Neck: Supple, trachea midline, no JVD
  Heart: tachycardic, irregularly irregular, no murmurs
  Resp: Breathing spontaneously, tachypnic, clear lungs
  Abdomen: Soft, nontender, hypoactive bowel sounds
  Extremities: No deformities. 1+ pitting edema B/L.
  Distal pulses diminished throughout
  Neuro: Mildly confused, oriented to person and place but not time, CN intact, able to follow commands, moving all extremities but has global weakness
Pathophysiology of heat stress
Care team

- EMS
- Emergency Department
  - Nurses
  - Techs
  - Respiratory therapist
  - Pharmacist
  - Doctor
  - Social worker

Disposition?
Extreme Heat – Pharmacy Considerations

➢ Medication-induced heat intolerance
  ○ Altered central thermoregulation
  ○ Impaired sweating
  ○ Changes in peripheral vasodilation
  ○ Sedation & cognitive impairment impairing judgment, avoidance behaviors
  ○ Dehydration & hypovolemia
  ○ Changes in cardiac output

➢ Heat & pharmacokinetic changes
  ○ Altered transdermal/subcutaneous absorption due to changes in perfusion (e.g., fentanyl patches, SQ injections)
  ○ Effects of sweating on absorption of topical medications
  ○ Changes in distribution and clearance of medications in dehydrated patients à drug toxicity (e.g., lithium)
Medications & Heat-Related Illness

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Common medication classes associated with increased risk of heat-related illness:

- Anticholinergics (e.g., diphenhydramine, scopolamine)
- Antipsychotics
- Antidepressants
- Anxiolytics
- Diuretics
- ACE inhibitors/ARBs
- Beta-blockers
- Calcium-channel blockers
- Antiparkinson medications
- Amphetamines/stimulants
- Opioids
- Alcohol
Extreme Heat – Pharmacy Considerations

Medication storage:
- Insulin: max 86 °F per package, but recent data show no significant impacts on stability when stored at 98.6 °F or in cycling temps from 77-98.6 °F for up to 28 days\(^1,2\)
- Glucagon (up to 86 °F)
- GLP-1 RA (up to 77 °F)
- Other diabetes-specific considerations: sweating & insulin pumps or CGMs; accuracy of meters & test strips in extreme temps; walking on hot surfaces with peripheral neuropathy

General stability concerns in extreme heat: EpiPen, naloxone, hormonal contraceptives, hormones, biologics, antibiotics

Extreme Heat & Patient Risk Factors

- Chronic conditions
- Social isolation
- Medications

Heat Islands
Temperature varies with land use

Discussion
Key Resources

➢ CDC “Keep Your Cool in Hot Weather”
  ○ https://www.cdc.gov/nceh/features/extremeheat/index.html
➢ CDC Heat Tracker
➢ NIHHS Heat Resources
➢ Health Care Without Harm Climate Council
  Extreme Heat Brochure
  ○ https://practicegreenhealthgc.wufoo.com/forms/z1mbvqg10hcg0zu/

OSHA-NIOSH Heat Safety Tool
Centers For Disease Control and Prevention
#124 in Weather
Rating: 2.8 • 54 Ratings
Free

EPA AIRNow
United States Environmental Protection Agency (USEPA)
Designed for iPad
Rating: 3.0 • 124 Ratings
Free
View in Mac App Store