As EMS providers we are called to treat several medical conditions. Heart Attacks, CVA’s and Diabetic Emergencies to most of us are a common call. But how often do we get the call where someone has a true medical emergency due to the heat. This month we will look at various heat emergencies.

In the world, there are approximately 4,000 heat related deaths yearly. 80% of those fatalities are elderly and is the second leading cause of death among young athletes. Our bodies like to be at a constant 98.6° to maintain homeostasis. Our control mechanism uses the hypothalamus in the brain as well as our peripheral thermo receptors to maintain the balance and control heat production and loss.

Heat loss through our body is done through conduction, convection, radiation and evaporation through our skin and respiratory tract. Hyperthermia is caused by the overwhelming of the thermoregulatory system due to environmental conditions (exogenous), excessive exercise or work (endogenous), or excessive clothing. As we get older, our thermoregulatory systems tend to slow down and we can’t compensate as well as we used to.

The response to the heat will be that we have an increase in our vasomotor tone and an increase in our cutaneous blood flow. This will result in a increased heart rate and cardiac output. Our parasympathetic response will be to start sweating. This can lead to dehydration.

Signs and symptoms of dehydration can be nausea, vomiting and abdominal distress. The patient may have vision disturbances, decreased urine output and poor skin turgor. Oral fluids can be administered to this patient as long as they are alert and oriented. IV fluids can be administered if the patient has any altered mental status or is nauseated.

Prickly heat is a rash that is caused by acute inflammation of the sweat ducts. It will present itself as a itchy pruritic rash. This will usually respond well to an antihistamine treatment, but if the patient has this condition for a prolonged time, they can develop chronic dermatitis.
Heat syncope is another condition and results from a cumulative effect of peripheral vasodilatation, decreased vasomotor tone and relative volume depletion. This usually occurs in non acclimated patients in early stages of exposure. You will need to evaluate your patient and rule out more serious causes of the syncope. Treatment for this condition involves rehydration, removal from the heat and rest.

Heat cramps are usually found in a patient in good condition who is working in the hot or humid environment. They have had profuse sweating which then causes a loss of potassium. The loss of potassium causes muscles to cramp. They will usually occur in the fingers, arms, legs and abdomen. The patient will also complain of nausea but will be normotensive. You may find the patient to be hypotensive and tachycardia with a normal mental status and body temperature.

Remove the patient to a cool place and have them rest and lie down. IV of NS can be established if the patient is too nauseated to drink a salt/water solution. Avoid massaging muscles and have the patient limit their activity.

Heat exhaustion is another condition that is caused when people work in hot, humid environments. The elderly are also at risk due to their decreased thirst mechanism. The patient will have an increased vascular space due to their vasodilatation and decreased blood volume due to sweating. This will cause a decreased mental status because of the lack of perfusion to the central nervous system.

Signs and symptoms include headache, dizziness, fatigue, nausea and confusion. The patient will have weakness and could have a syncopal episode. Profuse perspiration with pale skin, tachycardia, tachypnea and hypotension are also common. Orthostatic changes may also be present, so try to lay your patients down.

Move the patient to a cool place and have them lie down with their legs elevated. Sponge them with cool water if available and have a fan blowing on them to help with the evaporation process. Balanced salt/water solution or an IV of NS if the patient is too nauseated to drink. If the patient had a decreased mental status, make sure to check their blood glucose level. The patient should be seen in the hospital if they have had a loss of consciousness or have a cardiac condition.
Heat stroke is a true emergency and must be treated aggressively. It has been said that there is a triad of conditions that are together to help diagnose heat stroke. They are a temp of greater than 104.9*, CNS dysfunction and a lack of sweating. The absence of sweating is not a reliable clinical feature. The increased temperature damages the hypothalamus and heat regulation then fails. There is an associated 25-50% mortality rate with heat stroke.

There are different types of heat stroke as well. Exertional heat stroke occurs in healthy young people in hot environments. Heat builds up faster than it can be removed and then damages the hypothalamus. The patient in this condition may actually be sweating heavily.

With classic heat stroke, it occurs in the elderly, alcoholics, obese, heart disease patients and those taking phenothiazines such as tranquilizing or antipsychotic medications. In these patients the heat buildup can be slowly over several days. They may have dry skin and the absence of sweating.

Signs and symptoms of heat stroke can be headache, dizziness and irritability with decreased level of consciousness and seizures. A bounding pulse progressing to a rapid weak pulse with hypotension due to the vasodilatation is common. Treatment must start with your ABC’s for a heat stroke emergency and deliver high flow 02 or secure the airway. Monitor Sp02, EKG and temperature while providing volume replacement with IV fluids. Rapid cooling to a temp of at least 102*

There are several techniques that may be used to cool the patient. EMS has the options to use evaporation and ice packs. In the hospital setting, they can even do immersion, gastric lavage, peritoneal lavage and even cardiac bypass. Do not use wet sheets over the patient without good air movement since that may actually increase their temperature. Do not let cooling in the field delay your transport.

Other management considerations include glucose for hypoglycemia and versed for any seizure activity. Always watch your monitors for cardiac dysrhythmias and pulmonary edema since your patient may go into heart failure and cardiovascular collapse.

Ref: [www.doh.wa.gov/hsqa/emstrauma/OTEP/heatemerg.ppt](http://www.doh.wa.gov/hsqa/emstrauma/OTEP/heatemerg.ppt) and McHenry Western Lake County EMS Environmental Emergencies Mini Drill.
Name: ___________________________
Department: ______________________
Date:    _________________________
Level of Practice: _______________

1) Signs and symptoms of dehydration can be ________, __________ and ____________.

2) Why are the elderly at risk for dehydration? ________________________________.

3) Peripheral vasodilatation, decreased vasomotor tone and relative volume depletion is a condition known as ____________________.

4) If a patient has dry skin and absence of sweating, they may be in ________________.

5) The control mechanism in the brain to regulate temperature is the ________________.

6) Signs and symptoms of heat exhaustion are __________, __________, __________, __________, __________ and ____________.

7) If a patient with a heat emergency has an altered LOC, make sure to check this. ________.

8) This is a rash caused by acute inflammation of the sweat ducts. ________________.

9) Heat cramps will usually occur in the __________, __________, ____________ and ________________.

10) Heat cramps can be caused by the loss of _____________________.

If you are NOT a member of the McHenry Western Lake County EMS System, Please include your address on each optional quiz turned into our office. Our mailing address is: Northwestern Medicine – McHenry Hospital EMS, 4201 Medical Center Drive, McHenry, Illinois 60050. We will forward to your home address verification of your continuing education hours.

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