EXERTIONAL HEAT ILLNESS VS. HEAT STROKE

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CASE PRESENTATION

You are the doctor on the field, watching a soccer game between 2 local high schools in mid-August, suddenly, you get called about a 16 yo female soccer player. When you arrived, she was tachycardia, sweating, complaining of headache and nausea and dizziness with a temp of 38.5C

What are your immediate first steps?

FIRST STEPS IN THE FIELD

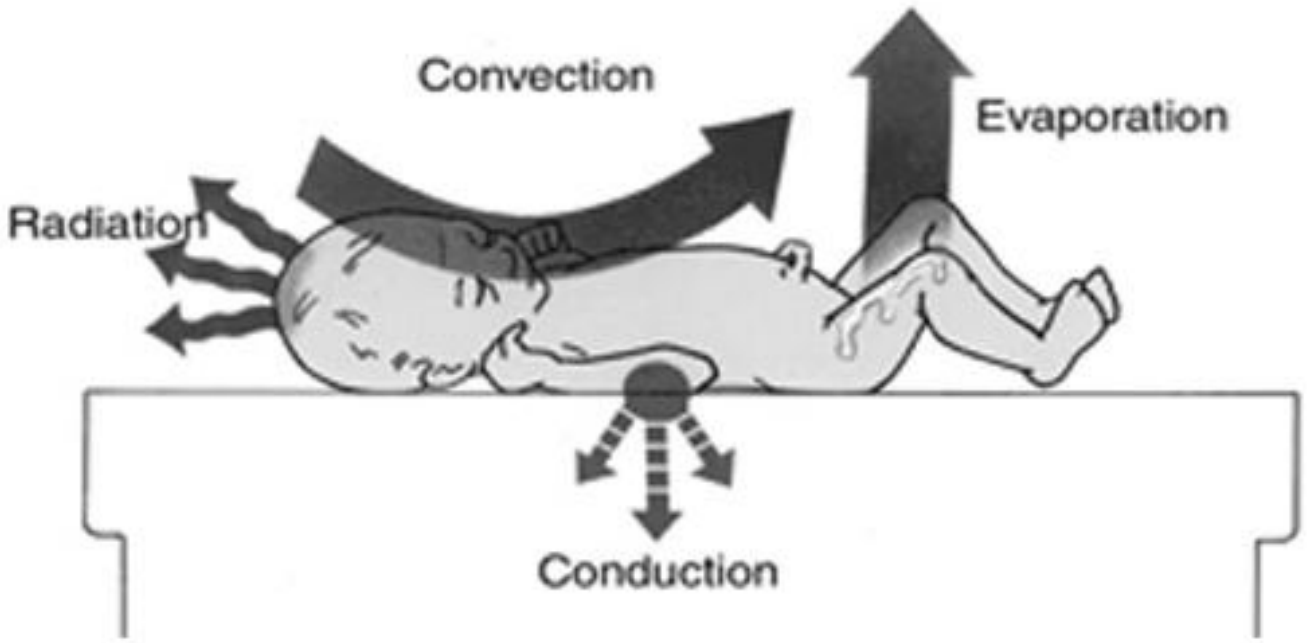
- Move to cool environment
- Remove excess clothing- get rid of gear or other coverings
- Give chilled salt-containing liquid
- Evaporative cooling or Ice water immersion depending on equipment

Continue with the cooling measures until the patient's temperature is < 102 or if you've cooled for at least 10-15 min (if no rectal thermometer available)

ICE WATER IMMERSION- GOLD STANDARD

- The amount of damage that's done is proportional to the time spent with elevated core body temperature
- Fastest way of cooling is through ice water immersion
- Place a towel across the patient's chest to hold them up in the ice tube
- Stir the water vigorously
- Remember to place a rectal thermometer – axillary, oral, or tympanic membrane temperature are NOT accurate!!

MODES OF HEAT LOSS



IN HOSPITAL CARE

- Remember your ABC's! (airway breathing, circulation)
- IV fluids or PO fluids for dehydration
- Check electrolytes- can see hypernatremia or hyponatremia (either from excess sweat or hypotonic fluid loss)
- Rapid cooling- cooling blanket, ice packs to neck, axilla, groin, spray patient with water and fanning
- Ice water immersion is OK too, but it is often difficult to do ice water immersion while simultaneously doing other interventions.
- Benzo to suppress shivering
- Supportive care for any end-organ damage

IMPORTANT PEARLS

- Rectal temperature is the last invasive way to obtain core body temperature. Once you started cooling, oral/TM/axillary temperature are all unreliable
- Do not give antipyretics (Tylenol or NSAID) These work on changing the hypothalamus temperature set-point, which is functioning appropriately in these patients.
  - They can exacerbate complications such as AKI, hepatic failure or DIC

EXERTIONAL HEAT ILLNESS VS. HEAT STROKE

- Difficult to differentiate between the two while on the field.
- Exertional heat illness can be accompanied by mild cognitive impairment as well, but it should not be long lasting.
- You would often see a high core body temperature for heat stroke, > 103

COMPLICATIONS

Basically everything!!! Due to the increase inflammation and denatured protein, you can get multi-organ failure from heat stroke.

- Electrolyte abnormalities
- Seizures or agitated delirium
- ARDS
- Rhabdomyolysis which can lead to AKI
- Hepatic injury or DIC
- GI bleed/ischemic bowel injury
- Myocardial injury

PATHO PHYS

4 proposed mechanism

- Acute phase reactant and inflammatory cascade
- Direct injury due to denaturation of proteins
- Vascular endothelium injury- impaired microcirculation and DIC
- Intestinal ischemia + increased permeability followed by endotoxemia

Increase temp lead to increase metabolic rate-> hyperpnea and tachycardia

REFERENCES

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