**Exercise Induced Collapse: Hyperthermia**

See also Exertional Heat Illness in Athletes

**Background**
1. Endurance exercise
2. 75% of energy dissipated as heat
3. Sweat evaporation allows cooling
   - Encourage fluid consumption

**Pathophysiology**
1. Heat cramps, heat exhaustion, heat stroke
2. Mental status-only affected by heat exhaustion/heat stroke
3. Heat stroke
   - Occurs when brain unable to autoregulate core body temp
4. Heat load can be due to environment/muscle action or both
   - Muscle activity-warmed blood delivered back to core causes increased body temperature
   - Core body temperature rises:
     - 0.15-0.2 °C for every 1% of bodyweight lost to dehydration during exercise
5. Heat exposure reduces performance
   - Usually independent of hydration
   - Misconception:
     - Dehydration causes heat exhaustion and heat exhaustion causes collapse
     - Even low levels of dehydration (<2% loss of body weight) impair cardiovascular and thermoregulatory response
     - Results in reduced exercise capacity

**Diagnostics**
1. Hypotension
2. Tachycardia
3. Skin hot/dry or sweating
4. Rectal temperature >40.5 °C (105 °F)

**Therapeutics**
1. Move athlete to cool environment
2. Remove as much clothing as possible
3. Apply ice packs to superficial great vessels in neck, axilla, and groin areas
4. Ice bath immersion not recommended
   - Profound peripheral vasoconstriction/shivering may increase core body temperature
5. Cautious IVF due to risk of cerebral/pulmonary edema
6. Stop cooling when core temp reaches 38 °C (100.4 °F)
**Prevention**

1. Optimal performance
   - Minimize dehydration/hyperthermia
     - Ingest amount of fluid approximating sweat loss even if exercise only lasts 1 hour
   - Allow body to acclimatize (8-10 days in adults/10-14 days in children)

2. Light-weight, loose-fitting clothes

**References**

3. Camargo, C, Simmons, FE. Anaphylaxis: Rapid recognition and treatment. UpToDate Online 16.3 Topic last update 10/10/08

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