

Cold Injury Lecture

Cold injury is dependent on multiple factors:

- Health status of victim
- Environment
 - Temperature
 - Wind
 - Moisture
 - Heat Sinks
- Protection
 - Wind Shield
 - Clothing
 - Dryness

3 main categories of injury:

- Trenchfoot
- Frostbite
- Hypothermia

Trenchfoot-

No intracellular ice crystals formed.

Reversible if treated before severe or progresses to frostbite.

Symptoms(Sxs)-

- Cramps in lower legs
- Painful feet
- Pins and needles shooting from feet into legs

Signs

- Redness in feet, progressing to:
- Paleness in feet
- Swelling in feet

Frostbite-

Damage due to formation of ice crystals inside the cells.

3 grades:

Mild (1st degree)-

Sxs/Signs: redness of affected part, blue mottling, swelling and firmness, white or tan plaque, decreased sensation

Moderate (2nd degree)-

Sxs/Signs: redness progresses to whiteness, significant swelling and decreased pliability of the affected tissue, blisters*

Severe (3rd degree)-

Sxs/Signs: tissue damage through the skin to the muscle and fascia, possible progression to involve the bone, gangrene or mummification.

Hypothermia-

3 grades:

Mild (1st degree)- Core temperature from 37 to 33 °C

Sxs: shivering*, mood change, apathy, fatigue, hunger

Signs: Increased heart rate and blood pressure, difficulty walking and talking normally

Moderate (2nd degree)- temp 33-27 °C

Sxs: stop shivering, poor mentation- lethargic to stupor

Signs: dilated pupils, diminished reflexes, decreased blood pressure & threshold for ventricular fibrillation

Severe (3rd degree)- temp <27 °C

Sxs: coma, few if any signs of life

Signs: loss of reflexes, acid-base and coagulation abnormalities, no pain response

Shivering is a very important clue that the victim needs to get warm soon- add clothing, get to shelter, etc.

Treatment:

- 1) Rewarming- rapid, best in tub of warm water 40-42 °C, until skin is soft again.
- 2) Allow victim to move, but don't rub the skin.
- 3) Pad the body, extremities during transport, and move very gently*.
- 4) Keep the victim warm during transport, do not rupture blisters if present.
- 5) Elevate frostbitten extremities.
- 6) Hydrate the victim with warm fluids by mouth or intravenously if appropriate.
- 7) Ibuprofen 400 mg 3x/day by mouth, possibly antibiotics.
- 8) If victim appears dead, do not leave as such, warm and transport, CPR may be indicated.

Prevention:

- 1) Get adequate sleep and rest in cold environments, retain good judgement.
- 2) Consume adequate calories, and keep well hydrated.
- 3) Avoid excesses of alcohol and tobacco.
- 4) Get adequate oxygen in high altitudes.
- 5) Avoid prolonged contact with cold metals, water (heat sinks)
- 6) Keep dry, esp. feet.
- 7) Dress in layers with non-constrictive clothing:
 - Outer- Non-breathing fabric to shield against wind, e.g. Goretex™
 - Intermediate- Insulation with airspace, e.g wool
 - Inner- Cotton against skin, polypropylene aboveKeep head covered
Protect feet from ground heat sink with insulated high-top boots, and double layer cotton then wool
Socks, but socks should have no wrinkles to protect feet from friction/blisters.