HEAT, COLD, ELECTRICAL, CHEMICAL INJURIES
BURN INJURIES

- Direct or indirect heat/electrical/radiation and chemical energy
- Exposure must be longer than threshold to cause damage
- Major pitfalls of burn injuries:
  - High morbidity (suffering, disability)
  - Financial loss
PATHOPHYSIOLOGY

- 45°C

- Vasoactive mediators are released from damaged tissue
- Loss of plasma into the interstitium
- Hypovolemic shock
- Hypoperfusion
- Organ damage

- Kidney
- GIT
- Lung
- Metabolism
CAUSES

• Thermal burns
  • hot fluid, steam
• Flame
• Chemical burns (acid, alkali)
• Electrical burns
• Radiation burns
THERMAL BURNS

- Contact
- Scald

- Flame
  - + possible inhalation trauma
  - + possible intoxication

especially common in kids (95%), coffee
ELECTRICAL BURNS

- Bones have the highest electrical current resistance. Therefore, when electrical current is passing through the bone, it produces a lot of heat which may cause collateral damage to tissues attached to the bones.
- Nerves and blood vessels present the lowest current resistance.
- Electrical damage usually just on the site of current entrance and exit from the body + damage to deeper tissues depending on current resistance.
- Electrical arch, lightning (several thousand °C) - complete destruction of tissue on the entrance and exit site.
CHEMICAL BURNS

- Acids
- Alkali
- Other substances
DAMAGE EXTENT – RULE OF 9
DEPTH OF BURN INJURIES

- First degree

- Second degree
  - IIa
  - IIb
DEPTH OF BURN

• Third degree

• Forth degree
SEVERE BURN

- Kids up to 2 years - 5 % body surface area
- Kids third degree always
- Adults - 20 % body surface area
- + always

+ always includes inhalation trauma, electrotrauma, chemical burns with intoxication, radiation trauma
SPECIALIZED BURN CLINICS

- FN Brno Bohunice
- FN Kralovské Vinohrady - Prague
- FN Ostrava
FIRTS AID

• Remove the source of burn

• vital signs and secure vital functions

• Cooling of the wound

• Anti-shock precautions

• Transport
HEATSTROKE

- Usually a combination of hot and wet environment
- physical work and lack of fluids.

- Symptoms are thirst, weakness, nausea, vomiting, hallucinations/desorientation, loss of consciousness.
- Hot, dry and red skin, fast and shallow pulse, fast breathing.
FIRST AID

- Lower the body temperature
- Cold fluids
SUNSTROKE

- Direct effect of sunlight on head
- First to second degree burns
FIRST AID

• Remove the victim from direct sunlight
• If fully conscious – cooling of the head + body, administer cool fluids
• If unconscious – same as heatstroke
HYPOTHERMIA

• Symptoms

• First aid

• Bring the patient to a warm environment or at least prevent further heat loss

• Moderate hypothermia
  - Active + passive warming, exercise, warm baths (37–40°C), warm fluids. No alcohol.

• Severe hypothermia
  - Secure vitals, prevent further heat loss, passive rewarming – no active rewarming or just in places with large blood vessels (neck, groins), fast transport.
FROSTBITES

1. degree
   - pale or purple skin, stinging pain

2. degree
   - pale – grey skin, very painful, blisters after rewarming

3. degree
   - waxy pale skin, not painful, risk of skin necrosis
FIRSTS AID

- Do not rub the injured places with snow or ice.
- Bring the victim into a warm environment (25°C).
- Sterile bandages on injured places, do not remove the blisters (risk of infection).
- Injured places without blisters may be submerged in hot water.
- Anti-shock precautions.
- Threat hypothermia.
- Transport.
CHEMICAL BURNS

- Cause not known

- Acids
  - You may try to neutralize the substance: alkali soap, soda on the bandage.

- Alkali
  - You may try to neutralize the substance: diluted vinegar, lemon juice on the bandage.
INGESTION

- Do not make the patient vomit
- Do not use the neutralization substances, only water
- Secure airways
- Vital signs
- Emergency
ELECTRICAL BURNS

- Low voltage 1000 V

- High voltage > 1000 V

- Lightning
THANK YOU FOR YOUR ATTENTION