PHYSICAL INJURIES

TERMAL INJURIES

A. EFFECTS OF HEAT

1. LOCAL (from 50ºC): - burn (Combustio) – hard object, fire
   - scalding burn (Ambustio) – liquids, steam
   - 4 degrees of tissue damages, Wallace rule "rule of nines"
   - modification for children (larger surface of head)
   - thermal illness:
     1. phase: disturbance of circulation (loss of liquid, duration of 13 d.)
     2. phase: toxemia and infection (up to 2 w.)
     3. phase: healing of burns
   - Death due to - thermal shock, secondary infections, damages of kidneys, acute ulcers
   - Distinction: ante and postmortem burns
2. GENERAL EFFECTS:
   - response: activation of thermoregulation centre, heat production, ↑release of temperature (metabolism, vasodilatation, sweating)
   - Failure of thermoregulation – stop of sweating - ↑ body temperature = Hyperthermia:
     a) thermal cramps - ? loss of salt
     b) thermal exhaustion – thirst, headache, vomiting, cramps
     c) thermal stroke – complete stop of sweating and increase of temperature to 41ºC: dry skin, slow of breathing, rapid pulse, increased of pressure, epi cramps
   - Individual hypersensitivity!, autopsy findings non-specific
   - sweltering (Sideratio): + high humidity – direct thermal disturbance with disbalance of liquid and electrolytes
   - sunstroke (Insolatio): direct effect of sun on the head

B. EFFECTS OF COLD

1. LOCAL DAMAGES
   - 3 degrees of tissue damages: I – perniones
     II – vesicule, bulle
     III – necrosis→gangrena (sicca, humida)
2. GENERAL EFFECTS
   - freezing (Congelatio)
   - undercooling (Hypothermia) - ↓ body temperature → peripheral vasoconstriction → spasm of capillaries→ stop of sweating, ↑ muscular cavity→ paralysis → shivering, ↓↓ body temperature: sleepy, death (24ºC)
   - alcohol!

INJURY BY ELECTRIC ENERGY

A. ELECTROCUTION (Elecrocutio)

Depends on: - characteristics of current and organism
- type of current (alternating more dangerous),
- frequency (40-100 Hz),

- voltage (120-220 V),
- amperage (100 mA),
- skin resistance (usual1.500-2.000 Ω),
- path through the body
- readiness

Electrical burn (Signum electricum)

B. LIGHTNING (Fulguratio)
Statically electricity of high voltage; produced when the charged undersurface of a thundercloud send its electrical charge to the ground
Electrical burns, burns, laceration wounds, arborescent burn -patterned area of transient erythema
Retrograde amnesia, muscles pain
Deaths caused by cardiopulmonary arrest or electrothermal injuries
Accidents, criminal responsibility

EFFECTS OF RADIATION

- Visible light – sun energy
- infrared light – heat energy
- UV light – cold light
- X-ray and radioactive elements
    - shorter waves – bigger damages
    - early damages, acute radiation illness, late damages,
    - nuclear explosions: mechanical, thermical and radiation effects