MANAGEMENT OF PATIENT WITH BURNS

Definition

- Injuries that result from direct contact or exposure to any physical, thermal, chemical, electrical, or radiation source are termed as Burns.

CLASSIFICATION

Etiology

- Based on **Cause**
  - **Thermal**
  - **Electrical**
  - **Chemical**
  - **Radiation**
  - **Inhalation**

Thermal Injuries

- Most common
- Types : Dry & wet

Contact

- Direct contact with hot object (i.e. pan or iron)
- Anything that sticks to skin (i.e. tar, grease or foods)

Flame

- Direct contact with flame (dry heat)
- structural fires / clothing catching on fire

Scalding

- Direct contact with hot liquid / vapours (moist heat)
- Cooking, bathing or car radiator overheating
- Single most common injury in the paediatric pt

Electrical Burns

- Usually follows accidental contact with exposed object conducting electricity
  - Electrically powered devices
  - Electrical wiring
  - Power transmission lines
- Can also result from Lightning
- Damage depends on intensity of current

- **Low-tension injuries(<1000 V)**
  - Low energy burns → Minimal damage to subcutaneous tissue
  - Entry & Exit points – fingers → small deep burns
  - AC → Tetany within muscles, cardiac arrest due to interference with normal cardiac pacing
- **High-tension injuries(>1000V)**
  - Earthed high tension lines → Arc over the patient → Flash burn

- **Severity depends upon:**
  - what tissue current passes through (Low voltage/ High voltage)
  - width or extent of the current pathway
  - AC or DC
  - duration of current contact

- Lightning
  - HIGH VOLTAGE!!!
  - Injury may result from
    - Direct Strike
    - Side Flash

Chemical Burns

- Usually associated with industrial exposure
- Accidental mishandling of household cleaners

Degree of tissue damage determined by

- Chemical nature of the agent
- Concentration of the agent
- Duration of skin contact

Acids- Eg- Formic acid,sulphuric acid

Alkalis - Eg. Lime, potassium hydroxide

Radiation Exposure

- Waves or particles of energy that are emitted from radioactive sources

- Alpha radiation
  - ✓ Large, travel a short distance, minimal penetrating ability
  - ✓ Can harm internal organs if inhaled, ingested or absorbed
- Beta radiation
  - ✓ Small, more energy, more penetrating ability
  - ✓ Usually enter through damaged skin, ingestion or inhalation

INHALATION

- **Smoke and inhalation injury**
  - carbon monoxide poisoning
  - inhalation injury above glottis
  - inhalation injury below glottis

According Depth of burn

- ***Superficial Partial-Thickness (First Degree burn)***

cause-Sunburn

Low-intensity flash

Skin involvement- Epidermis

Symptoms- Reddened, Tingling, Pain that is soothed by cooling

Deep Partial-Thickness (Second Degree)

Cause

- Scalds
- Flash flame
- Contact burns
- chemical

Skin involvement- Epidermis, upper dermis, portion of deeper dermis

Manifestations- Blisters that are red, shiny. Severe pain caused by nerve injury ,mild to moderate edema

- Recovery in 2 to 4 weeks, some scarring and depigmentation contractures

Full-Thickness (Third Degree)

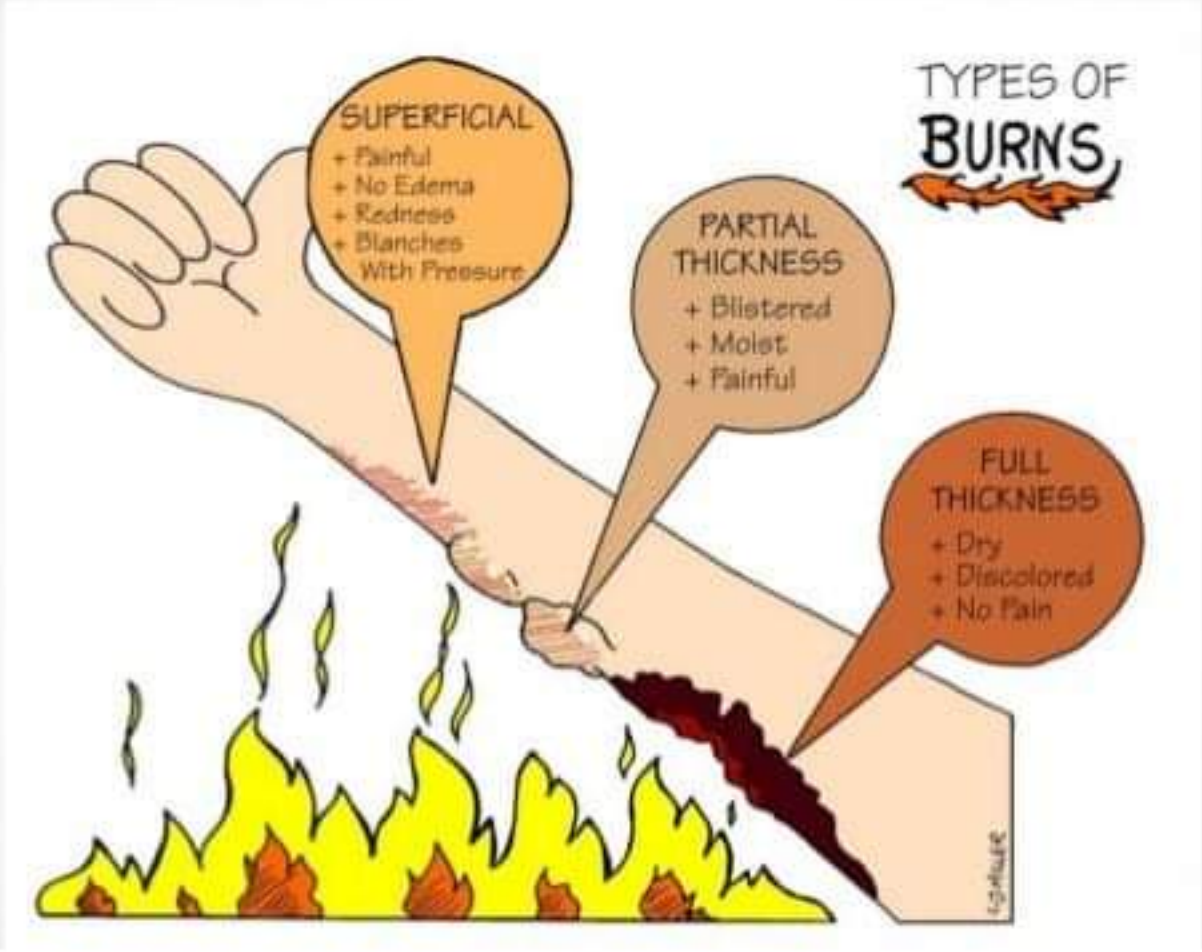
Cause-

- Flame
- Prolonged exposure to
- hot liquids
- Electric current
- Chemical

Skin involvement- Epidermis, entire dermis, and sometimes subcutaneous tissue; may involve connective tissue, muscle,
and bone

Manifestations- Dry; pale white, Leathery, visible thrombosed
blood vessels

- Pain free, all skin elements and local nerve endings are destroyed, surgical intervention required for healing


TYPES OF
BURNS
SUPERFICIAL
+ Painful
+ No Edema
+ Redness
+ Blanches
With Pressure
PARTIAL
THICKNESS
+ Blistered
+ Moist
+ Painful
FULL
THICKNESS
+ Dry
+ Discolored
+ No Pain

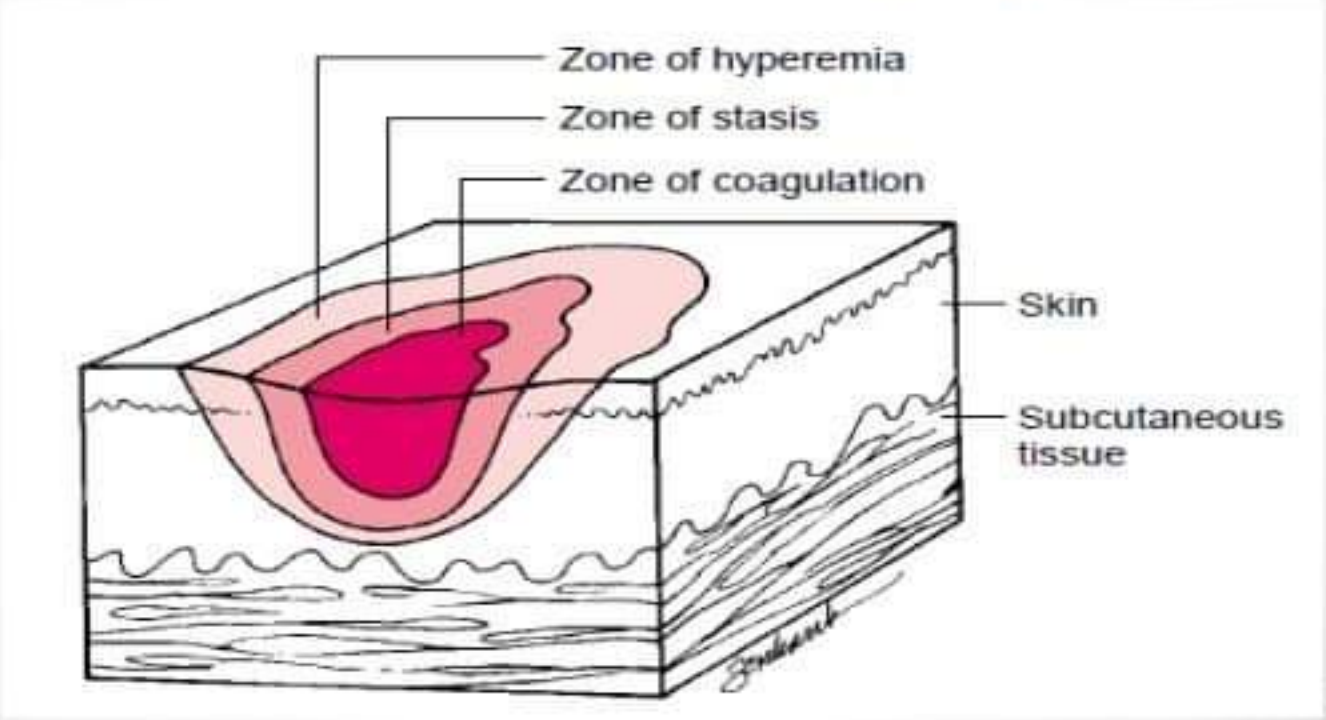
PALM METHOD

- In patients with scattered burns, a method to estimate the percentage
- of burn is the palm method. The size of the patient's palm is approximately 1% of TBSA.

Location of burn

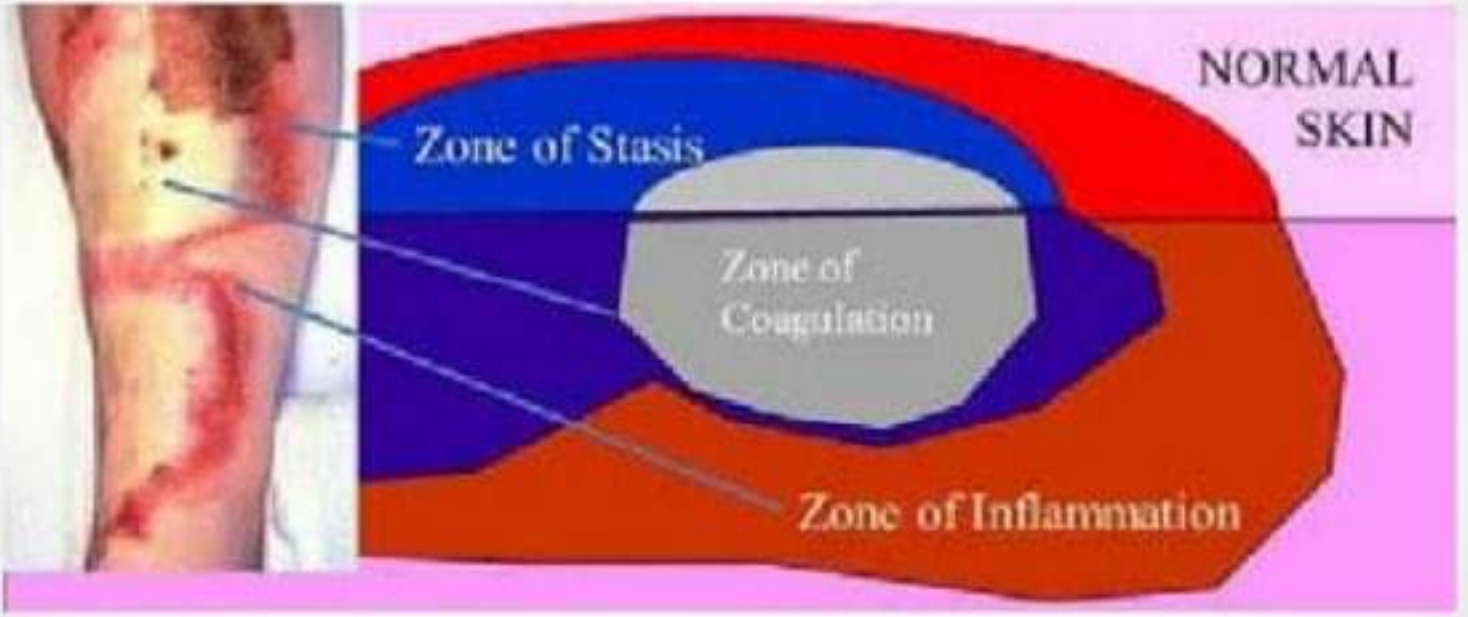
- Burns to face, neck ,chest and back may inhibit respiratory function due to mechanical obstruction secondary to edema, eschar formation
- Burns to the ear, nose are susceptible to infection because of poor blood supply
- Burns to buttocks, genitalia are susceptible to infection because of contamination
- Burns on extremities cause circulatory compromise and neurologic impairment.

Zones of burn injury

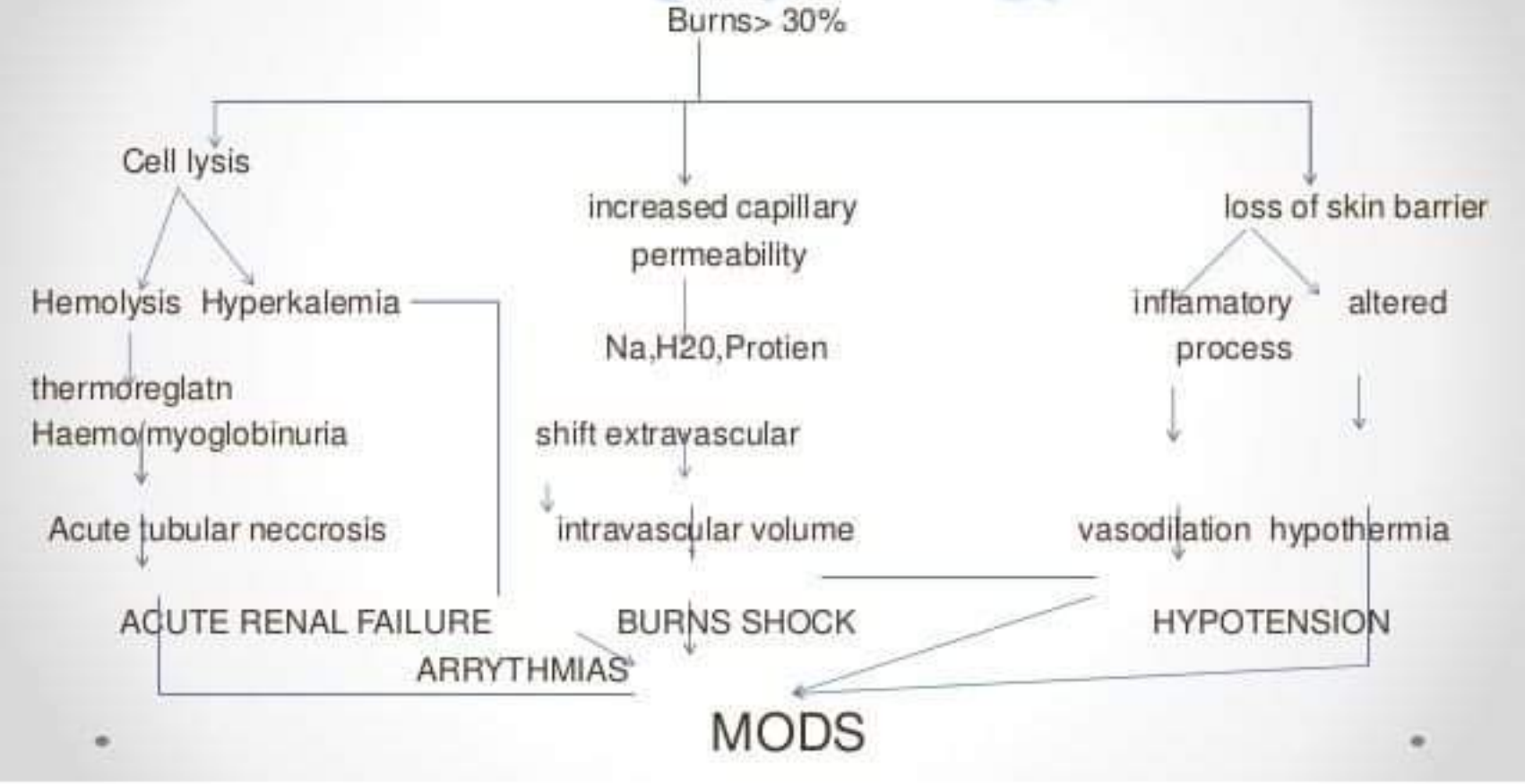


Zones of burn injury

- The inner zone (known as the zone of coagulation, where cellular death occurs) sustains the most damage
  - Necrotic area with cellular disruption
  - Irreversible tissue damage
- The middle area, or zone of stasis, has a compromised blood supply, inflammation, and tissue injury, Can survive or go on to coagulative necrosis depending on wound environment
- The outer zone—the zone of hyperemia—sustains the least damage


NORMAL
SKIN
Zone of Stasis
Zone of
Coagulation
Zone of Inflammation

Pathophysiology



MANAGEMENT

Phases of burn management

- 1. emergent phase/resuscitative phase
- 2.Acute phase/ wound healing phase
- 3. Rehabilitative phase/Restorative phase

PRE HOSPITAL MANAGEMENT

- Rescuer to avoid injuring himself
- Remove patient from source of injury
- Stop burn process
- Burning clothing; jewelry, watches, belts to be removed
- Pour ample water on burnt area (not ice/ ice packs – skin injury & hypothermia)

Evan's formula

- Requirement for first 24 hrs
  - Colloids : 1ml/kg/% burn
  - Saline : 1ml/kg/% burn
  - D5 : 2000ml

- Requirement for second 24 hrs
  - ½ of first 24 hrs

Wound care

- **Wound care should be delayed until a patent airway, adequate circulation and adequate fluid replacement have been established.**
- **2 types of wound treatment used to control infection**

1. **open method**
2. **multiple dressing change method**

Closed method

- Advantages
  - Less wound desiccation
  - Decreased heat loss
  - Decreased cross contamination
  - Debriding effect
  - More comfortable
- Disadvantages
  - Time consuming
  - Expensive
  - Increase chances of infection if not changed frequently