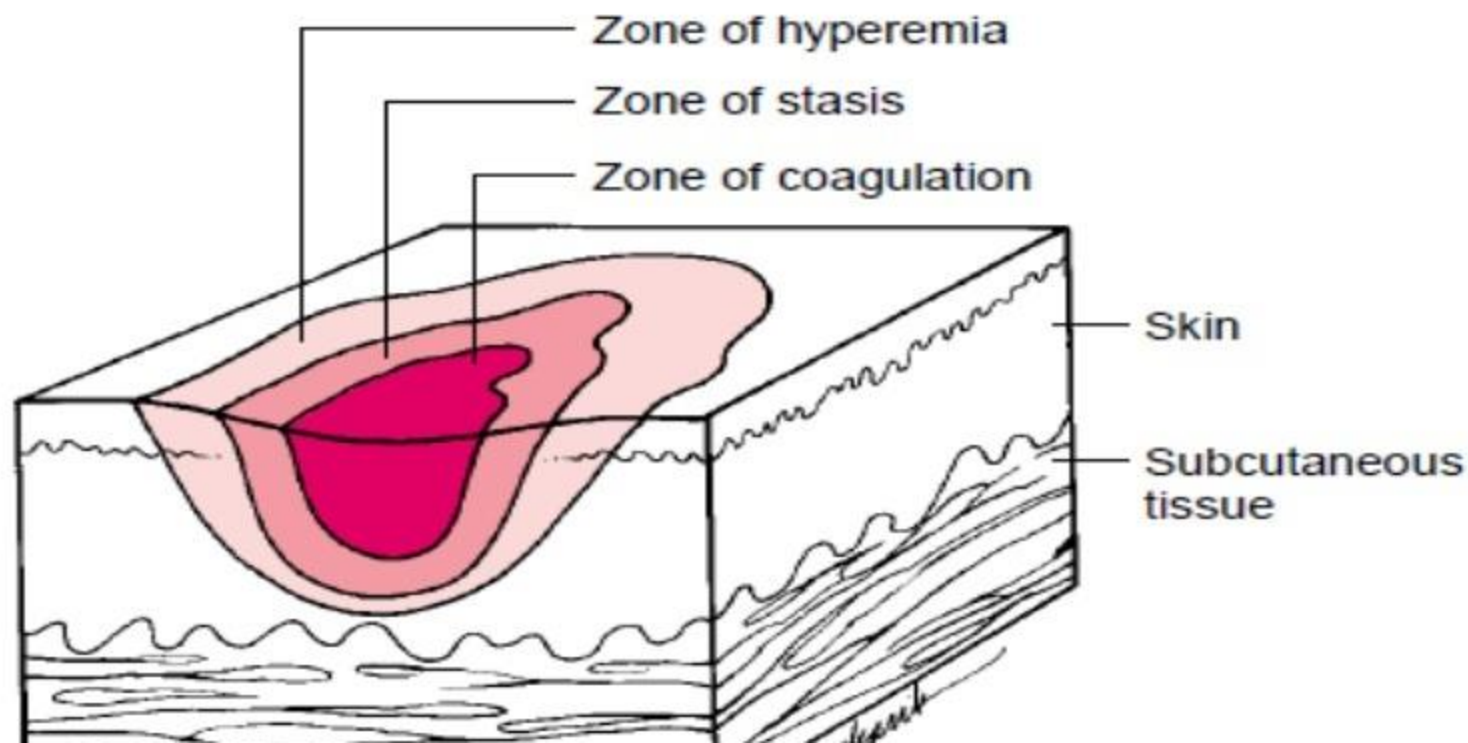


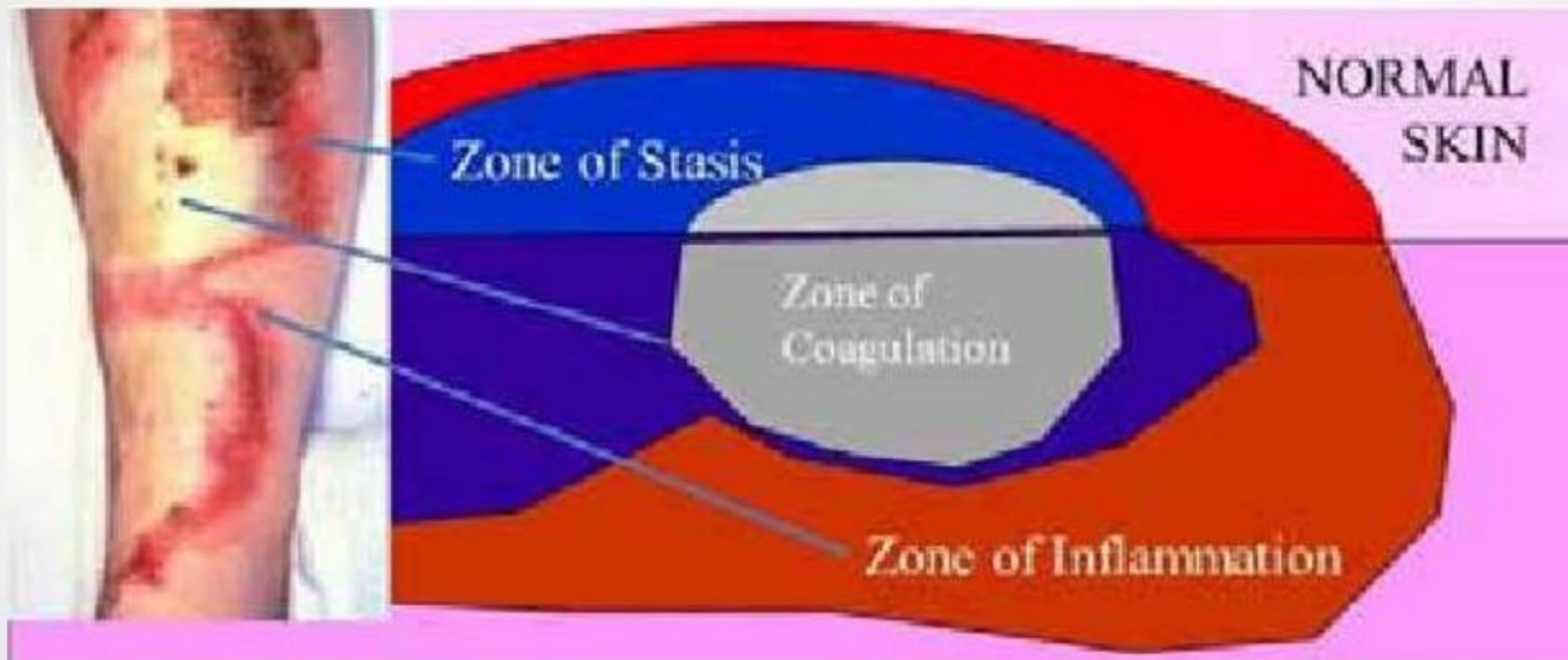
Patient risk factors

Zones of burn injury

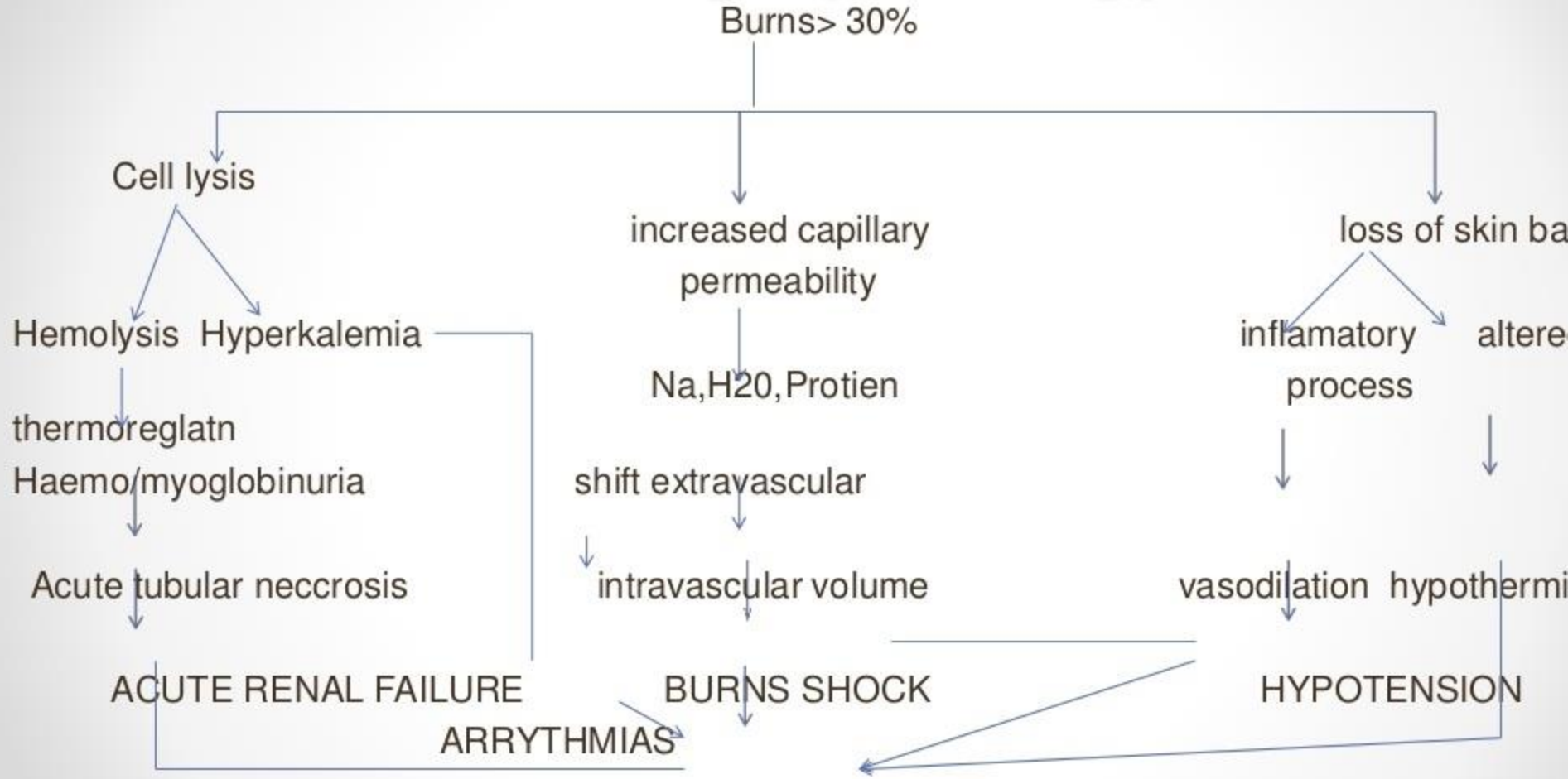


Zones of burn injury

- 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



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)

▶ **Chemical burns:**

- ▶ Remove saturated clothing
- ▶ Brush skin if agent is powder
- ▶ Irrigation with copious amount water to be started and continued in hospital

▶ **Electrical burns:**

- ▶ Turn off the current
- ▶ Use non-conductor item to separate from source

- Small thermal burns ($<10\%$ TBSA) may be covered with a clean, tap water-damped towel for patient comfort and protection until definite medical care instituted
- Cooling of injured area within 1 minute helps minimize the depth of injury
- If the burn injury is large ($>10\%$ TBSA) it is not advisable to immerse the body part in cool water since doing so might lead to extensive heat loss

- Do not break blisters.
- Do not apply lotions, powders, grease, ghee, gentian violet, calamine lotion, toothpastes, butter and other sticky agents over the burn wound.
- Prevent contamination: Wrap burn part in clean dry sheet /cloth.
- Assess for life threatening injuries.

EMERGENT/RESUSCITATIVE PHASE

- This phase may last 24-48 hours after injury

Resuscitation phase characterized by:

- Life-threatening airway problems
- Cardiopulmonary instability
- Hypovolemia

- Goal:
 - Maintain vital organ function and perfusion

- **Assess A B C**
- ET intubation + assisted ventilation with 100% O₂ if:
 - Overt signs and symptoms of airway obstruction (Progressive hoarseness)
 - Suspected inhalational injury (smoke/ carbon monoxide intoxication)
 - Unconscious patient/ rapidly deteriorating patient
 - Acute respiratory distress
 - Burns of face & neck
 - Extensive Burns (> 40% TBSA)

- Large gauge I.V catheter
- Central line Insertion
- Venesection
- Foleys catheter and NG tube placement
- Quick assessment of extent
- Tetanus prophylaxis (the only IM administered inj)
- Weigh the patient

- **History**

- Mechanism of injury
- Time of injury
- Surroundings (closed space/ chemicals)

- **Physical examination**

- Head to toe assessment
- Careful neurological examination (cerebral anoxia)
- Labs: CBC, electrolytes, BUN
- Pulmonary assessment: ABG, CXR, carboxyhemoglobin

- Pulse in extremities: manual/ doppler
- Loss of distal circulation
 - Pallor/coolness/absent pulse/loss capillary refill/decreased oxygen saturation
- Absent pulse: emergency escharotomy to release constrictive, unyielding eschar

ESCHAROTOMY

- It is the surgical division of the nonviable skin and tissues , which allows the cutaneous envelope to become more compliant
- **Deep 2nd & 3rd degree circumferential burns**
 - Chest: To allow respiratory movement
 - Limb: To restore circulation in limb with excess swelling under rigid eschar
- Not in SC tissue → Exposes SC fat



FLUID RESUCITATION

- Parkland Formula
- *Evan's formula:*
- Brooke formula

Parkland Formula

➤ Fluid of Choice

- Lactated Ringer's (RL)
- NS can produce hyperchloremic acidosis
- **4 ml x % of burn x weight (Kg) in 24 hours**
 - First 1/2 of total volume given in the first 8 hours
 - Remaining 1/2 of total volume given over following 16 hours

➤ NEXT 24 HRS

- **Total volume 1/2 of first day**
- Colloids (0.5 ml / kg / %)
- 5 % glucose to make up the rest

Brooke formula(modified)

- **2 ml x % of burn x weight (Kg) in 24 hours**
 - First 1/2 of total volume given in the first 8 hours
 - Remaining 1/2 of total volume given over following 16 hours

- **NEXT 24 HRS**
 - **Total volume 1/2 of first day**
 - Colloids (0 .3-0.5 ml / kg / %)

Evan's formula

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

- Requirement for second 24 hrs
 - 1/2 of first 24 hrs

Assessment of Adequacy of Fluid Resuscitation

- **Monitor**
 - Urinary Output
 - Adult: ≥ 1 ml/ kg/ hr
 - Daily Weight
 - Vital Signs
 - Heart rate and blood pressure
 - CVP
 - Level of Consciousness
 - Laboratory values

RESUSCITATION FAILURE

- Delayed resuscitation
- Electric burns
- Inhalation injury
- Escharotomy
- Carbon monoxide poisoning
- Elderly patients

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

Antimicrobial Agent

- **Silvadene (silver sulfadiazine) 1% cream-**
 - Most bactericidal agent
 - Minimal penetration of eschar
- **Mafenide acetate 5% to 10% (Sulfamylon) hydrophilic-based cream**
 - Effective against gram-negative and gram-positive organisms
 - Diffuses rapidly through eschar In 10% strength, it is the agent of choice for electrical burns because of its ability to penetrate thick eschar

- **Silver nitrate 0.5% aqueous solution-**
- Bacteriostatic and fungicidal
- Does *not* penetrate eschar

Analgesia

- Morphine sulphate
- Fentanyl
- Methadone
- Haloperidol
- Lorazepam
- Midazolam

ACUTE PHASE

- Begins 48 to 72 hours after the burn injury.
- In this phase the extracellular fluid start mobilize and start diuresis
- This phase is completes when wound is covered by skin grafts or the wounds are healed
- This may take weeks or many months

- Eschar begins to separate fairly after injury
- Re epitheliazation begins at wound margin and appears as red/pink scar tissue
- Hyponatremia/hypernatremia
- Hypokalemia/hyperkalemia
- Decreased hematocrit