Emergency Burn Care
For MO






ONCE A BURN PATIENT ALWAYS A PATIENT

95% of Burn injuries are preventable

So, always stress on Prevention

LEARNING OBJECTIVES

- Understand priorities of evaluation and resuscitation for burn patients
- Recognize signs of airway compromise requiring early intervention
- Understand the importance of avoiding hypothermia
- Understand initial fluid resuscitation rates for burn patients
- Understand simple calculation of burn surface area
- How to recognize and manage chemical and electrical burns

Burn

Defined as a breach in the continuity of integument by heat or an extreme cold caused by thermal, electrical or chemical agents or by ice etc.

MANAGEMENT/ PRIMARY RESUSCITATION
FIRST AID IN BURNS






Do's

- Stop the burning process- use water or sand
- ABC of resuscitation
- Cover the part with a clean cloth
- Shift patient to an appropriate burn care facility

In case of disaster - Triage

Don'ts

- Do not immerse large burns or the whole body in cold water.
- Do not use Ice.
- Do not forcefully remove clothes adherent to burnt skin
- Do not apply any local agents like paste, ink, etc.
- Do not break blisters.
- Do not cover burnt area with cotton wool.

In COVID19 situation

• While receiving the patient take full safety precautions while handling in casualty.

• Wear PPE and keep the patient in isolation.

• Send a sample for the COVID test as early as possible and

• Take full precaution till report comes.

ALWAYS REMEMBER YOUR SAFETY IS EQUALLY IMPORTANT AS THE TREATMENT OF THE PATIENT

SERIOUS BURNS: SHOULD BE REFERRED TO BURN SPECIALIST

Criteria to identify as Serious Burns

1.> 10% TBSA in children

2.> 20% TBSA in adults

3. Burns to face

4. Burns to hands

5. Burns to genitalia

6. Circumferential burns

7. Airway Burns

PRE-TRANSFER CARE

- Burns should be **dressed with clean, dry gauze only**
  - No antibiotic ointments are required for initial stabilization care
  - These will be applied by the receiving physician after wound care
- Re-check A B C
- Call receiving physician
- Give instructions to ambulance EMTs
  - Fluid rate
- Airway monitoring
- Pain medication
- Send patient to a dedicated burn center, if available

MANAGEMENT

- ABC’s
- Primary survey
- Secondary survey
- Wound management
- ICU
- Rehabilitation

BURN PATIENTS ARE EVALUATED LIKE TRAUMA PATIENTS

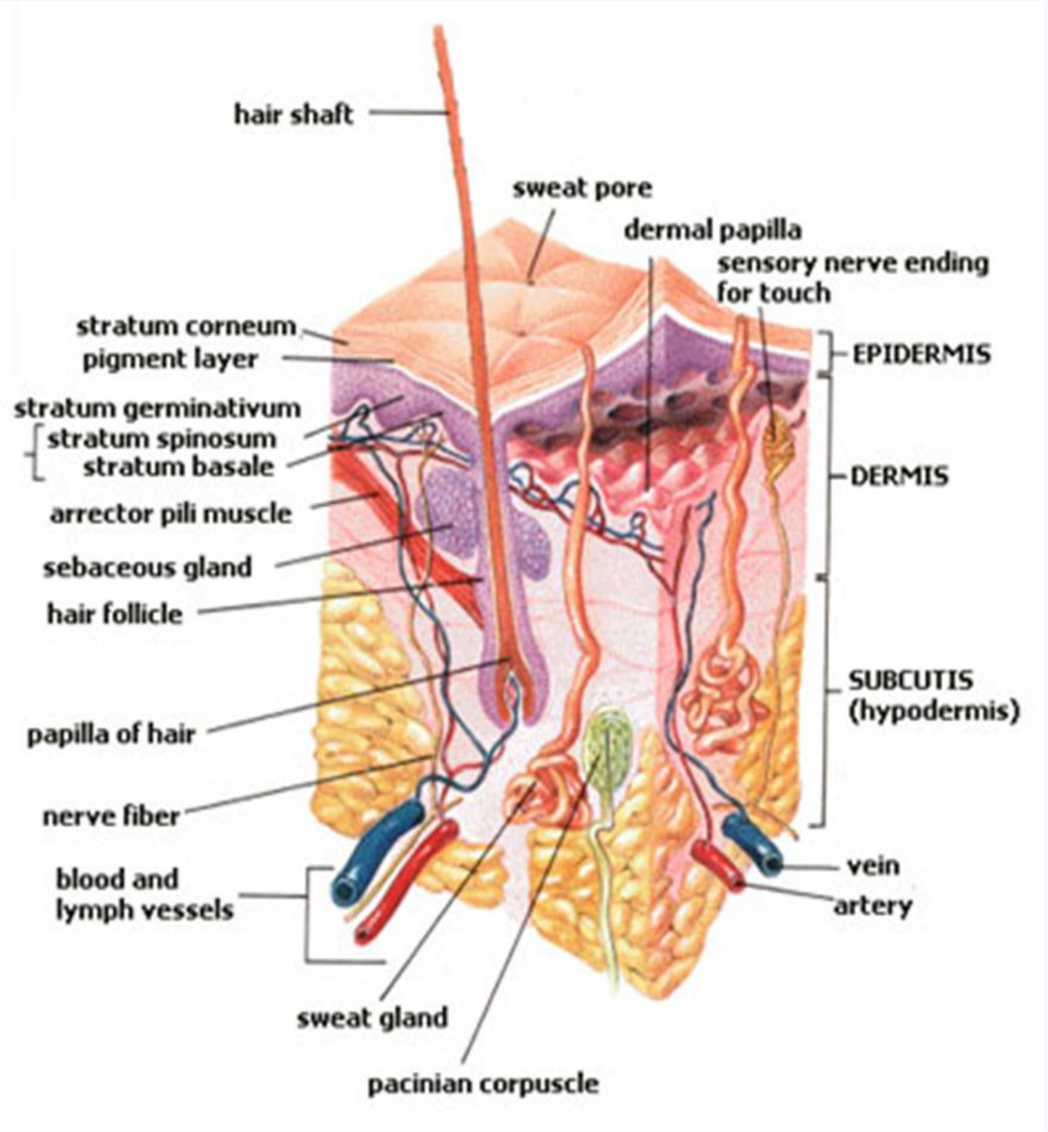
- Priorities are similar
- Primary Survey
  - (H) **A B C D E**
  - Immediate treatment /stabilization at each step
- Secondary Survey
- Re-evaluation phase
  - Dressings to burns
- Transfer

THERMAL BURN SEVERITY

- Thermal burns may be caused by flames or hot liquids (scalding injuries)
- First degree
- Second degree
- Third-degree
- Fourth degree

HUMAN SKIN

- Epidermis-
  - Stratum basale
  - Stratum spinosum
  - Stratum granulosum
  - Stratum lucidum
  - Stratum corneum
- Dermis-
  - Papillary and
  - Reticular



CLASSIFICATION- BASED ON DEPTH OF BURN

- **First degree:** injury localized to the epidermis. Painful, red, blanch to touch. Heals spontaneously. Eg. sunburn.

- **Second degree superficial:** injury to the epidermis and superficial dermis. Red painful, blistering, blanch to touch. Usually heals from intact skin appendages with some skin discoloration.

- **Second degree deep:** injury through the epidermis deep into the dermis. Pale mottled does not blanch to touch, painful to pinprick. Heals with scarring

- **Third degree:** full-thickness injury into subcutaneous fat. Hard leathery eschar, painless black, white or red. No visible skin appendages. Skin grafting necessary.

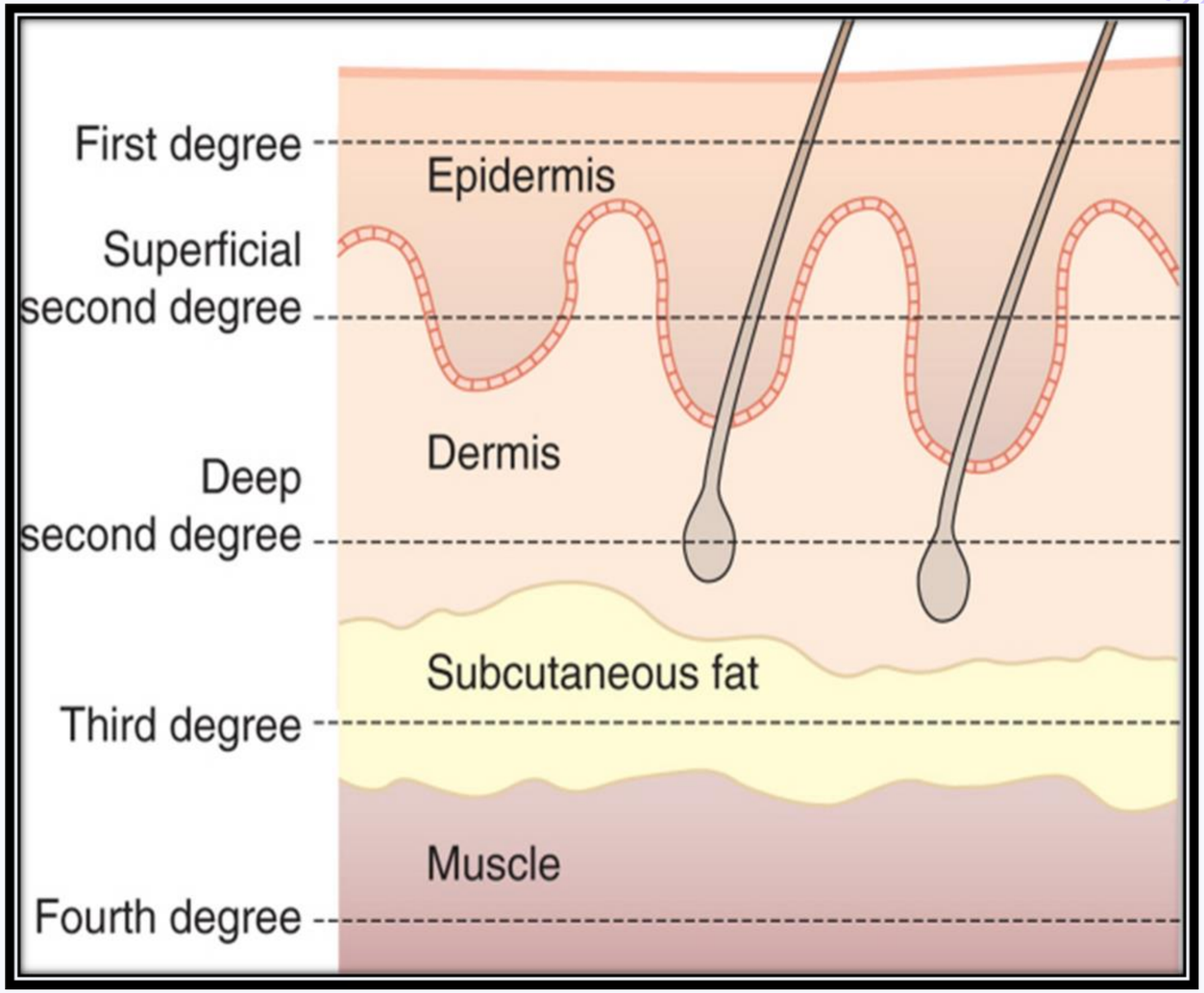
- **Fourth degree :** injury to underlying muscle and bone

Now burn is classified in only three degrees.

Skin appendages-

- Hair follicles
- Sweat glands
- Sebaceous glands
- Rete pegs

(of epidermis into dermis)



BURN SEVERITY 1ST DEGREE

- Superficial
- Skin reddening
- No blistering
- Mildly to moderately painful

SUPERFICIAL PARTIAL THICKNESS BURN

Very painful burns sensitive to temperature change and air exposure.

More commonly referred to as second-degree burns.

Typically, they blister and are moist, red, weeping burns which blanch with pressure.

They heal in 7 to 21 days. Scarring is usually confined to changes in skin pigment.

BURN SEVERITY 2ND DEGREE

- Partial thickness burn
- Blistering
- Sloughing of outer skin layers
- Very painful
- Pain receptors still intact

DEEP PARTIAL THICKNESS BURNS

- Blistering or easily unroofed burns which are wet or waxy dry, and are painful to pressure.

- Their color may range from patchy, cheesy white to red, and they do not blanch with pressure.

- They take over 21 days to heal and scarring may be severe.

- It is sometimes difficult to differentiate these burns from full-thickness burns.

BURNS

BURN SEVERITY 3RD DEGREE

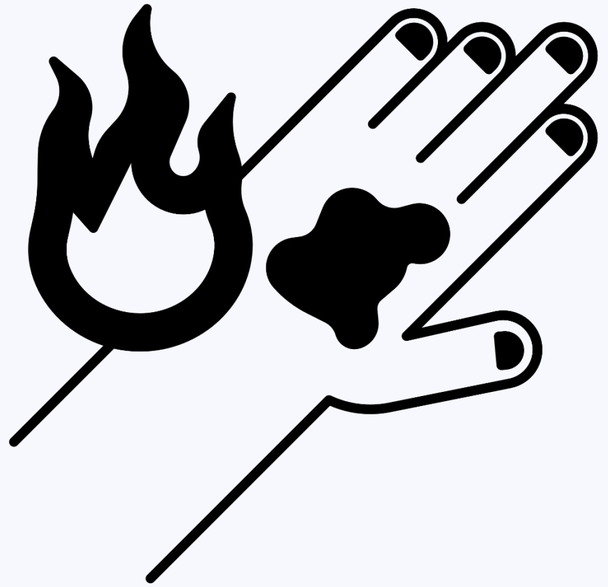
- Full-thickness burn
- Skin is thickened, pale, charred
- No pain / skin is insensate
- Pain receptors destroyed

FULL THICKNESS BURNS

- Skin to be waxy white to a charred black
- Tend to be painless.
- Healing is very slow, if at all, and may require skin grafting.
- Severe scarring usually occurs.

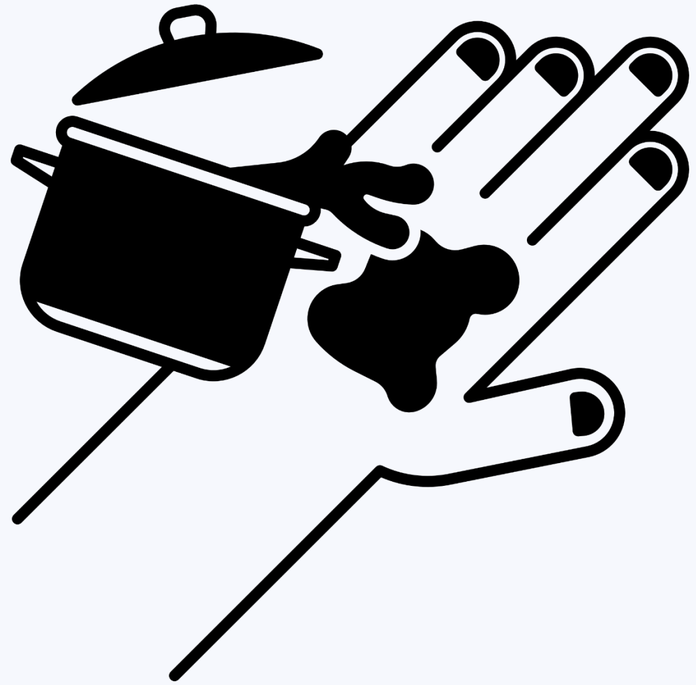
INITIAL CARE OF BURN PATIENT

1. Assess % of total body surface area involved
2. ABC status
3. Start IV line- preferably Central
4. Put urinary catheter
5. TT prophylaxis
6. Rule out any associated injury
7. Weigh the patient
8. Shift patient to ICU

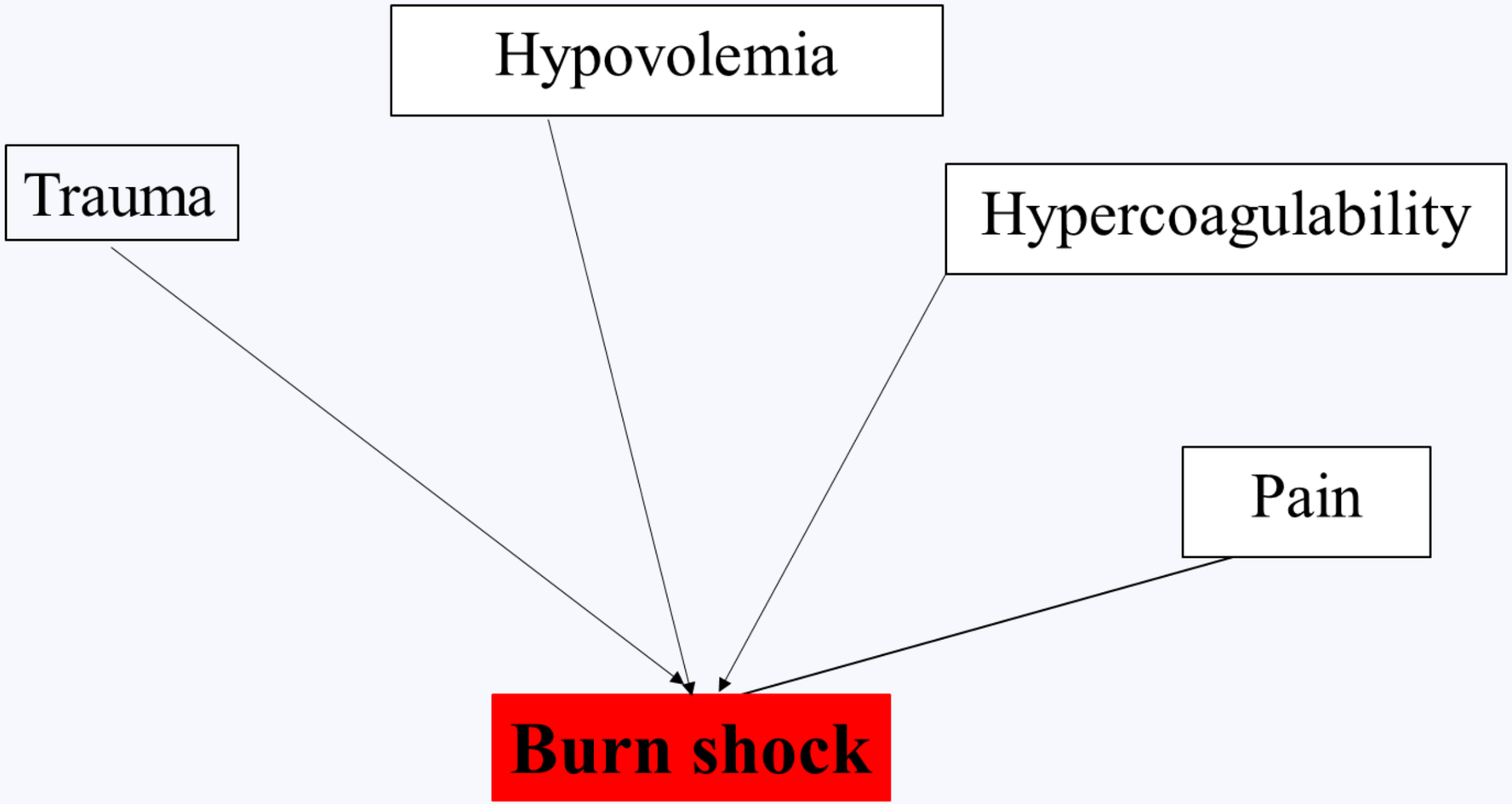


MANAGEMENT OF BURN

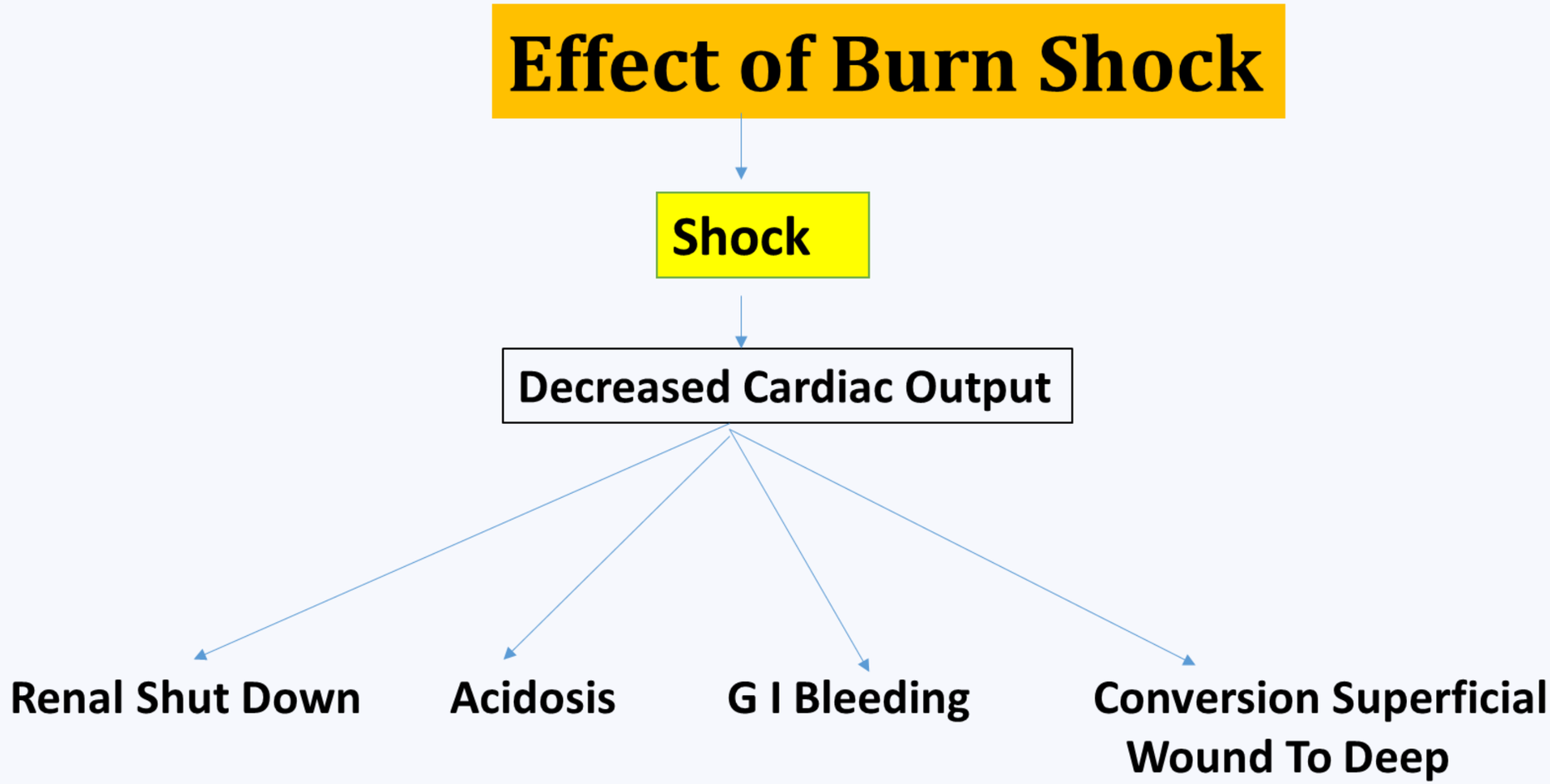
- General-
  - Shock & Fluid resuscitation,
  - Nutrition and
  - Other systemic problems/complications
- Local-
  - Management of Burn wound



PATHOPHYSIOLOGY OF BURN SHOCK



Effect of Burn Shock



PRIMARY SURVEY A: AIRWAY

- Airway at high risk of early obstruction
  - Upper airway burn causes glottic and laryngeal edema and obstruction
  - Edema develops rapidly
  - Swelling may make endotracheal intubation difficult or impossible
  - Cricothyrotomy may be necessary if edema severe

- **Early endotracheal intubation is required to secure the airway!**

AIRWAY EDEMA

Early

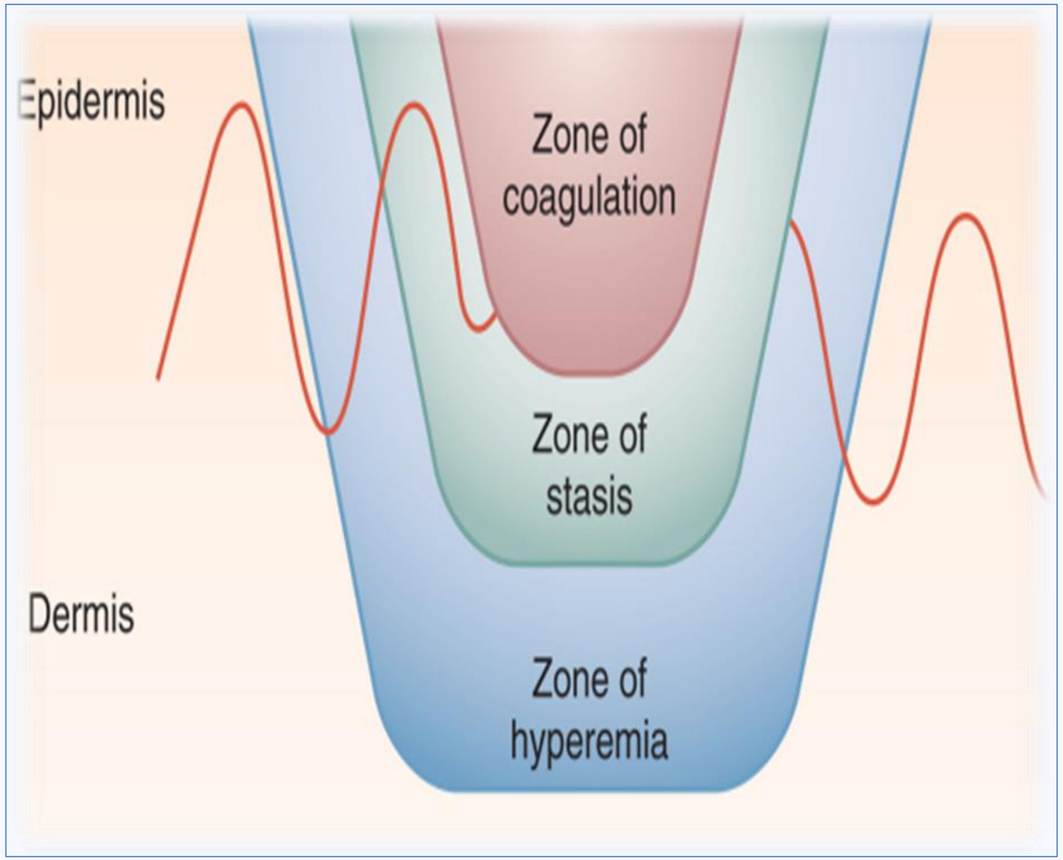
Late

SIGNS SUGGESTING AIRWAY BURNS

- Facial burns
- Singed facial hair
- Carbonaceous sputum
- Hoarse voice
- Sore throat
- Stridor
- In the presence of any of these signs, careful evaluation of the airway for EARLY intubation is critical

RESPIRATORY BURNS

JACKSON'S BURN ZONES



ABC

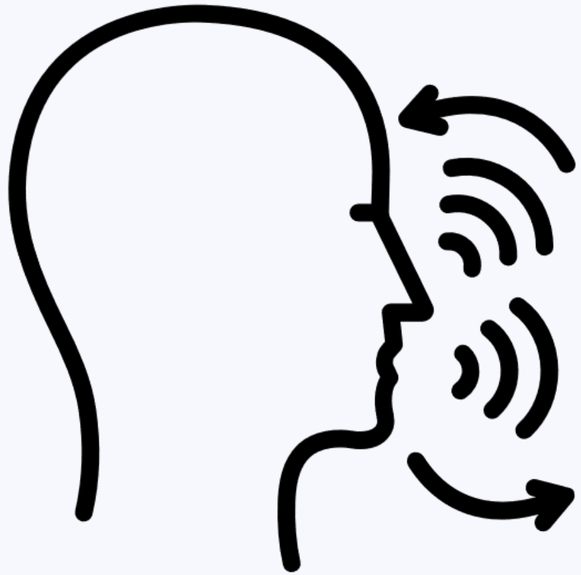
AIRWAY: protect airway in suspected inhalation burns.

- Signs of inhalation injury:
  - History flame burns or injury in enclosed space
  - Burns to face
  - Nasal singing
  - Hoarse voice
  - Intubate if: hypoxic, swollen oropharynx, or signs of respiratory distress
  - Consider bronchoscopy, mucolytics, high-frequency oscillating ventilation, bronchodilators

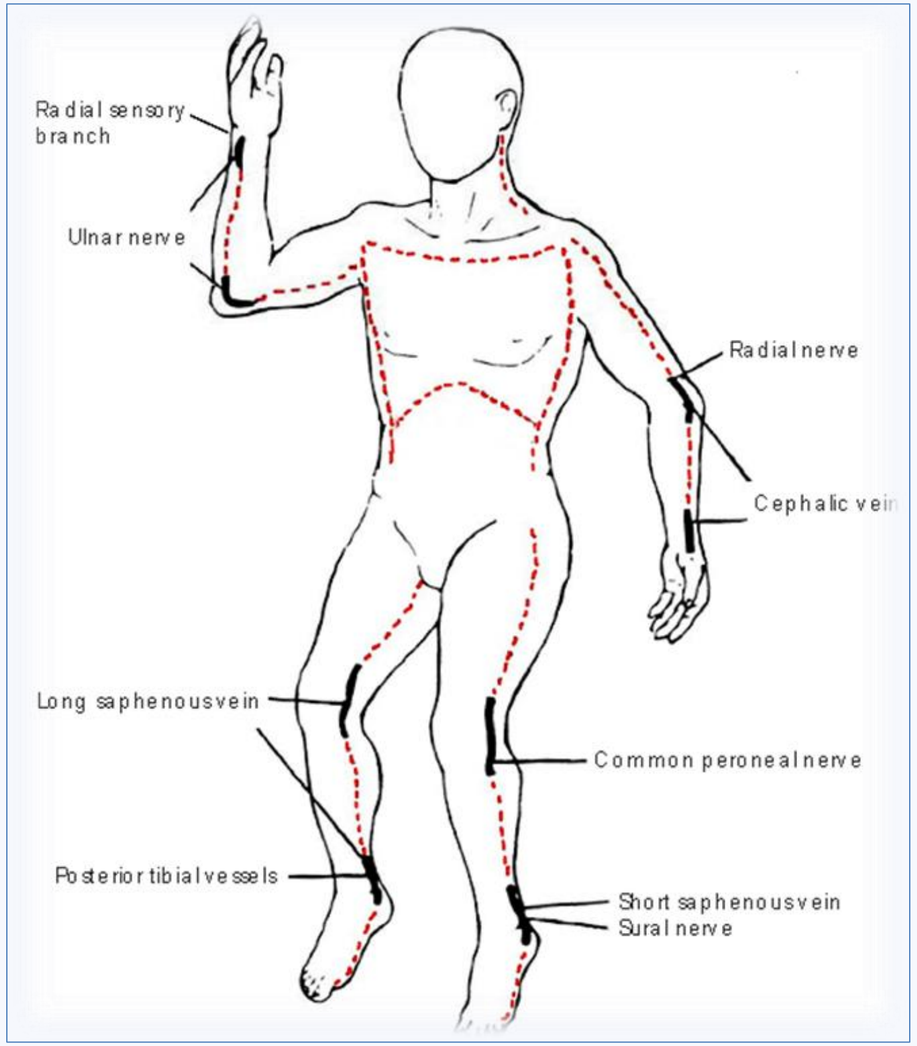
ABC

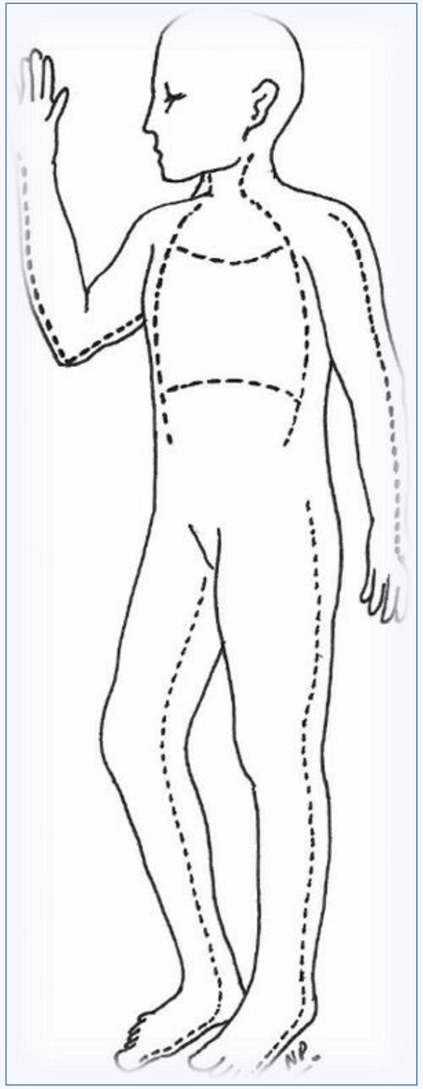
BREATHING-

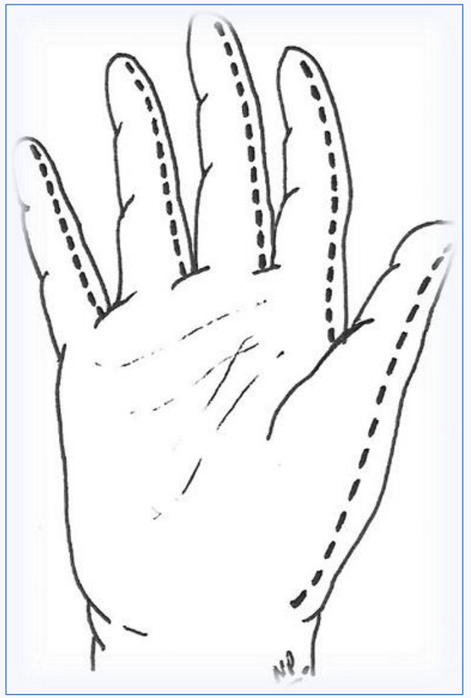
- Escharectomy- if circumferential burns restrict ventilation.
- 100% Oxygen to treat carboxyhaemoglobinaemia
- IV access to administer fluid,
- Give analgesia to reduce discomfort,
- Monitor saturation and blood pressure



ESCHAROTOMY







CHEST ESCHAROTOMY

CHEST ESCHAROTOMY

CIRCULATION

- Peripheral pulses in all four limbs
- Nail bed color in all limbs
- Blood pressure
- If circumferential burns consider- Fasciotomy / Escharotomy.

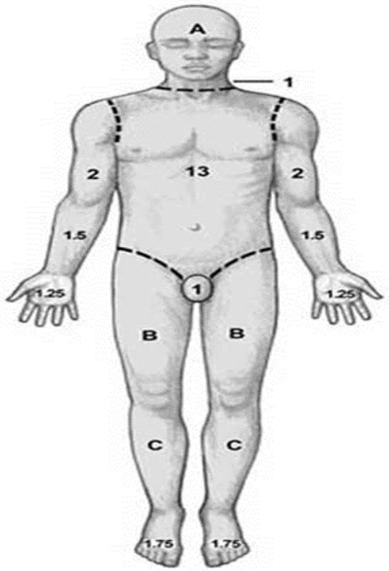
PRIMARY/SECONDARY SURVEY

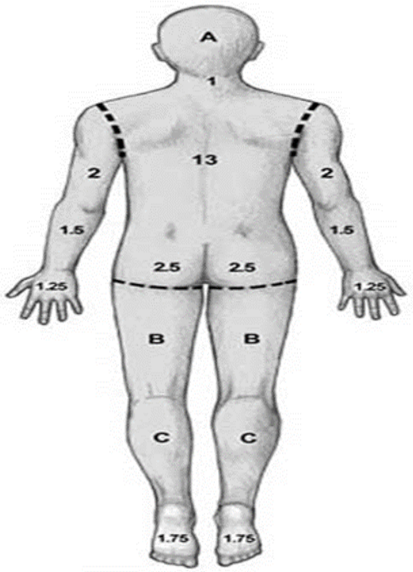
Assess the ***extent of the burn***:

- Erythema should not be considered.
- Lund and Browder chart: most accurate method, it compensates for variation in body shape with age. Useful in children.
- Wallace rule of nines: good quick assessment, not accurate in kids
- Palmar surface: area of palm and fingers

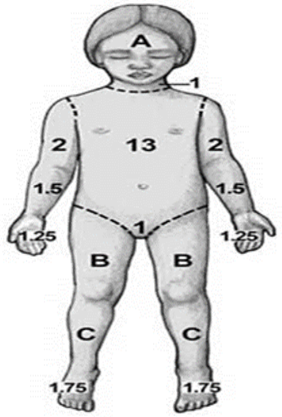
LUND AND BROWDER CHART

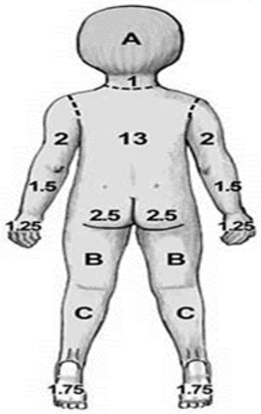
Lund and Browder Charts for area of body burnt

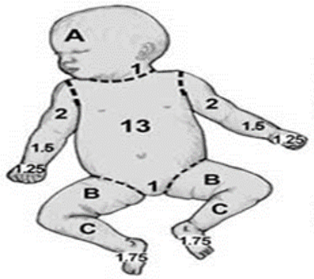


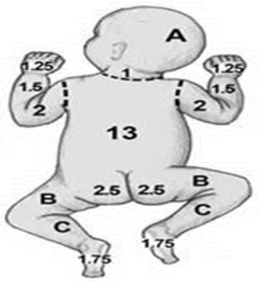


Burnt area	%
Head	
Neck	
Trunk (front)	
Trunk (back	
Arm (right)	
Arm (left)	
Hand (right)	
Hand (left)	
Buttock (right)	
Buttock (left)	
Genitals	
Leg (right)	
Leg (left)	
Feet (right)	
Feet (left)	
Total burn area	



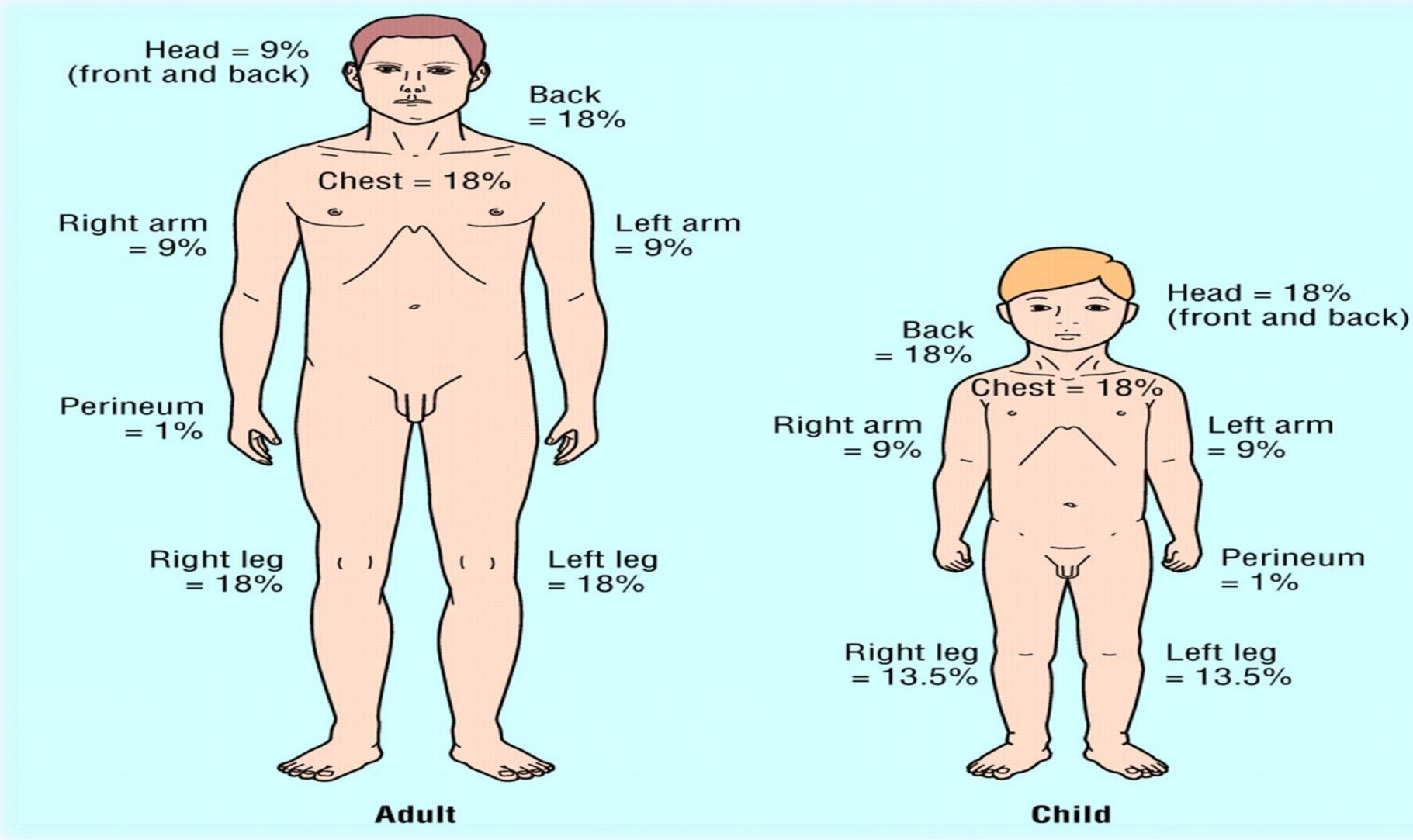






Age (years)	Under 1	2–4	5–9	10–14	15	Adult
A — ½ of head	9½	8½	6½	5½	4½	3½
B — ½ of one thigh	2¼	3¼	4	4½	4½	4¾
C — ½ of one leg	2½	2½	2¾	3	3¾	3

RULE OF NINE(WALLACE)



RULE OF PALM

MANAGEMENT OF FLUID AND ELECTROLYTES

- Colloids- whole blood , Plasma, Plasma expanders
- Crystalloids- Normal Saline , Ringer’s lactate solution etc.
- Urine output is to be 0.5ml -1ml/kg/hr.
- In electrical injury 2-3ml/kg/hr

IV FLUID CALCULATION: (CRYSTALLOID THERAPY)

Formula used-

- 2ml/kg/%BSA up to 50% Burn + 2500ml 5% dextrose in adults
- In children maintenance fluid (5%dextrose)- 4ml/kg for first 10 kgs + 2ml/kg next 10kgs + 1ml/kg after that.
- Half in first 8hrs and half in next 16hrs (In equal divided doses)
- Ringer's Lactate is the solution for Burn.
- In small children- Isolyte-P

WHEN TO RESUSCITATE-

% TBSA BURN ≥ 15-20% AND MORE.
IN CASE OF CHILDREN 5-10%.

HOW TO START-

- Calculate fluid as per protocol, half of this volume is to be administered in first 8 hours from the time of injury. Include any fluid already administered in this ration.
- Ensure correct TBSA estimation.
- Observe urine output regularly and accordingly review formula and adjust infusion rate.
- Consider bolus or increase/ decrease in infusion rate for oliguria/polyuria.
- Consider colloids- if amount of fluid is large.
- Monitor edema- Repetitive bed side examination for edema, airway pressure and tidal volume trends, Bladder pressure measurements.

MONITORING

Fluid formulae eliminate gross shock,

Monitoring provides fine tuning

Clinical

- Thirst
- Restlessness
- Pulse
- Urine output
- CVP

Laboratory

- Hb
- PCV
- Blood Urea
- Serum Electrolytes

Maintain U/O @ 0.5 - 1ml/Kg/Hr

ABDOMINAL COMPARTMENT SYNDROME-

- Result of excessive fluid administration.
- Represents the pathophysiologic consequences of a raised intra-abdominal pressure.
- Various clinical conditions are associated with this syndrome and include massive intra-abdominal or retroperitoneal haemorrhage, severe gut oedema or intestinal obstruction, and ascites under pressure.
- Measurement- Urinary bladder pressure measurement.

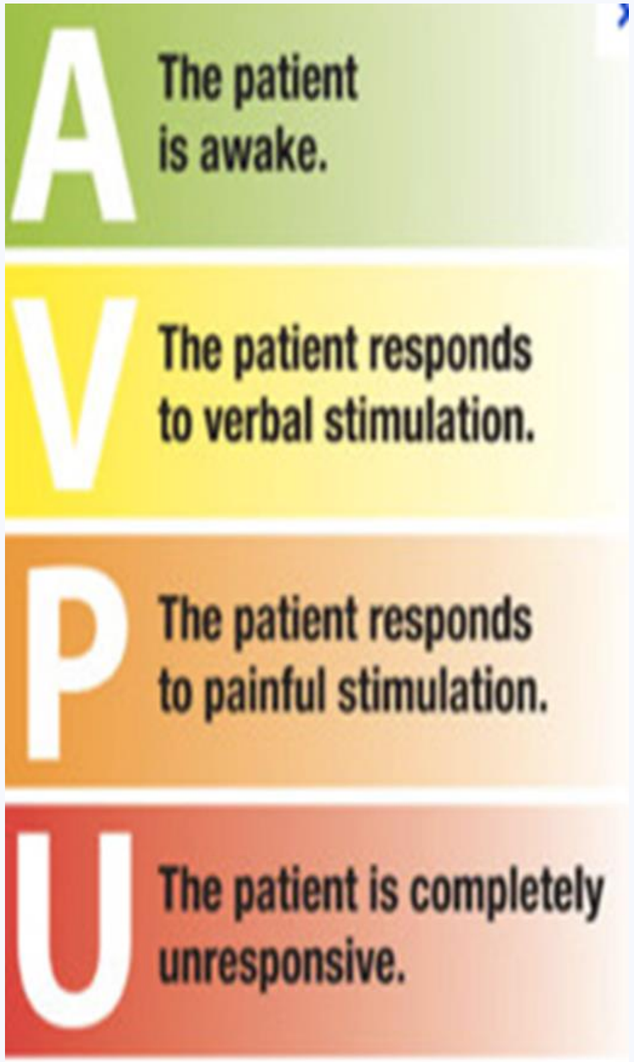
SECONDARY SURVEY: HEAD TO TOE ASSESSMENT

Head to Toe assessment

- Documentation of positive and pertinent negative findings
- Determination of any unsuspected life or limb threatening injuries
- Same as with trauma secondary survey

SECONDARY SURVEY
D: DISABILITY

- No different from standard trauma exam
- Determine basic neurologic status
- Pupillary exam: equal/reactive?
- Gross motor/sensory exam
  - Does he move all 4 extremities?
  - Does he have sensation in all 4 extremities
- Level of consciousness
  - AVPU



TOXINS FROM CLOSED SPACE FIRES

- Carbon monoxide poisoning
  - Headache, nausea, weakness, confusion
  - Normal or near normal pulse oximeter
  - Treatment: high flow oxygen by non-rebreather mask
  - Transfer to specialty center, possible hyperbaric treatment?
- Cyanide poisoning
  - Headache, nausea, dizziness, tachycardia, confusion
  - Normal pulse oximeter
  - Treatment: high flow oxygen by non-rebreather mask
  - Hydroxycobalamin or sodium thiosulfate may be used at referral hospital

CHEMICAL BURNS

Evaluation and treatment generally similar to thermal burns, with the following additions:

- ABC’s evaluated and stabilized
- Wash patient gently but thoroughly with warm water, including hair, to remove all residual chemical
- Irrigate eyes well to remove chemical
- Remember: some chemicals may have systemic or respiratory effects separate from burns

ELECTRICAL BURNS

- Electrical burn is “**on the inside**”
- The only visible burned areas may be the “entry” and “exit” wounds, which may appear minor
- Cardiac monitoring required (cardiac dysrhythmias possible)
- Patient is at risk for rhabdomyolysis from internal tissue burns (myonecrosis)ed urine (urinalysis positive for blood) is the clue
    - Concern for renal failure
    - Aggressive fluid hydration (1,000 ml/hr rate)

BURN SEVERITY 4TH DEGREE

- Full thickness burn involving muscle and bone

ELECTRICAL BURNS

ELECTRICAL INJURY ABDOMEN- INTESTINES EXPOSED AND

SUMMARY: GOALS OF INITIAL EMERGENCY CARE FOR A BURN PATIENT

- Secure airway
- Provide oxygen
- Assess for trauma or unstable medical conditions and treat for trauma first
- Begin IV fluid resuscitation at initial fluid rates
- Avoid hypothermia
- Provide pain medication
- Safely transfer patient to burn center

PATIENT SCENARIO

- 52 year old female involved in kerosene explosion and fire in her kitchen
- Brought in by family 30 minutes after injury
- Vitals: BP 146/92, P 126, RR 30, T 37.0°, pulse oximetry 93% on room air
- AVPU: “A” (Alert)
- Voice hoarse with noisy, stridorous respirations
- Facial burns noted with carbonaceous sputum present
- Extensive burns to face, neck, chest, abdomen anteriorly

BURNS CLINICAL BASED QUESTIONS

1. A 25-year-old gentleman was brought to the casualty with a history of his clothes having caught fire while making tea. Based on his history, How would **You classify his burns? Enumerate the different types of burns seen.**

2. A 30-year-old Gentleman Was Brought The Burns Emergency With Full Thickness Burns Involving Chest Abdomen And Bilateral Upper Limbs. He Complains Of Difficulty In Breathing. **How Would You Evaluate And Manage This Patient**?

3. A 40-year-old Lady Is Referred To The Burns Emergency With 30 Percent Burn Involving Face, Trunk And Bilateral Upper Limbs. Patient Gives History Of Self Immolation After A Domestic Fight. **How Will You Clinically Assess The Depth Of Her Burn Wounds? What Are The Other Methods Of Assessing Burn Wound Depth?**

4. A 35 year old gentleman was referred to the burns emergency with 30 percent deep thermal burn with facial burn injury. On examination, he was found to have tachypnoea with singeing of facial hair, nasal hair and soot was found to be present in his oral cavity. Elucidate how you will further manage this patient in detail.

5. A 5 year old male child was referred from A peripheral govt. Hospital with A diagnosis of 40% deep thermal burn. On presentation and primary survey, child was found to have A pulse rate of 140 B/min and A blood pressure of 70/40 mm hg with highly dark coloured urine present in his urine bag. How will you further manage this patient?

6. A 24 year old lady was referred to the burns emergency with A history of assualt with acid and A diagnosis of 10 percent chemical burn with facial burn.

Ennumerate the steps you will take to further manage the patient.

7. A 50 year old lady with 20 percent deep thermal burn was attended by you, a resident surgeon at A level district hospital. You want to refer the patient to level I burns centre for further management. What are the criteria for referral of a burns patient and what are the criteria for admission of a burns patient?

8. A 10 year old female child was brought to the burns emergency with scald burn involving buttocks, both thighs and the perineal region amounting to around 15% TBSA. How will you further manage this child?

9. A 20 year old gentleman, an electrician by occupation was referred to the burns emergency with A diagnosis of 25% electric contact with flash burn involving both upper and lower limbs after coming in contact with A high tension wire. On examination patient has pregangrenous changes in both hands and his urine is high coloured. How will you manage this patient?

10. A 55 year old lady, A known case of diabetes and hypertension since 20 years has been referred to you with A diagnosis of 30 percent deep thermal burn. On examination, patient is confused, urine is high coloured and the referral letter mentions her KFT to be deranged (urea: 156 mg/dl)

Ennumerate the steps you will take to manage this patient.

Thank You