Ontario Critical Care Clinical Practice Rounds (OC3PR): COVID-19

Jan 13 2022

Burns outside the Burn Centre

Chaired by Dr. Dave Neilipovitz

Presented by Dr. Stephanie Mason

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Burns outside the burn centre

A pragmatic approach

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Sunnybrook Health Sciences Centre

Disclosures

- None

Objectives

- Discuss principles of initial stabilization of the burn injured patient
- Describe criteria and process for transfer to a burn centre
- Review management of inhalation injury

Burn care in Ontario

- 2 adult burn centres, 1 pediatric
  - Sunnybrook HSC
  - Hamilton HSC (<20% TBSA)
  - Sick Kids

Initial assessment

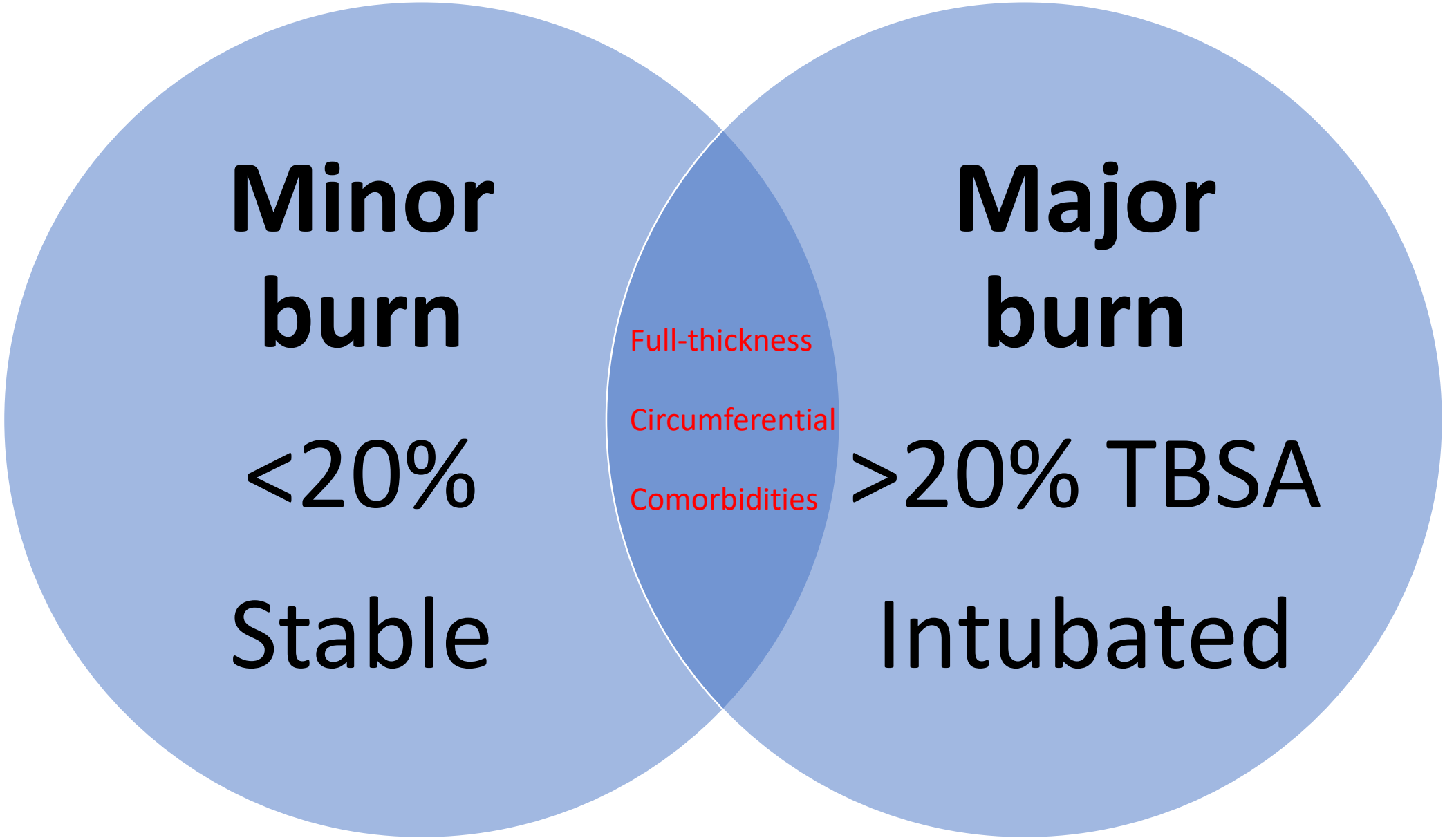
- Airway
- Breathing
  - 100% FiO2
- Circulation
  - 1L RL
  - IV access

- Patients with burn injuries are typically GCS15, normo-hypertensive, tachycardic
- High level of suspicion for other injuries

Burn specific airway considerations

- Who needs intubation?
  - Decreased GCS
  - Respiratory distress: stridor, hoarseness, hypoxia, tachypnea, air hunger
  - Conditional: large burn with facial component

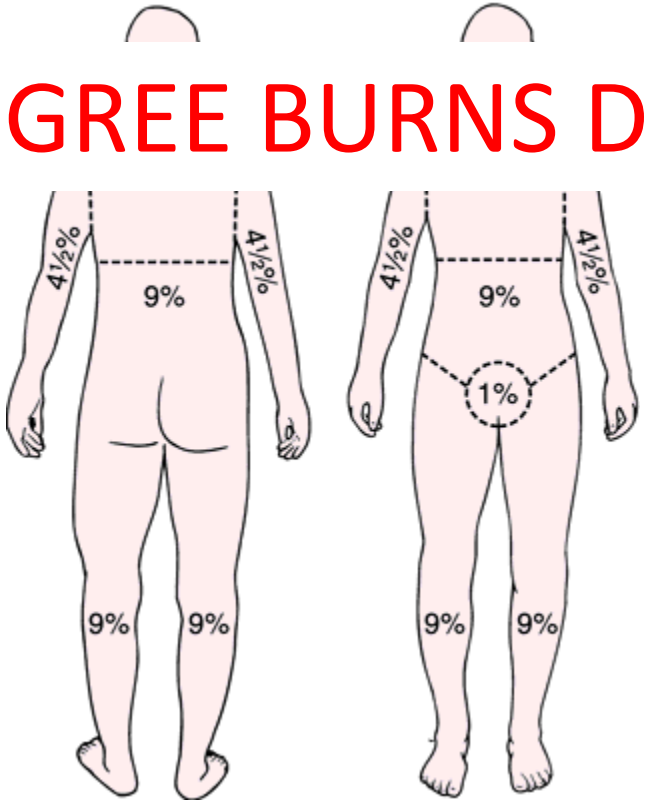
- Discuss with a burn provider before intubating:
  - Flash burns to face
  - Isolated facial burns
  - History consistent with inhalation injury but no distress

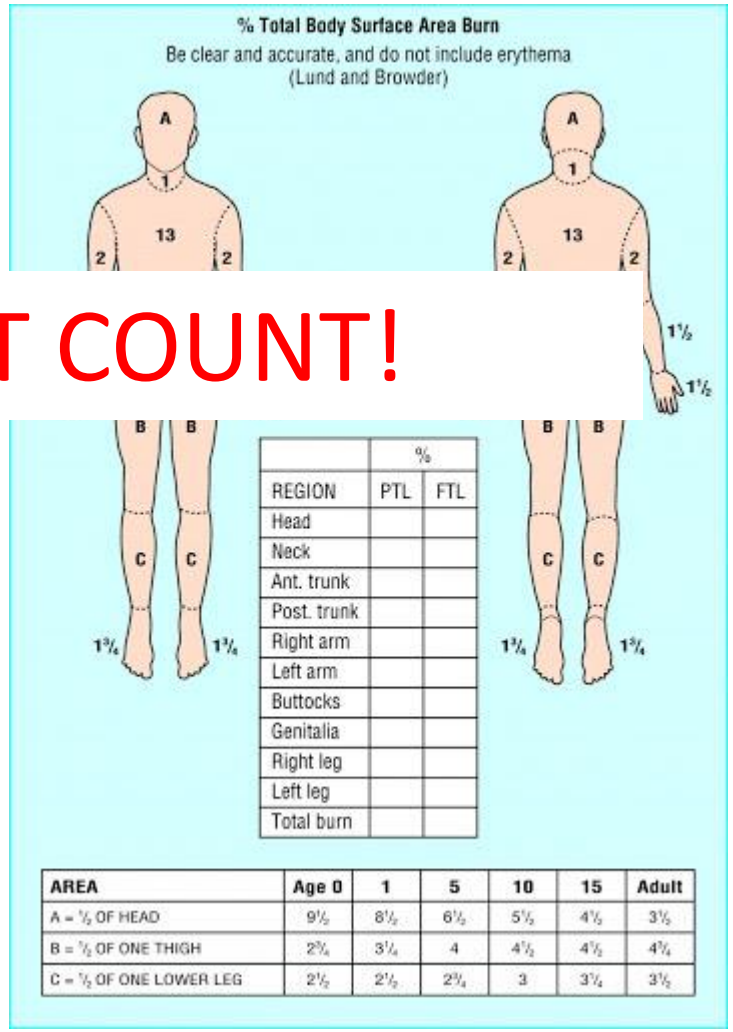

Minor burn
<20%
Stable
Full-thickness
Circumferential
Comorbidities
Major burn
>20% TBSA
Intubated

Burn size - % Total Body Surface Area

- Pick a method and stick to it
  - Lund & Browder
  - Rule of nines
  - Patient's palm + fingers = 1%

FIRST DEGREE BURNS DON'T COUNT!





	%	
REGION	PTL	FTL
Head		
Neck		
Ant. trunk		
Post. trunk		
Right arm		
Left arm		
Buttocks		
Genitalia		
Right leg		
Left leg		
Total burn		

AREA	Age 0	1	5	10	15	Adult
A = ½ OF HEAD	9½	8½	6½	5½	4½	3½
B = ½ OF ONE THIGH	2¾	3¼	4	4½	4½	4¾
C = ½ OF ONE LOWER LEG	2½	2½	2¾	3	3¼	3½

Fluid resuscitation

- ABLS
  - Adult 500cc/hr
  - Child 250cc/hr

What about the Parkland formula?

- Good rule of thumb = estimated %TBSA, add a zero = starting rate

- i.e 20% burn – 200cc/hr

- Ringers lactate
  - NOT blood, NOT albumin, NOT normal saline

Parkland formula

- 4cc/kg/%TBSA = estimated 24h fluid requirement
  - Half in first 8h
  - Half in next 16h

- Use to derive a starting rate, benchmark ongoing resuscitation

- Fluid rate should be adjusted on an hourly basis
  - Target UOP>30cc/hr
  - Target normal hemodynamics, normalizing lactate & base deficit
  - High Hct or Hgb indicative of underresuscitation

IV access

- Ok to put lines through burned skin
- 2 large bore IVs
- Consider central access
  - ≥30% TBSA
  - Poor PIVs
  - Intubated (need for multiple infusions)
- Arterial line – generally only if intubated
- Initial bloodwork: add carboxyhemoglobin if closed space fire

Summary: initial stabilization

- ABCs
- Estimate burn size
- Treat pain
- Minor vs major burn
- Start IVF for major burn
- Keep patient warm


HELP

BURNS CENTRE CONSULTATION GUIDELINES

These guidelines are meant to facilitate consultations with, and/or transfer to, a Burns Centre and should be applied using clinical judgement. Final decision to transfer remains at the discretion of the referring and receiving physicians.

The decision to transfer should be made within 1 hour.

For ALL paediatric and adult burns, contact CritiCall Ontario for consultation and potential referral to a Burn Centre.

All consultations should be coordinated through CritiCall Ontario: 1-800-668-4357

Systems Criteria

Any patient with a major burn injury (without other traumatic mechanism) requiring consultation or who requires more care than can be provided at the referring centre based on the assessment of the ED physician. A major burn injury with traumatic mechanism should be transferred to the regional Lead Trauma Hospital.

Physiological Criteria

CONSIDER TRANSFER TO A BURN CENTRE

- ≥ 20% TBSA partial and/or full thickness at any age
- ≥ 10% TBSA partial and/or full thickness for ages ≤ 10 and ≥ 50
- Full thickness burns ≥ 5% TBSA at any age
- Age ≥ 65 with 2nd or 3rd degree burns, any size
- Inhalation + partial and/or full thickness burns ≥ 5% TBSA
- Children with burn injury presenting to a hospital that does not have the appropriate equipment or qualified personnel to provide care for children
- Electrical burns
- Chemical burns
- Burns to hands, face, feet, joints, genitalia, perineum
- Burns with comorbidity
- Burns with patients who require special social, emotional, or rehabilitation care

SPECIAL CONSIDERATIONS

High risk considerations which may warrant transfer at a lower clinical threshold. These considerations include:

- ≥ 50 years of age;
- Anticoagulation;
- Immunosuppression;
- Pregnancy;
- Diabetes;
- Other significant medical problems

For any considerations, consult with on-call physician through CritiCall Ontario.

CONSIDER CONSULT WITH BURN CENTRE FOR CARE PLAN TO REMAIN AT PRESENTING HOSPITAL

- Advice for non-urgent or non-emergent burns at hospital with qualified personnel and equipment for burn care and scar management
- Burns <10% TBSA in adults who do not require transfer but seek medical advice or ambulatory burns clinical referral for assessment

For any considerations, consult with on-call physician through CritiCall Ontario.

Refer to ABA (American Burn Association) Burn Centre Referral Criteria

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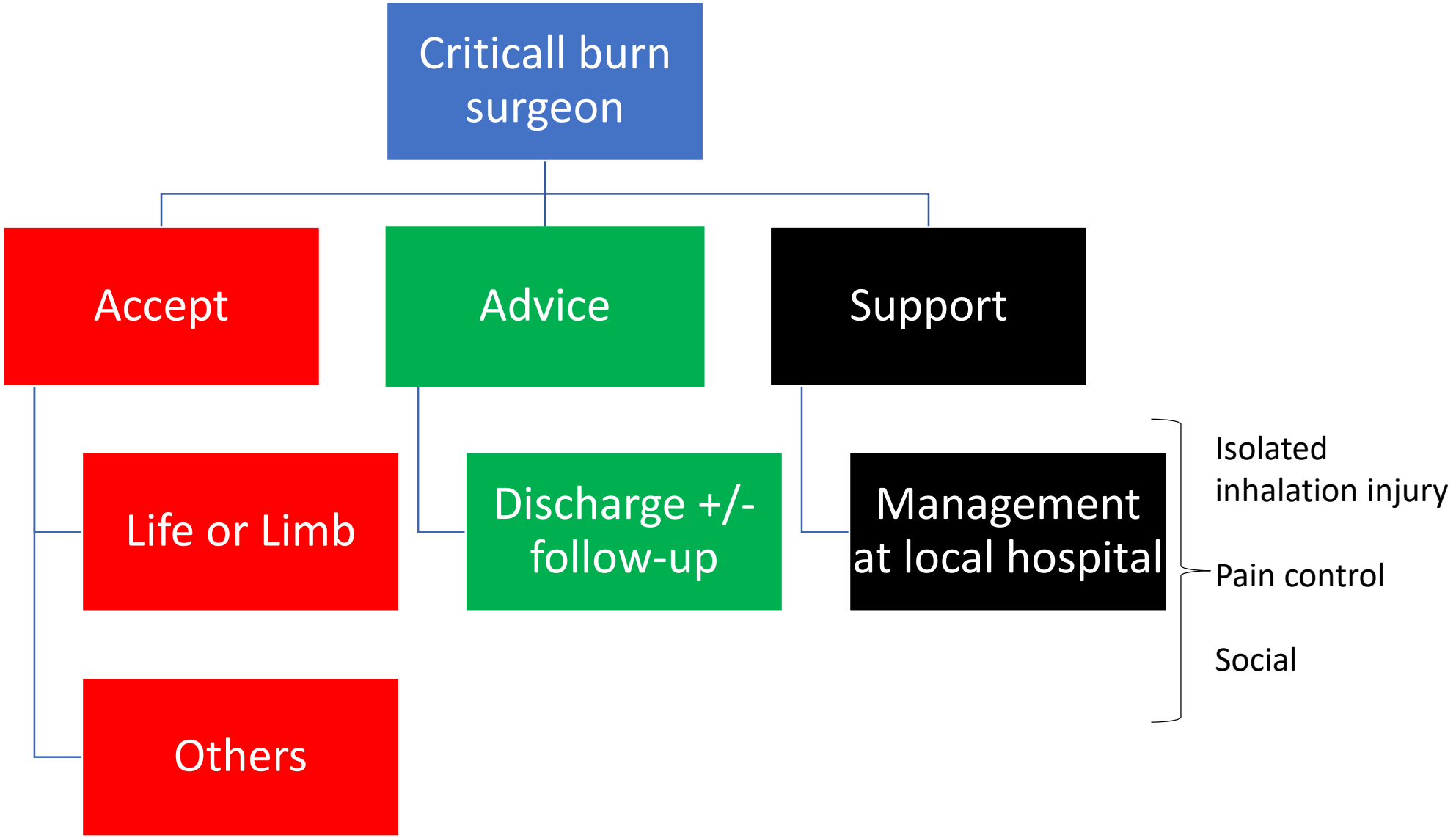
Burn consultation



First 24h of burn care

- Fluid resuscitation
- Pain and/or sedation management
- Dressing change daily

- Start enteral feeding
- No antibiotics
- DVTp
- AAT

Fluid resuscitation

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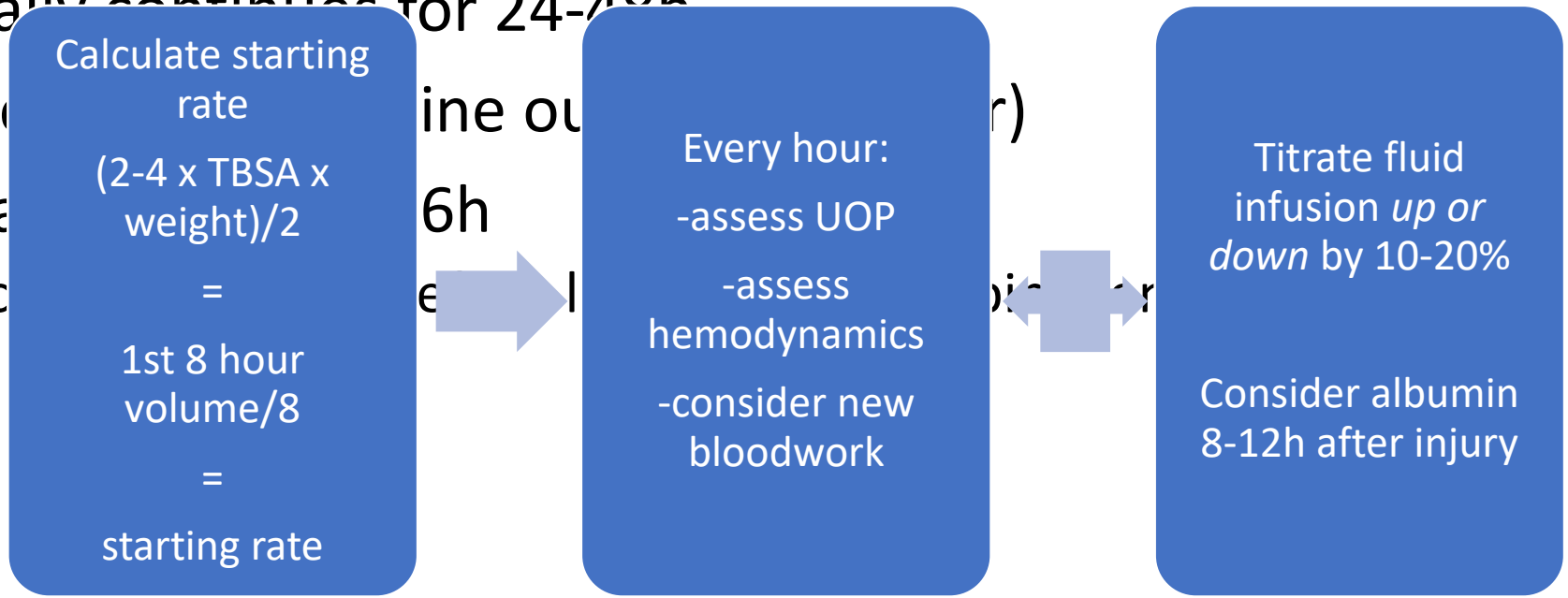


Failing resuscitation

- Labs worsening
- Persistent oliguria
- Hypotension

1. Increase IVF rate by 20%
2. Check foley
3. R/O other injuries
4. Add albumin

- Difficulty with ventilation
- Vasopressor-resistant shock
- Multiorgan failure
- Abdominal compartment syndrome

Albumin

- Avoided in first 8-12 hours
  - Injury causes increased vascular permeability even to oncotic proteins
- With evolution of inflammatory cascade, permeability to oncotic proteins is reduced
- Minimizes total fluid received; not directly linked to improved patient outcomes
- Usually 5% albumin, 0.3-0.5cc/kg/%TBSA or 1/3 of IVF rate

Inhalation injury

1. Upper airways → **Obstruction**
2. Lower airways → **Sloughing, collapse, ciliary injury, VQ mismatch -> hypoxemia, pneumonia, ARDS**
3. Systemic
    1. Cyanide poisoning
    2. Carbon monoxide poisoning

    } **Hemodynamic collapse, neurological sequelae**

Diagnosis

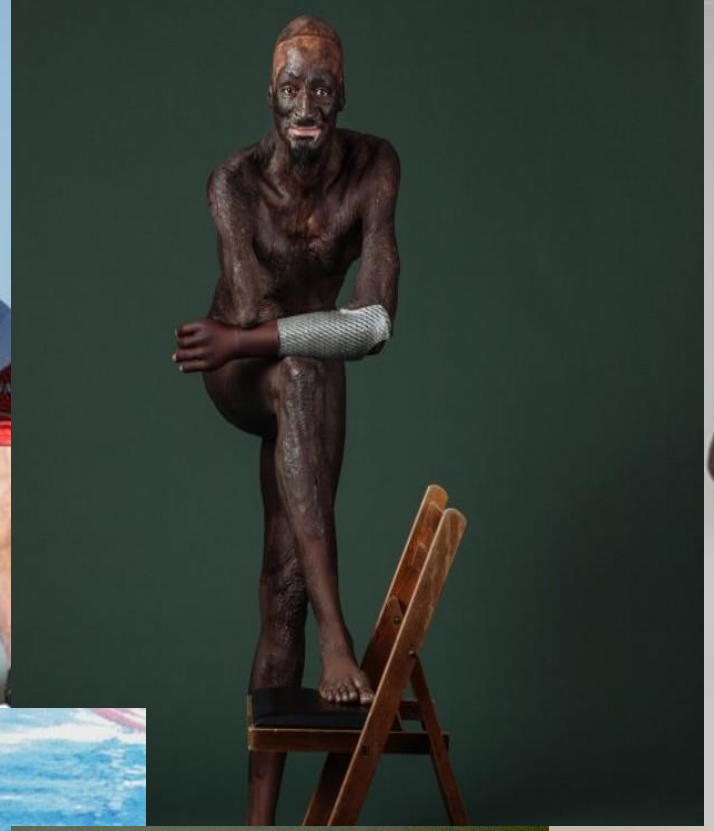
- Diagnostic bronchoscopy +/- BAL
- Initial CXR usually normal

Grade	**Findings at bronchoscopy**
0 (No injury)	Absence of carbonaceous deposits, erythema, edema, bronchorrhea, or obstruction
1 (Mild)	Minor or patchy areas of erythema, carbonaceous deposits, bronchorrhea, with or without compromise of the bronchi (any or combination)
2 (Moderate)	Moderate degree of erythema, carbonaceous deposits, bronchorrhea, with or without compromise of the bronchi (any or combination)
3 (Severe)	Severe inflammation with friability, copious carbonaceous deposits, bronchorrhea, bronchial obstruction (any or combination)
4 (Massive)	Mucosal sloughing, necrosis, endoluminal obliteration (any or combination)

Treatment

- Supportive
- Most sequelae manifest ≥12h after injury
- Goals:
  - Reduce shunt
  - Mucus fragmentation
  - Clot breakdown
  - Bronchodilation

- Regimen of inhaled bronchodilators, heparin/TPA, N-acetylcysteine continued until extubation

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