Acute Management of Burns

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Where to Start?
Features associated with Smoke Inhalation

1 2 3

If 2/3 present, consider prophylactic intubation
Closed Space Fire
Hoarseness, Dyspnea, Stridor
Carbonaceous Sputum

Please do NOT intubate if

Singed nasal or facial hair is the only sign of smoke inhalation
Please Keep Patient Warm, Dry, Covered

• Burns ➔ rapid heat loss ➔ hypothermia

• Wound care can be deferred until initial assessment is complete, and resuscitation is underway

• If transferring to a burn center, let them do wound care if transport time < 24 hours
What Next?
Circulation – Preventing Burn Shock

• Fluid loss → hypovolemia → renal failure → circulatory collapse
• Delay in resuscitation increases risk
• Early assessment of size and depth of burn will guide you to start resuscitation
• Use physiologic parameters after that to increase or decrease fluids
Estimating Size of Burn

- Guides resuscitation and mortality estimates
- Only second and third degree burns count!
- Two primary methods to calculate
- In very large burns, count what is spared using palmar rule and subtract from 100
Rule of 9s and the Palmar Rule

Rule of 9s not accurate in obesity, varies with age in children
Estimating Depth of Burn

• Depth of burn can be difficult to ascertain initially
• Burns evolve over time, and typically deepen over 2-3 days especially if an accelerant such as grease or gasoline is involved
• Accurate estimate determines need for transfer to a burn center, and likelihood of surgery
Factors that Determine Depth of burn

- Temperature & Duration of exposure
- Skin thickness – reduced in the elderly and young children
- Body area – thicker on palms and soles
- Where accelerant, chemicals involved?
Let’s Practice..
Formula for starting resuscitation

• Lactated Ringers 2 – 4 ml/kg x % TBSA
• Half in first 8 hours, rest over next 16 hours
Resuscitation

• Parkland and other formulas are only initial estimates – should be guided by patient response

• Primary measure is urine output
  • Aim for 0.5ml/kg/hr in adults, 1ml/kg/hr in children

• Can use Hct, osmolarity, and hemodynamic parameters such as SVV as adjunct measures

• Standard resuscitation is Lactated Ringers, recent shift toward using colloid (albumin, FFP)

• Protocolized, nurse-driven or automated in many burn units
Special Situations Requiring ↑ Fluid

- Electric Burns
- Deep 3\textsuperscript{rd} and 4\textsuperscript{th} degree burns
- Concomitant trauma, especially crush injury
- Pre-existing illness or intoxication

- If myoglobinuria present, target 1ml/kg/hr urine output

May alkalinize urine, uncertain benefit
Common Pitfalls

• Do not use diuretics for low urine output!
• Do not bolus fluids for low blood pressure
• Major burns cause vasodilation, may use vasopressors if needed to maintain perfusion once adequate fluid resuscitation is ensured
• Swelling may render non-invasive measurements of blood pressure inaccurate
Perils of Over-Resuscitation

• Excessive resuscitation leads to peripheral edema $\rightarrow$ tissue ischemia and hypoxia $\rightarrow$ worsening of the burn
• Can lead to abdominal compartment syndrome
• Monitor peripheral pulses and Doppler signals every hour in larger burns
• Monitor bladder pressure every 4 hours
• Reduction in incidence of decompressive laparotomy in last decade with increased recognition
The Goldilocks Rule
Summary

• Initial phase of burn treatment is centered around resuscitation, after ensuring a secure airway
• Keep patient warm and dry during initial evaluation
• Calculate resuscitation by formula, adjust per urine output