Question
What are the first 8 hour fluid resuscitation requirements (in mls.) for a 30 year old, 60 kg patient with burns to the entire right arm and anterior trunk (chest and abdomen)?

A. 3150  
B. 3240  
C. 3550  
D. 3640

Learning Objectives
Upon the completion of this program participants will be able to:
• Describe the prehospital assessment and care of burns.
• Contrast prehospital burn care goals with in-hospital goals.
• Review local destination protocols for burn patients in your region.
Burns

• Classifications (depth):
  – First (superficial)
    • Epidermis, no blisters
  – Second (superficial or deep partial-thickness)
    • Epidermis, partial dermis
    • Pain and blisters
  – Third (full-thickness)
    • Epidermis AND Dermis
    • Pain is an UNRELIABLE indicator

Burns

• Classification (Severity):
  – % BSA
  – Numerous evaluation systems:
    • Rule of nines
      – Count second degree or more ONLY
    • Palmar (1% = PATIENT’S PALM)
      – Better for smaller, insignificant burns
    • Lund and Browder
      – Better for age appropriate (pediatrics)

Inhalation Burns

• Doubles mortality
• Inhalation injury leads to fluid shifts affecting pulmonary compliance, oxygenation
• Tachypnea and stridor are LATE findings. Absence of these does not rule out inhalation injury
• Early intubation preferred
• Secure with COTTON umbilical ribbon, NOT tape
Burns

- Treatment priorities:
  - Airway
    - Assurance of patent airway
    - Pre-emptive intubation for suspected/known airway burns.
  - Breathing
    - Oxygenation
    - Ventilation
    - Escarotomy
  - Circulation
    - Fluid resuscitation (WARM fluids if possible)
    - Analgesia
  - Avoid loss of body temperature
  - Transport to appropriate facility

Trauma and Burns

- Traumatic injury in 5-15% of burn patients
- Trauma care takes precedence over burn care (but maintenance of body temp, airway protection and fluid resuscitation must also occur)

Burns

- Fluids:
  - 4 volume text (Adults)
    - 2 mL X Patient weight in kg X %TBSA of full and partial thickness burns = amount of fluid over 24 hours (50% of fluid given in first 8 hours).
    - Peds<30KG: use 3ml instead 2ml (also add maintenance glucose)
  - New text refers to both Parkland and Brooks formulae
Modified Brooks

- Initial 24 hours = NO Colloids
- Ringer’s Lactate
  - Adults: 2ml/kg/% burn
  - Pediatrics: 3ml/kg/%burn

Compartment Syndrome

- Fluid resuscitation leads to edema which can accelerate and exacerbate compartment syndrome
- Follow Doppler signals, capillary refill, pulses, skin temperature, ventilatory compliance
- Treatment = escharotomy and fasciotomy

Burns

- Analgesia:
  - Morphine
  - Fentanyl
  - Hydromorphone
  - Ketamine
Burns

- Many geographic regions do not have a tertiary burn care center.
- Burn centers are expensive to operate.
- Each EMS system should have a plan for burn care:
  - Designated referral centers.
  - Inter-local agreements.
  - Transport plans.

Prehospital burn care should also address toxins found in smoke:
- Carbon monoxide (CO)
- Cyanide
- Protocols should address these concerns.

ABA Burn center referral:
- Partial thickness burns greater than 10% total body surface area (TBSA).
- Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
- Third degree burns in any age group.
- Electrical burns, including lightning injury.
- Chemical burns.
- Inhalation injury.
- Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.
Burns

• **ABA Burn center referral:**
  – Any patient with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn unit. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols
  – Burned children in hospitals without qualified personnel or equipment for the care of children
  – Burn injury in patients who will require special social, emotional, or rehabilitative intervention

HF Burns

• Common brick cleaning solution
• HF dissociates on contact with the skin
• Fluoride ions penetrate deep into the skin
• Can be painless at first (concentration dependent)
• Treatment
  – Calcium chelation (inject calcium directly into the site of the skin where the burn occurred)

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Take-Home Points

• Prehospital burn care priorities are different from in-hospital burn care priorities.
• Burn care protocols should be in place and periodically reviewed.
• Protocols should also address exposure to toxic products of combustion (e.g., CO, CN).