Pediatric Burn Education

SUMMARY

Pediatric patients are not simply smaller versions of adults; they possess unique anatomical, physiological, and developmental differences that require specialized care, particularly when faced with traumatic injuries like burns. Understanding these differences is critical for healthcare professionals who provide care in emergency, critical, and acute care settings.

This case study aims to follow a systematic approach to managing pediatric burn patients, emphasizing the importance of early and accurate assessment, fluid resuscitation, pain management, and wound care, while also addressing the psychosocial needs of both the child and their family. It will guide healthcare professionals through the essential steps of burn management in pediatrics, from initial assessment in the field to definitive care, highlighting best practices and evidence-based interventions to optimize patient outcomes.

By exploring this case study, participants will gain insight into the complexities of pediatric burn care, preparing them to apply a focused, multidisciplinary approach when faced with these challenging situations

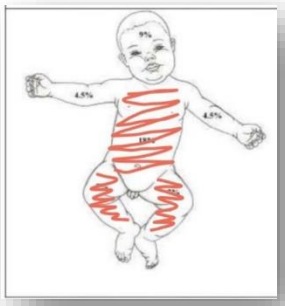
CASE

18-month-old, carried in by parent/guardian. Parent/guardian reports that the child pulled a hot pan of boiling water onto themselves approximately an hour ago. The child is crying in the parent's arms and is immediately taken to the resuscitation/trauma bay for evaluation.

INITIAL ASSESSMENT AND MANAGEMENT

A – Airway w/cervical spine protection: Patient spontaneously opens mouth and is crying. No stridor or upper airway noises noted. No concern for cervical spine injury.
B - Breathing and Ventilation: Breathing is spontaneous, respirations are even, rapid, breath sounds are clear (child is crying). Burns noted to anterior chest.
C - Circulation and Cardiac Status: temp 36 C, bp 98/64, HR 142, RR 30 breaths/minute, SpO2 99% in room air. Cardiac monitor placed – shows ST w/o ectopy, skin is pink, warm, dry, cap refill < 2 sec. Burns noted to anterior chest, abd/pelvis, and both upper and lower legs (anterior only). The team places 2 large bore IV's and begins LR at 125 ml/hr.
D – Disability, neuro deficits, gross deformity: Assess LOC using AVPU (Alert, Voice, Pain, Unresponsive). Child is Alert, no neuro deficits or gross deformity noted. *If ALOC, consider obtaining glucose.*
E – Exposure and Environmental Control: All clothing is removed. Resuscitation/Trauma Bay room temperature is increased, overhead heating lights/lamps are turned on, and IVF is warmed.
H – History: parent was boiling water and walked away. Child pulled on handle and pulled the pot of boiling water onto themselves. **Weight: 18 kg**. No past medical history, no daily medications, no allergies, childhood immunizations are up to date.

Physical Exam: Head to Toe is completed with the following pertinent findings: superficial partial thickness burns noted to anterior chest, abdomen/pelvis, both upper and lower legs.



CALCULATE TBSA

- Calculate TBSA – Lund Browder Chart
- Chest – 18 %, Legs 7% each = 14 % total
- Total TBSA: **32%**
- Other methods: Rule of Palms – using patients' hand – used to measure small/scattered burns -palm = 1%. Modified Lund and Browder – based on age and location of burn.

CALCULATE FLUID RESUSCIATION ADJUSTED RATE

- 3 ml x 18 (child's weight in kg) x 32 (estimated TBSA) = 1728 ml
- Total need for first 24 hours (1728 ml).
- Calculate adjusted rate (ml/hr) – divide 1728 in half (864 ml).
- To get ml/hr for first half to be given in 7 hours (1 hour delay).
- Divide 864 by 7 = 123 ml/hr x 7 hours.
- Consider maintenance fluids containing dextrose.

REMAINDER OF SECONDARY SURVEY

- Labs – CBC, CMP, Type and Screen, bedside glucose monitoring.
- X-rays – none
- Insert foley catheter for close monitoring of urine output 1 ml/kg/hr
- (18 ml/hr).
- Medicate for pain and anxiety.
- Wound care – cover area with dry sterile dressing.
- Provide psychosocial support to parents/guardians.
- Prepare for transfer to burn center.

PEDIATRIC CONSIDERATIONS

A – Airway: edema leading to airway obstruction is a major concern in children. Remember that anatomically a child's airway is smaller than an adult's.

- Intubation is indicated in infants/children w/significant respiratory distress/failure, or significate airway edema.
- Extensive facial burns may also require intubation
- Intubation should be by someone experience in pediatrci airway management. Utilize cuffed endotracheal tube.

B – Breathing: any pediatric patient with suspected inhalationsl injury should be stabilized and prepared for immediate transfer to burn center.

- Pulmonary injuries have few physical or radiographic signs in first 24-hours post burn.
- Endotracheal and gastric tubes need to be well secured.

C – Circulation: Early IV access and initiation of fluid resuscitation is essential to decrease acute renal failure.

- IV access – earlier the better, ultrasound guided placement maybe helpful. If unable to place PIV, IO might be indicted, risk for compartment syndrome if the extremity is burned and IO infiltrates. Can place IV through burned skin.
- Central venous line may also be another route.

D – Disability, Neuro deficit, Gross deformity: Change in LOC maybe result of hypoglycemia or hypoxia. Identify and treat the underlying cause. Glucose monitoring and maintenance fluids containing glucose should be considered.

E – Exposure, environmental control: Stopping the burning process is key. Remove all clothing including diaper, socks, shoes.

- Cover w/ clean, dry linens. Prevent hypothermia.

Non-Accidental Burn Trauma: this should always be a consideration, especially in the young and vulnerable populations.

- Consider developmental age when evaluating the patient.
- Circumferential burns, burns with clear line of demarcation, or delay in seeking medical care are concerning for non- accidental.
- Irregular burns that look like splatter burns, may in fact be just that – ensure the explanation makes sense with the injuries that you are seeing.

Reporting of suspected child abuse is mandatory in every state, reporting should be completed even if the patient is being transferred.

REFERRAL CRITERIA PER THE AMERICAN BURN ASSOCIATION

- Full-thickness burns
- Burns to face, hands, feet, genitalia or perineum
- Inhalational injuries
- Electrical burns
- Chemical burns
- Partial thickness burns that are >10 % TBSA.
- Hospitals without qualified personnel or equipment for the care of children

REFERENCES:

American Burn Association. (2023). Advanced Burn Life Support Course Manual (ABLS). American Burn Association.

Emergency Nurses Association. (2024). Trauma nursing core course (TNCC): An ENA course (9th ed.). Jones & Bartlett Learning.