Pediatric Burn Care: A Case Study

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BACKGROUND

A.D.

- 9 y.o. male with 50% TBSA mixture of 2nd and 3rd degree burns to BUEs, BLEs, anterior and posterior torso, neck and face, intubated and sedated, hypotensive
- The injury was sustained while he was pouring gasoline into a GoKart and the fumes ignited. He was intubated and sedated prior to arrival due to the large size of burn and in order to secure his airway
  - Date of Admit: 6/24/20-
  - Date of Discharge: 9/2/20- (PBD# 70)

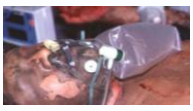
PRIMARY SURVEY

Initial Burn Management

- Primary Survey/Stop the burning process
- Universal Precautions
- Airway Management
- Breathing
- Circulatory Management
  - Start 1 or more large bore IV's
  - Initiate Fluid Resuscitation
- Avoid Hypothermia

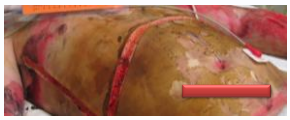
Airway and Stabilization

- Evaluate for upper airway injuries – edema formation
- Evaluate for lower airway injuries – inhalation
- Carbon Monoxide injuries
  - 100% Humidified Oxygen or Intubation if indicated
- Airway control
  - Chin lift/ Jaw thrust
  - Insert oral pharyngeal airway
  - Assess need for ET intubation



Breathing and Ventilation

- Listen and verify breath sounds
- Assess rate and depth
- Monitor chest wall excursion in presence of full thickness torso burns
  - Restriction of ventilation



Circulation

- Monitor BP, pulse rate, skin color
- Establish IV access
  - 2 large bore PIVs
  - Initiate resuscitation
- Assess circulation status of circumferentially burned extremities
- 5 P's
- Look beyond the surface

Disability, Neurologic Deficit

- **Typically alert & oriented….If not, consider:**
  - Associated Injuries?
  - CO poisoning? Cyanide poisoning?
  - Substance abuse?
  - Hypoxia?
  - Pre-existing medical conditions/medications?

A – Alert & Oriented
V – Responds to verbal stimuli
P – Responds only to painful stimuli
U – Unresponsive

Exposure and Environmental Control

- Remove all clothing and jewelry
- Prevent hypothermia
  - Warm room and ambulance
  - Keep patient covered
    - Dry sheets, blankets, saran wrap
    - Dry dressings
  - Warm IV fluids
- Maintain core temperature

INITIAL STABILIZATION

Referral Hospital

- 20:30 → Time of injury
- 22:18 → Arrival at OSH via Eagle Med
- VS: BP 119/8, P166, RR 17, SpO2 99%, Temp 36.7
- 23:15 → Intubated 6.5 ETT
- 23:55 →Depart OSH (~*1.5 hours)*

Assessment
Singed nasal hairs/eye brows
Oral pharynx clear
GCS 15
Strong central pulses
PERRL
Est. 67% TBSA

Interventions
Bilateral PIV 22g
Foley
OG
Central line
A-line
Multiple temp checks

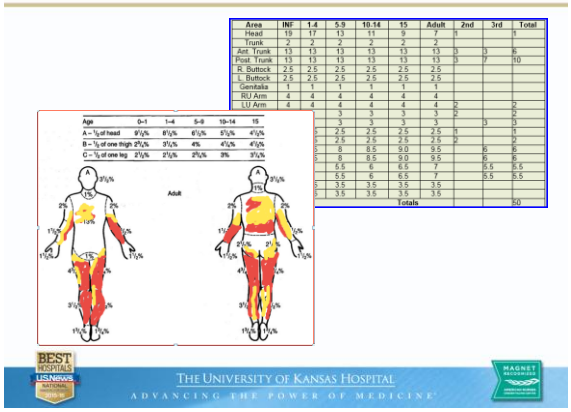
Referral Hospital

- Referral Hospital Resuscitation:
  - Scene: 300mL NS
  - LR @ 370mL/hr.
- Wound care:
  - Xeroform to all wounds except back
- Medication: 9mg Morphine, 30mcg Fent.

HOSPITAL COURSE

Hospital Course

- 00:38 → Direct admission to Burn ICU
- VS: BP 40/22, P 156, RR 16, SpO2 100%, Temp 38.7
- Bilateral LE escharotomies
- PICU consult
  - Aline placement
  - Developed an arterial clot → no pulse/cold foot
  - Vascular consulted→ line removed
  - Heparin gtt
- Enteral feedings: 8.5 hours after admission
- Time to first Excision: 2 days



Admission Photos (6/24/20-)

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Resuscitation

2011 ABLS Resuscitation Guidelines

- Initiation criteria:
  - Pediatrics: greater than 10% TBSA
  - Adults: greater than 15% TBSA
- Fluid Management
  - ≤ 5 years : 125ml LR/hr.
  - 6-13 years: 250 ml LR/hr.
  - ≥14 years: 500 ml LR/hr.
- Caution:
  - *Start IV fluid at 250mL/hr. for patients with pre-existing cardiac disease, pulmonary disease or age >70*
  - *Avoid fluid challenges unless patient is hypotensive due to trauma*

Fluid Resuscitation Formula

- **Children ≤ 14** **3 ml LR x TBSA x kg**
- **Adults** **2 ml LR x TBSA x kg**
- **Electrical** **4 ml LR x TBSA x kg**

- **Give ½ in first 8 hours of injury and remainder over next 16 hours.**
- **Adjust rate to maintain urinary output**

ABLS Resuscitation Formula ≤ 14 yrs (40 kg)

%TBSA x wt. kg x 3 mL = 24hr total

- 50% x 42.5 kg x 3 mL = 6,375/24 hrs

- ½ in the first 8 hrs (3,187 mL or ~ 400mL/hr)
- ½ in the remaining 16 hours (3,187 mL)

- Trigger Volume: 12,750 mL/24 hrs

Resuscitation

50% TBSA
42.5kg
Trigger: 12,750

- Initially under resuscitated
  - Received 975 mL crystalloid in first 4 ½ hrs en route
  - Required 1700 ml crystalloid
- Resuscitation orders: LR @ 450mL/hr.
- Estimated 8 hour total: 3,187 (actual: 4,368)
- Estimated 24 hour total: 6,375 (actual: 10,812)
  - 25% Albumin started at 11 hours post burn

Trigger Volume

%TBSA x wt. kg x 6 mL = 12, 750 ml

Over-resuscitation can result in serious morbidity / mortality. Patents who receive over 6 mL/kg/%TBSA burn in the first 24 hours are susceptible to severe complications including ALI, ARDS, and compartment syndromes of the extremities and/or abdomen.

Estimated 8 hour total: 3,187 (actual: 4,368)

Estimated 24 hour total: 6,375 (actual: 10,812)

	Pre	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00
BP		40/22	63/34	92/50	66/37	80/50	79/49	82/36	86/46
Pulse		156	171	164	160	159	162	162	152
LR	965		406	999	999	999	999	600	600
UO						12	22	22	15

WOUND MANAGEMENT

Wound Management

- Procedures:
  - 6/24: escharotomies to bilateral lower extremities
  - 6/25: excision and allograft placement
  - 6/29: excision and allograft placement
  - 7/1: excision and STSG placement
  - 7/3: excision, allograft and dermal regeneration template placement
  - 7/14: excision and dermal regeneration template placement
  - 7/23: excision and allograft placement
  - 7/28: excision and STSG placement
  - 8/12: excision and STSG placement

PBD # 11 (7/5/20-)

- "Takedown"

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Week 4 – Standing for the 1st time

PBD # 24 (7/18/20-)

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PBD # 40 (8/3/20-)

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- Donor Site - Scalp

PBD # 56 (8/19/20-)

- Donor Site – anterior feet

PBD # 63 (8/26/20-)

- Wound Closure

PBD # 63 (8/26/20-)

PSYCHOSOCIAL NEEDS

Special Visitors

BEYOND SURVIVING…..
TOOLS FOR THRIVING

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Tools for Thriving

- Phoenix Society for Burn Survivors
- S.T.E.P.S
  - Smile: warm & kind
  - Posture: Up/Shoulders back
  - Eye Contact: Look them in the eye
  - Tone of Voice: Friendly/Enthusiastic
  - Self-Talk

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RYR – Rehearse Your Response

- Survivors & Family often feel awkward, angry or embarrassed when strangers ask questions about their burn injury
- 3 Sentence Tool
  - How or when you were burned
  - How you are doing now
  - End the conversation

"I was burned in a GoKart accident, I'm doing better now, Thank you for asking!"

Staring

- Survivors may not be able to change the publics reaction to a burn injury, but they CAN change their own reaction to the staring
- Stand up straight, look the person in the eye, smile & initiate small talk *"How are you doing today?"*
- Response is usually equally as friendly & the staring ends.

Conversation Distracters

- Remove the attention away form the burn injury to another subject

"Do you shop here a lot?"

"I really like that shirt, where did you get it?"

Discharge PBD# 70 (9/2/20-)

- http://fox4kc.com/2015/09/02/9-year-old-boy-who-received-thousands-of-get-well-letters-heads-home-after-three-months-in-hospital/#ooid=o4ZTNjdzrGO5Ge2cIGjYMEy-4MTnZHRw

THANK YOU