"What's got you so hot and bothered anyway? "

allergic reactions, heat emergencies, and burns

Written by:
Susan Wood RN
Paramedic

NWC EMSS CE
May 2016

Discussion of allergic reactions, burns and heat emergencies with an emphasis on:

- differentiating mild, moderate & severe allergic reaction including risk factors & treatment priorities.
- predisposing factors associated w/ heat disorders & contrast the body's compensatory process for heat exhaustion or stroke.
- identifying differences b/t emergent & urgent presentations.
- treatment & intervention priorities for dehydration w/ heat disorders.
- physiologic response to injury which contributes to the development of burn shock.

- assessment & resuscitation for pts w/ thermal burns
- calculating TBSA using Rule of 9's or Rule of Palms.
- burn severity & identifying those pts that may benefit from consideration directly to a burn center.
- conditions associated w/ burn trauma including inhalation burns, hypovolemic shock, need for escharotomy, & compartment syndrome.
- psychosocial aspects of burn injury.

Allergic reactions

- How common are food allergies?
  ~ 15 M people in US have food allergies
  More common with children (1:13)
- What areas of the body are most often affected?
  - Skin, GI tract, respiratory or cardiovascular system

Food Allergy Research & Education

Is there anything really new about such an old illness?

"The EMS Praxis for Anaphylaxis"
Jeffrey M. Goodloe, MD, NREMT-P, FACEP
Medical Director for Metropolitan OK City & Tulsa
U of OK School of Medicine

He asked this very question…answer:

While there may not be a huge change for EMS, there is a practice issue for both pre-hospital and in the emergency department!

Food Allergy Research & Education

According to FARE, 8 foods are responsible for 90% of food allergies:

- Cow's milk
- Eggs
- Peanuts
- Fish
- Shellfish
- Tree nuts
- Wheat
- Soy

On any given day, a person is at risk for any of the foods to be "hidden", thus increasing the risk of allergic reaction and/ or anaphylaxis.

Egg
Milk
Peanut
Tree nuts such as walnuts
Soy (primarily in infants)
Wheat

Common food allergies in children

Common food allergies in adults

Shellfish such as shrimp, crayfish, lobster, and crab

Peanut

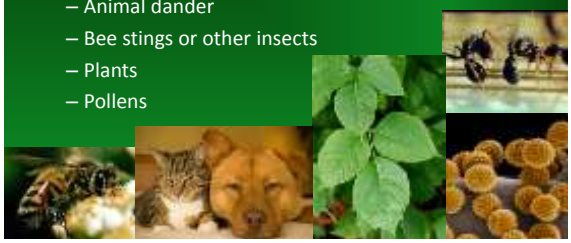
Tree nuts

Fish such as salmon

Food is only <u>one</u> of many things that causes an allergic or anaphylactic reaction

What other things might be considered?

- Animal dander
- Bee stings or other insects
- Plants
- Pollens



Iatrogenic things… what?

induced inadvertently by a physician or surgeon or by medical treatment or diagnostic procedures

- Such as?

Severity of a reaction is affected by:

the quantity of the antigen;

route & rapidity of absorption
(↑ risk = parenteral; ↓ risk = topical; oral = somewhere between the two)

a PMH of asthma or cardiac disease; and/or

patients taking beta blocker drugs.

What if the allergen is unknown?

SOP does not dictate that treatment is based on allergen but rather on symptoms

For long term risk, it is preferable to determine etiology but not imperative for short term treatment

What are common symptoms of any allergic reaction?

Pass out cards.

Hives (Urticaria)

What is it?

- Edematous reddened patches or welts on the skin
- May be itchy!
- Can appear anywhere on the body

Hives (Urticaria)

What causes them?

- HISTAMINE
- Antibody release & attach to mast cells

What else happens?

Wheezing, mucus and mayhem!

Skin becomes flushed, rash and itching
- **vasodilation of blood vessels**

Eyes & nose water, itch, productive cough
- **increased mucus production**

Lungs begin to wheeze
- **bronchoconstriction**

What other system is often affected but overlooked with assessment?

Gotta go!

The GI tract
- histamine is contained in almost all body tissues, including the GI tract

Patients complain of:
- abdominal cramps
- diarrhea
- N / V

1. A conscious A & O adult presents w/ urticaria & pruritus on chest & arms following yard work. They also c/o itchy, watery eyes, sneezing, & a scratchy throat. There is no facial or airway edema or respiratory distress.

   BP 124/72; P 86; RR 16; SpO2 99%; BS = clear.

   Which of these is indicated first?

A. Epinephrine 1:1,000 IM
B. Epinephrine 1:10,000 IVP
C. Diphenhydramine IM or slow IVP
D. Albuterol & ipratropium via HHN

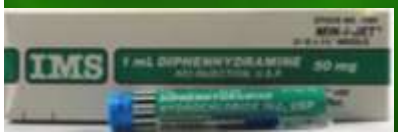
Diphenhydramine (Benadryl)

Classification: antihistamine (H1 blocker)

Why is that beneficial?

What is the dosage in accordance with SOP?

Diphenhydramine 1 mg/kg (max 50 mg) IM or IVP (IV desired in moderate to severe reactions)



Asthma?

How serious is this?

Localized reaction

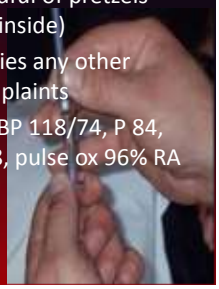
Treatment with cold pack for comfort

Type of reaction?

Pt c/o hives to hand and forearm only from grabbing a handful of pretzels (PB inside)

Denies any other complaints

VS: BP 118/74, P 84, R 18, pulse ox 96% RA



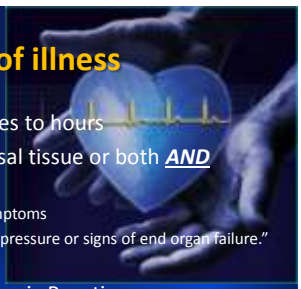
Anaphylaxis Guidelines

"Highly likely when ***any one*** of the following three criteria is fulfilled…"

WAO WORLD ALLERGY ORGANIZATION

Guidelines and Management for Anaphylaxis, Curr Opin Allergy Clin Immunol. 2012; 12 (4): 389-399

1. Sudden onset of illness



"Can occur within minutes to hours

Involving the skin, mucosal tissue or both ***AND***

– *At least one of these*:

- Sudden respiratory symptoms
- Sudden reduced blood pressure or signs of end organ failure."

P. 13 SOP Severe / Systemic Reaction

Life threatening:

…respiratory failure, cardiovascular collapse…

2. **Two or more** of the following occurs after exposure to a likely trigger:

Sudden

skin or mucosal;
respiratory;
reduced BP (or end-organ dysfunction);
or gastrointestinal symptoms.

SOP: The difference between ***mild*** and ***moderate*** reaction?

2. An adult presents with dyspnea, anxiety, facial swelling, watery eyes, and sneezing following exposure to a cat. VS: BP 110/70; P 100; R 24; RA SpO2 94%; lung sounds: diffuse wheezing. Which of these is indicated first?

A. Diphenhydramine IM
B. Epinephrine 1:1,000 IM
C. Epinephrine 1:10,000 IVP
D. Albuterol & ipratropium via HHN

Quiz Q #2

Why should epinephrine 1:1,000 IM be given?

- Moderate systemic reaction

Why first?

- Start the process immediately

Why should this *not* be categorized as a mild systemic reaction?

- Both mucus production causing sneezing, watery eyes and respiratory symptoms with dyspnea

Why not severe?

- BP ok

Moderate Reaction

What is given after epi?

Diphenhydramine

Albuterol 2.5 mg

beta-2 agonist to help relieve bronchospasm by relaxing smooth muscles

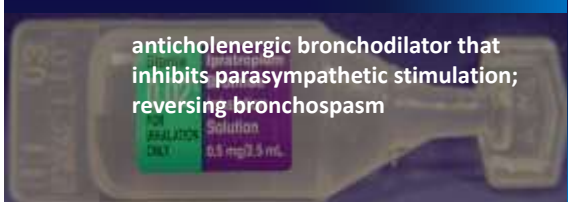
helps potassium to return to the cells by activating the Na/K pump

Moderate Reaction

What is given after epi?

Diphenhydramine

Ipratropium 0.5 mg / HHN



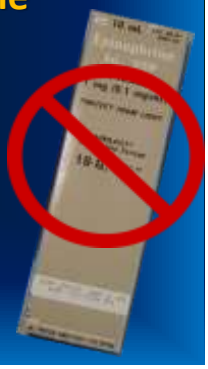
anticholenergic bronchodilator that inhibits parasympathetic stimulation; reversing bronchospasm

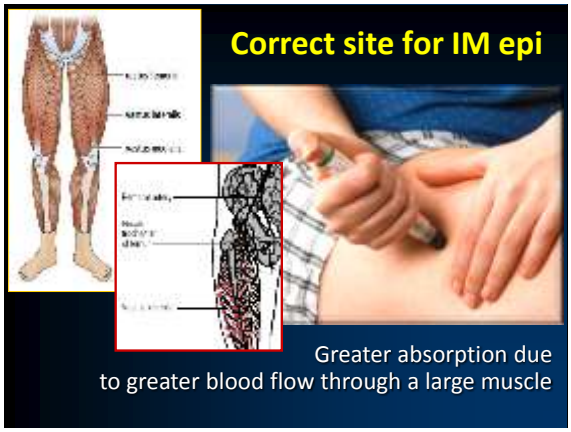
Epinephrine

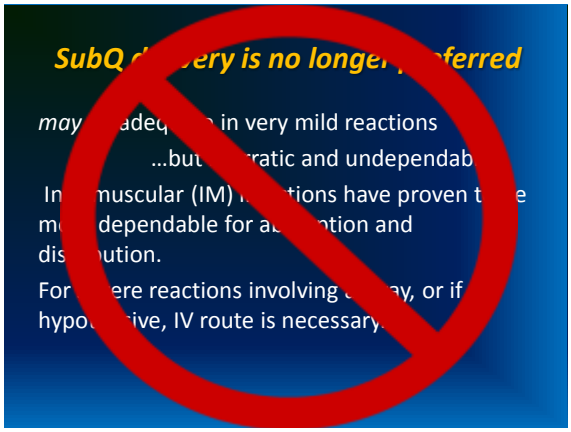
What is the rationale for giving epi 1:1,000 IM?

Beta-2 effects

- *Bronchodilation!*







3. What causes patients with anaphylaxis to experience shock and a relative hypovolemia?

A. Massive vasodilation
B. Pump failure and osmotic diuresis
C. Loss of sympathetic nervous system function
D. Endotoxin release that opens AV shunts around the capillaries

4. What is the desired action of epinephrine when given in the prescribed dose to a pt in anaphylactic shock?

A. H1 & H2 blocker to reverse the immune response
B. Anticholinergic agent to dry secretions and vasoconstrict the patient
C. Alpha & beta stimulant to bronchodilate & vasoconstrict the pt
D. Stabilize cell membranes to reduce inflammation and decrease airway hyper-reactivity

Myth: Anaphylaxis *always* presents w/ cutaneous S&S

Reality

10%-20% of anaphylaxis cases have NO hives or other skin signs

80% of food-induced fatal anaphylaxis cases had no cutaneous S or S

3. Reduced BP

Infants/children: age specific or > 30% drop

Adults: <90 mmHg systolic or 30% drop from baseline

Treatment Plan

GET A LINE!

This is important

While an IV is started?

IM epi…IVP to follow

IVFs

Dopamine

Diphenhydramine

Albuterol 2.5 mg & ipratropium 0.5 mg / HHN

Epinephrine

What is the rationale for giving epi 1:10,000 IV?

Beta-1 effects

vasoconstriction

If a patient in anaphylaxis does not respond to IV fluid challenges & epi & the BP remains < 90, what drug is indicated next?

A. Albuterol 2.5 mg/HHN
B. Glucagon 1-2 mg IVP slowly
C. Dopamine 10 mcg/kg/min IVPB
D. Diphenhydramine 50 mg slow IVP

Do patients even take their health seriously?

Study from 02-08'

12, 000 total pts

25% with h/o anaphylaxis

Non-compliance with carrying epi pen or reg appts with allergist

S. Clark, MD et. al
Weill Cornell Medical College
NYC

Smaller study regarding the proper use of epiPen

91% stated they had good knowledge

Majority could not identify injection side of the autoinjector!

Did not know to rub site after injection

R. Chaudhry, MD
U of Medicine & Dentistry
New Jersey

We have a huge opportunity here

…but do we take it?

Study from 10-12'

92 pts w/ allergic reaction

52 w/ anaphylaxis

- 8 (15%) given epi by EMS
- 25 (48%) oxygen
- 6 (11%) IVFs
- 13 (25%) steroids
- 10 (19%) albuterol
- 42 (81%) diphenhydramine

N El Sanadi et al.
Broward Co. , FL EMS

Emergency… we are here to help!

Don't worry…docs may not be much better

Survey of 318 MDs (EM)

They too do not always adhere to giving epi

They too do not send pts from the ED w/ epi Rx

They too referred pt to an allergist

M Zitt et al

WE HAVE TO DO BETTER…

A 13 yo presents w/ acute dyspnea

Mother reports nl. activity this am before school

~ 2 hrs later, school called; a rash w/ generalized flushing shortly developed after eating a chocolate chip cookie brought in from another student. During exam + N/V with SOB.

VS: BP 72/50,P 134, R 28, pulse ox 94% RA

…EMS is called

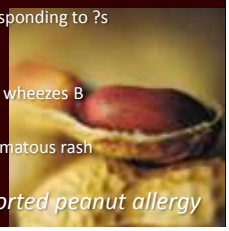
What is to be done?

What type of reaction would this be categorized?

Treatment plan?

Oxygen (if indicated), cardiac monitor, IV access

- Pt became lethargic but still responding to ?s appropriately
- airway patent; no stridor
- BS = ↓ bases & end expiratory wheezes B
- Capillary refill = 3 sec
- Diffuse maculo-papular erythematous rash



Mother reported peanut allergy

Symptoms can occur minutes to hours after exposure

Acute onset involving:

- The skin and / or mucosal tissue
- Respiratory compromise and / or ↓ BP
- Persistent gastrointestinal symptoms

Epinephrine: 1st line drug for anaphylaxis

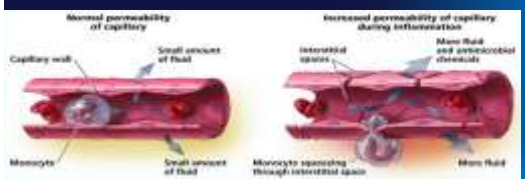
Used if 1+ body systems involved, airway compromise or signs of hypoperfusion

Sooner epi is given = ↑ outcome

Lesson for EMS: *Risk factors for severe or fatal anaphylaxis include a h/ o asthma, nut allergies, & age.*

Symptoms can also resolve, & then hrs later recur; term: biphasic anaphylaxis.

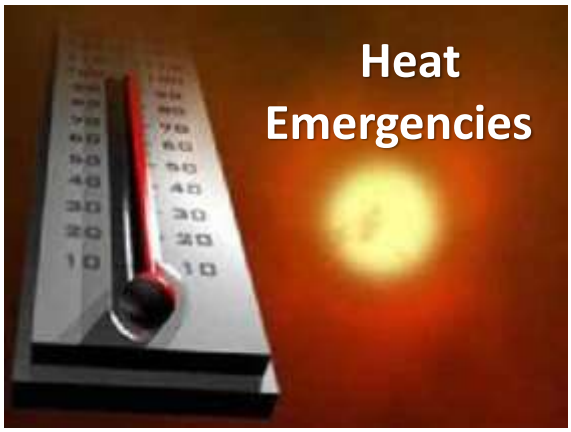
EMS Pearl: The earlier epinephrine is administered in the course of anaphylaxis, the better the chance of a favorable outcome.



Take home points:

- Most fatalities occur in first 60 min of onset
- Airway obstruction & cardiovascular collapse are most common causes of death
- Many pts who died from anaphylaxis only had ***minor previous reactions***
- Risk factors include sensitivity to peanuts, history of asthma & beta blocker use
- Hypotensive pts should remain supine due to the risk of complications from massive volume depletion due to fluid shifts.

Break time…come back in 5!



Heat Emergencies

Defined…

A medical condition caused or exacerbated by environmental factors

Severity

Based on skin parameter/ signs and symptoms

- Cramps
- Exhaustion
- Stroke

It is 88° F outside with 70% humidity. An awake and alert 26 y/o mail carrier is complaining of severe pain in their thighs, legs, and abdomen with nausea. The patient stated they have been late in their rounds and last drank a cup of ice water about two hours ago. BP: 120/82; P 120; R 32; SpO_2 99%; $EtCO_2$ 33; T 99° F.

A paramedic should suspect heat

A. tetany.
B. stroke.
C. cramps.
D. exhaustion.

Thermoregulatory Mechanisms

The body's desire to maintain its core temp balanced

Starts in the brain (hypothalamus)

Body responds to environmental factors

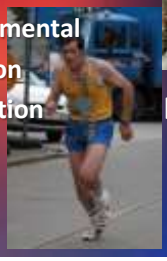
Internal heat production affected by age, health, nutritional status

Heat Production

Loss

Convection

Environmental
Radiation
Conduction



Evaporation

Compensatory Response

Vasodilation:
↑ blood flow thus cooling body through convection & radiation

Sweating:
Utilizes convection & evaporation to cool

SOP:

Cramps or tetany

Pt starts to become dehydrated and c/o muscle cramps often in the legs

Due to significant water loss, electrolyte imbalances can occur causing discomfort

Progression of Symptoms

SOP:

Treatment:

No immediate need for IVF replacement

Remove from warm environment

Do ***NOT*** massage cramped muscles

Cramps

	Average body temperatures		Common signs and symptoms
COLD	Medical emergency	<32°C	Hallucinations, delirium, complete confusion, extreme sleepiness, progressively becoming comatose. Shivering is absent (may even think they are hot). Reflex absent or very slight.
	Hypothermia	<35°C	Intense shivering, numbness, blue/grey skin. Seek medical help.
	Normal Average	**37 °C**	**Varies, depending on time of day, activity and mode of measurement.**
	Fever	>37°C	Feeling hot, sweating, feeling thirsty, chills. Seek medical help.
	Hyperthermia	>38°C	Severe sweating, may be flushed and red or pallor with dry skin. Fast heart rate, breathlessness. Possible convulsions. Seek medical help.
HOT	Medical emergency	>41°C	Fainting, vomiting, severe headache, dizziness, confusion, hallucinations, delirium, drowsiness. May become comatose, convulsions, brain damage, cardiac arrest.

Symptoms based on temp

Predisposing Factors

Which patients would most likely be predisposed to a heat illness?

Elderly

Why?

Chronic Diseases

Drugs

It is 92° F outside. A 70 y/o was found supine under a tree. Pt is awake, answers questions accurately, but c/o extreme dizziness, weakness, thirst, nausea & has vomited X 2. Skin is flushed & diaphoretic. Denies CP or SOB & has a PMH of DM & HTN. Meds: propranolol. The pt became ill over past 30 minutes after golfing for the past 2 hours.

VS: BP 84/60; P 118 & thready; RR 24; SpO_2 97%; T 99° F. Glucose 120.

A paramedic should suspect heat

A. tetany.
B. stroke.
C. cramps.
D. exhaustion.

Let's switch golfing for firefighting

Heat Exhaustion

What treatment should be done?

What intervention should be initiated for the above patient with heat exhaustion per SOP?

A. Midazolam 2 mg IVP
B. Massage arms & legs to remove lactic acid
C. IV NS fluid challenge in consecutive 200 mL increments to maintain SBP ≥ 90
D. Initiate rapid cooling: Cold packs to cheeks, palms and soles of feet

What 2 assessment findings differentiate this scenario from heat stroke?

Heat stroke defined…

When the body can no longer shed heat effectively & temp rises above the body's set point, hyperthermia occurs. Failure of thermoregulatory mechanisms…

Pathophysiology

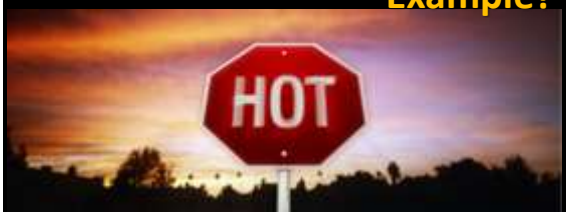
Failure of body reserves in face of heat stress
Fluid & electrolyte depletion
Anaerobic metabolism
Significant CV stress
Peripheral vascular shutdown

Pathophysiology

Sweating ceases
Cardiac decompensation
Redistribution of blood from core to periphery adds to hypotension
As cooling occurs, fluid shifts back to core and BP improves
Avoid huge IVF loads to prevent pulmonary edema

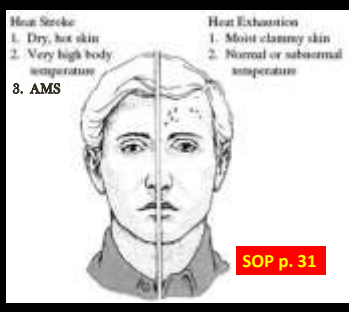
While it is often a presumed scenario of the heat stroke pt as a marathon runner (or more often the weekend warrior) who goes out and becomes dehydrated after significant exertion, more often EMS is called for the nonexertional heat stroke.

Example?



Presentation

↑ temp to 105°F
↑ P & RR
AMS
Dilated pupils
Hyperventilation
Hypotension
DRY hot skin
Delayed cap refill
↓ skin turgor
Electrolyte imbalance
LETHARGY



SOP p. 31

Help me please!

Treatment includes:

- move to cool place & remove clothing
- assess temp
- ***RAPID*** cooling measures
- assess for hypoglycemia
- place supine for ↑ ICP
- IVFs to maintain SBP of 90
- apply CCP to neck, lateral chest, groin, axillae, temples & behind knees
- treat w/ midazolam if convulsive activity presents

Remember…

Monitor volume status
IVFs for dehydration
Seizure precautions

Treat with midazolam
Observe for ↑ ICP
Consider other dx.

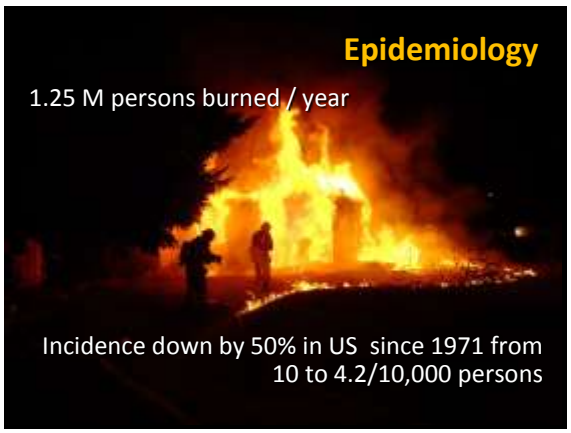
PT SAFETY!

From a variety of energy sources

- Thermal
- Radiant
- Electrical
- Nuclear
- Chemical

Epidemiology

1.25 M persons burned / year



Incidence down by 50% in US since 1971 from 10 to 4.2/10,000 persons

From The Journal of Emergency Medicine

Burns in the Emergency Department: A National Perspective

Breena R. Tarra, MD; Adam J. Singer, MD; Henry C. Thode Jr., PHD; Christopher Lee, MD

Authors and Disclosures

Posted: 07/09/2010; J Emerg Med. 2010;39(1):1-5. © 2010 Elsevier Science, Inc.

Loading...

Print This Email This

Abstract and Introduction

Abstract

Background: Burns are a common cause of injury presenting to the Emergency Department (ED). Several reports state that admission for and mortality from burn injury are declining. Total visits to the ED, however, have increased. Objectives: The objective of this study was to determine the number and trends over time of patients presenting to the ED for burn injury. Methods: The study was a retrospective analysis of National Hospital Ambulatory Medical Care Survey databases for 1996–2005 available from the Centers for Disease Control and Prevention. Subjects were patients with a first diagnosis of a burn. Patient weights in the database were used to obtain estimated national values. Measures used were estimated total numbers and percentages of patients by year. Trends from 1996 through 2005 were examined overall and by demographic factors and injury characteristics. Linear regression was used to evaluate trends.

- Abstract and Introduction
- Methods
- Results
- Discussion
- Limitations
- Conclusions
- References
- Sidebar

Guidelines for Operations of Burn Centers

Burn Care System

A burn care system should be considered a coordinated component of an emergency medical services system that encompasses one or more burn centers and features communication links to, and triage-transfer protocols among, health care facilities, prehospital personnel, and transportation services. Within this comprehensive emergency medical system, trauma and burn centers should work together in a coordinated way to develop educational and performance improvement and patient safety (PIPS) programs that benefit injured patients. To fulfill this requirement of coordinated care, there must be commitment from the administration of the burn center, and the hospital should maintain accreditation with the Joint Commission or alternative accrediting agency. As evidence of this commitment, the burn center should have written guidelines for the triage, treatment, and transfer of burn patients from other facilities.

The burn center must also demonstrate commitment to the development of, and participation in, regional mass casualty disaster coordination. This burn center commitment must include providing education to the community regarding the early treatment of burn care, such as sponsoring ABLS courses.

Who is at greatest risk?

- Children
- Elderly
- Debilitated
- Mass casualty

…and would have risk for greatest severity

Children

- 2nd leading cause of accidental death
- 34% of all burns
- 10,000 experience severe permanent disability
- ↑ risk for inhalation with airways more difficult to secure

Children

- Scalds 18 mos – 3 yrs
- History difficult
- Greater BSA/kg = larger evaporative surface, ↓ ability to conserve heat
- ↑ risk for hypothermia
- Higher fluid needs, less metabolic reserves – ↑ incidence of hypoglycemia

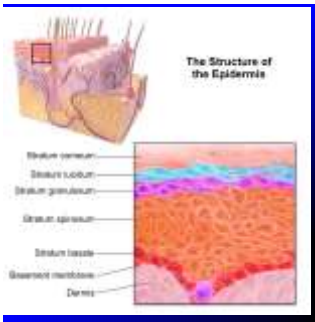
Elderly risks

Cooking, house fires, unattended cigarettes scalds

1,000 die/yr from home fires

Determining depth of injury

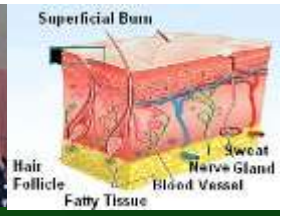
Superficial
Partial thickness
Full thickness



Epidermis

Outermost & thinnest; subdivided into 5 layers

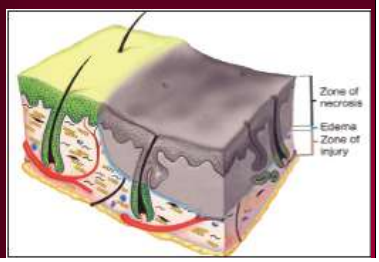
No blood vessels, totally dependent on dermis



Epidermis & outer dermis layer affected
Skin red, blanches & refills
Warm to touch, may be moist
Painful!
Usually no blisters

Partial thickness

Deeper in dermis - greater destruction
Skin contact
Hot liquids
Explosions producing burns
Hot grease



IAFF/ABA, 2007

How to identify?

Edema
Hairs intact
Red, cap refill intact
Moist, often blisters
Extreme pain
Risk of infection
Can convert to FT
Heals w/o grafting
Scar or changed appearance

Full thickness burns

Destroys epidermis + dermis including area that produces new skin cells

IAFF/ABA, 2007

Full Thickness Burns

↑priorities include:

Immediate assessment & management

- Airway
  (MOI include inhalation?)
- Breathing (listen for noises)
- Circulation
  (damaged cells cause ↑fluid leak)
- Disability
  (Frequent reassessment for deterioration-think hidden trauma/HI)

Identify TBSA
(↑concern w/ injury over joints)

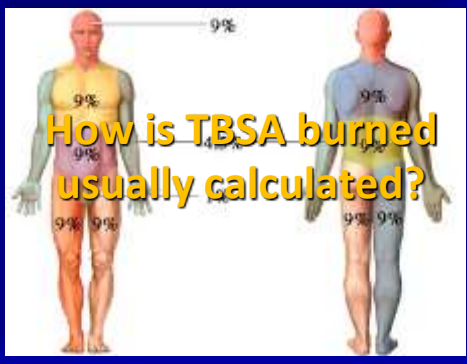
Pain Relief (including dressings)

A conscious and confused patient has been rescued from a smoky fire. He presents with severe ventilatory distress, singed nasal hairs and eyebrows, hoarseness, productive cough of carbonaceous sputum, stridor and diffuse wheezes in all lung fields. VS: BP 150/84, P 92, R 40 and labored; SpO_2 95%; $EtCO_2$ 20 with sharkfin waveform. What should a paramedic do first?

A. Administer 15L oxygen and prepare for DAI
B. Start an IV and administer 3 amps of sodium bicarbonate
C. Give epinephrine 0.1 mg IVP; withhold O_2 due to SpO_2 reading
D. Start an IV NS wide open and give sequential albuterol treatments

Which of these should take FIRST priority for transport due to the urgency of their injury?

A. 18% deep partial thickness leg burns
B. 2% partial thickness burns to both palms
C. Upper airway burn with suspected smoke inhalation
D. 9% deep partial thickness arm burn with a fractured radius and ulna



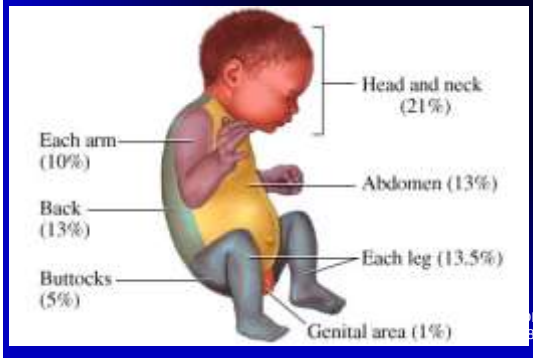
How is TBSA burned usually calculated?

SOP p. 84

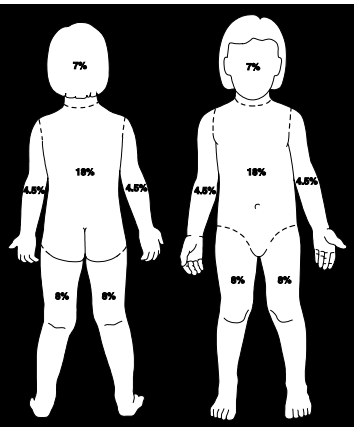
Rule of 9s modified for infant

4% taken from each leg (along w/ 1% from perineum)
Given to head

For Infants



Larger Children



What can be used to calculate smaller, scattered burns?

Rule of Palms

Palm surface w/ fingers = 1%
Irregularly shaped burns up to 10% BSA

Fluid infusion (ABA, SOP)

Warm NS

0-5 yrs: 125 mL/hr
5-14 yrs: 250 mL/hr
≥15: 500 mL/hr

Parkland formula:

4 mL X % TBSA X kg; ½ in first 8 hrs

SOP p. 41 ITC Special Considerations

Standard dosing until max dose given
Monitor VS carefully
Evaluate response

An awake and alert adult spilled hot coffee on his left hand and forearm (TBSA 3%) sustaining a deep partial thickness burn. The patient is c/o severe pain (10/10).

VS: BP 160/90, P 96, R 16. Attempts at IV access are unsuccessful. Which of these is indicated to treat the pain?

A. Midazolam IM
B. Fentanyl IN
C. Spray burn with Benzocaine
D. Transport with arm covered with crushed ice

No topical ointments, creams, or anti-microbials in field

If PT> 15% and/or FT> 5%: dry dressings

Smaller burns/eyelids moist dressings

Wound care

↓ Air movement to ↓pain
Reduce fluid loss
Prevent hypothermia
Prevent bacterial contamination

Wound care

ve blisters intact
Wrap digit ally or place gauze
d skin areas

Let's calculate some burns…

1. Depth of injury
2. TBSA
3. Type of dressing

Immediate transport

All FT and PT burns > 5%

Burns to face, hands, feet, genitalia, or over major joints

Toxic gas, smoke, steam, or flame inhalation

Geriatric, peds, or otherwise ill patient

Chemical, electrical, lightning burns

Transport considerations

Criteria for burn center referral

PT > 10% in ages
Full thickness any age group
Face, hands, feet, perineum, or major joints
Inhalation injury
Chemical burns; electrical/lightning burns
Children; Suspected child abuse
Pre-existing disorders that could complicate mgt, prolong recovery
Concomitant trauma; burn poses greatest risk
Pts require special social, emotion or rehab intervention

Courtesy of the
American Burn Association
Advanced Burn Life Support (ABLS)
Learn more about the ABA and ABLS at www.ameriburn.org

Burn Center Referral Criteria

A burn center may treat adults, children, or both.

Burn injuries that should be referred to a burn center include:

1. Partial thickness burns greater than 10% total body surface area (TBSA).
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
3. Third degree burns in any age group.
4. Electrical burns, including lightning injury.

Severity Determination

First Degree *(Partial Thickness)*
Superficial, red, sometimes painful.

Second Degree *(Partial Thickness)*
Skin may be red, blistered, swollen. Very painful.

Third Degree *(Full Thickness)*
Whitish, charred or translucent, no pin prick sensation in burned area.

5. Chemical burns.
6. Inhalation injury.
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.
8. 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.
9. Burned children in hospitals without qualified personnel or equipment for the care of children.
10. Burn injury in patients who will require special social, emotional, or rehabilitative intervention.

Excerpted from Guidelines for the Operation of Burn Centers (pp. 79-81). Resources for Optimal Care of the Injured Patient 2006. Committee on Trauma, American College of Surgeons.

Percentage Total Body Surface Area (TBSA)

Danger of Eschar

May tighten over wound like a tourniquet
Restricts blood flow
Increases pressure in compartment

S&S impaired circulation

Cyanosis
Impaired cap refill
Progressive neuro deficits: paresthesias, deep tissue pain
May need Doppler to obtain pulses

An adult has been rescued from a smoky fire. He is conscious, but very confused & disoriented, & is c/o a bad headache w/ nausea. Airway open & gag reflex intact. VS: BP 117/78; P 72; R 19; SpO_2 98%; $EtCO_2$ 32; BS clear bilaterally; skin flushed & diaphoretic; pupils are dilated bilaterally & reactive to light. Pt opens eyes to pain & closes them again, answers questions slowly & doesn't remember address; & moves all extremities on command. If any hospital can be reached in 30 minutes by ground, where should this patient be transported? You do not note any thermal skin burns.

A. Nearest trauma center
B. Lutheran General Hospital

Research is ongoing, not proven yet by any published studies…but intriguing

For a long time, standard treatment for burns was skin grafting.

Healthy skin from pt is harvested & used to cover damaged area. Another common is known as cultured epithelial autograft (CEA).

When a child receives either tx, skin may not always grow or grow correctly with the child. This often means repeated surgeries until the child has finished growing.

With ReCell, skin can grow & stretch as nl, allowing the pt to avoid multiple, painful procedures.

Having been used successfully on thousands of patients in Canada, the UK, France, Germany, and Australia, it still needs FDA approval in US

Austrailian plastic surgeon
Dr. Fiona Wood

Now Avita Medical is taking wound & burn treatment to a whole new level with a new technology called ReCell.

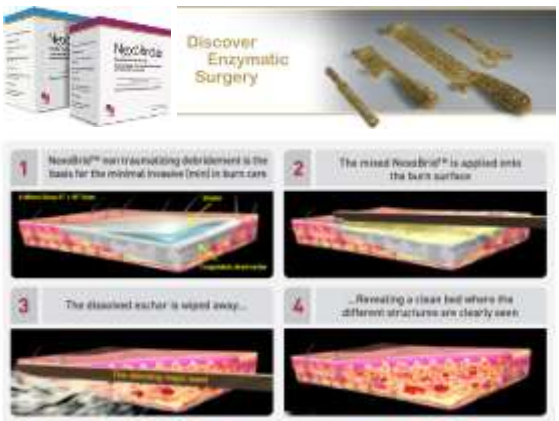
ReCell

StrataGraft

Proprietary human skin cell line
When properly cultured, forms a fully stratified multilayered human tissue with physical strength and biological characteristics of intact human skin

Silverlon dressings

Manufactured by Argentum of Geneva, Il
Long-acting silver-impregnated nylon bandage




Not everyone who gets hit by a drunk driver dies.
Psychological aspects


Questions