

Burn Fluid Resuscitation: Too much or too little?

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Burn Major Concerns

- Inhalation Injury
- Infection
- Multiple organ failure: That is where fluid resuscitation makes a difference

Four Main Aims of Burn Treatment

- Protection from the environment (infection)
- Temperature control (avoid hypothermia)
- Fluid control (treat dehydration): Main focus of this presentation
- Energy Control (need for increased caloric intake for healing)

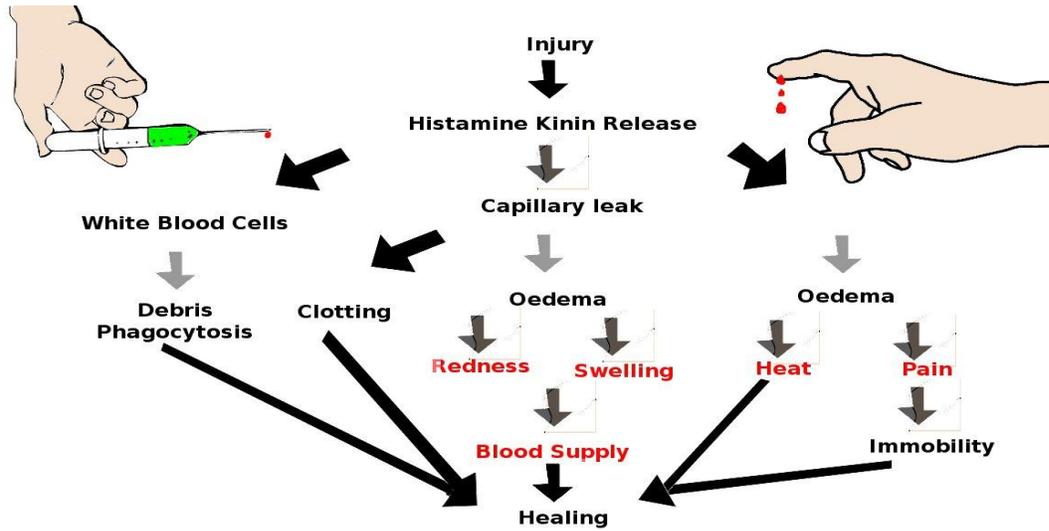
Who needs fluid resuscitation?

Patients with $\geq 20\%$ TBSA deep partial thickness to full thickness burns

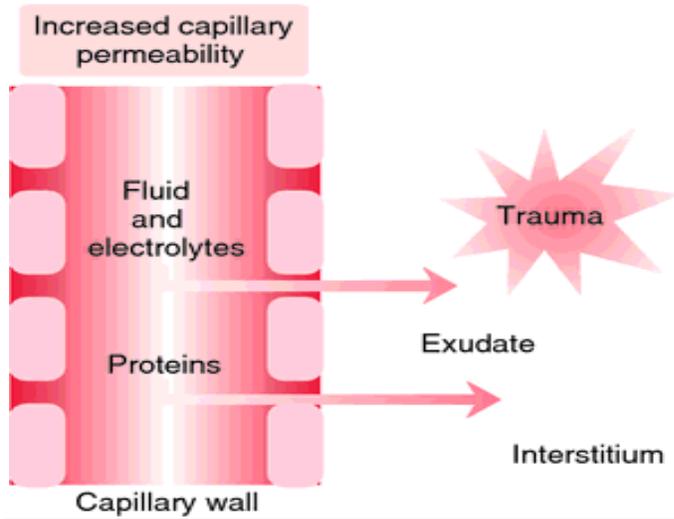
For burn injuries less than 20% TBSA, the actions of vasodilation and capillary permeability (fluid shifts) are usually limited to the burn site

- 90% of the edema is present within 4 hours
- Edema tends to reside in the dermis, and reabsorption is complete within 4 days

Review of Burn Patho: Burns result in big inflammatory response



Review of Fluid Shifts



Calculating % Total Body Surface Area (TBSA) Burned

Estimating Burn Area

Rule of Nines

The body surface is divided into areas representing 9% or multiples

Anterior 18%

Posterior 18%

9%

9%

9%

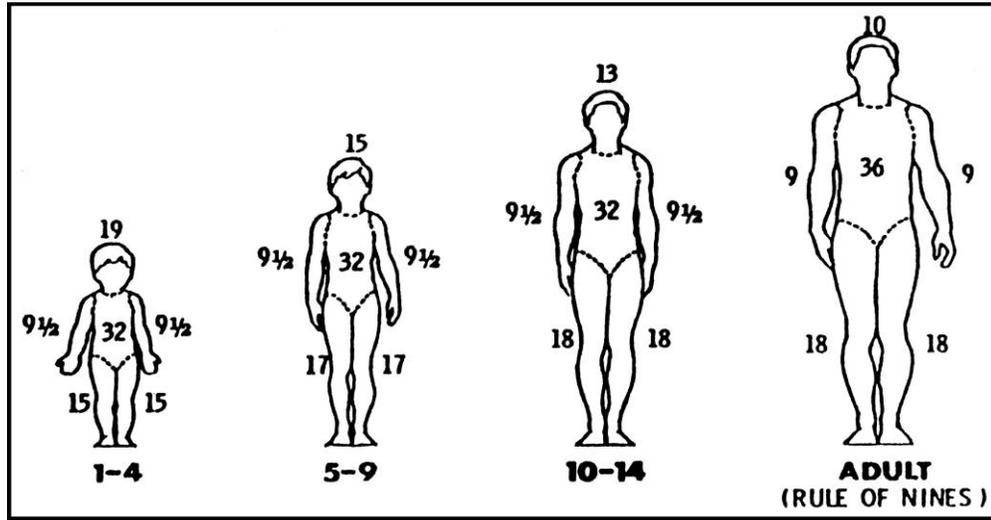
9%

1%

18%

18%

The Patient's Palm Represents 1% of his or her body surface



Visualizing burn depth

Use this illustration to help visualize the extent of tissue damage caused by burns.

Epidermis

Dermis

Subcutaneous tissue

Muscle

Superficial partial-thickness burns (first degree)

Deep partial-thickness burns (second degree)

Full-thickness burns (third degree)

Summary of 2012 ABLS Guidelines for Fluid Resuscitation

1. Pre-hospital and during primary triage in hospital for adults (don't yet have a weight or time for calculations)

> 14 years old 500 ml/hr

2. Pre-hospital and during primary triage in hospital for children

6-14 years old use LR @ 250 ml/hr

5 years old and younger LR @ 125 ml/hr

Fluid for infants < 10 kg use D5LR

3. Ongoing fluid resuscitation (when you have a weight & time for calculations)

Adults: 2 ml LR x kg x TBSA

Children: 3 ml LR x kg x TBSA

< 10 kg use D₅LR

Electrical (adults): 4 ml x kg x TBSA

4. Points of fluid resuscitation:

- $\frac{1}{2}$ of total volume over first 8 hours from time of burn
- Other $\frac{1}{2}$ given over the next 16 hours
- This are only starting point
- Guidelines only...titrate to patient response

Example

- 70 kg patient with 50% TBSA burn
- 1 L LR given pre-hospital/enroute to ED

Formula calculations for ongoing fluids:

$2\text{ml} \times 70\text{kg} \times 50\% \text{ TBSA} = 7000$ total over 24 hours

- 3,500 ml over first 8 hours
 - Since 1,000 ml already infuse, adjust to 2,500 (310 cc/hr)
- 3,500 ml over next 16 hours from time of burn (218 cc/hr)

5. Titrating fluids to patient response

- Follow hourly urine output
- Titrate fluid infusion based on **urinary output**
- Titrate rate of infusion by 1/3 of the rate
- Avoid fluid bolus

6. Too much or too little:

- Excessive volume
 - Exaggerates edema
 - Compromises blood flow
- Inadequate volume
 - May cause shock and organ failure

Reference:

- American Burn Association (2012). Advanced burn life support course handbook. Chicago, IL: Author

Advanced Burn Life Support Resources:

American Burn Association

Online Store Publications

www.ameriburn.org

1. ABLS Now® Course (price depends on how many register—group rates available)

A self-directed, web-based learning program

Multi-disciplinary format

Download registration form from website

Direct email: ABLSTNow@ameriburn.org

2. ABLS Handbook© (\$250 US funds)

The ABLS Handbook© is a CD which contains course materials and slides

Is a reference guide for immediate burn care up to the first 24 hours post burn injury, and a quick and handy tool for specific burn injury questions

