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 ≥ 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

Increased capillary permeability
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%

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

ADULT (RULE OF NINES)

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 burn (first degree)
Deep partial thickness burn (second degree)
Full-thickness burn (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:

2ml x 70kg x 50% TBSA = 7000 total over 24 hours

- 3,500 ml over first 8 hours
  - Since 1,000 ml already infused, 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: ABLSNow@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