VANDERBILT UNIVERSITY MEDICAL CENTER

Guideline: Pediatric Burn Nutrition

Revised Date: July 2023
Review Date: July 2025

Content Experts
Ryan Stark, MD Elizabeth Slater, MD Danielle Smith, RD

Table of Contents

I. Purpose:

Successful burn treatment can be challenged by the metabolic consequences observed by patients with severe burns. Metabolic rates of burn patients can exceed twice that of baseline and cause wasting of lean body mass within a few weeks of injury. [1]

Adequate nutritional support is an essential component of burn care which can reduce mortality and complications, optimize wound healing, minimizing the effects of hypermetabolism and subsequent catabolism. [1]

II. Population:

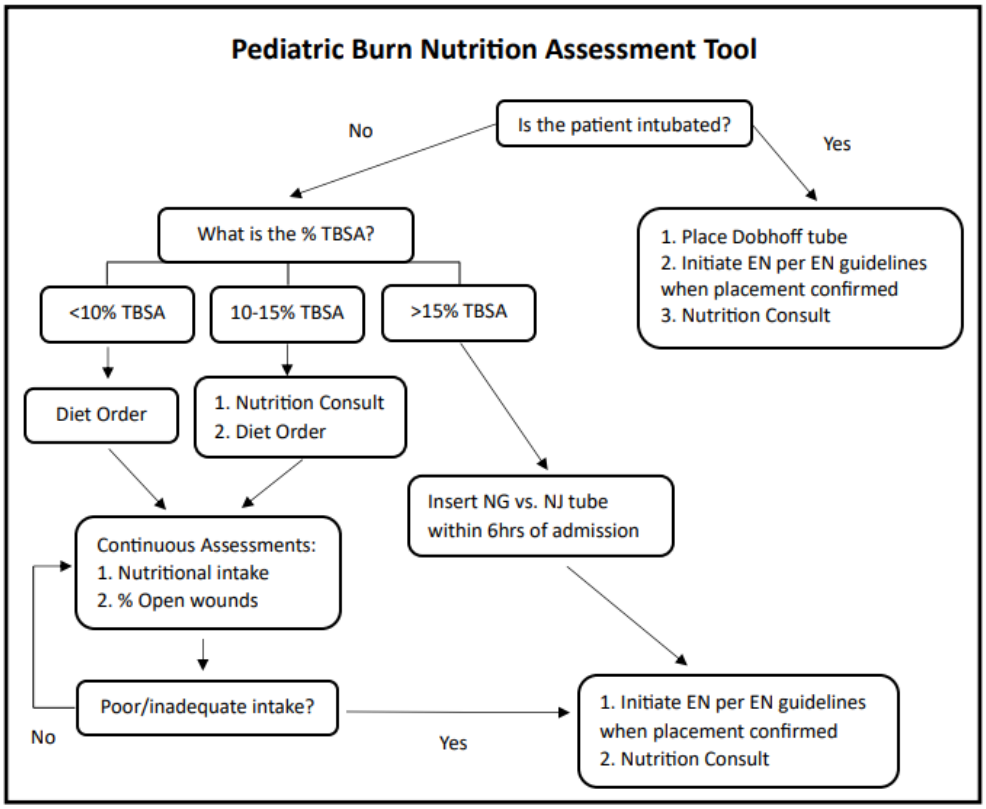
Pediatric burn patients

III. Definitions:

TBSA Depth of Burn

Estimated total body surface area (TBSA) of partial and full thickness burns is needed to calculate fluid requirements. Superficial burns are not included in this calculation. For reference, see Lund and Browder in Pediatric Burn Resuscitation Protocol (BC-P-01).

IV. Assessment:



V. Intervention/Treatment:

UPON ADMISSION

1. All pediatric patients ≥ 10% TBSA will receive a nutrition consult and age-appropriate diet order unless NPO or contraindicated.
2. All pediatric patients ≥15% TBSA will receive a nasogastric (NG) feeding tube and an age-appropriate diet order unless NPO or contraindicated. The feeding tube should be placed post-pyloric (NJ tube) if possible with confirmation by radiographic studies.

Initiation of Enteral Nutrition (EN):

Enteral nutrition can be started safely within hours of injury in patients of all ages, reducing the accumulated 'calorie deficit' and improving overall nutrition.[2-4]

1 NG/NJ is to be placed with first procedure or within 6 hours of admission.

2 EN should begin when the placement of the feeding tube has been confirmed.

3 Place nutrition consult for: Inpatient Consult Clinical Nutrition to evaluate EN. From 07:00-19:00 page on-call RD pager 835-8963 for EN evaluation. Dietitian will establish EN goals upon assessment.

Infant (0-12 months):

- Initiate continuous feeds of EBM 20 kcal/oz (if available) or Home Infant Formula 20 kcal/oz
- If unable to obtain nutrition history, initiate standard formula Similac Advance 20 kcal/oz; unless patient has milk allergy initiate Elecare Infant 20 kcal/oz
- Initiate at 1 ml/kg/hr (not exceeding 10 ml/hr)
- Advance by 1 ml/kg every 4 hours to max goal of 144 ml/kg/day

Pediatric (age 1-13):

- Initiate continuous feeds of Peptamen Jr 1.5 at 10 ml/hr; unless patient has milk allergy initiate Elecare Jr 30 kcal/oz
- Advance by 10 ml/hr every 4 hours to max 30 ml/hr until Dietitian evaluates to provide patient specific EN goal rate

Adolescent (age 14-18+):

- Initiate continuous feeds of Impact Peptide 1.5 at 10 ml/hr; unless patient has milk allergy initiate Elecare Jr 30 kcal/oz
- Advance by 10 ml/hr every 4 hours to max 45 ml/hr until Dietitian evaluates to provide patient specific EN goal rate

4 EN should be held in the following scenarios:

- ☐ If patient has emesis or tube feeds coming through the decompressing NGT
- ☐ Concern for abdominal compartment syndrome
- ☐ Concern for abdominal trauma
- ☐ Concern for hemodynamically unstable (increasing vasopressor requirements)

5 Dietitian to continue to evaluate EN tolerance, advancement to goal rate/total volume received and determine ability to utilize volume-based feeding chart after feeding stoppages for sedations and procedures.

Indications for Parenteral Nutrition (PN):
Enteral nutrition is preferred but if caloric goals are not able to be met with enteral feeds within 72 hours, PN should be started to prevent worsening of caloric deficits. Supplemental PN should be initiated to prevent worsening caloric deficits if caloric goals are not able to meet at a level of 75% with enteral feeds within 5-7 days.

Place Nutrition Consult: Inpatient Consult for Pediatric and NICU Parenteral Nutrition

Diet orders:
All pediatric patients, including those receiving enteral nutrition, will be ordered an age-appropriate diet unless NPO or contraindicated.

Age-Appropriate Diet Orders for VCH	
Infant Diets	Infant/Newborn (Birth-6 Months) Infant Foods (6-12 Months)
Toddler Diet	Pediatric Toddler Diet (age 1-2)
Pediatric Diet	Pediatric Diet (age 3-11)
Adolescent Diet	Pediatric Diet (age 12-18)

Age-Appropriate Diet Orders for VUH Pediatric Burn Unit	
Infant Diet	Infant (<12 months)
Toddler Diet	Toddler (age 1-3)
Preschool Diet	Preschool (age 4-5)
Pediatric/Adolescent Diet	Regular (age 6+)

Dietary Intake

Intake Evaluation	
75% Meals	<u>Order Oral Nutritional Supplement</u> Boost Kid Essentials 1.0 or Boost Breeze (suitable for clear liquid diet) **Oral supplements contain milk protein
50-75% Meals	Order Oral Nutritional Supplement and 72 Hour Calorie Count
Less than 50% of Meals and Not consuming oral supplements	Place Inpatient Consult for Clinical Nutrition for Dietitian to evaluate for supplemental EN

ASSESSMENT

Open Wounds: The percentage of open wound, grafts, donors, and burns should be updated weekly at the multi-disciplinary rounds meeting, and total caloric requirements adjusted by the Dietitian based on TBSA still open. This is to avoid over feeding.

VI. Procedural Considerations:

Procedural Sedation:
Children often require moderate sedation to tolerate wound care. Efforts should be made to minimize the withholding of nutrition. When possible, consider the following:

3. Identify time of future procedure
4. Place NPO orders in accordance with the Procedural Sedation Policy[7] (CL 30-02.13) rather than "at midnight."
5. Enteral meds with or without sips of water are fine.
6. Of note, Boost Breeze is a formula that is considered to be a clear. Therefore, a standard practice is changing the formula to Boost Breeze after midnight and then continued up until the procedural NPO guidelines listed below.
   Exception to practice is if patient has milk allergy due to Boost Breeze contains whey protein

NPO Guidelines	
Clear Liquids	2 hours
Breast Milk	4 hours
Milk and Formula	6 hours
All Solids	6 hours

VII. Nursing Considerations:

Documentation
Children have low tolerance for both under- and overfeeding and thus, it is important that documentation of all PO and EN intake is accurate. Educate patient and family and designate a method of communicating these occurrences.

Restarting Diets
Burn patients are often NPO daily for procedures. Restart diet order or tube feedings as soon as procedure is complete unless contraindicated. **Tube feeding should be restarted at previously tolerated rate.** "Trickle" feedings are not necessary. Evaluate ability to utilize volume-based feeding chart after feeding stoppages for sedations and procedures.

"Normalizing"
Patients should be encouraged to take medications and consume food by mouth as much as possible. This expedites the removal of feeding tube and prepares them for home.

VIII. Vitamin Supplementation

Many micronutrients are beneficial after thermal injury as they support immunity and wound healing. Micronutrient replacement has been associated with decreased mortality following burn injury.[8] The following vitamins should be ordered upon admission for pediatric burn patients:

% TBSA	Micronutrient	Pediatric Patient (<18 years old)
<30% TBSA	Multivitamin (MVI)	Daily
	Vit C	100-250 mg Daily
≥30% TBSA *or* 20-29% TBSA with inhalation injury	MVI	<5 yo: 1 mL or 1 chewable tab Daily
		>5 yo: 2 mL or 2 chewable tabs Daily
	Vit C	<20kg: 100ml Daily
		>20kg: 250 mg Daily
	Zinc	110 mg Daily
	Vit A	<40% TBSA: check level, supplement as needed
		≥40% TBSA & <13yo: 2500-5000 IU daily x 1 dose
		>40% TBSA & >13yo: 10000 IU daily x 1 dose
	Vit D (cholecalciferol)	>40% TBSA: 800 IU Daily

XI. References:

1. Saffle, J. R., Graves, C., & Cochran, A. (2012). Nutritional support of the burned patient. In Elsevier Inc..

2. Gottschlich M, Jenkins M, Mayes T, et al. The 2002 Clinical Research Award: An evaluation of the safety of early vs delayed enteral support and effects on clinical nutritional, and endocrine outcomes after severe burns. J Burn Care Rehabil. 2002;23:401-415.

3. Trocki O, Michelini JA, Robbins ST, et al. Evaluation of early enteral feeding in children less than 3 years old with smaller burns (8–25 per cent TBSA). Burns. 1995 Feb;21(1):17-23.

4. Moore E, Jones T. Benefits of immediate jejunostomy feeding after major abdominal trauma – a prospective, randomized study. J Trauma. 1988;26:874-881.

5. Wilson SE. Pediatric Enteral Feeding. In: Pediatric Nutrition, Theory and Practice. Grand RJ, Sutphen JL, et al. eds. Toronto, Ont: Butterworth; 1987.

6. Monroe Carell Jr. Children's Hospital at Vanderbilt. (2016.). *Protocols, Electrolyte Replacement, and Decision Support References for Heo/Wiz Downtime.* Retrieved from https://edocsprod.mc.vanderbilt.edu/EDocsView.aspx?docList=3362

7. Vanderbilt University Hospital. (2016.). *Moderate Sedation Guidelines.*

8. Rousseau AF, Losser MR, Ichai C, Berger MM. ESPEN endorsed recommendations: nutritional therapy in major burns. *Clinical nutrition (Edinburgh, Scotland).* 2013;32(4):497-502.