Standardization of Nutrition Practices

Given the metabolic complications and increased nutritional requirements in burns patients, the provision of nutrition support is a challenging task and variability in nutrition practices across burn units exists\(^1\). To reduce the effect of varying nutritional practices as confounding factors on the outcomes of The RE-ENERGIZE study, it is important to standardize, as much as possible, the prescription of enteral and parenteral nutrition, micronutrient delivery and practices related to withholding feeds for high gastric residual volumes and use of motility agents in these patients.

Based on the literature and providing for some flexibility for current practices across the participating sites, we are recommending compliance with the following nutritional practices for all patients enrolled in the study. After reviewing the practices at all the participating sites, these ranges below will allow for most current practices to continue.

1. **Prescribed Energy needs** should be calculated using one or more of the following methods:

   a) **Measured Energy Expenditure by Indirect Calorimetry\(^2,3\)**, preferred option, if available
      
      i. MEE X 1.0 – 1.3
   
   b) **Basal Energy Expenditure (BEE)** using Harris-Benedict Equation as follows:
      
      i. If ≥ 50% Burn Surface Area, use BEE x 1.7- 2.0
      ii. If < 50% Burn Surface Area, use BEE x 1.5-1.6

   BEE Women: 655 + ( 9.6 x weight* in kilos ) + ( 1.8 x height in cm ) - ( 4.7 x age in years )
   BEE Men: 66 + ( 13.7 x weight* in kilos ) + ( 5 x height in cm ) - ( 6.8 x age in years )

   c) **Predictive equations** such as Carlson et al 1992\(^4\) or Milner et al 1994\(^5\).

   In the event that the patient requires parenteral nutrition, do not exceed energy intake of 5 mg/kg*min of dextrose\(^6\)

   * Weight: use pre-burn weight. For Obese patients, if your standard practice is to adjust weight for obesity, use the weight you would use. If not, use ideal body weight.

   Energy needs are to be adjusted according to the progression of wound healing.

2. **Prescribed Protein needs** should be calculated using the following:

   According to % burn surface area
   
   i. If > 50% burns, use 2g/kg*/day to 3g/kg*/day
   ii. If < 50% burns, use 1.5 g/kg*/day to 2 gm*/kg/day

   * Weight: use pre-burn weight. For Obese patients, if your standard practice is to adjust weight for obesity, use the weight you would use. If not, use ideal body weight.

   Protein needs are to be adjusted according to the progression of wound healing, urinary urea nitrogen, or other biochemical markers used in your standard practice.
3. **Vitamin & Mineral Prescription** should be given as follows or depending upon blood levels (if blood testing is done as part of routine practice):

- Vitamin C: 0-1000 mg/day
- Vitamin A: 0-10,000 IU/day
- Vitamin D: according to serum levels
- Vitamin E: 0-420 mg/day
- Zinc (not elemental): 0-220 mg/day
- Copper Sulfate: 0-4.5 mg/day
- Selenium: 0-500 micrograms/day
- Magnesium:0-600 mg/day
- Folate: 0-1500 mg/day
- Thiamin: 0-110 mg/day

*Early supplementation by high dose IV Vitamin C (66 mg/kg/hr) within the first 48 hrs is allowed*. Standard multivitamin/mineral preparations are allowed (I, NG or po).

These ranges of vitamins/minerals/trace elements may be provided as supplementation over and beyond what is present in the standard enteral/parenteral nutrition.

**OR**

These ranges of vitamins/minerals/trace elements may be provided as the total amounts. This means that the amounts received from enteral/parenteral nutrition are to be subtracted from the total ranges and the remainder is given as supplements.

4. **Specialized nutritional formulas are not allowed such as:**

   i. Arginine enriched formulas (formulas that contain > 6 gms arginine/L)
      - Pivot (13 gm/L), Perative (8 gm/L) would not be allowed

   ii. Glutamine supplements or formulas enriched with glutamine
      - Impact Glutamine
      - Vivonex Plus
      - Glutasolve/other glutamine powders

   Formulas with glutamic acid inherently present are allowed

*To minimize any potential contamination, patients that have received glutamine for >24 hrs before randomization, should NOT be included.*

5. **Optimization of the Delivery of Enteral Nutrition:**

   The use of enteral nutrition is preferred over parenteral nutrition in burn patients. Interruptions to the delivery of enteral nutrition should be minimized while adopting strategies such as elevating the head of the bed (unless otherwise contraindicated, gastric residual volume threshold of 250 ml, use of motility agents and small bowel feeding tubes). Refer to attached Enteral Feeding Algorithm on next page for more details.

   Ongoing monitoring of the volumes of delivery of enteral nutrition and an action plan to ensure that the recommended prescribed needs are being met is recommended as part of the study protocol.

6. **Glycemic control:**

   The use of a glycemic control protocol (or the use of insulin) to control blood sugars between the ranges of at least 80 mg/dL to a maximum of 180 mg/dL (4.4-10 mmol/L) is recommended in order to avoid hyperglycemia, while minimizing the risk of both iatrogenic hypoglycemia and other harms associated with a lower blood glucose target.
Enteral Feeding Protocol

**STOP ENTERAL NUTRITION IF:**
- Patient develops:
  - bowel obstruction
  - bowel perforation
  - paralytic ileus

Start Enteral Nutrition as soon as possible after burn injury, preferably within 24 hrs of burn injury, if possible

Elevate HOB to 45 degrees if possible

If this is the 1st GRV > 250 ml*:
1) Refeed GRV to 400ml max and discard the rest
2) Start Maxeran 10mg IV q 6 hrs
3) Continue with Enteral Nutrition
4) Continue with checking GRV q 4 hrs

Check GRV q 4 hrs (Only if gastric feeding) Is the GRV > 250 mls?

Is this a rechecked residual that is > 250 mls?

1) Discard the residual
2) Continue with Motility agents
3) Switch to SMALL BOWEL FEEDING
4) Restart Enteral Nutrition

1) Refeed gastric residual
2) Continue with Enteral Nutrition

**WATER FLUSHES:**
Flush tube with at least 10 mls of sterile water:
- q4hrs during feedings
- after aspiration for GRVs
- before and after meds

**BLOCKED TUBE:**
Pancrelipase 8000 units mixed with crushed Na Bicarb 500mg in 5ml warm water prn

*Gastric residual volume of 250 mls is the minimum threshold volume. Volumes higher than 250 mls are acceptable if allowed at the individual site.
References


2 Practice Guidelines for Burn Care, ABA, Journal of Burn Care and Rehabilitation, April 2001.


