

Trauma Nutrition

Just a few pieces of information regarding trauma nutrition to get you started.....

1. Trauma Dietitians:

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2. Function of Dietitians:

- Dietitians attend critical care rounds 2-3 times per week and assess all ICU patients within 24-48 hours of admission
- Dietetic Technician screens IMC/Floor patients for nutrition risk. High nutrition risk patients are referred to dietitian.
- In order to place nutrition consults in the ICU, IMC, or floor: place computer order for consult in Power Chart AND page dietitian. On weekends, page 3547 for the on-call dietitian. Standard response time for consults is 24 hours.

3. Anthropometrics:

- Determine Height and Weight
- Calculate BMI (Body Mass Index):
 - $BMI = wt (kg) / ht (m^2)$
- Compare weight to Ideal Body Weight (IBW):
 - Males: 106# for first 5' + 6# for every inch over 5'
 - Females: 100# for first 5' + 5# for every inch over 5'
- Weight may need further adjustment for amputations

4. Energy Requirements for Mechanically Vented patients:

1. **Indirect Calorimetry** is the gold standard for measuring energy expenditure and should be used for difficult to assess patients (obese, spinal cord injuries, large open wounds, failure to wean from vent and failure to respond to nutrition support).
2. **Penn State Equation** (PSU) includes T_{max} and minute ventilation as inflammatory markers along with patient height, weight, age and gender. The Penn State (modified) equation is used for patients ≥ 60 yo and with a BMI ≥ 30 kg/m².

$$PSU = \text{Mifflin} * (0.96) + Ve(31) + T_{max}(167) - 6212$$

$$PS(\text{modified}) = \text{Mifflin} * (0.71) + Ve(64) + T_{max}(85) - 3085$$

T_{max}: in Centigrade over last 24 hr

Ve: Minute ventilation

Mifflin St-Jeor Equation:

$$\text{Men: } 10 (wt) + 6.25(ht) - 5(age) + 5$$

$$\text{Women: } 10(wt) + 6.25(ht) - 5(age) - 161$$

wt: actual weight in kg

ht: in cm

4. Injury Specific Nutrition Recommendations for non-ventilated patients:

- Multiple Trauma
 - Calories: 25 - 35 calories/kg
Mifflin* X 1.2 - 1.5 injury factor
 - Protein: 1.5 - 2.5 grams/kg
- Neurotrauma:
 - Calories: 25 - 35 calories/kg
 - **Mifflin*** X 1.2 – 1.5 injury factor
 - Protein: 1.5 – 2.5 grams/kg
- Soft Tissue:
 - Calories: 25 - 40 calories/kg
 - Protein: 1.5 - 2.5 grams/kg

5. Enteral Nutrition:

- See formulary card
- Trauma specific formulas:
 - Promote with Fiber: Standard high protein, fiber formula
 - Pivot: Immune, fiber formula
 - Criteria: ISS>18, ATI >20, or severe CHI (adm GCS <8)
 - Provides 7.6 gms Glutamine/L. Goal for trauma pt's is 0.3-0.5gm/kg. Supplement with Glutasolve to reach goal.
 - Glutasolve: Glutamine supplement used in conjunction with Pivot
 - 1 packet contains 15gm glutamine
 - Vital 1.5: Semi-elemental formula, concentrated. Use for malabsorption
 - Vivonex RTF: Elemental formula, very low fat. Use for chyle leak or severe fat malabsorption
 - Glucerna 1.5: Concentrated, moderate protein
 - Jevity 1.2: Long term fiber formula used when patient stable and prealbumin adequate, or adolescent with increased caloric needs
 - ProSource: liquid protein supplement used as a separate flush in conjunction with goal tube feeding to enhance protein content
 - Nepro: very concentrated, low electrolyte, usually requires addition of protein supplement. Use for pt's on intermittent HD.
- Goal is for early initiation of enteral nutrition, if feasible (within 24-48 hours)
- Nurses are trained to place postpyloric tubes (Corpak), in addition to NGT/OGT
- Bowel regimen should be ordered if on enteral nutrition (colace, sennekot/senna, and bisacodyl)
- TF is not held for OR or IR in intubated/trached patients except for the following:
 - Requiring thoracic or abdominal procedures, placement of feeding tubes, or for tracheostomy. See "NPO for OR/Radiology Guidelines".
- If patient unable to tolerate enteral nutrition or contraindication to enteral nutrition upon admission, TPN is initiated

6. Parenteral Nutrition:

- Order must be completed daily by 3pm
- Calculated to provide minimal amount of volume to meet needs. Recommend use IVF to meet increased fluid requirements. Exceptions are stable patients with plan for D/C on TPN (TPN will then be adjusted to meet hydration needs)

- Electrolytes should be repleted IV prior to TPN initiation and standing replacement orders written
- Glucose management per “IV Insulin Guidelines”
 - Insulin is not added to TPN in the ICU setting or in unstable patients
- Initiation:
 - 1000 ml High Protein Standard Solution @ 42ml
 - Order 20% lipids 250ml over 12 hours if triglycerides <300. If patient on propofol, do not order lipids.
 - Adjust electrolytes prn
- To determine goal for TPN:
 1. Establish goal kcal needs and goal protein needs
 2. Subtract fat calories to be provided
 3. Subtract protein calories to be provided (protein calories = goal grams protein multiplied by 4)
 4. Divide remaining calories by 3.4= Total grams of carbohydrate
 5. Divide goal grams of protein by total gram protein per liter (See below) in chosen standard solution. This number = X liters of TPN solution (Round to the nearest .1 liter)

Standard Solutions:	Grams of protein/liter
High Carbohydrate	60gm
Low Carbohydrate	60gm
High Protein	75gm
E'lyte Free	70gm

6. Divide total grams of carbohydrate (calculated in step 4) by X liters of TPN solution (calculated in step 5) and divide by 10 = Dextrose concentration
7. Compare Dextrose concentration to standard solution. If close to the standard, select that solution. If greatly different, recalculate using another standard solution or use optional box to hand-write TPN solution.
8. Convert X liters to X ml. Divide X ml of goal volume by 24 hrs = goal infusion rate
9. NOTE:
 - Calories of Nutrients in TPN:
 - 1 gram of CHO = 3.4 calories
 - 1 gram of PRO = 4 calories
 - 10% IVL 500ml = 550 calories; 1.1 cal/ml
 - 20% IVL 250ml = 500 calories; 2.0 cal/ml
 - 20% IVL 500ml = 1000 calories; 2.0 cal/ml
- Quick and Easy TPN calculation:
 1. Since most trauma patient's needs are met by the High Protein Standard Solution....
 - Determine grams of protein needed
 - Divide grams of protein by .075 to determine volume of solution
 - Round off to the nearest 100ml

- This volume will be goal solution, divide by 24 hours to calculate infusion rate

7. **When patients eat....**

- Order least restrictive diet possible (ie: If you must order a diabetic diet, order the higher calorie level).
 - Nutrition supplements if po intake poor (Ensure Plus, Glucerna Shake, Resource Breeze, Boost Pudding, Muscle Milk, Magic Cup)
 - If transitioning from enteral nutrition, change TF to nocturnal (6p-6a) until po intake established
 - MVI po daily to meet DRI
8. If you have any questions, please page a dietitian. We are more than happy to review nutrition information, research, individual patients, etc.

Thanks and we are looking forward to working with you!