Nutrition Support in the Bariatric Surgery Patient: When, Why and How

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Disclosures

- BariMD – Medical Advisory Board
- Celebrate Vitamins – Advisory Board

Nutrition Support – Why and When?

- Complication that requires NPO
- Unable to meet fluid recommendations
  - Clinical s/s of dehydration
    - Oliguric, rapid pulse, orthostatic changes, etc
- Fluid loss
- Aggressive resuscitation has been unsuccessful
  - NS in clinic, CHM 7 recommended
- In general, earlier support is better

Nutrition Support – how?

- PICC line
- Planned admission or IR if post-discharge
- Use TPN pharmacist
- Labs
- Consider noctural feeds
- TPN d/c'd when fluid/protein goals met
- PICC line retained for an additional period if possible

Obesity mimics critical illness…

- Chronic inflammatory state
  - Increased cytokines and TNF alpha
    - Increase IR and promote hyperglycemia
- Insulin resistance
- At higher risk of co-morbidities
  - CAD, HTN, hyperlipidemia,
  - Diabetes
  - Respiratory abnormalities

Hypercatabolism

- Morbidly obese remain at risk for nutritional depletion
- Still require aggressive nutritional support
- Deficiencies not corrected with standard infusates
- Can nutrition goals be met with weight loss?

Obesity & Risk of Mortality in the ICU

- Affect of BMI on ICU outcomes is mixed
- El-Solh: 117 morbidly obese patients vs 132 non-obese controls in medical ICU
  - Morbidly Obese:
    - LOS (17.7 d vs 11.3 d for non-obese)
    - ICU LOS (9.3 d vs 5.8 d for non-obese)
    - Mortality in hospital (30% vs 17% for non-obese)

El-Sohl et al, Chest 2001; 120

Obesity is independent risk factor in surgical ICU

- Cohort analysis of all patients admitted to surgical ICU @ Tufts-New England Medical Center, Boston (n=1373)
- In the subset of patients with prolonged ICU stays, mortality rates were significantly increased in patients with a BMI >40kg/m2 (7.4 x increase in odds of death) ; LOS doubled

Nasraway et al, Crit Care Med, 2006, 34(4)

Conflicting studies

- Other studies have not demonstrated a difference between morbidly obese patients and non-obese patients with respect to outcomes
- Difficulties with interpretation:
  - Data (Ht/wt) often estimated
  - Fluid status
  - Failure to control for obesity-related co-morbidities

Risk Factors for Bariatric Surgery Patients Requiring ICU Care

- Male sex
- Central adiposity
- Age > 50 years
- BMI > 60 kg/m^2
- Diabetes
- Cardiovascular disease
- Obstructive sleep apnea
- Venous stasis
- Intraoperative complications

Nutrition Support of the Critically Ill Obese Patient

Bariatric Complications

- Survey of ASPEN members
  - Most common indications for nutrition support
    - Anastomotic leak/fistula
    - Chronic nausea/vomiting
  - Caloric estimations
    - 62% used ABW, 15% IBW, 14% actual
  - Protein estimations
    - 56% used ABW, 29% IBW, 8% actual

Kumpf, et al. Nutrition in Clinical Practice, 2007;22:673-678

Hypocaloric Feeds Beneficial

- Metabolic rate is not markedly increased in most patients
- Weight gain during nutrition support is caused by gains in fat, not nitrogen
- Energy intake as glucose in excess of needs increases CO^2 and fatty liver
- Hyperglycemia increases risk of infective complications

Jeejeebhoy, KN. Nutrition in Clinical Practice, 2004; 19:477-480

Prospective hypocaloric trials

- Hypoenergetic parenteral nutrition in hospitalized obese patients
- Defined obesity as BMI >35
- Hypocaloric group
  - 13.6kcals/kg actual wt
- Control group
  - 22.5 kcals/kg actual wt

Choban et al, Am J Clin Nutr. 1997 Sep;66(3)

Findings (Choban et al)

- No difference in % of patients achieving positive Nitrogen Balance
- Weight change did not differ significantly between groups
- Protein intake was the same (2 g/kg IBW)
- Lower severity of illness scores (ward patients with APACHE II scores of 3.9-5.4)

Impact of varying protein intakes post RYGBP

- Followed albumin and prealbumin status in 22 patients with post-op complications
- All patients had BMI>35
- All patients required nutrition support (as per ASPEN guidelines)

Schinkel et al, Obesity Surgery, 16, 2006

Varying protein levels post RYGBP

- Energy provisions: 14-21 kcals/kg current body weight
- Monitored daily protein intake and compared to serum albumin and prealbumin levels
- Positive linear relationship between protein status and protein intake in complicated RYGBP patients

Schinkel et al, Obesity Surg 16,2006.

Varying protein level, conclusions

- 2.1 g/kg IBW (along with estimated adequate calories)---demonstrated positive impact on protein markers
- Minimum energy intake of 14 kcals/kg of current body weight

Schinkel et al, Obesity Surg 16,2006.

Estimating Energy Requirements in the Obese

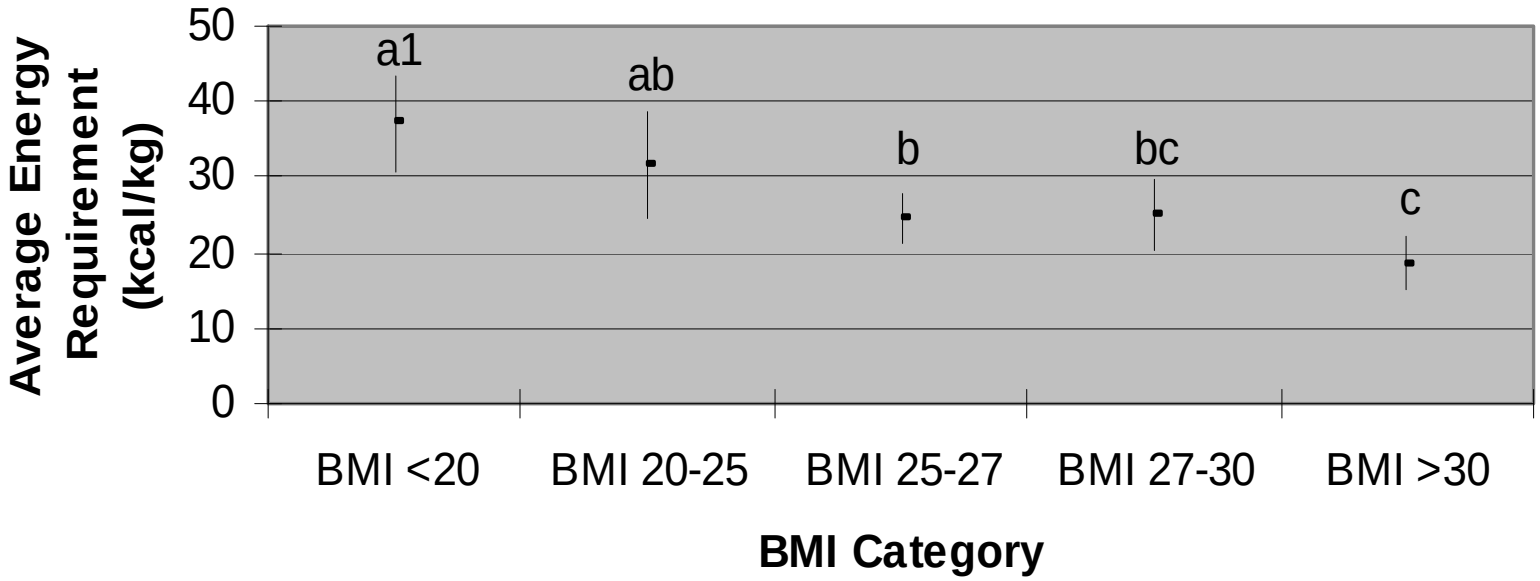
- No method for estimation of energy requirements in morbidly obese patients has been widely accepted in critical care
  - The Mifflin St-Joer equation was found to be the most accurate method for REE assessment in extremely obese women

Dobratz, et al. JPEN, 2007; 32:217-227

- As degree of obesity increases, and the severity of illness increases, the degree of error in energy estimation also increases

ASPEN guidelines, 2001; Choban & Dickerson, NCP 20 (4), 2005.

Average Energy Requirement and Standard Deviations for Each BMI Category



Alberda et al, NCP 2002 (17)

Weight Loss in the Morbidly Obese, Critically Ill

- 13 post-op patients
- PN with 50% of REE as dextrose (881 kcal); 2.1 g/kg IBW amino acids.
- Average wt loss of ~1.7 kg/week
- Net protein anabolism
  - Serum protein concentrations and nitrogen balance studies
- Complete tissue healing of wounds, abscess cavities, and closure of fistulae

Dickerson, et al. AJCN 1986;44:747-755

Goals for the Critically Ill Obese Patient on Nutrition Support

- Early, aggressive nutrition support
- Maintain fluid needs
- Optimize protein intake
  - Patients with Class III obesity may require 2.5g/kg IBW protein
- Hypocaloric nutrition to manage hyperglycemia and thereby, decrease risk of infectious complications
- Anabolic electrolytes, zinc and selenium

Thank you!