Nutritional Support in a Critically Ill Trauma Patient: A Case Study

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Introduction and Objectives

In the U.S., motor vehicle crashes are the leading cause of death among ages 5-34 with ages 18-24 have highest crash-related injuries. In 2009, >2.3 million adult drivers & passengers were treated in the emergency department.

The objectives of this poster are to discuss the nutritional assessments and support of a critically ill patient admitted to Harborview Medical Center (HMC) Trauma Intensive Care Unit (ICU).

Introduction to Case Study: Car vs Tree

The patient is a 27 year old male involved in a high-speed motor vehicle crash.At the scene, he underwent prolong extrication and required CPR. He was transferred to an outside hospital before being airlifted to HMC. He suffered multiple fractures, including long bone and facial, sigmoid colon perforation, colonic contusion, and mesenteric laceration.

Patient Anthropometrics:
Ht: 187 cm, Admit Wt: 118 kg, BMI: 33.7 kg/m^2

Nutrition Assessment & Support

Energy needs were calculated two ways:
1. Harris Benedict Equation x 1.2-1.4 stress factors: 2600-3100 kcal
2. Indirect Calorimetry: 3454 kcal, 3758 kcal, 3227 kcal

Protein Needs: 150-200 g/kg (1.5-2.0 g/kg)

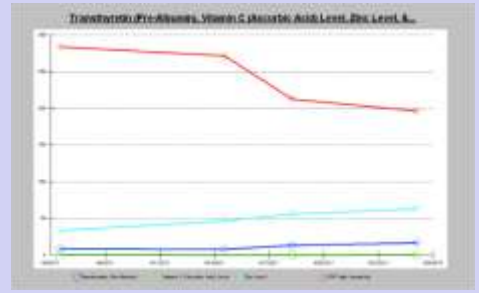
Enteral Nutrition: Nepro @ 75 ml/hr + 60 ml Prostat BID (3360 kcal, 206 g protein)

Parenteral Nutrition: D70% (350 ml), AA15% (1000 ml), 20% IL (500 ml) (2433 kcal, 150 g protein)

Other Assessment Tools

Pre-Albumin: Commonly used to monitor protein-energy status. Serum levels may decrease with inflammation, malignancy, protein wasting diseases of the intestines or kidneys, and in the presence of zinc deficiency.

C-Reactive Protein (CRP): Non-specific marker of the hypermetabolic period of an inflammatory response. CRP is used in conjunction with Pre-albumin; if CRP is high and pre-albumin is low, pre-albumin can no longer be used as a measure of nutrition status.



Zinc: High concentrations are found in the skin and plays a role in immune function, protein synthesis and wound healing. Zinc deficiency can delay wound healing and compromise the immune system especially in trauma patients with large open wounds.

Vitamin C: Important for collagen synthesis in wound healing. Low vitamin C may warrant supplementation for proper wound healing, especially in trauma patients.

Indirect Calorimetry (IC)

It is considered the gold standard for energy assessment. IC estimates energy production by measuring oxygen consumption and carbon dioxide production. At Harborview, only ventilated patients are eligible.

It is particularly helpful in trauma patients for:
- body weights that may be extreme and difficult to determine
- temporary or long term paralysis
- large wounds that increase energy needs
- long-term intubation
- assess if over/under feeding

Major Surgeries & Events

Day1: Intubated, abdominal compartment syndrome, bedside decompression laparotomy, resection of sigmoid colon, acute kidney injury

Day 2: Sigmoid colostomy

Day 4: Enteral nutrition started (NPO x 4 days)

Day 9: Post-pyloric feeding tube placed

Day 10: CVVH started

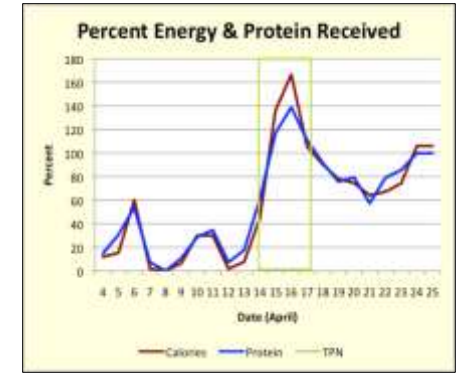
Day 13: Right hip disarticulation

Day 15: Tracheostomy

Day 16: First response to neuro exam (opened eyes to voice & move LUE to command)

Day 19-25: CVVH stopped, HD started

Abdominal Compartment Syndrome
An increase in abdominal pressure that can impair blood flow to organs causing multiple organ dysfunction and potentially death.



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References

1. CDC. *Injury Prevention & Control: Motor Vehicle Safety*. Accessed on May 4, 2011 (http:www.cdc.gov/Motorvehiclesafety)

2. Mahan, L. Kathleen, Escott-Stump, Sylvia. *Krause's Food & Nutrition Therapy.* St. Louis, MO: Saunders Elsevier, 2008.

3. Maier, RV: *Seattle's Harborview Medical Center, 1877-2003*. Archive Surgery 2004; 139:14-15