

SHOULD HYPOCALORIC HYPERPROTEIC NUTRITION BECOME THE STANDARD OF CARE IN CRITICALLY ILL PATIENTS?

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BACKGROUND & OBJECTIVES

- Standard enteral nutrition (SEN) formulas containing 50% of calories in carbohydrates and 18 to 25% protein are advocated as standard of care by the 2016 ASPEN nutrition guidelines and are designed to meet the caloric needs of critically ill patients. SEN may be most useful in those patients with both protein and calorie malnutrition as defined by a low BMI (< 18.5 - marasmus). In contrast, hypocaloric nutrition meeting 50-70% of caloric goals along with an increased delivery of protein to meet 1.5 g/k IBW/day are advocated for obese patients. Furthermore, according to some authors best clinical outcomes appear to be observed with the delivery of higher protein load while decreasing delivery of non-protein calories.
- We hypothesized that hypocaloric hyperproteic nutrition should be considered more often in our current intensive care units (ICUs). Enteral nutrition formulas (ENF) containing very high amounts of protein (> 35%) and lower carbohydrate loads (29%)-(VHPLC) were developed to meet the high protein and low caloric requirements of the obese patient. Thus, our aim was to understand how clinical practice has evolved to meet new demands and guidelines.

METHODS

Population:

- Retrospective analysis of existing electronic medical records (EMR) of patients admitted to the ICUs at the Geisinger Health care system

Data Collection:

- Demographics (age, gender, admitting diagnosis)
- BMI on admission
- All forms of nutrition delivery for first seven days ICU stay
- Estimated nutrition needs
- Enteral prescription
- Calories and protein delivered

Statistics:

- Descriptive characteristics were tabulated using number and percent formula infused
- Protein and calorie needs were described using mean, standard deviation
- The summary of mean estimated needs and delivery of nutrients were compared using standard t-test.

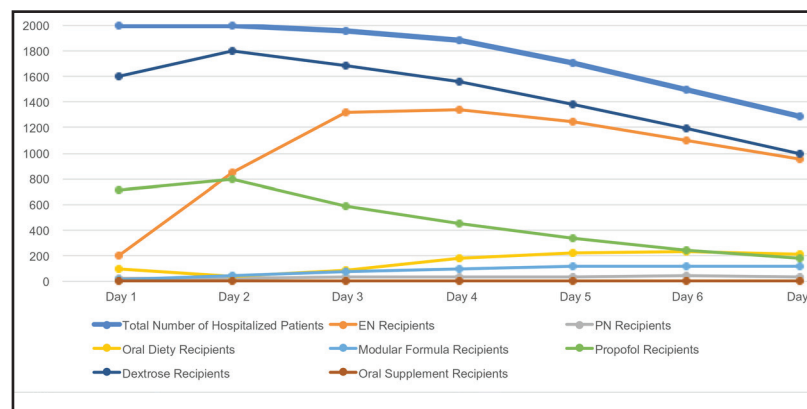
| ICU Stay Days, n=12,321 | N | N Missing | Mean (S.D.) | Median (IQR) | Range |
|-------------------------|-------|-----------|----------------|-------------------|--------------|
| Calorie Needs | 12251 | 70 | 1688.4 (336.6) | 1675 (1448, 1920) | (191, 3075) |
| Protein Needs | 12321 | 0 | 99.0 (29.9) | 93 (78, 115) | (25, 230) |
| Calorie Needs % Met | 12251 | 70 | 44.3 (42.7) | 29.2 (7.8, 74.6) | (0.0, 256.9) |
| Protein Needs % Met | 12321 | 0 | 35.6 (44.0) | 14.2 (0.0, 63.7) | (0.0, 229.3) |

DEMOGRAPHICS

| | All Encounters (n=2000) | |
|--|-------------------------|--------------|
| Patients, n | 1899 | |
| ICU Stay Days for Nutrition Assessment, n | 12,321 | |
| ICU Length of Stay Days for Nutrition Assessment | n | % |
| 1 | 6 | 0.3% |
| 2 | 37 | 1.9% |
| 3 | 77 | 3.9% |
| 4 | 174 | 8.7% |
| 5 | 206 | 10.3% |
| 6 | 216 | 10.8% |
| 7 | 1284 | 64.2% |
| Age, mean (S.D.) | 62.2 | (16.2) |
| BMI, median (IQR) | 28.3 | (23.7, 34.3) |
| Sex | n | % |
| Female | 896 | 44.8% |
| Male | 1104 | 55.2% |

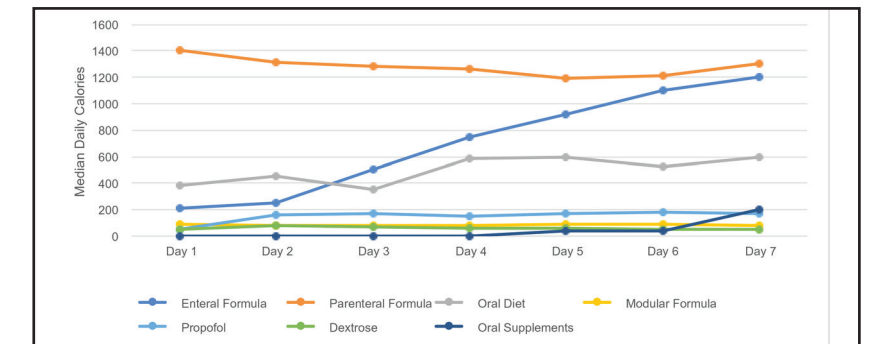
| | Under Weight | Normal Weight | Over Weight | Obese |
|------------------------------------|--------------|---------------|-------------|-----------|
| BMI (kg/m ²) | <18.5 | 18.5-24.9 | 25-29.9 | ≥30 |
| % Population | 5.5% | 26.7% | 26.5% | 41.6% |
| SEN: ≤ 20% Protein Formula (n/%) | 56/53.3% | 305/57.2% | 306/57.7% | 394/47.4% |
| ENF: 21-25% Protein Formula (n/%) | 49/46.7% | 226/42.4% | 208/39.2% | 169/20.3% |
| VHPLC: > 25% Protein Formula (n/%) | 0/0.0% | 2/0.4% | 16/3.0% | 269/32.3% |

Daily Number of Patients Who Received Each Source

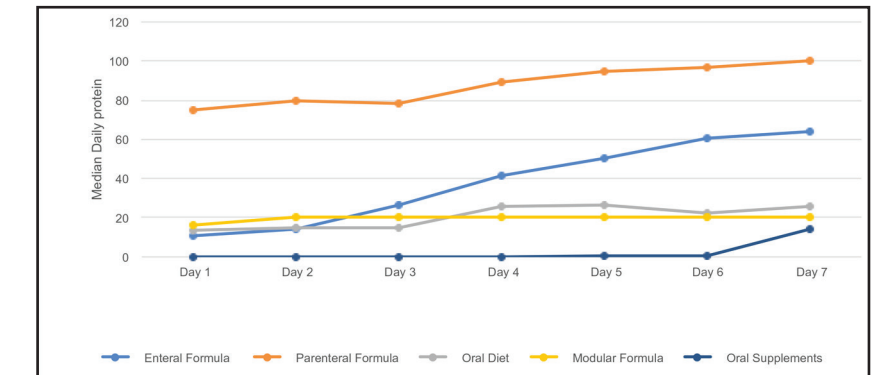


RESULTS

Median Daily Calorie Intake by Source for Patients Who Received That Source



Median Daily Protein Intake by Source for Patients Who Received That Source



- Patients on a VHPLC formula received significantly more protein than when other ENF used ($p < 0.0001$)
- Protein module supplementation modestly increased protein delivery by an average of 12 gm/day
- Use of dextrose and propofol increased calorie delivery

CONCLUSION

A significant change in weight demographics has occurred in ICUs, with >70% of patients being overweight or obese. This demands changes in nutrition practices with a preference to increasing protein delivery within a hypocaloric protocol. Increasing protein delivery while decreasing non-protein calories should be considered in critically ill patients and may be associated with improved outcomes.



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