Optimal Nutritional Support for the Surgical Patient: Standard Enteral Diet

Daine Bennett, M.D.
University of Colorado Denver
Department of Surgery
August 22, 2011
Rationale for Immunomodulation

- Arginine
- Ω-3 Fatty Acids
- Glutamine
Arginine

- Synthesis of collagen
- Increased peripheral T lymphocytes response
- Nitric Oxide synthesis-phagocytic killing
Ω-3 Fatty Acids

- Fish oil and canola oil
- Replaces Ω-6 FA’s in cell membranes
- Reduces eicosanoid production (PGE2)
  - Improved immune cell function
Glutamine

- Release by skeletal muscle
- Fuel source for T-lymphocytes, enterocytes
- Increased CD4:CD8 ratio
- Increased proliferation of lymphocytes
Body of Data

- Decreased mortality (except is Sepsis)
- Decreased Infectious Complications
- Shorter Hospital Courses
Points of concern

- Variability of composition of formula
- Conflict of interest due to funding sources
- Heterogeneity of subjects and results
Conflict of Interest

Disclosure Information: Dr Heyland received a research grant as the principal investigator and an honorarium as a speaker for Nestle. Dr Ochoa was a paid consultant for Nestle until July 2010, and receives a salary as Medical Scientific Director for Nestle since July 2010. All other authors have nothing to disclose.

Funding

DNL was funded by a Research Fellowship awarded by the Special Trustees of University Hospital, Queen’s Medical Centre, Nottingham. JRC was supported by a grant from Nutricia Clinical Care, UK. The enteral feeds were provided free of cost by Nutricia Clinical Care, UK.

Supported, in part, by Novartis Nutrition, Berne, Switzerland.
2001 Meta-analysis of 22 studies

- End points of mortality, length of stay, and infectious complications

- Subgroup analysis
Subgroup analysis of Critically Ill

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Treatment</th>
<th>Impact</th>
<th>Critically Ill Patients</th>
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<tr>
<td>Corra et al. 1990</td>
<td>No</td>
<td>Yes</td>
<td>20</td>
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<td>Gottschlich et al. 1990</td>
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<td>Brown et al. 1994</td>
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<td>Bower et al. 1996</td>
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<td>Kudsk et al. 1996</td>
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<td>33</td>
<td>1/16 (6.3)</td>
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<td>Ross Products Division of Abbott Laboratories, 1996</td>
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<td>170</td>
<td>20/87 (23)</td>
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<td>Engel et al. 1997</td>
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<td>Mendez et al. 1997</td>
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<td>Rodrigo and Garcia 1997</td>
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<td>Atkinson et al. 1998</td>
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<td>Galban et al. 2000</td>
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Subgroup Analysis of Critically Ill

- No effect on mortality
- No effect on infectious complications
- Reduced length of hospitalization in IMEN
Variable Results

Figure 1. Effect of Immunonutrition on Mortality in 22 Trials

For Elective Surgical Patients:
- Daly et al., 2002
- Daly et al., 2006
- Singh et al., 2000
- Schilling et al., 2000
- Giacinti et al., 2007
- Senko et al., 2006
- Singh et al., 2000
- Senko et al., 2009
- Snyderman et al., 2000

For Critically Ill Patients:
- Carna et al., 1990
- Gottschlich et al., 1990
- Brown et al., 1994
- Moons et al., 1994
- Glover et al., 1996
- Kudsk et al., 1996
- Ross Products Division of Abbott Laboratories, 1996
- Engle et al., 1997
- Mendirut et al., 1997
- Rodrigo and Garcia, 1997
- Weinmann et al., 1998
- Alderson et al., 1998
- Abtsson et al., 1998
- Galvan et al., 2000

Pooled Risk Ratio

Risk Ratio (95% Confidence Interval)

P value for homogeneity is .54. The study by the Ross Products Division of Abbott Laboratories has not been published.
Standard and immunomodulating enteral nutrition in patients after extended gastrointestinal surgery — A prospective, randomized, controlled clinical trial

Stanislaw Klek\textsuperscript{a,*}, Jan Kulig\textsuperscript{a}, Marek Sierzega\textsuperscript{a}, Kinga Szczepanek\textsuperscript{a}, Piotr Szybiński\textsuperscript{a}, Lucyna Scislo\textsuperscript{b}, Elzbieta Walewska\textsuperscript{b}, Aldona Kubisz\textsuperscript{a}, Antoni M. Szczepanik\textsuperscript{a}

- 2008 RCT of 183 patients
- Elective cases undergoing upper GI resection
- Similar calories and nutrients
- Not funded by manufacturers IMEN
Results

- Infections: SEN=23, IMEN=21
- No mortality difference
- Increased deaths in patients with severe sepsis fed with IMEN
- 44.4% v. 14.3%, p=0.039
- Recruitment of these patients subsequently stopped
Cost

“Reducing Costs and Patient Morbidity in the Enterally Fed Intensive Care Unit Patient”
(Farber, et al)

- Impact $49/day x 14 days = $689
- Standard $4.25/day x 14 days = $60
Conclusions

- Contradicting data
- Variability of patient populations and formulas used
- Bias
- Dangerous in sepsis
- Routine use of IMEN not indicated at this time
References