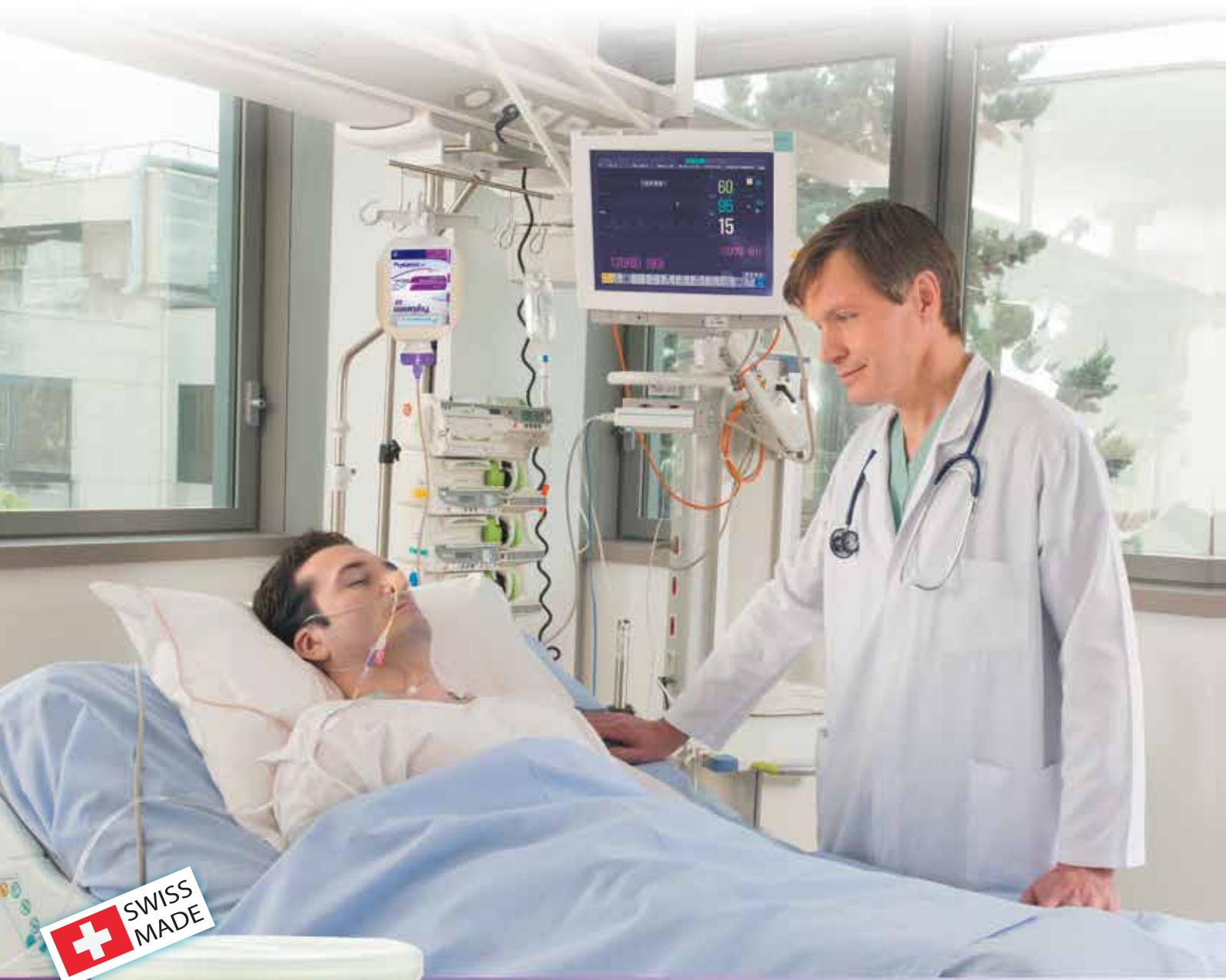


Clinical Study Summaries



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The only peptide-based formula supported by over 24 years of clinical experience and more than 50 clinical studies



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ENHANCED PROTEIN-ENERGY PROVISION VIA THE ENTERAL ROUTE IN CRITICALLY ILL PATIENTS: A SINGLE CENTER FEASIBILITY TRIAL OF THE PEP UP PROTOCOL

Heyland DK, Cahill NE, Dhaliwal R, Wang M, Day AG, Alenzi A, Aris F, Muscedere J, Drover JW, McClave SA
Critical Care 2010, 14:R78

Background

The association between inadequate feeding and poor outcomes in critically ill patients has been reported in previous observational studies. However, traditional enteral nutrition (EN) feeding protocols often use conservative, reactionary approaches to optimizing nutrition.

Purpose

To evaluate:

- Feasibility, acceptability and safety of a new EN protocol (questionnaire completed by nurses).
- Patients' nutritional and clinical outcomes.

Patients

20 adults on mechanical ventilation who stayed in the Intensive Care Unit more than 3 days.

Methods

Prospective before and after study. Twenty patients consecutively enrolled in the before group and 30 patients in the "new protocol" after group.

Intervention

	Standard Protocol	New Protocol
Enteral Nutrition	Standard polymeric	Peptamen® 1.5
Initial TF rate	25 ml/h	62 to 83 ml/h
Motility agents	As needed	Systematic
Compensate for lost TF time	No	Yes
Maximum residuals	200 ml	250 ml
Protein supplement	No	Yes

Results

- 1) Protocol feasibility and acceptability by nurses: 7.1/10.
- 2) Patients in the "new protocol" after group received on average, a higher percentage of their energy and-protein requirements compared to the "standard protocol" before group (Energy: 67.9% vs 58.8%, Protein 73.6% vs 61.2%, $p= 0.33$ and $p= 0.13$).
- 3) In a subgroup of patients ($n=18$) prescribed to receive full volume feeds, they received 83.2% ($p= 0.02$) and 89.4% ($p= 0.002$) of their energy and protein needs, respectively, compared to the before group (see figures 1a and 1b below).
- 4) No increase in complications from EN.

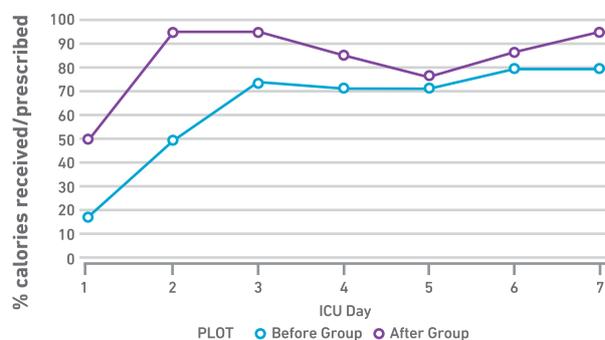


Figure 1a

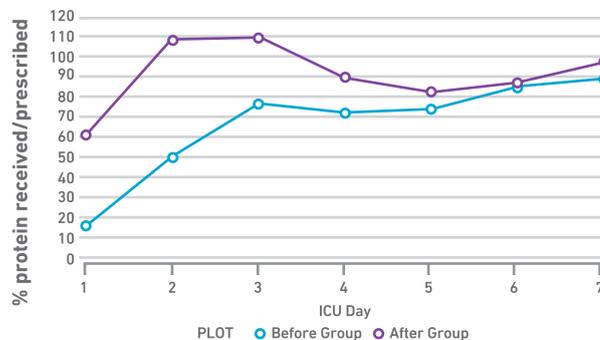


Figure 1b

Conclusion

This new protocol seems to be safe and acceptable to critical care nurses. Adoption of this protocol may be associated with enhanced EN delivery, but further trials are needed to evaluate its effect on nutritional and clinical outcome measures.

ENHANCED PROTEIN-ENERGY PROVISION VIA THE ENTERAL ROUTE FEEDING PROTOCOL IN CRITICALLY ILL PATIENTS: RESULTS OF A CLUSTER RANDOMIZED TRIAL

Heyland DK, Murch L, Cahill N, McCall M, Muscedere J, Stelfox HT, Bray T, Tanguay T, Jiang X, Day AG *Crit Care Med* 2013 41(12):1-11.

Background

The provision of enteral nutrition (EN) to mechanically ventilated, critically ill patients within 24–48 hours from admission to the ICU is associated with reduced infections and improved survival compared to delayed initiation of EN. Feeding protocols are system-level tools that may help to achieve these nutritional goals and are endorsed by major international nutrition societies as effective and safe. Although approximately 80% of ICUs around the world use a feeding protocol, there is tremendous variability in their content and most conventional feeding protocols recommend that EN be started at low rates and gradually advanced to an hourly goal rate, without accounting for feeding interruptions. It has been shown that critically ill patients consistently receive less than their prescribed nutritional needs. A novel protocol that includes strategies to enhance the delivery of EN and shifts the approach from a reactive to proactive one, followed by de-escalation of aspects of nutritional therapy that are no longer needed, was developed.

Purpose

The primary aim of this trial was to determine the effect of the enhanced protein-energy provision via the enteral route feeding protocol (PEP uP protocol) combined with a nursing educational intervention, compared to a standard feeding protocol (usual care) on amount of protein and calories received.

Methods

- A cluster randomized trial of 18 ICUs in North America. Allocation was stratified by teaching versus nonteaching hospital and country (Canada or United States).
 - From over 200 ICUs previously participated in our International Nutrition Audits, investigators identified 45 sites in North America that had low levels of caloric intake (< 50% prescribed calories received) which already had standard feeding protocols in place: staff in 18 sites agreed to participate in the study.
- All adult patients who were mechanically ventilated prior to or within the first 6 hours of ICU admission. The analysis was planned on patients who remained mechanically ventilated for at least 72 hours.
- The PEP uP protocol:
 - Starting feeds at higher initial target rate. Shift from an hourly rate target goal to a 24-hour volume goal and give nurses guidance on how to make up this volume if there was an interruption for nongastrointestinal reasons.
 - For patients who are deemed unsuitable for high-volume intragastric feeds, the protocol provides an option to initiate “trophic feeds” at a low volume of a concentrated feeding solution.
 - Use of a semi-elemental feeding solution (Peptamen®) to maximize the likelihood of tolerance, absorption, and assimilation, compared to a polymeric solution.
 - Protein supplements prescribed at initiation of EN and can be discontinued if EN is well tolerated.
 - Start of metoclopramide at the same time EN is started with a reevaluation in the days following to see if it is necessary.
- Outcomes
 - The proportion of the protein and calorie prescriptions received by study patients via EN over the first 12 days in the ICU.
 - The safety of the PEP uP protocol by documenting the prevalence of witnessed vomiting (gastric contents located outside the mouth), regurgitation (gastric contents detected in the mouth), macroaspiration (gastric contents detected in the airway), and ICU-acquired pneumonia in study patients in both groups.

ENHANCED PROTEIN-ENERGY PROVISION VIA THE ENTERAL ROUTE FEEDING PROTOCOL IN CRITICALLY ILL PATIENTS: RESULTS OF A CLUSTER RANDOMIZED TRIAL — Continued

Results

- There were 1,059 patients in the ITT analysis, 577 in the efficacy analysis, and 57 in the intervention group that initially received 24-hour volume feeds as their first order.
- Patient groups were well balanced between the two groups and the two time periods as evidenced by similar demographics.
- The ICUs that implemented the PEP uP protocol, we observed significant improvements in several nutritional endpoints.
- Patients in the intervention group received a significantly larger proportion of prescribed protein and calories from EN, compared to baseline (47 vs 34%, $p= 0.005$ for protein; 44 vs 32%, $p= 0.001$ for calories) but there were no significant changes in the control group.
- In the interventional sites, the implementation of the PEP uP protocol was associated with a trend toward decreased average time from ICU admission to the start of EN compared to the control group (40.7–29.7 hr vs 33.6–35.2 hr, $p= 0.10$).
- On average, patients remained on study protocol for 6.3 days and had interruptions to their feeding protocol on 2.9 days during their ICU stay. The main reason for interrupting the feeding protocol was for procedures.
- There was no significant difference in complication rates between the two groups.

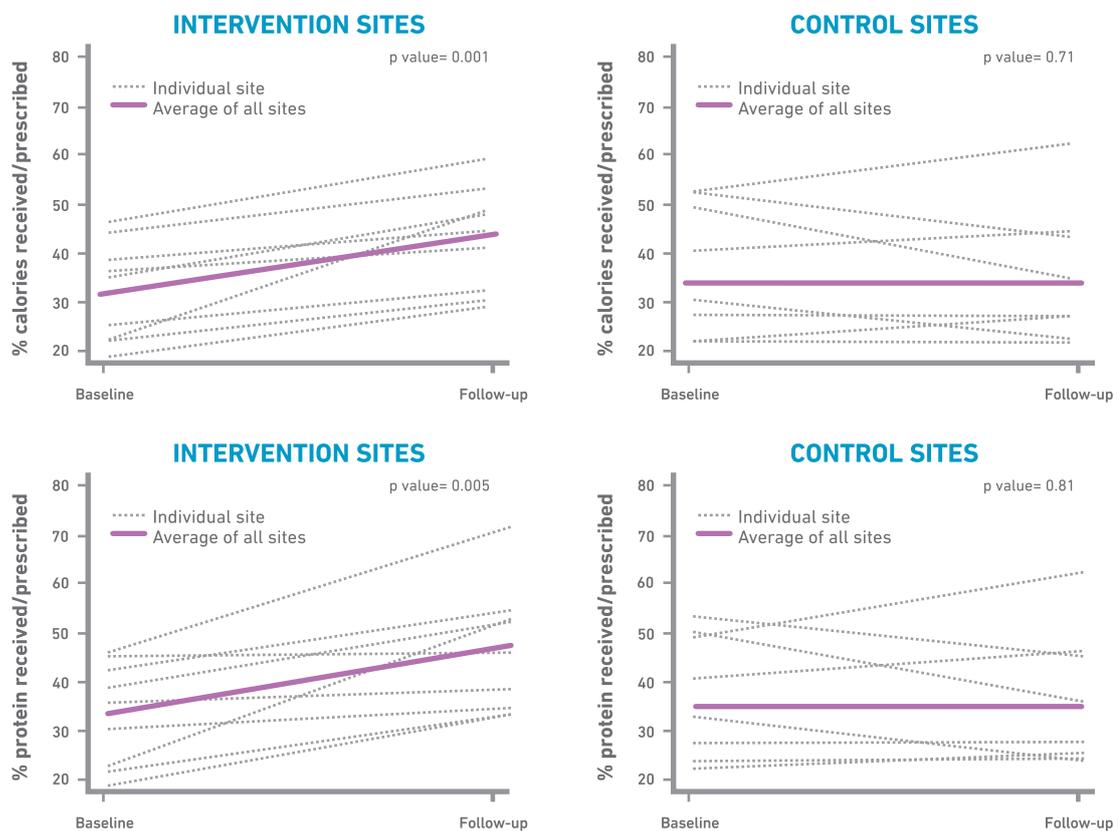


Figure 1: Changes in protein and energy adequacy in control and intervention sites. This figure shows the pre- and postdata collection overall and by sites connected by lines. *Thick line* shows average improvement in protein and caloric adequacy in interventions and control sites. *Dashed lines* reflect changes at individual sites.

Conclusion

In ICUs with low baseline nutritional adequacy, the PEP uP protocol results in modest but statistically significant increases in protein and calorie intake in critically ill patients. With greater attention to the implementation of this novel feeding protocol, the iatrogenic underfeeding that is so prevalent in ICUs around the world can be reduced.

TOLERANCE OF A WHEY-BASED ENTERAL NUTRITION IN TUBE FED PATIENTS. Toleranz einer molkenbasierten Sondennahrung bei enteral ernährten patienten

Graf MG, Kurmann S, Sterchi AB, Leuenberger Z, Stanga Z, Joray ML *Aktuel Ernährungsmed* 2013 38:213-4.

Background

Tube fed patients, and especially patients after abdominal surgery, frequently experience GI symptoms such as feelings of fullness, bloating, nausea and diarrhoea. Compared to casein, which is a primary protein source in many products, whey protein remains soluble and facilitates gastric emptying. Whey protein improves morphology and permeability of villi. Whey protein is quickly absorbed and stimulates muscle protein synthesis. A high MCT (medium chain triglyceride) content of the product can help reduce the risk of fat maldigestion.

Purpose

The purpose of this study is to evaluate the incidence of GI symptoms (type, severity, and duration) in tube fed (TF) patients and to evaluate improvement in tolerance following introduction of a whey-based enteral nutrition formula high in medium-chain triglycerides (MCT).

Methods

10 patients fed via nasogastric (NG) or nasojejunal (NJ) tubes who experienced symptoms of GI intolerance on casein-based EN (3 patients on whole protein EN and 7 patients on hydrolyzed EN), were switched to whey-based EN (Peptamen® HN). Peptamen® HN (Nestlé Health Science, Switzerland) is a complete, hydrolyzed, high calorie (1.33 kcal/mL), high protein (20% kcal as whey peptides) EN formula.

Symptoms (type, severity and duration) were recorded daily for a period of 7 days following the switch to Peptamen® HN.

Results

The introduction of Peptamen® HN had a positive impact for patients with symptoms such as vomiting, nausea, feelings of fullness and/or diarrhoea. After the switch, symptoms improved or disappeared completely in most cases. Compared to the previously used EN product, improved tolerance was documented in most patients during the 7-day period.

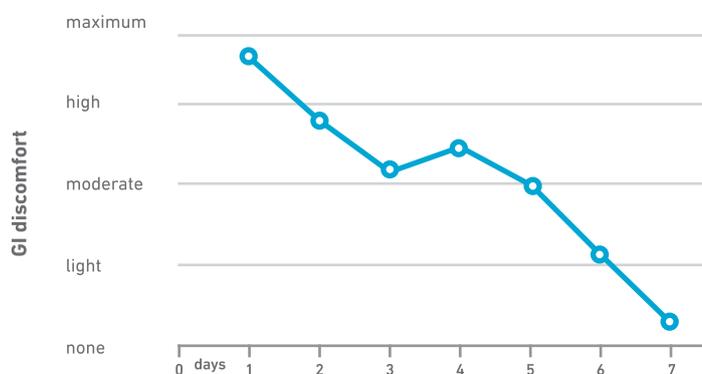


Figure 1: Cumulative effect of patient GI symptoms over the 7 days following introduction of Peptamen® (effect points/patient) such as nausea, vomiting, indigestion, bloating, diarrhoea, burp, wind.

During the study period, 5 patients achieved their caloric needs, while 4 patients received between 1000 and 1800 kcal, and one patient had tolerated 665 kcal. Limitations of this study include the small number of patients studied and the absence of a control group to compare with the usual course of symptoms.

Conclusion

The introduction of a whey-based high caloric enteral nutrition formula led to improved or resolved GI-intolerant symptoms in most patients. A positive effect was achieved during the 7-day study period in most patients.

EARLY ENTERAL NUTRITION WITH WHEY PROTEIN OR CASEIN IN ELDERLY PATIENTS WITH ACUTE ISCHEMIC STROKE: A DOUBLE-BLIND RANDOMIZED TRIAL

De Aguilar-Nascimento JE, Prado Silveira BR, Dock-Nascimento DB 2011 Nutrition 27:440-444.

Background

Malnutrition is highly prevalent among elderly patients admitted to intensive care units (ICU) for acute neurological conditions. Ageing is associated with a decline in skeletal muscle mass that accelerates the process of sarcopenia and directly affects the health of elderly people. An acute condition that necessitates ICU admission of the elderly may aggravate the loss of lean body mass; therefore, both the appropriate amount and the type of protein in the formulation of the enteral diet may play a role in the outcomes.

Purpose

The aim of this study was to compare the effects of an early enteral formula containing whey protein and a standard enteral formula (containing casein as the protein source), on glutathione levels and inflammatory markers of elderly patients admitted to the ICU with acute ischemic stroke.

Patients

31 patients (> 65 y old) admitted to ICU with acute ischemic stroke. Eligibility criteria include initiation of early enteral nutrition < 48 h after admission and APACHE II score between 8-30.

Design

Prospective randomized controlled trial

Methods

Patients were randomized to receive early nasogastric feeding with either a standard formula (Casein Group) or a formula containing hydrolyzed whey protein (Whey Protein Group).

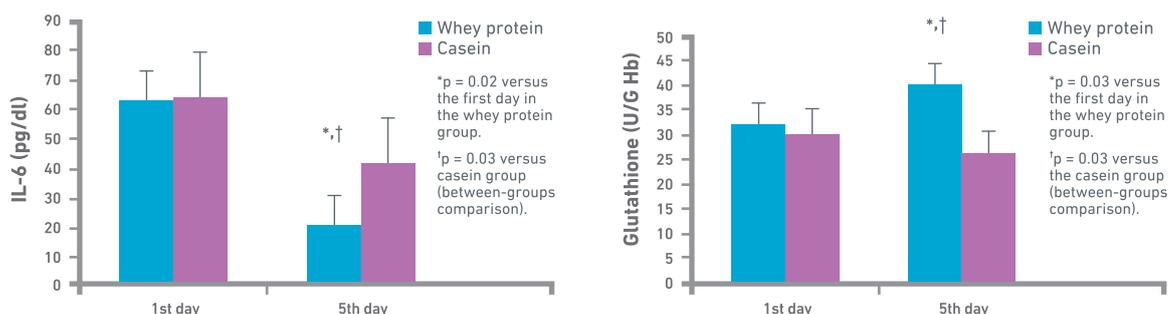
Group	Casein Group	Whey protein Group
Diet	Hiper-Diet Energy Plus* and Caseical §	Peptamen® 1.5
Kcal	35 kcal/kg/d	35 kcal/kg/d
Protein (g)	1.2 g of protein/kg/d	1.2 g of protein/kg/d

* Standard formula containing hydrolyzed casein.

§ 0.8% casein added to obtain the same amount of protein as whey protein group.

Results

25 patients completed the study. Albumin levels dropped from the first to the fifth feeding day only in the casein group ($p < 0.01$). Serum IL-6 decreased (62.7 ± 47.2 to 20.6 ± 10.3 pg/dL; $p = 0.02$) and glutathione increased (32.2 ± 2.1 to 39.9 ± 6.8 U/G Hb; $p = 0.03$) only in the WP group. The between-groups comparison showed that serum IL-6 was lower ($p = 0.03$) and Glutathione peroxidase (GPx) level was higher ($p = 0.03$) in the whey protein group than in the casein diet group (there was no difference between the two groups at baseline for both IL-6 and GPx).



Conclusion

Early enteral nutrition with whey protein may decrease inflammation and increase antioxidant defenses in elderly patients admitted in ICU due to acute ischemic stroke compared to casein-based formula.

EARLY ENTERAL NUTRITION PHARMA NUTRITION IMPROVES NUTRITIONAL STATUS AND REDUCES INFLAMMATION IN SEVERE SUBARACHNOID HEMORRHAGE

M. Bandini, L. Di Mauro, M. Vincenzi, M. Moczulska, P. Ferraris, M. Zanello 65e Congresso Nazionale, Poster, Minerva Anestesiologica 2011 77; Suppl 2 No. 10: 171.

Background

Critically ill patients are at high risk of acute protein-energy malnutrition due to stress catabolic reaction and inflammatory responses. In severe aneurismatic Subarachnoid Hemorrhage (SAH), there is evidence supporting the role of inflammation and malnutrition on worse outcomes.

Purpose

The aim of this study was to compare the effects of early enteral nutrition (Peptamen® AF, Nestlé Health Science, Switzerland) versus a standard formula, in critically ill patients suffering from severe SAH, on blood visceral protein, plasmatic markers and clinical expression of Systemic Inflammatory Response Syndrome (SIRS).

Patients

Thirty-two patients (age 61.6 ± 11.6 yo, BMI 25.4 ± 4) with critical catabolism (0.150 ± 0.05 g/kg/day nitrogen loss) and severe SAH (HH grade: 4-5, GCS: <9 ; SAPS II: 48 ± 9).

Design

Prospective randomised controlled trial.

Methods

Patients were consecutively enrolled and randomised to receive early EN with 2 isocaloric, isoprotein regimens over 7 days. The Study Group received Peptamen® AF (hydrolyzed whey protein-based formula supplemented with n-3 PUFAs). The control group received standard formula Nutrison Energy, Nutricia, plus Isosource Protein, Nestlé Health Science).

Blood levels of Prealbumin, Transferrin, C-Reactive Protein, Aptoglobine, Procalcitonine, IL6 were measured at T0 (pre-) and T8 (post-treatment). Systemic inflammation and related organ failure were evaluated according to the standard SIRS and SOFA scores, respectively. The nitrogen balance (NB) was measured at day T3 and T8.

Results

Both groups are similar and comparable at T0.

Group	Control	Study Group
Diet	Std EN – 2 formulas	Peptamen® AF
T8 free SIRS (days)	1	3.3 (p< 0.01)
T8 SOFA score	-1.1	-2 (p< 0.01)
C-Reactive Protein	11.2 ± 4.3	8.1 ± 5.5 (p< 0.05)
T8 IL-6 (pg/ml)	58.5 ± 7.3	33.2 ± 6.5 (p< 0.05)
T8 (energy administered vs prescribed)	84%	96%

At T8, the Study Group presented more SIRS-free days over treatment period, a decrease in SOFA score, reduced plasma IL-6 levels and C-Reactive Protein, and higher EN tolerance (energy administered vs prescribed) than the control group.

Conclusion

Short term Enteral Nutrition enriched with n-3 PUFAs may protect visceral protein synthesis and reduce the systematic inflammatory response in neurocritical patients.

CHYLE LEAKS AND UPPER GASTROINTESTINAL SURGERY

Wakefield SC, Green J. Abstracts of the 34th ESPEN Congress, Barcelona, Spain; 8–11 September 2012; 7(1): 1-300.

Background

Increased lymphadenectomy is being performed in upper gastrointestinal cancer surgery to improve prognoses. There is currently no consensus on chyle management with different Trusts providing different treatments. Our management at the Imperial College Healthcare NHS Trust, is to start specialised nutrition with a high medium chain triglyceride (MCT) feed (Peptamen®) or a very low fat diet enriched with MCT orally.

Purpose

An audit was carried out to determine if there was an increase in the incidence of chyle leaks after this change in surgical technique; whether the length of stay differed in patients with chyle leaks; and whether the type of nutrition affected recovery time.

Methods

Patients who underwent surgery for upper gastrointestinal cancer (oesophagectomy, total and subtotal gastrectomy with Roux-en-Y) during a 2-year period were identified (n=113). Dietetic records were reviewed to determine chyle leak occurrence and duration, patient length of stay, route and type of nutrition used.

Patients

106 patients who underwent surgery for upper gastrointestinal cancer and whose records were complete.

Design

Patients were randomized to receive early nasogastric feeding with either a standard formula (Casein Group) or a formula containing hydrolyzed whey protein (Whey Protein Group).

Results

A significant increase in the rate of chyle leaks following radical lymphadenectomy was observed (7.8% to 22%, $p=0.06$). Patients with chyle leaks also had a significantly longer length of hospital stay (24 vs. 16 days, $p=0.003$) compared to those without chyle leak. 73% of patients with chyle leaks resolved with specialised oral (27%) or enteral feeding (72%); 27% required parenteral nutrition (TPN); of which one required surgery despite conservative measures.

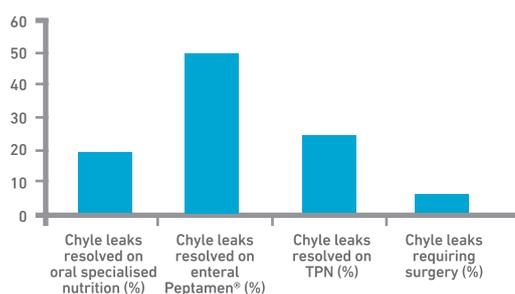


Figure 1: Method by which chyle leak was resolved (%)

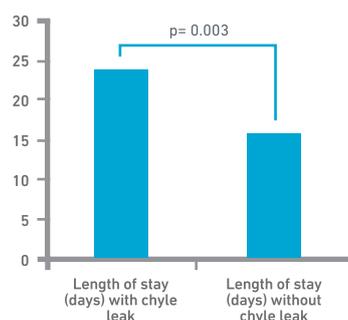


Figure 2: Length of stay with and without chyle leak

Conclusion

The incidence of chyle leaks has increased with increasingly radical surgery. Patients with chyle leaks stay longer as the leak must be resolved before building up to a normal diet and surveillance is required. The majority of patients' leaks resolved with specialised oral or enteral nutritional measures; a very low fat or MCT diet, as previously reported.

EVIDENCE IN SUPPORT OF PEPTAMEN® FORMULAS

Authors and Journal	Study Objective	Formulas Studied	Patient Conditions	Results
PEPTAMEN®				
Tiengou LE et al. <i>Journal of Parenteral and Enteral Nutrition</i> . 2006;30(2):1–5.	To compare tolerance and outcomes in patients with acute pancreatitis receiving a semi-elemental formula versus a polymeric formula.	Peptamen® vs. Sondalis-Iso®	Adults with acute pancreatitis	Peptamen® usage resulted in a significant decrease in weight loss (p= 0.01) and hospital length of stay (p= 0.006). Although not significant, a clinical trend was seen for decreased infection, improved CRP, amylase and serum albumin in the Peptamen® group. Use of Peptamen® in acute pancreatitis may ensure a more favorable outcome than use of a polymeric formula.
Dylewski ML et al. <i>Nutrition Poster 72; A.S.P.E.N. Clinical Nutrition Week</i> . 2006.	Compare the effects of a whey-based hydrolyzed protein feeding vs. an intact casein-based formula in pediatric burn patients.	Peptamen® vs. casein-based formula	Pediatric patients with burns exceeding 20% TBSA	Peptamen® is better tolerated than the casein-based feeding in pediatric burn patients. Peptamen® promoted more rapid progression to goal feeding and a decrease in incidence of diarrhea (p= 0.03).
Shea JC et al. <i>Pancreatology</i> . 2003;3:36–40.	To determine if an enteral formula containing MCT and hydrolyzed peptides would minimally stimulate the pancreas and decrease pain associated with chronic pancreatitis.	Peptamen® vs. Ensure® vs. high fat hamburger	Adults with chronic pancreatitis and healthy adults	Peptamen® minimally stimulated the pancreas and cholecystokinin release, as compared to a 30 gm fat oral diet (hamburger) and/or Ensure in healthy subjects. There was a significant decrease in pain scores with Peptamen® usage patients with pancreatitis (p= 0.011).
Salomon SB et al. <i>Journal of the American Dietetic Association</i> . 1998;98:460–2.	To determine if a hydrolyzed whey-based, low LCT, high MCT diet would improve gastrointestinal tolerance and fat absorption in HIV-infected subjects.	Peptamen® vs. regular diet	Adult HIV	Patients with HIV tolerated Peptamen® well. Significant decrease in number of stools (p< 0.01) was seen during the Peptamen® phase of the study, in addition to a significant decrease in fecal fat content of stool (p< 0.019).
McClave SA et al. <i>Journal of Parenteral and Enteral Nutrition</i> . 1997;21:14–20.	To assess safety and efficacy of a whey-based peptide diet in acute pancreatitis.	Peptamen® vs. total parenteral nutrition (TPN)	Acute pancreatitis and chronic pancreatitis with flare-ups	Peptamen® fed jejunally was as effective as TPN in the nutritional management of patients with pancreatitis. Peptamen® patients had significantly greater improvement in Ranson criteria (p= 0.002) score and a non-significant trend toward improvement in LOS, ICU stay, days to PO diet, and days to normal amylase. Nutrition support with Peptamen® is significantly less costly than TPN (p< 0.005).
Herzog D et al. <i>Gastroenterology</i> . 1997;112:A995.	To assess growth velocity and relapse frequency in children with quiescent Crohn's disease and growth failure.	Peptamen® vs. high calorie diet	Pediatric patients with Crohn's disease and growth failure	Peptamen® fed exclusively for 28 days every 4 months to children with Crohn's disease significantly reduced relapse frequency (p= 0.03) and permitted normalization of growth velocity (p= 0.005) and bone density (p= 0.001) in quiescent pediatric Crohn's disease with severe growth failure.
Pereira SP et al. <i>Clinical Science</i> . 1996;91:509–12.	To compare nutritional support with Peptamen® with the use of steroid in patients with active Crohn's disease.	Peptamen® vs. prednisone	Acute active Crohn's disease	All patients showed an improvement in all indices of Crohn's disease activity. The patients' response to Peptamen® and to steroids was equivalent. Peptamen® can be efficacious in the nutrition support of active Crohn's disease.
Donald P et al. <i>Nutrition Research</i> . 1994;14:3–13.	To compare the ability of peptide-based vs. free amino acid-based enteral products in improving nutritional status and feeding tolerance in surgical patients.	Peptamen® vs. free amino acid diet	Adult surgical (post-operative) patients	Statistically significant improvements occurred in serum prealbumin (p= 0.04) and cholesterol (p= 0.02) in the Peptamen® group; declines occurred in the free amino acid group. There was a non-significant increase in serum transferrin levels in the Peptamen® group.
Rowe B et al. <i>Journal of the American College of Nutrition</i> . 1994;13:535A.	To determine the incidence of glutathione (GSH) depletion in ICU patients and if a diet high in cysteine can replete GSH.	Peptamen® (whey-based) vs. Nutren® 1.0 (casein-based)	Adult ICU patients under physiologic stress	43% of the patients had depleted GSH levels. GSH levels increased on Peptamen®, but did not increase on the casein-based diet. The patients on Peptamen® received a cysteine-rich protein source that provided seven times more cysteine than the casein diet.

Authors and Journal	Study Objective	Formulas Studied	Patient Conditions	Results
Borlase BC et al. <i>Surgery, Gynecology and Obstetrics</i> . 1992;174:181–8.	To compare tolerance and length of stay (LOS) in patients on a peptide diet vs. a free amino acid diet.	Peptamen® vs. free amino acid diet	Critically ill, hypoalbuminemic elderly	The Peptamen® group had significantly fewer stools than the free amino acid group ($p < 0.02$). Both groups had equal tube-feeding intake. The LOS was 45 days in the Peptamen® group (23 +/- 8 days in the ICU) vs. 54 days in the free amino acid diet group (28 +/- 9 days in the ICU; NS). Improved N2 balance was seen in the Peptamen® group ($p < 0.001$).
Murray ND, Vanderhoof JA. <i>Journal of Parenteral and Enteral Nutrition</i> . 1988;12(suppl):215.	To compare tolerance of a peptide-based whey protein diet with LCT and MCT to a low fat amino acid-based diet.	Peptamen® vs. free amino acid diet	Pediatric patients with SBS	Ostomy output was decreased in patients receiving Peptamen® vs. the free amino acid diet; fat excretion was similar in both groups. Patients without ostomies receiving Peptamen® had thicker stools. Trace element excretion was greater with the free amino acid diet.
Zoli G et al. <i>Alimentary Pharmacology & Therapeutics</i> . 1997;11:735–40.	To determine the efficacy of an oral elemental diet versus steroids in patients with active Crohn's disease.	Peptamen® (orally) vs. prednisone	Adults with active Crohn's disease	Peptamen® given orally to adult patients with Crohn's disease was at least as effective as steroids in inducing remission of the disease, and may improve nutritional status, probably through a more rapid restoration of normal intestinal permeability.
Polk DB et al. <i>Journal of Parenteral and Enteral Nutrition</i> . 1992;16:499–504.	To study growth velocity and disease activity in children with Crohn's disease receiving intermittent feedings of a peptide diet.	Peptamen® vs. regular diet with oral supplements	Pediatric Crohn's disease	Intermittent feedings with Peptamen® resulted in a significant improvement in height/weight velocity ($p < 0.0001/p < 0.02$) and reduced disease activity ($P < 0.01$), allowing a reduction in prednisone intake.
Fried MD et al. <i>Journal of Pediatrics</i> . 1992;120:569–72.	To determine gastric emptying times and incidence of regurgitation in children with documented delayed gastric emptying.	1 casein-predominant vs. 3 whey-predominant (including Peptamen®)	Pediatric patients with documented delayed gastric emptying	Patients on whey-based formulas had a significant reduction ($p < 0.05$) in vomiting (2 ± 2) compared with those on the casein-based formula (12 ± 11). Whey-based formulas like Peptamen® reduce the frequency of vomiting by improving the rate of gastric emptying ($p < 0.001$).
PEPTAMEN® WITH PREBIO1™				
Parekh N. <i>American College of Gastroenterology Annual Meeting Abstracts</i> . 2006:S313–14, Abstract Number 776.	To describe the outcome from switching from a polymeric or semi-elemental formula to an isocaloric, isotonic semi-elemental formula with prebiotics.	Peptamen® with Prebio1	Adult patients with intestinal failure undergoing intestinal rehabilitation	Patients experienced weight gain and maintained albumin during the change to the fiber containing formula. Three months of oral or enteral intake of Peptamen® with Prebio1 may induce weight gain in patients with intestinal failure undergoing intestinal rehabilitation.
Hussey TA et al. <i>Journal of Pediatric Gastroenterology and Nutrition</i> . 2003;37:341.	To observe tolerance and efficacy of a six-week tube feeding regimen of Peptamen® with Prebio1.	Peptamen® with Prebio1	Pediatric patients with Crohn's disease	Peptamen® with Prebio1 was well tolerated and associated with clinically meaningful gains in weight ($p < 0.0001$), height ($p < 0.01$), nutritional status ($p < 0.01$) and quality of life scores ($p < 0.01$). Inflammation and disease activity ($p < 0.0001$) were decreased. A six-week tube-feeding regimen of Peptamen® with Prebio1 is effective in helping to manage pediatric Crohn's disease.
PEPTAMEN® AF				
Oz HS et al. <i>Journal of Parenteral and Enteral Nutrition</i> . 2009;33:380–9.	To determine if an enteral nutrition formula high in cysteine, EPA-DHA and FOS would protect against systemic inflammatory syndrome in a well-established rat model.	Peptamen® AF vs. Promote® vs. chow	Rats with lipopolysaccharide (LPS)-induced systemic inflammatory response	Rats were allocated to receive Peptamen® AF, Promote or rat chow for 6 days, after which they received an injection with LPS or saline. Rats were euthanized 18 hours after injection with LPS or control. Peptamen® AF rats showed significantly less weight loss ($p < 0.05$), significantly less increase in ALT (liver function enzyme) ($p < 0.02$), less hepatic damage, less decrease in hematocrit, and greater hepatic glutathione content ($p < 0.05$). Data suggests that Peptamen® AF may protect against systemic inflammatory response.

Authors and Journal	Study Objective	Formulas Studied	Patient Conditions	Results
PEPTAMEN® 1.5				
De Aguiar-Nascimento JE, et al. <i>Nutrition</i> 27. 2011;440–444.	To investigate the feeding effects on glutathione and inflammatory markers when using an early enteral formula containing whey protein in comparison to an early enteral formula containing casein as the protein source.	Either a hydrolyzed whey protein (WP) enteral formula (Peptamen® 1.5) or an intact* casein-based (CP) enteral formula (Hiper-Diet Energy Plus) with a casein-based protein modular.	Adults admitted to the ICU due to ischemic stroke	Individuals who received hydrolyzed whey protein achieved more clinical benefits than those who received intact casein. An enteral formula containing whey protein as a nitrogen source was associated with a decrease IL-6 (p= 0.04) and an increase in glutathione peroxidase (p= 0.03) in elderly patients admitted to the ICU secondary to ischemic stroke.
Khoshoo V, et al. <i>European Journal of Clinical Nutrition</i> . 2002;56: 656–658.	To determine if a hypocaloric, hypertonic whey-based hydrolyzed formula empties the stomach as efficiently *as an iso-osmolar formula of lower energy density.	Peptamen® 1.5 vs. Peptamen®	Pediatric gastrostomy-fed children with volume intolerance	Gastric residuals were similar between formulas (p< 0.05). There was significantly more weight gain with Peptamen® 1.5 after one month of feeding (p< 0.05) Peptamen® and Peptamen® 1.5 were equally well tolerated. The higher density whey-based formula can safely substitute an equal volume of a lower energy density formula to produce weight gain without affecting tolerance.
PEPTAMEN® JUNIOR				
Flack S, et al. <i>Journal of Human Nutrition and Dietetics</i> . 2003;16:366.	To determine the usability of a pediatric whey-based diet in children >1 year of age.	Peptamen® Junior	Pediatric patients with eosinophilic enteropathy and other food intolerances	Peptamen® Junior was associated with improvement in diarrhea, vomiting and abdominal pain. It was concluded that Peptamen® Junior is suitable for most ethnic groups, is well tolerated and provides a better nutritional choice for children than previously offered through infant or adult nutrition products.
Khoshoo V, Sun S, et al. <i>J Am Diet Assoc</i> . 2010;110:1728-1733.	To evaluate the tolerance of a peptide-based formula with insoluble and prebiotic fiber in children with compromised gut function.	Peptamen® Junior Fiber vs. Peptamen® Junior	Children with gastrointestinal dysmotility, Crohn's disease, or mild short bowel syndrome	Stool frequency did not differ by formula. Stool consistency did differ with more soft "mushy" stools (less hard stools) occurring with use of fiber (p< 0.001) and more watery stools occurring with control formula (p= 0.01). The extremes of stool consistency were normalized with the fiber formula. No significant differences were observed in vomiting, abdominal pain, feeding intakes, or weight gain between the two formulas.



Peptamen[®]

Optimized for patients with
compromised gastrointestinal function



LOW OSMOLALITY
Minimise the risk of
osmotic diarrhoea



**100%
HYDROLYZED
WHEY PROTEIN**
Easily absorbed and
facilitates gastric
emptying



RICH IN CYSTEINE
Supports glutathione
synthesis ⁴ which
stimulates the immune
response against
infection



70% MCT
for improved digestion
and absorption
of fat



**90% OF
PROTEIN ARE FROM
SMALL PEPTIDE LESS
THAN 40 CHAIN LENGTH**
more efficiently absorbed
than free intact
proteins



Backed by
**MORE THAN 20
YEARS OF CLINICAL
EXPERIENCE**

We believe in the power of nutrition. We call it the

NFACTOR

Peptamen®

Time is critical



Peptamen®: a specific enteral formula designed for better tolerance

- ✓ **Whey protein to facilitate gastric emptying and reduce reflux**^{1,2,3}
- ✓ **Peptides to help to manage diarrhoea**^{4,5}
- ✓ **MCT* to decrease potential for fat malabsorption**⁶
- ✓ **Low osmolality**
- ✓ **Different caloric densities to meet individual patients' needs**

PEPTAMEN® IS THE ONLY PEPTIDE-BASED FORMULA SUPPORTED BY OVER 24 YEARS OF CLINICAL EXPERIENCE AND MORE THAN 50 CLINICAL STUDIES.

Nutrition. The factor that can make a difference.™

1. Khoshoo V, et al. Incidence of Gastroesophageal Reflux with Whey- and Casein-Based Formulas in Infants and in Children with Severe Neurological Impairment. *J Pediatr Gastro Nutr.* 1996;22(1):48-55. **2.** Fried MD, et al. Decrease in gastric emptying time and episodes of regurgitation in children with spastic quadriplegia fed a whey-based formula. *J Pediatr.* 1992;120(4 Pt 1):569-472. **3.** Khoshoo V, Brown S. Gastric emptying of two whey-based formulas of different energy density and its clinical implication in children with volume intolerance. *Eur J Clin Nutr.* 2002;56(7):656-658. **4.** McClave SA, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) *JPEN* 2009;33(3):277-316. **5.** Meredith JW et al. Visceral protein levels in trauma patients are greater with peptide diet than with intact protein diet. *J Trauma.* 1990;30(7):825-828. **6.** Rolandelli RH, et al, Lipids and Enteral Nutrition. In: *Clinical Nutrition: Enteral and tube feeding.* J.L. Rombeau, R.H. Rolandelli. W.B. Saunders Company, 1997.

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