

TOP Nutrition Newsletter

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Nutrition support in acute pancreatitis: a systematic review of the literature.

BACKGROUND: Failure to use the gastrointestinal (GI) tract in patients with acute pancreatitis may exacerbate the stress response and disease severity, leading to greater incidence of complications and prolonged hospitalization. The objectives of this study were to determine the optimum route for nutrition support, whether nutrition therapy is better than no artificial nutrition support, whether specific additives to enteral or parenteral therapy can further enhance their efficacy, and whether methodologic differences in delivery of enteral nutrition (EN) influence tolerance. **METHODS:** A computerized search was performed of MEDLINE, Cochrane database, EMBASE, and reference lists of pertinent review articles for prospective randomized trials in adult patients with acute pancreatitis that evaluated interventions with nutrition therapy. Primary outcome data and surrogate endpoint parameters (for nutrition indices, stress markers, and measures of the inflammatory/immune response) were extracted in duplicate independently. Where appropriate, meta-analysis was performed by random-effects model. **RESULTS:** From 119 articles screened, 27 randomized controlled trials were included and analyzed. In patients admitted for acute pancreatitis, meta-analysis of 7 trials showed that use of EN was associated with a significant reduction in infectious morbidity (risk ratio [RR] = 0.46; 95% confidence interval [CI], 0.29 - 0.74; $p = .001$) and hospital length of stay (LOS; weighted mean difference [WMD] = -3.94; 95% CI, -5.86 to -2.02; $p < .0001$), a trend toward reduced organ failure (RR = 0.59; 95% CI, 0.28-1.27; $p = .18$), with no effect on mortality (RR = 0.88; 95% CI, 0.43-1.79; $p = .72$) when compared with use of parenteral nutrition (PN). Results from individual studies suggest that EN in comparison to PN reduces oxidative stress, hastens resolution of the disease process, and costs less. Insufficient data exist to determine whether EN improves outcome over standard therapy (no artificial nutrition support) in patients admitted for acute pancreatitis. However, in those patients requiring surgery for complications of acute pancreatitis, meta-analysis of 2 trials indicates that provision of EN postoperatively may reduce mortality (RR = 0.26; 95% CI, 0.06 - 1.09; $p = .06$) compared with standard therapy. PN provided early within 24 hours of admission was shown to worsen outcome, whereas PN provided later after full-volume resuscitation appeared to improve outcome when compared with standard therapy. In early individual studies, specific supplements added to EN, such as arginine, glutamine, omega-3 polyunsaturated fatty acids, and probiotics, may be associated with a positive impact on patient outcome in acute pancreatitis, compared with EN alone without the supplements, but studies are too few to make strong treatment recommendations. Supplementation of PN with parenteral glutamine was shown to reduce oxidative stress and improve patient outcome (reduced duration of nutrition therapy and decreased hospital LOS) compared with PN alone in patients with acute pancreatitis. A wide range of tolerance to EN exists, irrespective of known influences such as mode (continuous vs bolus) and level of infusion within the GI tract (gastric vs postpyloric). **CONCLUSIONS:** Patients with acute severe pancreatitis should begin EN early because such therapy modulates the stress response, promotes more rapid resolution of the disease process, and results in better outcome. In this sense, EN is the preferred route and has eclipsed PN as the new "gold standard" of nutrition therapy. When PN is used, it should be initiated after 5 days. The favorable effect of both EN and PN on patient outcome may be further enhanced by supplementation with modulators of inflammation and systemic immunity. Individual variability allows for a wide range of tolerance to EN, even in severe pancreatitis.

Nutrition in the Critically Ill Patient: Part III. Enteral Nutrition.

OBJECTIVE: To review the human nutrition in the critically ill patient in a three-part presentation. **DATA SOURCES:** Articles and published peer-review abstracts and a review of studies reported and identified through a MEDLINE search of the English language literature on enteral nutrition. **SUMMARY OF REVIEW:** Enteral nutrition is indicated in the critically ill patient when there is an inability to ingest adequate nutrients by mouth and where the gastrointestinal tract is otherwise normal. The commonly used polymeric feeding solutions provide a mixture of nutrients similar to that encountered in the normal diet, usually as an iso-osmolar low residue solution. Because lactose intolerance may be encountered during critical illness, most formulations are lactose free. Special glutamine formulations and immune enhancing enteral formula (e.g. enriched with 3 fatty acids, arginine and ribonucleic acids) have been used in critically ill patients. However there have been few studies to indicate that these diets are of greater benefit compared with normal enteral formulations. The daily nutritional requirements are often not met in critically ill patients largely due to delayed gastric emptying or diarrhoea. Prokinetic agents, special formulations containing fibre and probiotics, have been used in an attempt to improve the tolerance to the formulations, although there have been no comparative studies that allow firm recommendation to be made. In general, a standard enteral solution is usually prescribed first and instilled into the stomach using a fine bore nasogastric tube. If gastric emptying is delayed prokinetic agents are tried before a transpyloric tube or enterostomy tube feeding is considered. **CONCLUSIONS:** Nutritional requirements for the critically ill patient should be delivered enterally in patients who have a normally functioning gastrointestinal system. A standard formulation is usually prescribed and instilled into the stomach using a fine bore tube. If gastric emptying is delayed prokinetic agents are tried before a transpyloric tube or enterostomy tube feeding is considered. Diarrhoea caused by enteral pathogens may require specific treatment. If pathogens are excluded then fibre and probiotics may be considered. Motility reducing agents (e.g. opiates) may cause abdominal bloating.

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Nutrition in the Critically Ill Patient: Part II. Parenteral Nutrition.

OBJECTIVE: To review the human nutrition in the critically ill patient in a three-part presentation. **DATA SOURCES:** Articles and published peer-review abstracts and a review of studies reported and identified through a MEDLINE search of the English language literature on parenteral nutrition. **SUMMARY OF REVIEW:** Intravenous nutrition plays an important supportive role in the management of the critically ill patient who has prolonged gastrointestinal failure. Energy substrates consist of concentrated glucose and lipid solutions, although the former requires central venous access for its administration. The nitrogen requirement is supplied as L-amino acids which usually consist of a solution containing the essential amino acids which are supplemented by a few of the non-essential amino acids. While, amino acid mixtures of glutamine dipeptides, ornithine alpha-ketoglutarate, asparagine, oxaloacetate, arginine, aspartate and glutamate have been used in a variety of conditions, prospective randomised controlled trials have not consistently demonstrated improved survival with their use in the critically ill patient. The water soluble vitamins and vitamin K should supplement intravenous nutrition with amounts at least to meet the recommended daily allowance. Additional supplementation of thiamine, folic acid and ascorbic acid are often administered in the critically ill patient. Apart from zinc, the body stores of the essential trace elements of zinc, copper, iodine, iron, manganese, cobalt, selenium, chromium, fluoride and molybdenum are usually adequate to meet the needs of patients requiring parenteral nutrition for less than 3 months. **CONCLUSIONS:** In the critically ill patient with prolonged gastrointestinal failure, intravenous nutrition plays a supportive role in the management of a patient.

Treatment with supplementary arginine, vitamin C and zinc in patients with pressure ulcers: a randomised controlled trial.

BACKGROUND & AIMS: Nutrients putatively implicated in pressure ulcer healing were evaluated in a clinical setting. METHODS: Sixteen inpatients with a stage 2, 3 or 4 pressure ulcer randomised to receive daily a standard hospital diet; a standard diet plus two high-protein/energy supplements; or a standard diet plus two high-protein/energy supplements containing additional arginine (9 g), vitamin C (500 mg) and zinc (30 mg). Nutritional status measurements (dietary, anthropometric and biochemical) and pressure ulcer size and severity (by PUSH tool; Pressure Ulcer Scale for Healing; 0=completely healed, 17=greatest severity) were measured weekly for 3 weeks. RESULTS: Patients' age and BMI ranges were 37-92 years and 16.4-28.1 k g/m² respectively. Baseline PUSH scores were similar between groups (8.7+/-0.5). Only patients receiving additional arginine, vitamin C and zinc demonstrated a clinically significant improvement in pressure ulcer healing (9.4+/-1.2 vs. 2.6+/-0.6; baseline and week 3, respectively; P<0.01). All patient groups presented with low serum albumin and zinc and elevated C-reactive protein. There were no significant changes in biochemical markers, oral dietary intake or weight in any group. CONCLUSIONS: In this small set of patients, supplementary arginine, vitamin C and zinc significantly improved the rate of pressure ulcer healing. The results need to be confirmed in a larger study.

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