Nutritional Supplementation for Patients with Cancer: Clinical Effectiveness and Guidelines

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RESEARCH QUESTIONS

1. What is the clinical effectiveness of nutritional supplementation (from food or other sources) for patients with cancer?

2. What is the comparative clinical effectiveness of nutritional supplementation with food compared with other nutritional sources for patients with cancer?

3. What are the evidence-based guidelines for nutritional supplementation for patients with cancer?

KEY MESSAGE

One systematic review, two randomized controlled trials, and one evidence-based guideline were identified regarding nutritional supplementation for patients with cancer.

METHODS

A limited literature search was conducted on key resources including Medline, PubMed, The Cochrane Library (2013, Issue 12), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2008 and December 2, 2013. Internet links were provided, where available.
RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and evidence-based guidelines.

One systematic review, two randomized controlled trials, and one evidence-based guideline were identified regarding nutritional supplementation for patients with cancer. No relevant health technology assessments were identified.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses


BACKGROUND: International guidelines on the nutritional management of patients with cancer recommend intervention with dietary advice and/or oral nutritional supplements in patients who are malnourished or those judged to be at nutritional risk, but the evidence base for these recommendations is lacking. We examined the effect of oral nutritional interventions in this population on nutritional and clinical outcomes and quality of life (QOL). METHODS: Electronic searches of several databases including MEDLINE, EMBASE, and CINAHL (from the first record to February 2010) were searched to identify randomized controlled trials of patients with cancer who were malnourished or considered to be at risk of malnutrition and receiving oral nutritional support compared with routine care. We performed a meta-analysis using a fixed effect model, or random effects models when statistically significant heterogeneity was present, to calculate relative risk (mortality) or mean difference (weight, energy intake, and QOL) with 95% confidence intervals (CIs). Heterogeneity was determined by using the chi(2) test and the I(2) statistic. All statistical tests were two-sided. RESULTS: Thirteen studies were identified and included 1414 participants. The quality of the studies varied, and there was considerable clinical and statistical heterogeneity. Nutritional intervention was associated with statistically significant improvements in weight and energy intake compared with routine care (mean difference in weight = 1.86 kg, 95% CI = 0.25 to 3.47, P = .02; and mean difference in energy intake = 432 kcal/d, 95% CI = 172 to 693, P = .001). However, after removing the main sources of heterogeneity, there was no statistically significant difference in weight gain or energy intake. Nutritional intervention had a beneficial effect on some aspects of QOL (emotional function, dyspnea, loss of appetite, and global QOL) but had no effect on mortality (relative risk = 1.06, 95% CI = 0.92 to 1.22, P = .43; I(2) = 0%; P(heterogeneity) = .56). CONCLUSION: Oral nutritional interventions are effective at increasing nutritional intake and improving some aspects of QOL in patients with cancer who are malnourished or are at nutritional risk but do not appear to improve mortality.
Randomized Controlled Trials


Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), (n-3) fatty acids from fish oil, have immune-modulating effects and may improve nutritional status in cancer. The objective of this study was to investigate the effects of an oral nutritional supplement containing (n-3) fatty acids on nutritional status and inflammatory markers in patients with non-small cell lung cancer (NSCLC) undergoing multimodality treatment. In a double-blind experiment, 40 patients with stage III NSCLC were randomly assigned to receive 2 cans/d of a protein- and energy-dense oral nutritional supplement containing (n-3) fatty acids (2.0 g EPA + 0.9 g DHA/d) or an isocaloric control supplement. EPA in plasma phospholipids, energy intake, resting energy expenditure (REE), body weight, fat free mass (FFM), mid-upper arm circumference (MUAC), and inflammatory markers were assessed. Effects of intervention were analyzed by generalized estimating equations and expressed as regression coefficients (B). The intervention group (I) had a better weight maintenance than the control (C) group after 2 and 4 wk (B = 1.3 and 1.7 kg, respectively; P < 0.05), a better FFM maintenance after 3 and 5 wk (B = 1.5 and 1.9 kg, respectively; P < 0.05), a reduced REE (B = -16.7% of predicted; P = 0.01) after 3 wk, and a trend for a greater MUAC (B = 9.1; P = 0.06) and lower interleukin-6 production (B = -27.9; P = 0.08) after 5 wk. After 4 wk, the I group had a higher energy and protein intake than the C group (B = 2456 kJ/24 h, P = 0.03 and B = 25.0 g, P = 0.01, respectively). In conclusion, a protein- and energy-dense oral nutritional supplement containing (n-3) fatty acids beneficially affects nutritional status during multimodality treatment in patients with NSCLC.


BACKGROUND: The aim of nutritional therapy in cancer patients is to prevent weight loss and to improve functional capacity and quality of life. Clinical studies however, have continued to demonstrate that a reduction in body weight loss is difficult to achieve in cancer cachexia. Several studies have shown that supplementation with eicosapentaenoic acid (EPA), an omega-3 fatty acid, has anti-cachectic effects in adult cancer patients. This study evaluated the clinical effects of a protein and energy dense EPA containing nutritional supplement in a group of pediatric cancer patients receiving active chemotherapy treatment. METHODS: The study was a prospective, randomized, single center, open-label design. Fifty-two patients diagnosed with pediatric malignant disease and receiving intensive chemotherapy were included. Thirty-three patients received a nutritional supplement containing EPA in addition to their regular food intake. Nineteen control patients did not receive supplementation. Patients were examined and their data (body weight, body mass index, and weight percentile) were recorded regularly once a month for 3 months. A subgroup of patients was evaluated for 6 months. RESULTS: At 3 months, there were significantly fewer patients in the treatment
group as compared to controls that showed losses in body weight (P = 0.001), BMI (P = 0.002), and a negative deviation in weight percentile (P = 0.021). In addition, remission rate was significantly (P = 0.036) higher in the treatment group as compared to controls. CONCLUSIONS: This study demonstrates a decrease in cancer-induced weight loss in pediatric patients fed a protein and energy dense nutrition supplement containing EPA. (c) 2008 Wiley-Liss, Inc.

Guidelines and Recommendations

APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials

Includes Nutritional Supplements


BACKGROUND & AIMS: Cancer-related malnutrition is multifactorial and related to a bad prognosis. The aim of this study was to investigate the effect of intensive, individual dietary counseling of patients in radiotherapy and/or chemotherapy for gynecologic-, gastric-, or esophageal cancer. METHODS: 61 outpatients were stratified by diagnoses and randomly assigned to one of two groups (G1; n = 32 and G2; n = 29). The basic regimen, applied to both groups, included measurement of body weight, 24-h dietary recall interview, micronutrient status and quality of life. In addition G1 received intensive, individual dietary counseling one hour per week and, if the patient accepted, a daily oral nutritional supplement containing 2531 kJ, 33.8 g protein and 2.2 g EPA. RESULTS: At the end of the treatment period, significantly fewer patients had lost weight in the intervention group (mean: 44% vs. 72%, p < 0.05), and the fulfillment of estimated energy requirements was better during treatment (mean: 107% vs. 95%, p < 0.05). A significant positive effect was observed on the fulfillment of protein requirement, both during the treatment period (mean: 92% vs. 71%, p < 0.001) and at follow-up (mean: 86% vs. 71%, p < 0.05). CONCLUSION: In these cancer patients, intensive, individual dietary counseling was associated with a better weight maintenance and a higher provision of adequate amounts of protein and energy. The intervention had no significant effects on patients’ quality of life, incidence of treatment-related side effects or appearance of micronutrient deficiencies.


OBJECTIVE: Weight loss is common in patients with malignant tumors and it can adversely affect quality of life and survival. The aim of the present study was to investigate the effects of a nutritional intervention in cancer patients in an outpatient setting. METHODS: Cancer outpatients (N = 58) who were classified as undernourished or at high risk for undernutrition by the Nutritional Risk Screening 2002 tool were randomized into two groups. One group (n = 30) received standardized individual nutritional therapy, including counseling by a dietitian, food fortification, and oral nutritional supplements if required. The second group (n = 28) received standard care. The nutritional intervention lasted 3 mo. Dietary intake (3-d dietary record), nutritional status (body weight), physical functioning (performance status, hand-grip strength) and quality of life (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire version 3.0) were assessed at baseline and after 6 wk and 3 mo. An additional follow-up assessment was carried out 3 mo post-intervention. RESULTS: Nutritional intervention led to a significantly higher average energy and protein intake in the nutritional therapy group (+379 kcal; 95% confidence interval [CI], 117-642; P = 0.007, respectively; +10.4 g; 95%
CI, 2.3-18.5; P = 0.016). However, the increased dietary intake was not associated with improvements in nutritional status, physical functioning, or quality of life. CONCLUSIONS: Individual nutritional counseling significantly and positively influenced energy and protein intake, but did not improve nutritional or physical outcome or quality of life. These results indicate that nutritional therapy alone is of limited efficacy in cancer patients whose nutritional status has already deteriorated. Copyright 2013 Elsevier Inc. All rights reserved.

**Patient Preference**


PURPOSE: Oral nutrition supplements are commonly used to increase the nutrient intake of children who are undergoing treatment for cancer. However, little research has been conducted systematically examining preferences for oral supplements in this population. This study aims to address a gap in the literature by examining taste preferences of oral nutrition supplements routinely recommended for children undergoing treatment for cancer. METHODS: Twenty-one children undergoing treatment for cancer and 38 healthy control subjects participated in an acute double-blinded feeding trial. A variety of energy drinks, available both commercially and in the hospital, were sampled. Patients rated the taste of the drinks on a 10-cm coloured analogue scale. RESULTS: A commercially-based drink (MooveTM) rated the highest in the blinded and branded tests for the treatment (mean rating out of 10, 6.44+/-.2.69 and 7.26+/-.2.33, respectively) and control groups (mean rating, 7.61+/-.1.91 and 7.70+/-.2.32, respectively). Taste ratings were significantly higher for commercially available supplements over the hospital-prepared supplements, (p=0.041), with no main effect for tasting condition (i.e. blinded versus branded, p=0.902). There was a statistically significant trend such that ratings, when the brand that was known decreased for hospital supplements, while ratings for commercially available supplements increased (p=0.014). CONCLUSION: Fresh milk-based supplements were the preferred type of oral nutrition supplement in a cohort of paediatric oncology patients. The data also suggest that commercially available products are more likely to be accepted than hospital-prepared supplements. This pilot study supports the need for further research in the area of oral nutrition supplements for paediatric oncology patients as a way of determining a reliable way to estimate preferences and therefore maximise compliance. Results from this research could be also used as the basis for designing research to study the effects of flavour fatigue and long-term compliance with oral nutrition supplements in this population.

**Review Articles**


PURPOSE OF REVIEW: Cancer and its treatments frequently have a negative impact on the weight and nutritional status of patients. Weight loss is associated with reduced survival and poorer outcomes of treatment but is not well characterized and frequently confused with cachexia, which may complicate the interpretation of studies of nutritional support. The aims of this review were to examine the impact of cancer on nutritional status and to review the role of simple oral nutritional interventions and novel agents

RECENT FINDINGS: The terms weight loss, malnutrition and cachexia refer to different entities and new definitions have recently been proposed that take account of the role of the underlying inflammatory processes. Oral nutritional interventions are widely recommended for malnourished cancer patients, but the evidence for their benefits to clinical, nutritional and patient-centred outcomes is limited. Meta-analysis has highlighted the variability in response to simple nutritional interventions of different cohorts of cancer patients and suggested that improvements in nutritional endpoints and aspects of quality of life may be achieved in some patients. Recent research has largely focused on treatments aiming to modulate the inflammatory processes associated with cachexia, but to date has not identified a single treatment with clear efficacy

SUMMARY: Studies characterizing the potential for nutritional support in combination with anti-inflammatory agents in defined patient groups are defined to advance the evidence base in this area.


It is clear that cancer patients develop complex nutrition issues. Nutrition support may or may not be indicated in these patients depending on individual patient characteristics. This review article, the first in a series of articles to examine the A.S.P.E.N. Guidelines for the Use of Parenteral and Enteral Nutrition in Adult and Pediatric Patients Cancer Guidelines, evaluates the evidence related to the use of nutrition screening and nutrition assessment in cancer patients. This first article will provide background concerning nutrition issues in cancer patients as well as discuss the role of nutrition screening and nutrition assessment in the care of cancer patients. The goal of this review is to enrich the discussion contained in the Clinical Guidelines, cite the primary literature more completely, and suggest updates to the guideline statements in light of subsequent published studies. Future articles will explore the guidelines related to nutrition support in oncology patients receiving anticancer therapies.