Oncology

ONC: Major Recommendations (2007)

Recommendations

Recommendations are categorized in terms of either conditional or imperative statements. While conditional statements clearly define a specific situation, imperative statements are broadly applicable to the target population and do not impose restraints on their application.

Conditional recommendations are presented in an if/then format, such that:

If CONDITION then ACTION(S) because REASON(S)

Fulfillment of the condition triggers one or more guideline-specified actions. In contrast, imperative recommendations include terms such as "require," "must," and "should," and do not contain conditional text that would limit their applicability to specified circumstances.

Resources Available with Each Recommendation

In addition to the recommendation statement and strength rating, you will find on each recommendation page:

- A brief narrative summary of the evidence analyzed to reach the recommendation
- A statement of justification, or reason for the strength of the recommendation
- Detailed information on the evidence supporting the recommendations and background narrative (available in the Supporting Evidence section toward the bottom of each recommendation page)
- A reference list at the end of each recommendation page that includes all the sources used in the evidence analysis for the particular recommendation (each reference is hyperlinked to a summary of the article analyzed in the evidence analysis).

Below you will find a list of the Oncology and Nutrition Recommendations organized by Type of Cancer and type of treatment for the type of cancer. To see the Recommendation Summary, just click on the Recommendation title. Also view the Executive Summary of Recommendations or print the guideline in PDF format.

Oncology (ONC) Major Recommendations

Breast Cancer

Chemotherapy
- ONC-Breast cancer: Determination of resting energy expenditure
- Onc-Breast cancer: Use of arginine oral supplement

Auto-Hematopoietic cell transplant
- ONC-Breast cancer: Use of parenteral nutrition

Radiation
- ONC-Breast cancer: Use of antioxidant vitamin E oral supplement

Colorectal Cancer

Radiation
- ONC-Colorectal cancer: Medical nutrition therapy

Esophageal Cancer

Chemoradiation
- ONC-Esophageal cancer: Medical nutrition therapy
- ONC-Esophageal cancer: Use of enteral nutrition
- ONC-Esophageal cancer: Use of parenteral nutrition

Head and Neck Cancer

Radiation
- ONC-Head and neck cancer: Determination of resting energy expenditure
- ONC-Head and neck cancer: Determination of protein needs
- ONC-Head and neck cancer: Use of medical food supplement
- ONC-Head and neck cancer: Medical nutrition therapy
- ONC-Head and neck cancer: Use of enteral nutrition
- ONC-Head and neck cancer: Use of honey
- ONC-Head and neck cancer: Use of antioxidant vitamin E oral supplement

Surgery
- ONC-Head and neck cancer: Use of arginine-enhanced medical food supplement or enteral nutrition
- ONC-Head and neck cancer: Use of EPA-enhanced medical food supplement

Hematological Malignancies

Chemotherapy

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ONC-Hematological malignancies: Medical nutrition therapy

Hematopoietic cell transplant

ONC-Hematological malignancies: Determination of calorie needs
ONC-Hematological malignancies: Determination of protein needs
ONC-Hematological malignancies: Use of oral glutamine
ONC-Hematological malignancies: Use of parenteral nutrition

Lung Cancer

Chemotherapy

ONC-Lung cancer: Determination of resting energy expenditure
ONC-Lung cancer: Use of antioxidant vitamins C, E and beta-carotene oral supplements

Pancreatic Cancer

ONC-Pancreatic cancer: Use of omega-3 fatty acid-enhanced medical food supplement or oral supplement

Oncology

Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary


Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Breast cancer: Determination of REE and Chemotherapy

Use of indirect calorimetry to measure REE is more accurate than estimation in early stage and advanced metastatic breast cancer patients. If measurement of REE is not possible or not thought to be imperative, use the HBE to estimate calorie requirements. Limited evidence indicates that the mean estimated REE was comparable to measured REE in these populations. No research was available to compare HBE using individual error or to compare HBE with other predictive equations in these populations.

Rating: Weak

Imperative

Risks/Harms of Implementing This Recommendation

- Anxiety may be caused by indirect calorimetry procedures employing a face mask or canopy.
- In some individuals, estimation of REE with predictive equations will lead to under- or over-feeding.

Conditions of Application

- The studies reviewed for this recommendation only reviewed HBE as an energy estimating equation. See energy expenditure and energy assessment recommendations in the Critical Illness Guideline for information on other conditions. For more information on measuring vs. estimating RMR, see Determining Resting Metabolic Rate.
- The AARC Clinical Practice Guidelines (1994) recommend that measurements may be indicated in patients with several conditions including:
  - Cancer with residual tumor
  - Extreme obesity
- The AARC Clinical Practice Guidelines (1994) also provide recommendations for hazards and complications, limitations of the procedures and infection control.
- Measures should be conducted by specialty-trained personnel who have documented and demonstrated proficiency to calibrate, operate and maintain the calorimeter and to recognize calorimeter values within the normal physiologic range.

Potential Costs Associated with Application

- Cost of equipment, supplies and staff needs to be addressed in all indirect calorimetry measurements.

Recommendation Narrative

Two small neutral quality time series studies expressed the measured REE of breast cancer patients as a percentage of estimated REE as predicted by the HBE. In both studies, measured REE was comparable to estimated REE, 98.6 ±9.6% HBE in advanced stage patients (Harvie et al, 2004) and 100.5 ± 8.0% HBE in early stage patients (Harvie et al, 2005).
  - Harvie et al, 2004 found that average measured and estimated energy needs of patients with advanced metastatic breast cancer were comparable to those of healthy controls (within 5% of each other).
• Harvie et al, 2005 reported the breast cancer patients’ REE was significantly higher than that of healthy control subjects (100.5 ± 8.0% HBE vs. 94.5 ± 8.5% HBE respectively; P < 0.05).

• Further research is needed to determine the effects of breast cancer and breast cancer treatment on patients’ actual REE.

**Recommendation Strength Rationale**

• Based on two small neutral quality time series studies, conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Are the measured energy needs of breast cancer patients undergoing chemotherapy different from estimated needs?

**References**


References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process


**Quick Links**

**Recommendations Summary**

**ONC: Breast Cancer: Chemotherapy and Use of Arginine Oral Supplement 2007**

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Breast cancer: Arginine and Chemotherapy**

Use of an oral arginine supplement to improve long-term clinical response for patients with breast cancer prior to the start of neoadjuvant chemotherapy is not currently recommended. Evidence is not available to evaluate the safety of arginine or its effect on cancer symptoms for patients with breast cancer receiving chemotherapy. One RCT demonstrated a statistically significant histopathological response in tumor sizes less than 6 cm, however there was no improvement in short-term clinical response.

**Rating: Weak**

**Imperative**

- **Risks/Harms of Implementing This Recommendation**

  No potential risks or harms are associated with this recommendation.

- **Conditions of Application**

  No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**

  No obvious costs are associated with this recommendation.

- **Recommendation Narrative**

  - In a positive quality RCT (Heys et al, 1998) using oral L-arginine supplements in patients with breast cancer, the arginine supplemented group experienced no significant differences in clinical response as compared to the placebo group, however, there was a significant improvement in histopathological response in the study group vs. placebo in patients with initial tumor size less than 6 cm.
  
  - More research is needed to establish the safety and efficacy of arginine for patients with breast cancer undergoing chemotherapy.

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Recommendation Strength Rationale

Based on one positive quality RCT, conclusion statement is a Grade III.

Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

What is the relationship between the use of an arginine oral supplement and a reduction in cancer symptoms in patients with breast cancer?

References


Oncology

Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Breast Cancer: Auto-HCT and Use of Parenteral Nutrition (PN) 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Breast cancer: Auto-HCT and PN

Parenteral nutrition (PN) should not be routinely recommended for breast cancer patients undergoing auto-HCT who are well-nourished prior to treatment. While PN may preserve nutritional status and lean body mass in these patients, it does not appear to affect LOS or survival, and may increase risk of infectious complications.

Rating: Weak

Imperative

Risks/Harms of Implementing This Recommendation

No potential risks or harms are associated with the application of this recommendation.

Conditions of Application

Application of this recommendation is limited to breast cancer patients who are well-nourished prior to auto-HCT.

Auto-HCT is no longer routinely used for breast cancer treatment in the U.S. (Berry et al, 2002; Farquhar et al, 2005; Schmid et al, 2005; Stadtmauer et al, 2000; Vogl and Stadtmauer, 2006).

Potential Costs Associated with Application

No obvious costs are associated with the application of this recommendation.

Recommendation Narrative

One neutral quality RCT (Roberts et al, 2003) found that PN preserved nutritional status and lean body mass, but did not decrease LOS or improve survival among breast cancer patients undergoing auto-HCT who were well-nourished prior to treatment. The study group had more infections and more days on antibiotics than the control group.

Recommendation Strength Rationale

Based on one neutral quality RCT, conclusion statement is a Grade III.

Supporting Evidence
The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between the use of parenteral nutrition vs. control to reduce symptoms and support recovery and the reduction of symptoms associated with inpatient treatment for hematopoietic cell transplant for breast cancer patients?

References


References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process


Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Breast Cancer: Radiation and Use of Antioxidant Vitamin E Oral Supplement 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Breast cancer: Vitamin E and Radiation

If vitamin E (alpha tocopherol, 670-1000 mg) oral supplement is proposed to promote tolerance or reduce late-effects of radiation, advise that no research is available on the impact of vitamin E supplementation to promote tolerance of radiation. Evidence is inconclusive on the benefit of vitamin E for treatment of chronic radiation-induced fibrosis. Vitamin E supplementation may have adverse effects such as nutrient-nutrient interactions, drug-nutrient interactions (e.g., anti-coagulant and anti-hypertensive medications/herbal supplements) and disease-related complications.

Rating: Weak

Conditional

- Risks/Harms of Implementing This Recommendation

No potential risks or harms are associated with implementation of this recommendation.

- Conditions of Application

No conditions limit the application of this recommendation.

- Potential Costs Associated with Application

No obvious costs are associated with the application of this recommendation.

- Recommendation Narrative

- One positive quality RCT (Gothard et al, 2004) found no benefit with the combination of an oral supplement vitamin E (1000mg alpha-tocopherol a day) in combination with 800 mg per day of pentoxifylline on the treatment of chronic RIF resulting from breast cancer treatment.
- A neutral quality observational, single group before-after time series study (Delanian et al, 2005).
found significant regression of chronic RIF at 6 months and maximum fibrosis regression at 36 months after treatment with 1000 IU of alpha-tocopherol per day. All RIF areas responded well to treatment, and symptom severity diminished by half as assessed by the SOMA score. However it is important to note that this study used an unvalidated method to measure fibrosis and a convenience sample.

- Studies measured change in fibrosis using vastly different methodologies--surface measures of palpable fibrosis versus optical measures using a perometer. Additional work is needed to develop and validate operator-independent measures of radiation effect.
- Further research is needed.

**Recommendation Strength Rationale**

- Based on one positive quality RCT and one neutral quality observational, single group before-after time series study, conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

- Is there a relationship between supplementation of antioxidant vitamin E, which may interact with radiation therapy treatment, tolerance of radiation therapy treatment and late-effects of radiation therapy treatment in patients with chronic radiation-induced fibrosis resulting from breast cancer treatment?

**References**


**Oncology**

**Oncology (ONC) Guideline (2007)**

**Recommendations Summary**

**ONC: Colorectal Cancer: Radiation and Medical Nutrition Therapy (MNT) 2007**

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Colorectal cancer: Radiation and MNT**

Dietitians should provide weekly Medical Nutrition Therapy (MNT) that includes an individualized nutrition prescription and counseling for patients with colorectal cancer undergoing pelvic radiation. Individualized counseling with a focus on the consumption of regular foods may improve calorie and protein intake, nutrition status, quality of life (QOL) and reduce symptoms of anorexia, nausea, vomiting and diarrhea.

**Rating: Fair**

Imperative

- **Risks/Harms of Implementing This Recommendation**

No potential risks or harms are associated with the application of this recommendation.

- **Conditions of Application**

No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**

- Costs of MNT sessions and reimbursement vary.
Recommendation Narrative

- In a positive quality RCT (Ravasco et al, 2005), patients with colorectal cancer undergoing radiation therapy were given individualized dietary counseling plus a regular diet, resulting in a significantly less decline in nutritional status (PG-SGA; p < 0.02), fewer toxicity symptoms (Grade 1 and 2 combined anorexia, grade 1 and 2 combined nausea/vomiting, grade 1 and 2 combined diarrhea; p-values < 0.01), and improved QOL (EORTC QLQ); improvement in 6 function scores), when compared to groups receiving oral supplementation or no nutrition intervention. The researchers concluded that individualized counseling with a focus on the consumption of regular foods may improve caloric and protein intake, nutrition status, quality of life and reduce symptoms of anorexia, nausea, vomiting and diarrhea.
- Further research into the role of nutrition intervention in radiation therapy for colorectal cancer is needed.

Recommendation Strength Rationale

- Based on one positive quality RCT, conclusion statement is a Grade III.

Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between nutrition intervention to improve nutritional intake (protein and kcals) to reduce symptoms and the reduction of symptoms associated with pelvic radiation therapy for colorectal cancer patients?

References


Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Esophageal Cancer: Chemoradiation and Medical Nutrition Therapy (MNT) 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Esophageal cancer: Chemoradiation and MNT

The Dietitian should provide Medical Nutrition Therapy (MNT) consisting of a pre-treatment evaluation and weekly visits for six weeks during chemoradiation treatment for esophageal cancer to improve outcomes. MNT may reduce the amount of weight loss, unplanned hospitalizations, LOS, as well as improves tolerance to treatment and the likelihood of receiving prescribed radiation dose.

Rating: Weak

Imperative

- Risks/Harms of Implementing This Recommendation
  
  No potential risks and harms are associated with the application of this recommendation.

- Conditions of Application
  
  No conditions limit the application of this recommendation.

- Potential Costs Associated with Application
  
  Costs of MNT sessions and reimbursement vary.
Recommendation Narrative

- One neutral quality retrospective chart review study (Odelli et al, 2005) found that implementation of a standard nutrition pathway by an RD is associated with improved outcomes in esophageal cancer patients, including decreased weight loss, fewer unplanned hospital admissions during treatment, shorter LOS during unplanned hospital admissions, and improved tolerance of treatment as assessed by completion of the prescribed treatment course and percent desired radiation received.

- The researchers recommended that all esophageal cancer patients planning chemoradiation treatment receive a proactive nutrition assessment by a trained oncology RD on initial presentation, and that all patients receive appropriate nutrition support by a multidisciplinary team.

- Further research is needed to determine the frequency, duration and optimal length of nutrition intervention for improved treatment-related outcomes and survival.

Recommendation Strength Rationale

- Based on one neutral quality retrospective chart review study, conclusion statement is Grade III.

Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between intervention by a dietitian to enhance nutritional intake (protein, kcals) to improve tolerance and support recovery from chemoradiation therapy for esophageal cancer patients, and the reduction of complications associated with treatment?

References


Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Esophageal Cancer: Chemoradiation and Use of Enteral Nutrition 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

 Recommendation(s)

ONC: Esophageal cancer: Chemoradiation and use of enteral nutrition

Enteral nutrition (EN) may be used to increase calorie and protein intake in esophageal cancer patients undergoing chemoradiation therapy. EN has been shown to maintain weight, however EN has not been shown to improve tolerance to therapy or survival.

Rating: Weak

Imperative

- Risks/Harms of Implementing This Recommendation

  - Typical risks associated with implementing EN apply (Elliott et al, 2006).
  - Insertion of a PEG tube using the pull technique has been associated with an increased risk for tumor implantation in the gastrostomy site (Adelson and Ducic, 2005; Cruz et al, 2005).

- Conditions of Application

  No conditions are associated with the application of this recommendation.

- Potential Costs Associated with Application

  - Costs related to administering EN.

- Recommendation Narrative

  - One positive quality prospective, non-randomized controlled trial (Bozetti et al, 1998) found that EN for severely dysphagic esophageal cancer patients, providing 37 kcals/kg/day and 2.0 g protein/kg/day, delivered for 34 days, resulted in weight maintenance and unchanged total protein/albumin status. The control group of esophageal cancer patients classified as non dysphagic received a standard, ad libitum
diet during chemoradiation. During the study, the control group experienced significant reductions in body weight, total serum protein and albumin. There were no significant differences between groups in terms of tolerance of therapy, response to therapy, suitability for radical resection, or median survival time. Note: severe dysphagia was not defined.

- Further research is needed.

**Recommendation Strength Rationale**

- Based on one positive quality prospective, non-randomized controlled trial, conclusion statement is Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between enteral nutrition to enhance nutritional intake (protein, kcals) to improve tolerance and support recovery from chemoradiation therapy for esophageal cancer patients, and the reduction of complications associated with treatment?

**References**


**References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**


Elliott, L, Molsoged, L, Davis-McCallum, P, editors, Grant, G, technical editor. The Clinical Guide to Oncology Nutrition, 2

**Oncology (ONC) Guideline (2007)**

**Quick Links**

**Recommendations Summary**

**ONC: Esophageal Cancer: Chemoradiation and Use of Parenteral Nutrition 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Esophageal cancer: use of parenteral nutrition and chemoradiation**

Use of parenteral nutrition (PN) to prevent weight loss or improve effectiveness of treatment for patients with esophageal cancer receiving chemoradiation therapy (CRT) is not recommended. PN has not been shown to prevent weight loss or improve effectiveness of treatment, even though patients were able to tolerate a higher dose of CRT. PN may have adverse effects such as complications related to refeeding syndrome, inadequate glycemic control and increased risk of infections.

**Rating: Weak**

**Imperative**

**Risks/Harms of Implementing This Recommendation**

No potential risks or harms are associated with the application of this recommendation.

**Conditions of Application**

The higher cost, increased risk and no benefit does not justify the use of PN.

**Potential Costs Associated with Application**

No obvious costs are associated with the application of this recommendation.

**Recommendation Narrative**
One neutral quality retrospective review (Sikora et al, 1998) found that patients who received PN during CRT for esophageal cancer, at 30-35 kcals/kg/day and 1.0 - 1.5 g protein/kg/day, during the treatment period (21 - 28 days), tolerated higher doses of chemoradiation than a comparison group which received no PN support.

The PN group experienced significant decreases in weight during treatment compared to the group not receiving PN. There were no significant differences between the groups in chemoradiation toxicities, chemoradiation-related deaths, post-surgical complications, total hospital stay, total days in the ICU, treatment response, or mortality. While patients receiving PN were more likely to receive scheduled chemoradiation therapy compared to patients who did not receive PN, it did not result in improved effectiveness of this treatment regimen in esophageal cancer patients.

**Recommendation Strength Rationale**

Based on one neutral quality retrospective chart review study, conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between parenteral nutrition to enhance nutritional intake (protein, kcals) to improve tolerance and support recovery from chemoradiation therapy for esophageal cancer patients, and the reduction of complications associated with treatment?

**References**


**References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**


**Oncology**

**Oncology (ONC) Guideline (2007)**

**Quick Links**

**Recommendations Summary**

**ONC: Head and Neck Cancer: Chemoradiation and Determination of Resting Energy Expenditure (REE) 2007**

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Head and neck cancer: Chemoradiation and Determination of REE**

Use of indirect calorimetry to measure Resting Energy Expenditure (REE) is more accurate than estimation in patients with advanced head and neck cancer undergoing chemoradiation therapy. If measurement of REE is not possible or not thought to be imperative, use the Harris Benedict Equation (HBE) to estimate calorie needs. However, limited evidence indicates that HBE underestimates REE in this population.

**Rating: Weak**

**Imperative**

**Risks/Harms of Implementing This Recommendation**

- Some patients may experience anxiety associated with the indirect calorimetry measurement process.
- Under- or over-feeding may result when energy needs are estimated rather than measured.

**Conditions of Application**

- The studies reviewed for this recommendation only reviewed HBE as an energy estimating equation. See energy expenditure and energy assessment recommendations in the Critical Illness Guideline for information on other conditions. For more information on measuring vs. estimating RMR, see Determining Resting Metabolic Rate.
- The AARC Clinical Practice Guidelines (1994) recommend that measurements may be indicated in patients with several conditions including:
  - Cancer with residual tumor
  - Extreme obesity
- The AARC Clinical Practice Guidelines (1994) also provide recommendations for hazards and complications, limitations of the procedures and infection control.
- Measures should be conducted by specialty-trained personnel who have documented and demonstrated

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proficiency to calibrate, operate and maintain the calorimeter and to recognize calorimeter values within the normal physiologic range.

- **Potential Costs Associated with Application**
  - Cost of equipment, supplies and staff needs to be addressed in all indirect calorimetry measurements.

- **Recommendation Narrative**
  - One small, neutral quality time-series study (Garcia-Peris et al, 2005) compared measured REE with estimated REE using the HBE during a course of radiation therapy in head and neck cancer patients. Measured REE formed a U-shaped curve, with higher measures before, at end, and after treatment, while REE estimated by HBE decreased throughout the study.
  - Further research is needed to determine the energy needs of head and neck cancer patients.

- **Recommendation Strength Rationale**
  - Based on one small, neutral quality time-series study, conclusion statement is a grade III.

- **Supporting Evidence**
  - The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

- **Are the measured energy needs of head and neck cancer patients receiving radiation therapy different from estimated needs?**

  - **References**

  - **References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**

### Quick Links

#### Recommendations Summary

**ONC: Head and Neck Cancer: Radiation Determination of Protein Needs 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- **Recommendation(s)**
  - **ONC: Head and Neck Cancer: Determination of Protein Needs and Radiation**

  The protein needs for patients with head and neck cancer undergoing radiation therapy may be higher than the RDA. Limited evidence indicates patients consuming the RDA for protein experienced a significant decrease in weight and LBM during treatment. More defined protein intervention studies are needed.

  **Rating: Weak**
  - Imperative

  - **Risks/Harms of Implementing This Recommendation**
    - Use of high protein diets may be contraindicated in patients with hepatic disease and renal disease.

  - **Conditions of Application**
    - There are no conditions that may limit the application of this recommendation.

  - **Potential Costs Associated with Application**
    - There are no obvious costs associated with the application of this recommendation.

  - **Recommendation Narrative**

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The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Are the protein needs of head and neck cancer patients undergoing radiation therapy different than the RDA?

References


Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Head and Neck Cancer: Radiation and Use of Medical Food Supplement 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Head and neck cancer: Medical Food Supplements and Radiation

Dietitians should consider use of medical food supplements (MFS) to improve protein and calorie intake for patients with head and neck cancer undergoing radiation therapy. Use of MFS may be associated with fewer treatment interruptions, a reduction of mucosal damage, and may minimize weight loss.

Rating: Fair

Imperative

Risks/Harms of Implementing This Recommendation

No potential risks or harms are associated with the application of this recommendation.

Conditions of Application

No conditions limit the application of this recommendation.

Potential Costs Associated with Application

- Consuming additional protein and calories through the use of MFS may increase food costs.
- Social services may be needed to assist patients with financial arrangements if economic issues are a concern.

Recommendation Narrative

Two (2) RCTs found that oral nutritional supplementation during radiation therapy for head and neck cancer may be helpful in preventing treatment interruptions, in reducing number of mucosal interruptions and in minimizing weight loss.

- A positive quality RCT (Nayel et al, 1992) found all patients in the intervention group increased body weight, MAC and TSF. Malnourished patients in the intervention group demonstrated the largest increase in body weight. In five (5) out of 12 control patients treatment had to be suspended due to Grade III treatment toxicities, whereas no intervention patient experienced Grade III toxicities, and none required suspension of treatment.

- A neutral quality RCT (Arnold and Richter, 1989) found that both the supplemented (MFS) and unsupplemented groups lost weight during treatment, but the supplemented group lost less weight through week 7 of treatment. Supplemental calories did not displace food calories in supplemented...
patients, but added to total nutrient intake. There were no differences in radiation side effects, treatment interruptions, tumor response, or survival status between the two groups.

- Further research is needed to determine the appropriate use of MFS during radiation therapy for head and neck cancer.

**Recommendation Strength Rationale**

- Based on one positive and one neutral quality RCT, conclusion statement is a Grade II.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between the use of medical food supplements to improve nutritional intake (protein, kcals) and the reduction of symptoms associated with radiation therapy for patients with head and neck cancer?

**References**


**Oncology**

**Oncology (ONC) Guideline (2007)**

**Quick Links**

**Recommendations Summary**

**ONC: Head and Neck cancer: Radiation and Medical Nutrition Therapy (MNT) 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- **Recommendation(s)**

  **ONC: Head and neck cancer: MNT and radiation therapy**

  Medical Nutrition Therapy (MNT) that consists of nutrition assessment, intensive intervention, and ongoing monitoring and evaluation by an RD should be provided for patients with head/neck cancer being considered for radiation therapy. MNT has been shown to improve calorie and protein intake, maintain anthropometric measurements and improve quality of life (QOL).

  **Rating: Strong**

  **Imperative**

  **ONC: Head and neck cancer: MNT and pre-treatment evaluation**

  The Dietitian should provide MNT consisting of a pre-treatment evaluation and weekly visits during radiation treatment for head and neck cancer to improve outcomes.

  **Rating: Strong**

  **Imperative**

  **Risks/Harms of Implementing This Recommendation**

  No potential risks or harms are associated with the application of this recommendation.

  **Conditions of Application**

  No conditions limit the application of this recommendation.

  **Potential Costs Associated with Application**

  Costs of MNT sessions and reimbursement vary.

  **Recommendation Narrative**

  - Three positive and one neutral quality studies found that nutrition intervention for head and neck cancer patients undergoing radiation therapy can help to prevent nutrition deterioration.
  - One positive quality RCT (Isenring et al, 2003) found that patients who received regular (weekly
for six weeks and biweekly for 12 weeks) nutrition counseling from an RD based on the American Dietetic Association MNT protocol for cancer (radiation oncology) lost significantly less weight and fat-free mass than controls. The researchers concluded that early and intensive nutrition support appears to minimize loss of body weight and FFM when compared with control patients in cancer outpatients receiving radiotherapy for head and neck cancers.

- Another positive quality RCT (Ravasco et al, 2005) found that nutrition intervention (1 baseline visit and weekly visits for six weeks) for head and neck cancer patients during radiation therapy can increase calorie and protein intake, as well as maintain anthropometric and laboratory measures. Researchers concluded that during radiation therapy, nutrition interventions improved outcomes, with counseling having an equal or greater benefit than MFS supplementation; at 3 months post-therapy, only counseling significantly impacted patient outcomes.

- One positive quality prospective non-randomized trial (Goncalves et al, 2005) found that 64 patients who received an intensive nutrition intervention with instruction to maintain 40 kfcals/kg body weight during the treatment period, were able to maintain weight, preserve FFM, and maintain nutrition parameters.

- One neutral quality two-group comparison study (Dawson et al, 2001), compared two groups of patients with squamous cell carcinoma of the oral cavity and found that increased interaction or visits by an RD can help decrease post-surgery and post-radiation therapy weight loss in oral cancer patients.

Further research is needed to determine the frequency, duration and optimal length of nutrition intervention for improved treatment-related outcomes and survival.

### Recommendation Strength Rationale

- Based on two positive quality RCTs, one positive quality prospective non-randomized trial, and one neutral quality two-group comparison study, conclusion statement is a Grade II.

### Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

**Is there a relationship between nutrition intervention by a dietitian to improve nutritional intake (protein and kcals) and the reduction of side effects associated with radiation therapy for head and neck cancer patients?**

**References**


### Quick Links

**Oncology**
- Oncology (ONC) Guideline (2007)

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**Recommendations Summary**

**ONC: Head and Neck Cancer: Radiation and Use of Enteral Nutrition (EN) 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Head and neck cancer: Radiation and use of EN**

Use enteral nutrition (EN) to increase calorie and protein intake for outpatients with stage III or IV head and neck cancer undergoing intensive radiation treatment. Maintenance of nutritional status by EN during radiation therapy may improve tolerance of therapy to promote better outcomes.

**Rating: Strong**

**Imperative**

- **Risks/Harms of Implementing This Recommendation**

  - Typical risks associated with implementing EN apply (Elliott et al, 2006).
  - Insertion of a PEG tube using the pull technique has been associated with an increased risk for...
tumor implantation in the gastrostomy site (Adelson and Ducic, 2005; Cruz et al, 2005).

- **Conditions of Application**

  No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**

  - Costs related to administering EN.

- **Recommendation Narrative**

  - Two positive quality RCTs (Daly et al, 1984; Hearne et al, 1985) found that oral nutrition alone may not be adequate for patients with head and neck cancer in order to maintain nutrition status during radiation therapy.
    - The energy and protein goals used for patients in the RCTs were 40 kcal per kg and 1.0 - 1.5g per kg body weight, respectively.
    - Outpatient EN resulted in improvement or maintenance of weight status and increased mean calorie and protein intake when compared with controls.
    - The researchers concluded that EN may be required to meet nutrition goals during radiation therapy and may improve tolerance of therapy to promote better outcomes.
    - Further research is needed to determine the role of EN in improving nutritional intake in head and neck cancer patients.

- **Recommendation Strength Rationale**

  - Based on two positive quality RCTs, conclusion statement is Grade II.

- **Supporting Evidence**

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  - Is there a relationship between enteral nutrition to improve nutrition intake (protein and kcals) and the reduction of side effects associated with outpatient radiation therapy for head and neck cancer patients?

- **References**


- **Oncology**

  - Oncology (ONC) Guideline (2007)

**Quick Links**

**Recommendations Summary**

**ONC: Head and Neck Cancer: Radiation and Use of Honey 2007**

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- **Recommendation(s)**

  **ONC: Head and neck cancer: Use of honey and radiation**

  If the topical use of honey is proposed to prevent mouth sores caused by radiation treatment for patients with head and neck cancer, advise that its use may or may not be beneficial. Limited evidence shows that topical use of honey has been associated with decreased incidence of severe mucositis, weight gain and reduced treatment interruptions; however, the risks of interference with effectiveness of radiation treatment and infectious complications were not evaluated.
**Risks/Harms of Implementing This Recommendation**

- Care should be taken to use pasteurized honey in the immunocompromised patient population to reduce risk of infection and food borne illness.
- Care should be taken by patients with diabetes or impaired glucose metabolism to account for any carbohydrate provided by the honey consumed.

**Conditions of Application**

No conditions limit the application of this recommendation.

**Potential Costs Associated with Application**

Minimal costs are associated with the application of this recommendation.

**Recommendation Narrative**

- One small neutral quality RCT (Biswal et al, 2003) of 40 patients receiving radiation therapy to the head and neck area showed a decrease in radiation induced grade 3 or 4 mucositis, a larger number of patients who experienced weight gain and less mucositis-related treatment interruptions when honey was applied topically to the mouth. This study included patients of varying weight, sex, age and size of radiation field and treatment was over a 6-7 week duration. The risks of interference with effectiveness of radiation treatment and infectious complications were not evaluated.
- Larger randomized, placebo-controlled studies with greater patient heterogeneity are needed to strengthen these findings.

**Recommendation Strength Rationale**

Based on one RCT of neutral quality, conclusion statement is Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between the topical application of honey to the oral mucosa of a patient with head and neck cancer and improved tolerance to radiation therapy and the reduction of complications associated with radiation therapy?

**References**


**Oncology (ONC) Guideline (2007)**

**Recommendations Summary**

**ONC: Head and Neck Cancer: Radiation 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Use of Antioxidant Vitamin E Oral Supplement**

Use of vitamin E oral supplements to enhance efficacy, improve tolerance and reduce late-effects of radiation therapy for patients with head/neck cancer is not recommended. While limited evidence supports the use of vitamin E oral supplements to reduce late effects (osteoradionecrosis), there is strong research reporting an increased risk for second primary cancers and decreased survival rate with use of vitamin E in doses greater than or equal to 400 IU (268mg).

**Rating: Weak**

Imperative

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Risks/Harms of Implementing This Recommendation

No potential risks or harms are associated with the application of this recommendation.

Conditions of Application

No conditions limit the application of this recommendation.

Potential Costs Associated with Application

No obvious costs are associated with the application of this recommendation.

Recommendation Narrative

- A positive quality RCT (Bairati et al, 2005) of older, stage I and II head and neck cancer patients receiving radiation therapy who continuously supplemented with 400 IU per day of α-tocopherol (oral vitamin E) for three years resulted in negative outcomes. The study indicated use of the supplement may be associated with an increased occurrence of second primary cancers and decreased duration of cancer-free survival in this population.
- A neutral quality before and after time series study (Delanian et al, 2005) with a small, convenience sample found that a combination of pentoxifylline (800 mg per day) and vitamin E (1,000 IU per day) boosted with clodronate (1,600 mg per day, 5 days/week) in only the most serious cases, induced mucosal and bone healing in patients with osteoradionecrosis. All patients improved at 6 months, and the investigators were not blinded.

Recommendation Strength Rationale

Based on one positive quality RCT, and one neutral quality before and after time series studies, conclusion statements are Grade II and Grade III.

Minority Opinions

Consensus reached.

Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between supplementation of antioxidant vitamin E and the efficacy of radiotherapy treatment in patients with head and neck cancer?

Is there a relationship between supplementation of antioxidant vitamin E, which may interact with radiation therapy treatment, tolerance of radiation therapy treatment and late-effects of radiation therapy treatment in patients with osteoradionecrosis resulting from head and neck cancer treatment?

References


Oncology

Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Head and Neck Cancer: Surgery and Use of Arginine-Enhanced Medical Food Supplement or EN 2007

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

Recommendation(s)

ONC: Head and neck cancer: Post-operative use of arginine

Post-operative use of arginine-enhanced medical food supplements (MFS) or enteral nutrition (EN) to improve outcomes
for patients with head and neck cancer is not recommended. Arginine-enhanced versus non-arginine-enhanced MFS and EN did not produce significant changes in weight and body composition in either well-nourished or malnourished subjects. Most evidence shows there is no impact of arginine-enhanced MFS or EN on immune function. Limited research reported that arginine-enhanced EN can improve post-operative complications and LOS in malnourished patients.

**Rating: Fair**  
**Imperative**

**ONC: Head and neck cancer: Pre-operative use of arginine**

Pre-operative use of arginine-enhanced EN to improve outcomes for patients with head and neck cancer is not recommended. No significant improvement in clinical outcomes, nutritional status, or surgery-induced immune suppression was observed among malnourished compared to patients receiving a non-enhanced EN, or those who did not receive EN.

**Rating: Fair**  
**Imperative**

- **Risks/Harms of Implementing This Recommendation**
  - No potential risks or harms are associated with these recommendations.

- **Conditions of Application**
  - No conditions of application limit the application of these recommendations.

- **Potential Costs Associated with Application**
  - No obvious costs are associated with the application of these recommendations.

- **Recommendation Narrative**
  - Two positive quality and one neutral quality RCT suggested that the catabolic process that occurs in post-surgical head and neck cancer patients is not altered by arginine.
    - deLuis, Izaola et al, 2004 (positive quality) and deLuis et al., 2002 (neutral quality) provided a supplement enriched with arginine (0.625g per 100ml) to head and neck cancer patients for an average of 21 and 22 days. Changes in weight from baseline were not significant in either or the arginine and control groups.
    - deLuis, Izaola et al, 2005 (positive quality) provided 1.2g arginine per 100 ml for 90 days to head and neck cancer patients. Changes in weight, FFM, FM, TSF, and AC were not significant.
  - One positive quality RCT (de Luis, Izaola et al, 2005) compared the use of an oral supplement enhanced with arginine vs. an omega-3 enhanced formula with head and neck cancer patients. Both groups experienced a significant improvement in plasma protein levels while only the omega-3 group experienced weight gain. There was no significant difference in fat-free mass between the two groups. There was no significant benefit of arginine over omega-3 fatty acid supplementation in this group of patients.
  - Two positive quality RCTs (de Luis, Izaola et al, 2004; de Luis, Arranz et al, 2005) found no significant differences in plasma proteins and immune parameters between head and neck cancer patients receiving arginine-enhanced vs. standard enteral formulas.
  - One neutral quality study (de Luis, Aller et al, 2002) found that fistula development was significantly less common among head and neck cancer patients receiving arginine-enhanced enteral feedings, otherwise no statistically significant differences were observed between those receiving arginine-enhanced vs. standard enteral formulas.
  - One positive quality RCT (Riso et al, 2000) compared the use of an arginine-enhanced enteral formula to a control isocaloric, isonitrogenous enteral formula in post-operative patients with head and neck cancer to measure immunologic and clinical outcomes. The study group receiving the arginine-enhanced formula experienced an improved post-operative immunological response, most notably in patients who were classified as malnourished prior to the start of the study. The malnourished group also experienced a decrease in both post-operative complications and LOS compared to the control group.
  - One positive quality RCT (Van Bokhorst-de van der Schueren et al, 2001) compared the use of an arginine-enhanced enteral formula to a standard enteral formula or no enteral feedings. No significant differences in clinical outcomes, nutritional status, or surgery-induced immune suppression were observed between the three groups.

- **Recommendation Strength Rationale**
  - Based on five positive quality and one neutral quality RCTs, conclusion statements are grade II and III.

- **Supporting Evidence**
  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).
  - Can the catabolic process that occurs in head and neck cancer patients be altered by amino acids?
  - Is there a relationship between use of an arginine-enhanced enteral nutrition and plasma protein levels and immune function with postoperative patients with head and neck cancer?
  - Is there a relationship between use of an arginine-enhanced medical food supplement and post-operative complications in patients with oral or laryngeal cancer?
  - Is there a relationship between use of a preoperative arginine-enhanced enteral nutrition formula and reduction in
post-operative complications by patients with oral or laryngeal cancer?

Is there a relationship between post-operative arginine-enhanced enteral nutrition and post-operative wound complication rates by patients with oral or laryngeal cancer?

Is there a relationship between the use of postoperative arginine-enhanced enteral nutrition and treatment-related diarrhea by patients with oral or laryngeal Cancer?

Does the intake of an arginine-enhanced medical food supplement improve plasma protein levels in post-surgical patients with head and neck cancer?

- **References**

- **Oncology**
- **Oncology (ONC) Guideline (2007)**

**Quick Links**

**Recommendations Summary**

**ONC: Head and Neck Cancer: Surgery and Use of EPA-Enhanced Medical Food Supplement 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- **Recommendation(s)**
  - **ONC: Head and neck cancer: Surgery and EPA-enhanced medical food supplement**

If the use of an EPA-enhanced MFS is proposed to decrease post-surgical complications (e.g., infections and weight loss) for oral and laryngeal cancer patients, advise inadequate evidence exists to show a benefit. While one study comparing EPA- versus arginine-enhanced MFS found that an EPA supplement led to an increase in weight, there were no differences in fat-free mass or infectious complications.

**Rating:** Weak

**Conditional**

- **Risks/Harms of Implementing This Recommendation**
  - No potential risks or harms are associated with the application of this recommendation.

- **Conditions of Application**
  - No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**
  - Enhanced MFS tend to be higher in cost.

- **Recommendation Narrative**
  - One positive quality RCT (deLuis, Izaola et al, 2005) with post-operative oral and laryngeal cancer patients who had not experienced weight loss in the 3 months before surgery to see if an EPA-containing nutritional supplement (2 cans for 2.2g EPA per day) versus an arginine-containing nutritional supplement for 12 weeks post-operatively would support post-operative recovery. Results for the EPA group included increased weight and increased fat mass and tricep skinfold.
  - This study was not placebo controlled, and patients were instructed to eat 30 kcal per kg per day,
1.1g protein per kg per day and exercise, which are potentially confounding to the study results. Further studies are needed to clarify EPA's relationship with cachexia and treatment outcomes.

**Recommendation Strength Rationale**

- Based on one positive quality RCT, conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

**Is there a relationship between an oral and laryngeal cancer patient's postoperative intake of EPA-containing nutritional supplement to improve tolerance and support recovery from surgery, and the reduction of complications associated with surgery?**

- References
  

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

**Oncology (ONC) Guideline (2007)**

Quick Links

Recommendations Summary

**ONC: Hematological: Chemotherapy and Medical Nutrition Therapy (MNT) 2008**

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- **Recommendation(s)**

- **ONC: HEM: Chemotherapy and MNT**

  Medical Nutrition Therapy (MNT) that consists of nutrition assessment, intensive intervention, and ongoing monitoring and evaluation by a registered dietitian may be of benefit to patients with acute leukemias undergoing chemotherapy. Daily monitoring of intake and incorporating patient preferences have been shown to increase nutrition intake which positively affects body weight and tumor-therapy side effects (e.g., fatigue and anorexia).

  **Rating: Weak**

  **Imperative**

- **Risks/Harms of Implementing This Recommendation**

  No potential risks and harms are associated with the application of this recommendation.

- **Conditions of Application**

  No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**

  Costs of MNT sessions and reimbursement vary.

- **Recommendation Narrative**

  In one small, neutral quality RCT, Ollenschlager et al, 1992 found that in 29 hospitalized patients nutritional care by an RD resulted in positive nutrition outcomes for patients receiving chemotherapy for acute lymphocytic and nonlymphocytic leukemia.

  - Daily contact for assessment, education and motivation by an RD was effective in increasing body weight in the intervention group earlier and more often than in the control group.
  - Nutrition intake was highly correlated with body weight status.
  - Mean daily energy intake of 23.3 ± 11.4 kcals/kg/day was associated with weight loss; 30.9 ± 13.1 kcals/kg/day was associated with stable weight; and 39.3 ± 12.2 kcals/kg/day was associated with weight gain (P < 0.0001). A significant correlation was found between nutritional intake and tumor-therapy side effects (e.g., anorexia and fatigue) (P-values <0.01) was found.
  - More research is needed to evaluate the impact of dietitian interventions on treatment related
recommendation for outcomes and survival.

**Recommendation Strength Rationale**

- Based on one small RCT of neutral quality, conclusion statement is Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between intervention by a dietitian to enhance nutritional intake (protein, kcals) to improve tolerance and support recovery from chemotherapy for acute leukemia, and the reduction of complications associated with treatment?

**References**


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**Recommendations Summary**

**ONC: Non-Small Cell Lung Cancer: Chemotherapy and Determination of Resting Energy Expenditure 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the **Supporting Evidence Section** below.

**Recommendation(s)**

**ONC: Lung Cancer: Chemotherapy and Determination of REE**

Use of indirect calorimetry to measure **REE** is more accurate than estimation in patients with non-small cell lung cancer (NSLC) cancer undergoing chemotherapy. If measurement of **REE** is not possible or not thought to be imperative, use **HBE** to estimate calorie needs. However, limited evidence indicates that the **HBE** may underestimate energy needs by an average of 12-13%.

**Rating:** Weak

**Imperative**

- **Risks/Harms of Implementing This Recommendation**
  - Some patients may experience anxiety associated with the indirect calorimetry measurement process.
  - Under- or over-feeding may result when energy needs are estimated rather than measured.

- **Conditions of Application**
  - The studies reviewed for this recommendation only reviewed **HBE** as an energy estimating equation. See energy expenditure and energy assessment recommendations in the Critical Illness Guidelines for information on other conditions. For more information on measuring vs. estimating **RMR**, see Determining Resting Metabolic Rate.
  - The AARC Clinical Practice Guidelines (1994) recommend that measurements may be indicated in patients with several conditions including:
    - Cancer with residual tumor
    - Extreme obesity
  - The AARC Clinical Practice Guidelines (1994) also provide recommendations for hazards and complications, limitations of the procedures and infection control.
  - Measures should be conducted by specialty-trained personnel who have documented and demonstrated proficiency to calibrate, operate and maintain the calorimeter and to recognize calorimeter values within the normal physiologic range.

- **Potential Costs Associated with Application**
  - Cost of equipment, supplies and staff needs to be addressed in all indirect calorimetry measurements.

- **Recommendation Narrative**
  - Two neutral quality time-series studies compared measured **REE** with estimated **REE** using the **HBE** before and after receipt of a course of chemotherapy and at the end of a course of chemotherapy in NSCLC patients.
Harvie et al, 2003 reported that the average measured REE was comparable to estimated, except in males prior to chemotherapy (measured REE was 113% of estimated).

Harvie et al, 2005 (15/19 male subjects) found that average measured REE was 112% of the REE as estimated by HBE.

Further research is needed to determine the energy needs of NSCLC patients.

**Recommendation Strength Rationale**

Based on two neutral quality time-series studies, conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Are the measured energy needs of non-small cell lung cancer patients undergoing chemotherapy different from estimated needs?


**References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**

- **American Association for Respiratory Care (AARC). Metabolic measurement using indirect calorimetry during mechanical ventilation. Clinical practice guidelines. Respir Care. 1994; 39 (12): 1, 170-1, 175.**

**Quick Links**

**Recommendations Summary**

### ONC: Lung Cancer: Chemotherapy and Use of Antioxidant Vitamins C, E and Beta-Carotene Oral Supplements 2007

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the **Supporting Evidence Section** below.

#### Recommendation(s)

- **ONC: Lung cancer: Chemotherapy and use of Antioxidant Supplements**

  The use of antioxidants (vitamin C, vitamin E, beta-carotene, selenium) above the tolerable upper intake level to improve treatment outcomes in patients with advanced non-small cell lung cancer undergoing chemotherapy is not recommended. In this population, use of high-dose multiple oral antioxidants did not significantly influence response to treatment, survival, survival time and toxicity. More studies are needed.

  **Rating: Weak**

  **Imperative**

  - **Risks/Harms of Implementing This Recommendation**

    There are no potential risks or harms associated with application of this recommendation.

  - **Conditions of Application**

    No conditions limit the application of this recommendation.

  - **Potential Costs Associated with Application**

    No obvious costs are associated with the application of this recommendation.

  - **Recommendation Narrative**
In a positive quality, PRCT (Pathak et al, 2005) found supplementation with high-dose multiple antioxidants vitamin C (ascorbic acid) 6100 mg/day; vitamin E (dl-alpha-tocopherol succinate, also containing selenium, copper sulfate, and zinc sulfate) 1,050 mg/day; vitamin A (synthetic beta-carotene) 60 mg/day, did not significantly influence response to treatment, survival, survival time and toxicity in patients receiving chemotherapy (paclitaxel and carboplatin) for advanced stage (IIIB and IV) non-small cell lung cancer.

The biologically active forms of the antioxidants were not used and there were no assessment of the patients’ serum levels of antioxidants.

More studies are needed.

**Recommendation Strength Rationale**

- Based on one positive quality RCT, conclusion statement is a Grade III.

**Minority Opinions**

Consensus reached.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between supplementation of multiple antioxidants and an interaction with paclitaxel and carboplatin chemotherapy protocols and tolerance of chemotherapy treatment in patients with non-small cell lung cancer?

**References**


**References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**


**Oncology (ONC) Guideline (2007)**

**Quick Links**

**Recommendations Summary**

**ONC: Small-cell lung Cancer: Chemotherapy and Medical Nutrition Therapy 2007**

*Click here* to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

**Recommendation(s)**

**ONC: Lung cancer: MNT and Chemotherapy**

Medical Nutrition Therapy (MNT) that consists of nutrition assessment, intensive intervention, and ongoing monitoring and evaluation by an RD may be of benefit to patients with small cell lung cancer undergoing chemotherapy. Providing MNT may improve protein and calorie intake, which has been shown to improve weight status and QOL.

**Rating: Weak**

*Imperative*

- **Risks/Harms of Implementing This Recommendation**

  No potential risks and harms are associated with the application of this recommendation.

- **Conditions of Application**

  No conditions limit the application of this recommendation.

- **Potential Costs Associated with Application**

  Costs of MNT sessions and reimbursement vary.

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In a two-group comparison study of neutral quality (Glimelius et al, 1992) nutrition intervention by an RD to improve nutrition intake in patients receiving intensive chemotherapy for small cell lung cancer resulted in improved weight status and QOL, but did not have a significant impact on nutrition intake, nutritional status, or treatment outcome.

- At the start of the study, the average calorie and protein intake of the study period group (SPG) at initiation of the study was low (20-25 kcal/kg/day) and 40% of SPG patients had a protein intake < 40 g/day.
- During the study period, protein intake improved in the SPG group (average 50-80 g/day per patient), but no patient reached the desired protein intake level of 95-105 g/day.
- Sixty four percent (64%) used oral supplements at some point during treatment, which probably increased calorie and protein values.
- The study was limited by the use of historical controls.
- More research is needed to evaluate the impact of RD interventions on treatment related outcomes and survival.

Based on one two-group comparison study of neutral quality, conclusion statement is Grade III.

Supporting Evidence
The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is there a relationship between nutrition intervention to enhance intake (protein, kcals) to improve tolerance and support recovery from intensive chemotherapy for small cell lung cancer patients, and the reduction of complications associated with treatment?

References

References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

Oncology
Oncology (ONC) Guideline (2007)

Quick Links

Recommendations Summary

ONC: Pancreatic Cancer: Use of Omega-3 Fatty Acid-Enhanced Medical Food Supplement or Oral Supplement 2007

Use of omega-3 fatty acids to alter the prolonged acute-phase response is not recommended for pancreatic cancer patients. Consumption of an omega-3 fatty acid-enhanced medical food supplement (mean dose 2.2 g daily) or an oral supplement (2g EPA daily) for pancreatic cancer patients experiencing weight loss has not been shown to reduce serum CRP concentrations after 12 weeks of EPA supplementation and there are potential drug-nutrient interactions (e.g., anti-coagulant and anti-hypertensive medications/herbal supplements).

Rating: Fair
Imperative

ONC: Pancreatic cancer: Use of omega-3 supplements for anticachetic effects

Use of supplemental omega-3 fatty acids for anticachetic effects leading to changes in body composition (e.g., increase in LBM, weight gain or weight stabilization) is not recommended for patients with pancreatic cancer. EPA as a capsule or in a medical food supplement was not associated with an increase in LBM. Evidence that fish oil supplements stabilize weight or produce weight gain is inconclusive. There are potential drug-nutrient interactions (e.g., anti-coagulant and anti-hypertensive medications/herbal supplements).

Rating: Strong
Risks/Harms of Implementing This Recommendation

There are no potential risks or harms associated with this recommendation.

Conditions of Application

No conditions are associated with the application of this recommendation.

Potential Costs Associated with Application

There are no obvious costs associated with this recommendation.

Recommendation Narrative

Use of Omega-3 supplements and weight loss

Four studies (two neutral quality time series, one neutral quality non-randomized trial, and one negative quality time series), published by the same group of industry-sponsored researchers, evaluated acute phase response as measured by serum CRP, in patients with pancreatic cancer and ongoing weight loss.

- In three studies, patients were instructed to consume an omega-3 fatty acid-enhanced MFS which provided a mean dose of 2.2g EPA daily. All 3 studies indicated no change in acute phase response over the treatment period of 7-12 weeks.

- In a neutral quality timeseries (7 weeks) (Barber, Ross, Voss, et al, 1999) which included twenty weight losing pancreatic cancer patients consented to consume two cans per day of an omega-3 fatty acid-enhanced MFS (Mean Dose Consumed: 1.9 cans, 2.09g EPA, 0.91g DHA) indicated that patients experienced weight gain compared to pre-intervention (p=0.033), an increase in LBM (P=0.0047), an increase in performance status (p=0.046), an increase in EPA (p=0.0003) and DHA (p=0.0086) in plasma phospholipids, and an increase in appetite (p=0.0095).

- In a neutral quality non-randomized trial (4 weeks) (Barber, Ross, Preston et al, 1999), 36 patients pancreatic cancer patients with ongoing weight loss consented to consume two cans per day of an omega-3 fatty acid-enhanced MFS (Mean Dose Consumed: Not reported) or supportive care alone versus 6 healthy controls found an increase in CRP in control patients (p=0.0013) with no change in CRP in fish oil group.

- They also found an increase in total negative APP in fish oil group (P=0.048), a decrease in total negative APP in control group (p=0.016), with a reduction of albumin (P=0.012), prealbumin (P=0.0048) and transferrin (p=0.038) in control patients.

- In a neutral quality timeseries (12 weeks) by Wigmore et al, 2000 of 26 patients unresectable pancreatic cancer patients consented to consume fish oil supplements daily (Mean Dose Consumed: Not reported), researchers found a decrease in rate of weight loss at 4 weeks (P=0.0009) and an increase in plasma EPA (P=0.03) and arachidonic acid (P=0.05) at 4 weeks.

- The negative quality time-series (Wigmore et al, 1996) indicated a reduction in CRP concentration and rate of weight loss after four weeks of supplementation with 2g of EPA daily (P<0.002), but not at 3 months.

Use of Omega-3 supplements for anticachetic effects

- Three positive quality RCTs (Bauer et al, 2005; Moses et al, 2004; Fearon et al, 2003) showed no difference in LBM in pancreatic cancer patients who consumed 1.5-2.1 g EPA and 0.9-1.0 DHA per day vs. the control group.

- One positive quality RCT (Fearon et al, 2003) reported an association between plasma EPA and LBM gain (P=0.04) and weight gain (P<0.01) in the group receiving an oral nutritional supplement with omega-3 fatty acids.

- Two studies, one neutral quality (Wigmore et al, 2000), one negative quality (Wigmore et al, 1996) lacked control groups, but did not observe an increase in LBM over time in patients receiving fish oil supplements.

- One neutral quality, timeseries study (Barber et al, 1999) reported an increase in LBM (P<0.01) over time; however, this study had a small sample size and no control group.

- One small neutral quality timeseries study (Wigmore et al, 2000) and one small negative quality timeseries (Wigmore et al, 1996) using EPA produced conflicting results on the effectiveness of EPA as fish oil supplement to reduce weight loss in pancreatic cancer patients.

- The dosage of EPA as a fish oil supplement and length of supplementation varied among the studies.

- In patients with pancreatic cancer, one large positive quality RCT (Fearon et al, 2003) showed no difference in effect between control and intervention groups with use of an EPA containing supplement over 8 weeks.

- One negative quality, non-placebo controlled, non-blinded longitudinal study (Barber et al, 2001), and one neutral quality time-series (Barber et al, 1999) of 2.2 g EPA in which patients consumed an EPA-containing nutritional supplement (2 cans for 2.2 g EPA per day) from three weeks to seven weeks in length did result in weight stabilization or weight gain in patients with pancreatic cancer.

- More studies with better compliance and consistent length of EPA-nutritional supplementation are needed.

The EPA and DHA in Prosure®, the MFS used in most of the studies referenced, comes from sardine oil rather than isolated EPA or DHA.

Recommendation Strength Rationale

Recommendation ONC: Pancreatic cancer: Use of omega-3 supplements for weight loss

- Based on four studies (two neutral quality time series, one neutral quality non-randomized trial, and one negative quality time series), conclusion statement is a Grade III.

Recommendation ONC: Pancreatic cancer: Use of omega-3 supplements for anticachetic effects
Based on six studies (three positive quality RCTs, two neutral quality time series, one negative quality time series), conclusion statement is a Grade I.

Based on two small time series studies (one neutral quality and one negative quality), conclusion statement is a Grade III.

Based on one large positive quality RCT, one negative quality, non-placebo controlled, non-blinded longitudinal study, and one neutral quality time-series study conclusion statement is a Grade III.

**Supporting Evidence**

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Can the acute phase response in cancer patients can be altered by fatty acids?

Can lean body mass in pancreatic cancer patients be altered by fatty acids?

Is there a relationship between the use of EPA as a fish oil supplement to the reduction of weight loss associated with pancreatic cancer?

Is there a relationship between a patient’s consumption of EPA-containing medical food supplement to the reduction of weight loss associated with pancreatic cancer?

**References**


Moses AGW, Slater C, Preston T, Barber MD, Fearon KCH. Reduced total energy expenditure and physical activity in cachectic patients with pancreatic cancer can be modulated by n energy and protein dense oral supplement enriched with n-3 fatty acids. *Br J Can* 2004;90:996-1002.


**References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process**