Nutrition in Cancer Patients: It Does Make a Difference

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Alicia Gilmore has nothing to disclose.
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Learning Objectives

- Explain the difference between cancer-related anorexia and cachexia
- Describe the evidence for specific medical and nutritional interventions for patients suffering from anorexia or cachexia
- Identify the proper nutritional assessment tools for identifying nutrition-specific indicators of malnutrition risk, and the optimal, multi-disciplinary, collaborative approaches for managing these issues

Anorexia Defined

- Anorexia ≠ Cachexia
- Terms are not interchangeable

Definition of Anorexia

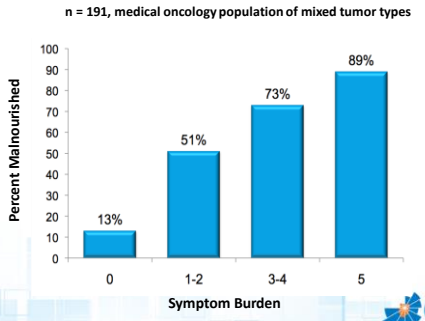
"a lack or loss of appetite for food (as a medical condition)"

"loss of appetite and inability to eat"

Causes of Anorexia in Individuals with Cancer

- Nausea and vomiting
- Early satiety
- Taste alterations/sensitivity to food smells
- Dry mouth
- Constipation
- Diarrhea
- Mucositis/stomatitis
- Anxiety
- Depression
- Stress (many sources)
- Fatigue
- Medications

Symptom Burden a Predictor of Nutrition Risk



Isenring E, et al. *Nutr Cancer*. 2010;62(2):220-228.

Physiology of Anorexia

- Metabolic function remains intact
- Caused only by inability to eat
- Physiologic changes does not prevent nutritional repletion
- Additional protein and calories will improve nutritional status

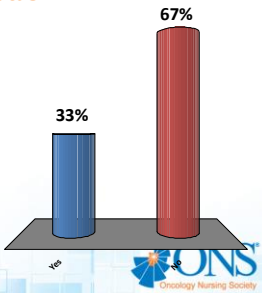
National Cancer Institute:http://www.cancer.gov/cancertopics/cancerlibrary/epeco/selfstudy/module-3/module-3b-pdf

Managing Anorexia: Challenges

- How to creatively manage symptoms and side effects to allow for increased intake
- Must rely on patience, persistence, and repetition
- Need to be an advocate
- Must educate the family

Without the presence of obvious weight loss, the majority of cancer patients typically have similar protein and calorie needs as healthy individuals.

A. Yes
B. No



Individuals with Cancer May Need More

Healthy individuals	Cancer Patients
Calories: 25 to 30 kcal/kg	25 to 35 kcal/kg*
Protein: 0.8 to 1.0 g/kg	1.5 to 2.5 g/kg

*For maintenance; for gain/repletion, up to 40 kcal/kg!

What does 40 kcal/kg look like?

- 100 lbs: 1,800-1,900 kcal/day
- 130 lbs: 2,300-2,400 kcal/day
- 150 lbs: 2,700-2,800 kcal/day
- 180 lbs: 3,200-3,300 kcal/day

Forchielli ML, Miller SJ. Nutritional goals and requirements. In Merritt R (ed). A.S.P.E.N Nutrition Support Manual. 2nd ed. Silver Spring, MD: ASPEN Publishing; 2005;5 0-51.

Cachexia Defined

- Cachexia ≠ Anorexia

Definition of Cachexia

"A multi-factorial syndrome defined by an ongoing loss of skeletal muscle mass (with or without loss of fat mass) that cannot be reversed by conventional nutritional support and leads to progressive functional impairment."

Patient.uk.co. Cachexia: http://www.patient.co.uk/doctor/cachexia

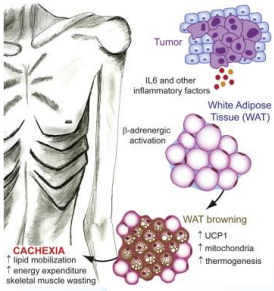
Physiology of Cachexia

- Deranged metabolic state, with abnormal hormonal milieu
- Typically occurs in conjunction with anorexia, but not always
- Pathophysiology hinders nutritional repletion
- Protein and calories alone will not improve nutritional status

European Palliative Care Research Collaborative (EPCRC): http://www.cancer.gov/cancertopics/cancerlibrary/epeco/selfstudy/module-3/module-3b-pdf

Hallmarks of Cachexia

- Insulin resistance
- Hyperglucagonemia
- Hyperglycemia
- Hyperlipidemia
- Failure to utilize glucose and free fatty acids for energy
- ↑ metabolism due to white to brown fat conversion
- Lean body mass becomes primary energy source



Fearon KCH, et al. Cancer Cachexia: Mediators, Signaling, and Metabolic Pathways. *Cell Metab* 2012; 16(2): 153-166
Petruzzelli M, et al. A switch from white to brown fat increases energy expenditure in cancer-associated cachexia. *Cell Metab*. 2014;20(3):433-47.

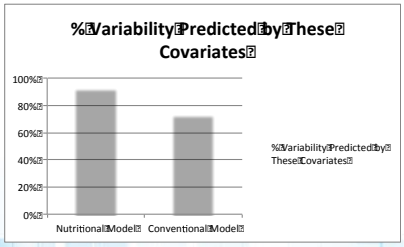
Lean Body Mass Defined

- LBM = Everything *but* fat
- When LBM is used for energy, this means depletion of skeletal and smooth muscle, organs, skin and mucous membranes, red and white blood cells, connective tissue, platelets and plasma, and more
- Outcome = ↑ Morbidity

Bosy-Westphal A, Müller MJ. Identification of skeletal muscle mass depletion across age and BMI groups in health and disease - There is need for a unified definition. Int J Obes (Lond). 2014 Sep 1. Published online ahead of print.

Lean Body Mass Depletion: Predictor of Survival

- 2 prognostic models of survival in lung & GI patients (n=1,473)
  - Conventional covariates: tumor type, stage, age, performance
  - Nutrition covariates: BMI, weight loss, muscle index/attenuation



Overweight & obese patients had similar LBM as patients categorized as cachectic

Regardless of baseline BMI, weight & muscle loss = ↓ survival

Martin L, et al. Cancer cachexia in the age of obesity: skeletal muscle depletion is a powerful prognostic factor, independent of body mass index. *J Clin Oncol*. 2013;31(12):1539-47.

Unintentional vs. Intentional Weight Loss

Intentional:

- Induced by intentional calorie deficit, results in adaptive response, and a switch from LBM and fat for energy to predominantly fat

Unintentional:

- Induced by combination of calorie deficit and underlying inflammatory response, and the switch from LBM and fat for energy to predominantly fat ***does not occur***

Silver HJ, Dietrich MS, Murphy BA. Changes in body mass, energy balance, physical function, and inflammatory state in patients with locally advanced head and neck cancer treated with concurrent chemoradiation after low-dose induction chemotherapy. Head Neck. 2007;29(10):893-900.

Reality of Unintentional Weight Loss

- **Well-designed study of 17 head and neck patients in active, concurrent therapy protocol**
- **DEXA, Indirect Calorimetry, Physical Performance Assessment, Fasting Blood Measures, Serial 24-Hour Dietary Recalls**

Over 9 Week Follow Up Through Treatment:

- Weight loss began immediately
- Average total loss of 6.8 kg (15 lbs) ~ 1.7 lbs per week
- **LBM accounted for 71% of loss**

Silver HJ, Dietrich MS, Murphy BA. Changes in body mass, energy balance, physical function, and inflammatory state in patients with locally advanced head and neck cancer treated with concurrent chemoradiation after low-dose induction chemotherapy. Head Neck. 2007;29(10):893-900.

Screening

- The process of identifying those who are at risk for malnutrition.
- Why is this important?
  - 40% patients experience anorexia and weight loss prior to diagnosis
  - 40-80% patients are expected to experience malnutrition at some point in treatment (1)

1.Ollenschlager G, Viell B, et al. Tumor anorexia: causes, assessment, treatment. Recent Results Cancer Res. 1991;121:249-259.

Screens

- Valid
- Specific
- Quick and easy to use
  - Who is administering the tool?
  - How much time will it take?
  - How are referrals handled?

Tools

- Patient Generated Subjective Global Assessment (PG-SGA)
- Malnutrition Screening Tool (MST)
- Malnutrition Screening Tool for Cancer Patients (MSTC)
- Malnutrition Universal Screening Tool (MUST)

Tools

Screening Tool	Items evaluated	Population validated	Composition
PG-SGA	7	Inpatient and Outpatient	Conducted by patient and RN Includes diagnosis and physical exam
MST	2	Inpatient and Outpatient	Asks regarding weight loss, how much wt and if pt is eating less Screening only
MSTC	4	Inpatient only	Uses change in intake Weight loss Body mass index Eastern Cooperative Oncology Group (ECOG) performance measure
MUST	4	Inpatient only	Uses BMI, unintentional wt loss and acute disease effect as well as potential for no oral intake Presence of obesity is noted

Tools

- All screens are then triaged
- Range from low to high risk
- Now what?

Interventions: Dietary

On-going coaching, encouragement, being an advocate

- Taste
- Presentation
- Atmosphere
- Meal preparation
- Meal frequency and snacks
- Family dynamics

European Palliative Care Research Collaborative (EPCRC):
http://www.cancer.gov/cancertopics/cancerlibrary/epeco/selfstudy/module-3/module-3b-pdf

Interventions: Non-dietary

Potential benefits for symptoms contributing to anorexia:

- First address contributory, factors: anxiety, depression, family and spiritual distress, malabsorption, pain, oral complications, constipation, insomnia, correctable hormonal factors (thyroid, hypogonadism, adrenal insufficiency, etc), lack of support/help
- Progestational agents and corticosteroids
- Cannabinoids – medical cannabis appears more effective than pharmaceuticals; consult knowledgeable resource
- Promotility agents and Proton pump inhibitors
- Non-steroidal anti-inflammatory agents
- Nutrients – omega-3s, amino acids, zinc, vitamins (IV and oral)
- Exercise – almost always underutilized

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Early Nutrition Intervention = Improved Outcomes

Quality of life (QOL)
Performance status
Response and tolerance to treatment ↑

Morbidity: Symptoms & Side Effects
Complications ↓

Marin Caro MM, Laviano A, Pichard C. Nutritional intervention and quality of life in adult oncology patients. *Clin Nutr*. 2007;26(3):289-301.

Early, Dedicated Nutrition Intervention Works

- RCT of 111 CRC patents seen in outpatient radiation oncology clinic
- Randomized to Dedicated Nutrition Intervention (NI) or Usual Care (UC)
- Followed Average of 7 Years

Maintain Adequate Nutr Status: 91% for NI vs. 0% for UC ($p < 0.002$)

Late Radiotherapy Toxicity: 9% for NI vs. 65% for UC ($p<0.001$)

Median Survival: 7.3 years for NI vs. 4.9 years for UC ($p<0.01$)

Ravasco P, Monteiro-Grillo I, Camilo M. Individualized nutrition intervention is of major benefit to colorectal cancer patients: long-term follow-up of a randomized controlled trial of nutritional therapy. *Am J Clin Nutr*. 2012;96(6):1346-53.

Nutrition Matters in All Phases

Pre-cachexia → Cachexia → Refractory Cachexia

- Loss of just 5% of baseline weight can shorten survival
- Intervening early allows repletion when metabolic changes are not working against you
- Allowing patients to lose nutritional reserves early leads to death from malnutrition ***before*** death from disease process
- Consider Days/Weeks/Months For Nutritional Approach

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http://www.cancer.gov/cancertopics/cancerlibrary/epeco/selfstudy/module-3/module-3b-pdf

Why Screening & Early Intervention Key