Nutrition in Cancer Patients Makes a Difference

Presented by

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UNC HEALTH

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Learning Objectives

- Explain cancer-related anorexia and the significance of unintentional weight loss
- Describe the evidence for specific nutritional interventions for patients experiencing anorexia and unintentional weight loss
- Identify proper assessment tools for identifying indicators of malnutrition risk and appropriate nutritional interventions

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Unintended weight loss and anorexia in patients with cancer are associated with decreased performance status, reduced response and tolerance to treatment, decreased survival, and reduced quality of life.

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Anorexia Defined

"Loss of appetite and inability to eat"

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

"Loss of appetite, especially as a result of disease"

Anorexia ≠ Cachexia

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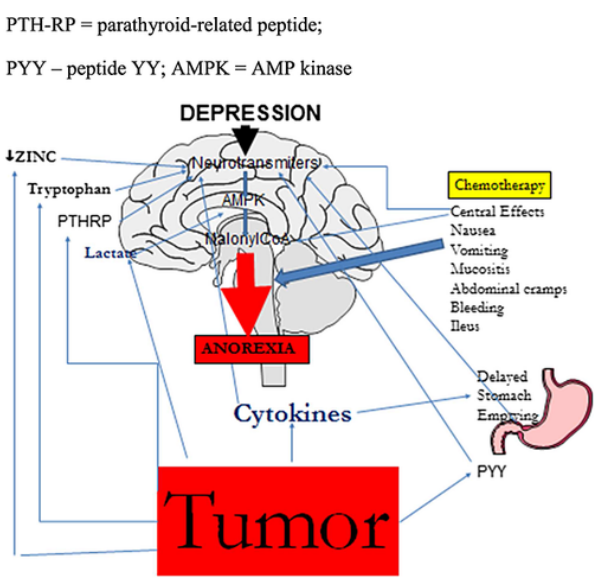

Pathophysiology of Anorexia

In the presence of a tumor, the body mounts an intense inflammatory response associated with anorexia and cachexia

C. Ezeoke & J. Morley. Pathophysiology of anorexia in the cancer cachexia Syndrome. *Journal of Cachexia, Sarcopenia and Muscle* 2015; 6: 287–302

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Causes of Anorexia in Individuals with Cancer

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

M. Muscaritoli et al. Prevalence of malnutrition in patients at first medical oncology visit: the PreMiO study. *Oncotarget.* 2017 Oct 3; 8(45): 79884–79896

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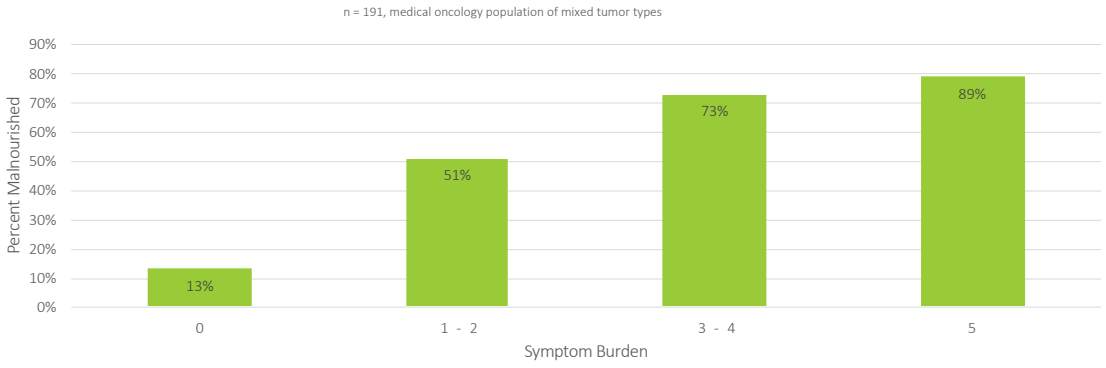
Symptom Burden a Predictor of Nutritional Risk



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

Adapted from *Nutrition in Cancer Patients: It Does Make a Difference* by Alicia Gilmore, MS, RD, CSO, LD, CNSC Suzanne Dixon, MPH, MS, RD

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Managing the Challenges of Anorexia

Oncology Dietitian's Role

- Be creative
- Rely on patience, persistence and repetition
- Be advocate
- Involve family/caregivers

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Calorie and Protein Needs for Individuals with Cancer

Calories

25-30 kcals/ kg/day

*if resting energy expenditure (REE) and/or total energy expenditure can't be measured directly

*Direct calorimetry, indirect calorimetry, and prediction equations attempt to mirror actual expenditures and account for changes in metabolic state

*Predictive equations are dependent on individual's status—*healthy, acutely ill, critically ill, or obese*

Protein

0.8 g/kg/day for healthy individuals

1.2 to 2 g/kg/day for catabolic individuals

1.5 g/kg/day for those who are metabolically stressed

For cancer patients in general, 1.0 to 1.5 g/kg/day of actual weight

(1.2 to 1.5 g/kg/day serves as a target range to maintain or restore lean body mass)

Nutrition Therapy for Adults Receiving Radiation Treatment By Julie Lansford, MPH, RDN, CSO, LDN https://www.todaysdietitian.com/newarchives/0519p44.shtml

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Cachexia Defined

Sarcopenia = Severe muscle depletion

"The presence of significant weight loss or *sarcopenia* in the absence of simple starvation.

"A progressive wasting syndrome characterized by weakness and a marked and progressive loss of body weight, fat, and muscle. Tumor-related factors prevent maintenance of fat and muscle"

- Weight loss >5% over the past 6 months; or
- Body mass index <20 and degree of weight loss >2%; or
- Sarcopenia and any degree of weight loss >2%

Cachexia ≠ Anorexia

https://www.cancer.gov/about-cancer/treatment/side-effects/appetite-loss/nutrition-hp-pdq#_30

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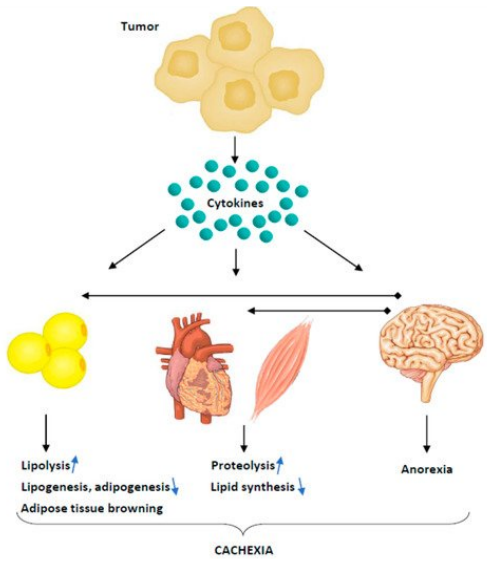
Physiology of Cachexia

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



A. Duval et al. mTOR and Tumor Cachexia. Int. J. Mol. Sci. 2018, 19, 2225; doi:10.3390/ijms19082225

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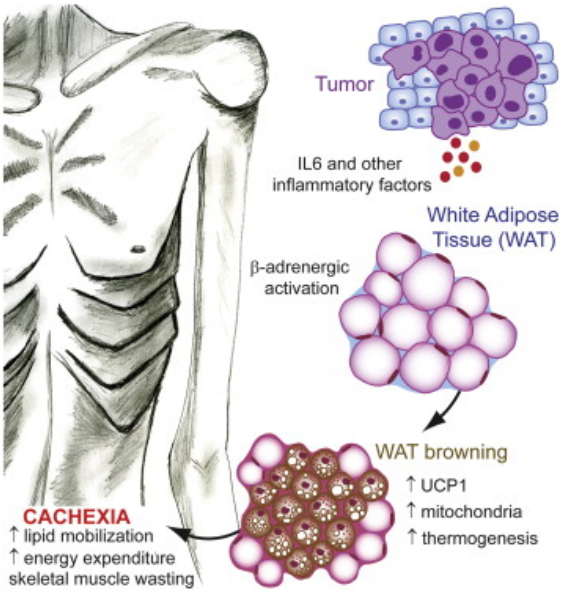
Hallmarks of Cachexia

- Insulin resistance
- Hyperglucagonemia
- Hyperglycemia
- Hyperlipidemia
- Failure to utilize glucose and free fatty acids for energy

↑metabolism due to white fat 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.

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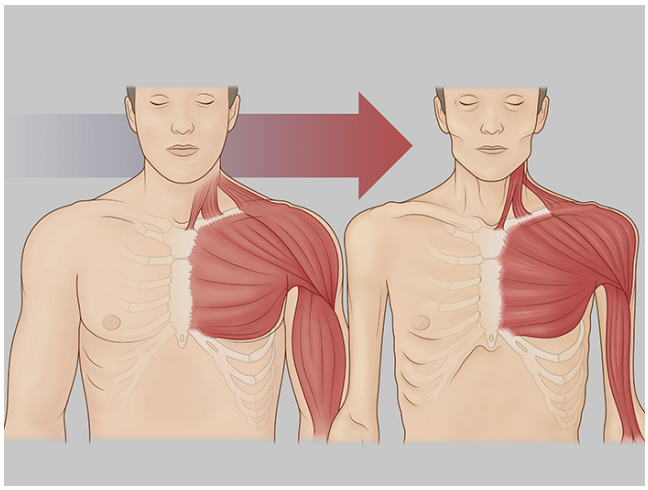

Sarcopenia

Anorexia and cachexia, can lead to progressive loss of skeletal muscle mass (with or without loss of fat mass) and worsen impairment of function.

C. Ezeoke & J. Morley. Pathophysiology of anorexia in the cancer cachexia Syndrome. *Journal of Cachexia, Sarcopenia and Muscle* 2015; 6: 287–302

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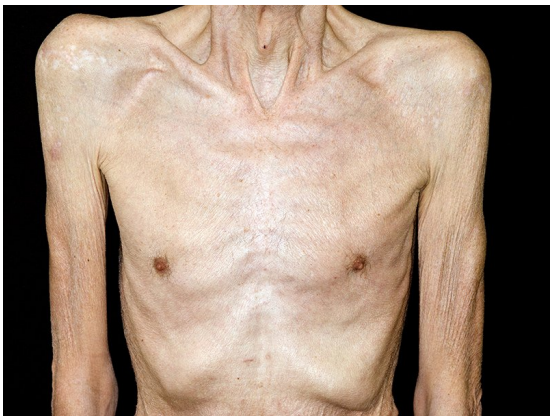
Lean Body Mass (LMB)

LBM = Everything but fat

LBM used for energy depletes 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 39, 379–386(2015)

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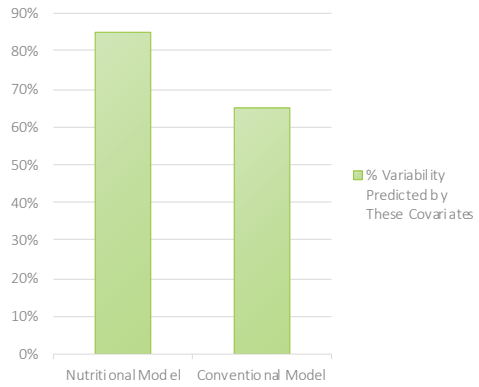
Lean Body Mass Depletion: Predictor of Survival

Two 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.

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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*

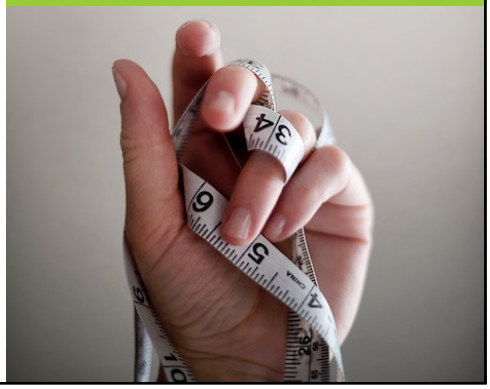
✓*LBM accounted for 71% of loss*

Silver HJ, et al. 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

Unintentional Weight Loss

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



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Dietary Interventions

On-going Coaching, Encouragement, Advocate

- Taste /Smell
- Presentation
- Atmosphere
- Meal preparation
- Fractional intake- meal frequency and snacks
- Family dynamics
- Honor patient's preferences
- Nutritional supplements
- Enteral nutrition

A. Tuca et al. / Critical Reviews in Oncology/Hematology 88 (2013) 625–636

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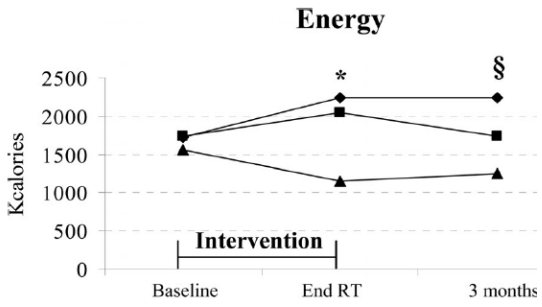
Nutrition Intervention

Nutritional counseling (diamonds) can increase intakes and improve outcomes better than protein supplements (squares) or no intervention (triangles).



Ravasco et al. *Head and Neck* 27:659-668, 2005.
Ravasco et al. *J Clin Oncol* 23:1431-1438, 2005.

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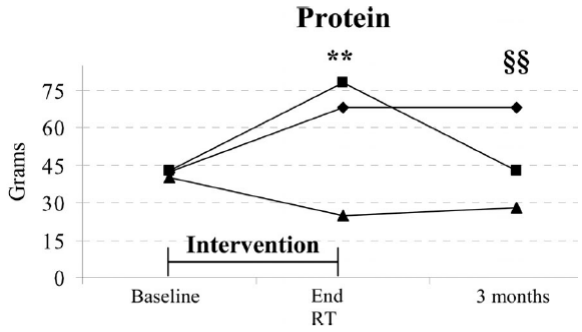

Ravasco et al. *Head and Neck* 27:659-668, 2005.
Ravasco et al. *J Clin Oncol* 23:1431-1438, 2005.

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Non-Dietary Interventions

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
- Prokinetic agents and Proton pump inhibitors
- Non-steroidal anti-inflammatory agents
- Nutrients – omega-3s, amino acids, zinc, vitamins (IV and oral)
- Exercise – almost always underutilized

A. Tuca et al. / Critical Reviews in Oncology/Hematology 88 (2013) 625–636

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Validated Screening Tools

Patient Generated Subjective Global Assessment (PG-SGA)

Malnutrition Screening Tool (MST)

Malnutrition Screening Tool for Cancer Patients (MSTC)

Malnutrition Universal Screening Tool (MUST)

- Valid
- Specific
- Quick and easy to use

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Screening for Malnutrition Risk

Screening Tool	Items Evaluated	Populations Validated	Components
PG-SGA	7	Inpatient and Outpatient	Conducted by patient and RN Includes diagnosis and physical exam
MST	2	Inpatient and Outpatient	Weight loss How much weight loss Is patient is eating less d/t poor appetite
MSTC	4	Inpatient	Change in intake Weight loss Body mass index Eastern Cooperative Oncology Group (ECOG) performance measure
MUST	4	Inpatient	BMI Unintentional weight loss Acute disease effect Potential for no oral intake Presence of obesity is noted

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Nutrition Matters

- 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
  - *It is estimated that the deaths of 10-20% of patients with cancer can be attributed to malnutrition rather than to the malignancy itself.*
- Consider Days/Weeks/Months For Nutritional Approach

J. Arends et al. (2017) ESPEN expert group recommendations for action against cancer related malnutrition. *Clin. Nutr.* 36, 1187-1196

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Screening and early nutrition intervention are vital components of patient care

Weight loss and malnutrition at diagnosis

Treatment and Disease Progression Exacerbate Malnutrition

Further Progression Can Lead to Cachexia

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