Medical Nutrition Therapy for Patients with Cancer

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Cancer

- Normal cells have a definite life span and ultimately undergo apoptosis

- Cancer is a general term used when abnormal cells exhibit uncontrolled growth

- Cancer is actually many diseases caused by a multitude of cell types that require different treatment modalities.

- Cancer is known by other names including malignancy or neoplasm.
Types of cancer

Malignant

- Masses of abnormal cells that may invade surrounding tissues or metastasize via the blood, lymphatics, or by direct extension to distant areas of the body from the original or primary location.

Benign

- Do not penetrate or destroy surrounding tissues. These cancers can occur in any part of the body.
Common types of cancers

Carcinomas:

- Comprises 80% to 90% of all cancers occurring in adults;
- Arise in the epithelial tissue and coverings of internal and external surfaces

Adenocarcinomas:

- Cancers that form in glands or in gland-like tissues
Common types of cancers

Basal cell carcinomas:
- The most common form of skin cancer

Sarcomas:
- Soft tissue or bone tumors

Oat cell carcinomas:
- Rapidly spreading and highly fatal cancers of the bronchus
Common types of cancers

**Small cell carcinomas:**
- Commonly arise in the lung can occur in other sites e.g. prostate, cervix, head, and neck

**Lymphomas:**
- Cancers that develop in lymph glands

**Leukemias:**
- Cancers of the white blood cells

**Myelomas:**
- Cancer of the plasma cells of the bone marrow
Carcinogenesis

- Multistep process involves accumulation of genetic changes from the interaction with environment

- Phases include initiation, promotion, and tumor progression.

- Why normal genes may be activated in various ways and transformed into genes capable of changing normal cells into cancerous cells?
Carcinogenesis

- ACS describes the spectrum of cancer survival as 3 distinctive phases:
  - Treatment and recovery
  - Living after recovery
  - Living with advanced cancer

- Each phase has specific needs and challenges with respect to nutrition and physical activity.

- Each phase affected by the primary site of the cancer or recurrence, state of health, & therapeutic modality
Diagnostic tests

Biopsy:

- A surgical procedure that involves removing all or part of tissue suspected of being cancerous.

Imaging studies:

- Display the structure and function of internal organs; e.g. CT scans, X-rays, RI scans, Ultrasonography, MRI, PET scans

Pathologic and cytologic studies:

- The analysis of tissue samples for the presence of cancer cells
Diagnostic tests

Tumor Markers:

- Prostate: PSA (prostate-specific antigen)
- Colon and rectum: CEA (carcinoma embryonic antigen)
- Ovarian: CA 125 (cancer antigen 125)
- Liver and testicle: AFP (alpha-fetoprotein)
- Pancreas: CA 19-9 (cancer antigen 19-9)
Treatment modalities

- **Chemotherapy:** Severity and impact of treatment is dependent on the specific agent(s) used and duration of treatment.

- **Radiation therapy:** Causes localized effects limited to specific area(s) of the body being irradiated.

- **Surgery:** Sequelae dependent upon organ systems involved in resection.

- **Stem cell transplant:** for hematologic malignancies.
Nutritional assessment

- Nutritional status in cancer patients can be affected by the following:
  - Disease process and its systemic effects
  - Treatment effects from Surgery, Chemotherapy, Radiation therapy or Immunologic therapies provided
Nutritional assessment

Nutrition care planning include support to the patient as follows:

- Before treatment begins to optimize tolerance to cancer therapy
- During treatment to prevent nutrition-related complications
- Post-treatment to provide for nutrition rehabilitation
Nutritional assessment

Medical history:
- Present history of disease
- Treatment history
- Current oncologic treatment
- Comorbid condition

Nutrition history:
- Appetite, changes
- Food frequency
- Food intolerances, allergies
- Special diets
- Tobacco and alcohol
- Nutr. supplements
- Functional status
Nutritional assessment

Physical observations:

- General appearance
- Wt history, % Wt loss from usual Wt
- Evidence of muscle wasting
- Hand grip strength
- Skin turgor
- Presence of nutritional impact symptoms
- Presence of edema
## Nutritional assessment

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Nutritional assessment

Patient Generated-Subjective Global Assessment (PG-SGA) tool, includes the subjective evaluation of

- Fat
- Muscle
- Fluid status
Nutritional assessment

Using PG-SGA, nutrition risk is determined as follows:

- **Stage A**: Well-nourished
- **Stage B**: Moderately malnourished or suspected malnutrition
- **Stage C**: Severely malnourished
Nutrition Reassessment

- The patient's response to nutrition intervention should be monitored on an ongoing basis

- As patient's nutritional status improves, nutritional support can be altered

- If nutritional status is not improving, the nutrition support can be readjusted
Patient history

Comorbid diseases:
- HTN, Heart disease, DM, Obesity

Nutrition impact symptoms
- Nausea - Vomiting - Diarrhea - Taste aversions - Constipation - Pain - Infection - Fatigue - Xerostomia
Patient history

Anthropometrics indexes include the following:

- Ht - Wt - BMI - Usual Wt - % body Wt changes

Vitals: to assess metabolic stress:

- Temperature - Presence of fever - Fever duration - Blood & Pulse pressure - Respirations
Patient history

Nutrition intake:
- Food history and recall - Food aversions - Taste changes - input and output

Current medications:
Laboratory

Complete blood count & differential,

- WBC, Hematocrit, Hb, Plateless

Neutrophil count:

- Neutrophils concerned with protecting the body against infection from bacteria and fungi.
- Neutropenic precautions & use of a low-bacteria nutrition therapy instituted when the absolute neutrophil count drops below 1,500/mm³.
Laboratory

Fe stores and anemia:
- Fe, Ferritin, Transferin, Hb, HCRT

Electrolytes:
- Are used to assess hydration status and to evaluate possible refeeding syndrome include Na, KCl, Mg, P

Calcium:
- Elevated levels indicative of bony metastasis.
- Food Ca restrictions not indicated in the presence of elevated Ca levels.
Laboratory

Liver function and possible liver involvement and metastasis

- SGOT, SGPT, Alkaline phosphate
- Uric acid, total bilirubin

Kidney function panel used to assess kidney function

- Blood urea nitrogen, Creatinine, Creatinine Index
Laboratory

Nutrition stores:
- Albumin, Total protein, Prealbumin, Nitrogen balance, (TLC)

Glucose:
- Often elevated in the presence of steroids and in individuals diagnosed with pancreatic cancer

C-reactive protein (CRP):
- Presence of an acute phase protein response indicating inflammatory response.
- CRP is often elevated in the presence of a tumor
Anthropometrics

- Cancer patients who lose $>10\%$ BW have a shorter length of survival than those with similar cancers, at a similar stage, who remain well-nourished.

- The following parameters place patients at risk:
  - 5% WT loss over 1 month
  - 10% WT loss over the previous 6 months
Anthropometrics

- TSF may not be routinely used to evaluate nutritional status in cancer patients because of variation among individuals based on skin turgor and age of the subject.

- BMI and W-to-H ratio have been evaluated much more extensively as related to determining risk of developing cancer, particularly for breast, colon, and gynecologic cancers.
Calculations for nutrient needs

- Multiple studies were done to measure REE using indirect calorimetry in cancer patients.
- Studies indicated that these methods do not accurately assess energy needs of cancer patients.
- Other methods for measuring body composition e.g. BIA have not been validated for use in cancer patients.
Calculations for nutrient needs

Calories

25-30 kcal/kg BW
- Nonambulatory or sedentary adults

30-35 kcal/kg BW
- Slightly hypermetabolic patients, for WT gain, or for an anabolic patient

35 kcal/kg BW
- Hypermetabolic or severely stressed patients or those with malabsorption
Calculations for nutrient needs

Protein

- 1.0-1.2 g/kg BW, non-stressed patient with cancer
- 1.2-1.5 g/kg BW, patients undergoing treatment
- 1.5-2.5 g/kg BW for patients with increased protein needs such as protein-losing enteropathies or wasting.
Nutrition intervention should focus on the following:

- Preventing WT loss even in overweight WT patients
- Maintenance of lean body mass
- Preventing unintentional weight gain, in certain groups of cancer patients e.g. breast cancer
Nutrition impact symptoms

- Food choices and eating patterns to accommodate changing needs
- Small, frequent snacks may be easier to tolerate than 3 large, daily meals
- Food easy to chew, swallow, digest, and absorb even if high in fat
- Supplements and nutrient-dense nourishments prescribed to maintain adequate nutrient intake
Nutrition impact symptoms

- Light physical activity such as walking
- Vitamin supplements may necessary because of inadequate intake
- Not to exceed DRI for nutritional supplements containing antioxidant nutrients
Efficacy of nutrition support

- Cannot be evaluated simply from the perspective of clinical parameters.
- Patients undergo various stages of disease including a maintenance phase and, for some, a terminal phase.
- Nutritional efficacy evaluated within the context of the stage of disease & comorbid conditions and quality of life.
Goals

- Nutrition is an important component in the management of individuals diagnosed with cancer.

- Whether individuals are undergoing active treatment or recovering from cancer therapy, the benefit of optimal nutrient and energy intake is well documented.
Goals: patients receiving cancer therapy

- Prevent or reduce nutrient deficiencies
- Preserve lean body mass
- Improve tolerance to treatment
- Minimize the effect of nutrition-related side effects and complications
Goals: patients receiving cancer therapy

- Maintain strength and energy
- Enhance immune function by decreasing risk of infection
- Aid in recovery and healing from cancer therapy
- Maximize quality of life
Goals: patients living with advanced cancer

- Quality of life
- Independence
- Ability to perform activities of daily living
- Comfort
- Symptom relief rather than reversal of malnutrition and weight gain