Nutrition in Cancer Care

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Learning Objectives

• Identify treatment-related nutritional deficiencies such as anorexia, dysphagia, mucositis, and xerostomia in cancer patients

• Outline management strategies in oncology patients with anorexia, dysphagia, mucositis, and xerostomia

• Recognize the importance of reducing drug-drug interactions with supplements

• Distinguish between the different diet trends in cancer nutrition
Nutrition Therapy

• Maintenance of adequate nutrient stores and muscle mass
• Improved strength and energy
• Management of side effects
• Improved quality of life
• Fewer complications, infections, hospitalizations, treatment breaks
• Improved survival and outcome

Malnutrition in Cancer Patients

• 30% to 85% of patients experience malnutrition prior to diagnosis
  • 80% of upper GI cancer patients and 60% of lung cancer patients have already experienced significant weight loss at time of diagnosis
• 40-80% of patients are expected to experience malnutrition during treatment
  • As little as a 6% weight loss predicts a reduced response to treatment, reduced survival, and a reduced quality of life

Unintentional Weight Loss

• 13% of renal cell cancer patients had dose reductions, while 21% had treatment termination due to unintentional weight loss
• Body weight and lean body mass are considered risk factors for chemotherapy tolerance and survival in gastric cancer
• Toxicity from radiation can lead to unplanned treatment breaks that result in lower loco-regional control and survival rates in patients with head and neck cancer


Prevalence of Malnutrition

<table>
<thead>
<tr>
<th>Tumor Site</th>
<th>Prevalence of Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreas</td>
<td>80-85%</td>
</tr>
<tr>
<td>Stomach</td>
<td>65-85%</td>
</tr>
<tr>
<td>Head &amp; Neck</td>
<td>65-75%</td>
</tr>
<tr>
<td>Esophagus</td>
<td>60-80%</td>
</tr>
<tr>
<td>Lung</td>
<td>45-60%</td>
</tr>
<tr>
<td>Colon/Rectum</td>
<td>30-60%</td>
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<tr>
<td>Gynecological</td>
<td>15%</td>
</tr>
<tr>
<td>Urological</td>
<td>10%</td>
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</tbody>
</table>

Stratton et al, eds. Disease-Related Malnutrition: An Evidence-Based Approach to Treatment. CABI Publishing; Wallingford:2003.
Prevalence of Treatment-Related Nutrition Effects

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Weight Loss</th>
<th>Dysphagia</th>
<th>Nausea/Vomiting</th>
<th>Mucositis</th>
<th>Taste Alterations</th>
<th>Xerostomia</th>
<th>Diarrhea</th>
<th>Constipation</th>
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<tbody>
<tr>
<td>Chemotherapy</td>
<td>✔</td>
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<td>Radiation</td>
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<tr>
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</tr>
</tbody>
</table>

Nutrition Issues for Oncology Patients

- Anorexia
  - Taste changes
- Dysphagia
- Mucositis
- Xerostomia
- Side-effects from treatment
  - Constipation
  - Diarrhea
  - Dehydration
  - Nausea and Vomiting
Anorexia

- Loss of desire to eat
- Experienced by 15-25% of cancer patients
- Results in decreased survival and adherence to chemotherapy
- Risk factors
  - Tumor effect
  - Treatment effect
  - Psychosocial effect
  - Age

Management of Anorexia

- Remove the cause
- Non-pharmacologic interventions
  - Symptom-related nutritional interventions
- Pharmacologic therapy
- Nutrition support
Pharmacologic Anorexia Management

- Weight gain primarily seen in fat mass
- Medications
  - Megestrol 160-1600 mg PO daily
  - Dexamethasone 0.75 mg PO four times daily
  - Prednisone 5 mg PO three times daily
  - Dronabinol 2.5 mg PO two times daily

Nutrition Management of Anorexia

- Small, frequent meals
  - High in protein and calories
- Eat every 2.5-3 hours
- Find food that is tolerable
- Beverages with calories
- Increase physical activity
Oral Nutrition Supplements

- Boost or Ensure
- Supplement energy, protein, fat, carbohydrate, and fiber intake
- Systemic review showed results in improvement of
  - Increase total energy
  - Increase protein intake
  - Reduce incidence of complications


Nutrition Management of Taste Changes

- Plastic utensils
- Add spices and sauces to food
- Tart foods and drinks
- Eat foods that appeal to you
- Sugar-free lemon drops, gum or mints

Dysphagia

- Common in head and neck and esophageal cancers
- Approximately 25% of cancer patients
- Due to tumor, radiation, strictures, dysmotility issues, dry mouth/throat
- Essential for optimal nutrition
- Quickly leads to malnutrition
- Dehydration becomes significant issue


Nutrition Management of Dysphagia

- Define location of concern
- Avoid very hot and very cold
- Work on foods that are slippery, have sauces, gravies or will travel more easily
- Avoid irritant foods
  - Spicy, caffeine, high fat, acidic foods
- Liquids and very soft foods easier to tolerate
- Mouth rinses
Mucositis

- Inflammation of any mucosal membranes, including the oral cavity
- Onset: 4-7 days
- Duration: 1-6+ weeks
- Complications
  - Pain, nutrition, infection
- Risk Factors
  - Poor oral health
  - Tobacco and alcohol
  - Females > Males
  - Dehydration
  - Chemotherapy regimen: especially high doses
  - Radiation

http://www.oralcancerfoundation.org/complications/mucositis.php
http://www.cancernetwork.com/cancer-management/dermatologic adverse-events-associated-systemic-anticancer-agent.php#sthash.T3Cy5yFU.dpuf

Mucositis Management

- Prevention
  - Good oral hygiene
  - Baking soda and salt rinses; saline rinses swish/spit QID
    - 1 tsp salt, 2 tsp baking soda, 8 oz warm water
- Treatment: supportive management
  - Oral hygiene
  - Topical/systemic analgesics
  - “Magic” mouthwash
  - Anti-infectives
    - Candida
    - HSV

http://www.oralcancerfoundation.org/complications/mucositis.php
Nutrition Management of Mucositis

- Easy to swallow food
  - Puree foods
- Drink with straw
- Suck on ice chips
- No tobacco products
- Avoid certain foods
  - Hot foods
  - Citrus
  - Spicy
  - Tomatoes and ketchup
  - Salty
  - Raw vegetables
  - Sharp, crunchy foods
  - Alcohol


Xerostomia

- Dry mouth
- Occurs in 50-90% of cancer patients
- Risk factors
  - Cancer treatment related
  - Immune disorders
  - Comorbid diseases
  - Medications
- Treatment: amifostine
Nutrition Management of Xerostomia

- Sip water
- Chew gum or suck on hard candy, ice pops, or ice chips
- Eat to swallow foods
- Keep lips moist
- No alcohol-containing mouthwash
- No tobacco products


Constipation Management

- Bulk-forming laxatives
  - Metamucil
- Stimulant laxatives
  - Senna and bisacodyl
- Osmotic laxatives
  - Miralax and Milk of Magnesia
- Stool softeners
  - Docusate
- Mineral oil, castor oil, fiber, milk of magnesia generally not recommended
Nutrition Management of Constipation

• Increase fluids
• Increase fiber
• Dietary GI stimulants
  • Warm beverage/coffee
  • Prune juice
• Fiber supplement
• Increase physical movement

Diarrhea

• Moderate to severe
  • 14% of chemotherapy agents
• Causes
  • Direct and indirect toxic effects of treatment
  • Abdominal/pelvic radiation
  • Surgical intervention of GI tract
  • Malignancy
  • Infection
Diarrhea Management

• Treatment
  • Loperamide
    • 4mg PO at the first sign of diarrhea
    • 2mg PO q 2h until diarrhea free for 12 hours
    • Do not take > 12 tablets/day
  • Diphenoxylate/atropine
    • 5 mg PO QID
    • May alternate with loperamide
  • Octreotide
    • 50-150 mcg SQ q 8h; up to 500 mcg SQ q8h

Nutrition Management of Diarrhea

• Rehydrate
• BRAT diet
  • Low fiber, low residue
• Slow down gut function
  • Identify stimulants and avoid
  • Avoid lactose
• Watch electrolytes; K, Mg, Na, Cl
Nutrition Management of Nausea and Vomiting

- BRAT diet
- Small, frequent meals
- Remain upright for 1 hour after eating
- Suck on peppermints or lemon drops
- Do not skip meals and snacks
- Keep record of nausea and the cause

Long-Term Complications

- Chemotherapy
  - Electrolyte imbalances due to nephrotoxins
- Radiation
  - Enteral nutrition and/or stents for upper GI tract strictures or fistulas
- Surgery
  - Chronic malabsorption after extensive bowel resections
  - Adhesions and bowel obstruction
Vitamins and Supplements

Supplements

- Use is highest in chronic disease
  - In 2016 spend was $34 billion on vitamins/herbs
- 64-81% of cancer patients start a supplement after diagnosed
- Viewed as harmless by majority of patients
- Drug interactions seen between these and prescription medications
- May interact with chemotherapy
  - Compete for target cells
  - Increase/decrease the toxicity and uptake of drugs
- Even multivitamins may have > 200% daily value

Hagerty M. Oncology Nurse. 2011.
Vitamins

• Calcium
  • Food source preferable for increased absorption
  • Increased calcification seen in those who used dietary and supplement source
  • Amount: 1200-1500 mg daily

• Vitamin D
  • Significant research indicating improved health with adequate levels
  • Check for baseline before supplementing
  • Limited availability in foods; fortified dairy, some fish
  • Depending upon level:
    • < 15 IU recommend 50,000 IU D2
    • >15 – 30 IU recommend 2,000 IU D3 daily
    • > 30 IU recommend 1,000 IU D3 daily

Hajerly M. Oncology Nurse. 2011.

Vitamins

• High-dose vitamin C
  • May stimulate or inhibit tumor growth
  • May be dangerous to consume excessive amounts

• Probiotics
  • Prevent radiation and chemotherapy-induced diarrhea
  • Starting upon initiation may be beneficial

• Glutamine
  • Reduce mucositis and diarrhea
  • Aids in faster healing of the mucosal cells and entire GI tract

Herbal Supplement Issues in Cancer

- Overlapping in multiple products
- Herbs that affect anesthesia
  - Kava kava, Valerian
- Drug interactions changing metabolism
  - St John’s Wort, Grapefruit juice, Pomegranate
- Antiplatelet, blood thinners
  - Garlic, Ginkgo, E, Ginger, Ginseng, Feverfew, Echinacea, Omega 3; hold 1 week around surgery
- Unlabeled prescription drugs
  - Valium in some Chinese herbals, PC-SPES
- Recommendations
  - Lowest dose, one herb at a time, not long term

Terrie YC. Pharmacy Times. 2018.

Specific Potential Interactions with Supplements

- Ascorbic acid
  - Reduces bortezomib activity
- Black cohosh
  - May lower lipids and increase absorption and toxicity of tamoxifen
- CoQ10
  - May interfere with effectiveness of chemotherapy
- Echinacea
  - May interfere with immunotherapy
- Garlic
  - May increase bleeding in cancer patients
- St. John’s wort
  - May decrease absorption of irinotecan and imatinib

Dangerous Herbs

- Aristolochia: Renal failure, renal cancer
- Comfrey: Liver damage/deaths, carcinogenic
- Androstene: Increased cancer, lower HDL
- Chaparral: Liver dysfunction, carcinogenic
- Germander: Abnormal liver function
- Kava: Liver dysfunction and coagulation
- Glandular extract: Risk mad cow disease
- Lobelia: Rapid heart rates, SOB
- Skullcap: Liver damage
- Yohimbe: Blood pressure, arrhythmias, MI


Pharmacist Role in Supplement Management

- Communication with patient and health care team
- Educate patient on the risk versus benefits
- Complete a drug-supplement interaction report
- Respect cultural beliefs
Diet Trends in Cancer Patients

Vegetarian or vegan diet
Macrobiotic diet
Ketogenic diet

Vegetarian or Vegan Diet

• If followed carefully, will not result in nutrition deficiencies
• Reduces the incidence of GI cancers
• May prevent tumor progression in men with localized prostate cancer

Macrobiotic Diet

- High-carbohydrate, low-fat, plant-based diet
  - Whole grains
  - Vegetables
  - Soup
  - Cooked and sea vegetables
  - Fish
- Multiple variables in calculating macros
  - Person’s sex, level of activity, and local area

Ketogenic Diet

- Research: brain tumors; prostate/breast
  - Anti-inflammatory properties of ketones
  - High in saturated fats, known to be pro-inflammatory
- Tolerance
  - Ketones are appetite suppressing
  - Delayed gastric emptying aggravated by high fat
  - 27 current trials listed; terminated/recruiting
- Risks
  - Excessive weight loss
  - Kidney stones (occurs in 1 out of 20 patients)
  - Constipation, multiple vitamin and mineral deficiencies
  - Serum TG (often >400), micronutrient deficiencies
‘Sugar Feeds the Tumor’

- Glucose feeds all cells; deficit of glucose causes increased protein breakdown
- Sugar’s relationship to higher insulin levels may influence cancer cell growth. Cancer cells have insulin receptors; insulin may promote growth
- Stress from this causes some people to avoid all carbohydrate
- Stress turns on the fight or flight mechanisms
  - Increases hormone levels that can raise blood glucose and suppress immune function
  - May reduce any possible benefit of eliminating sugar in the first place
- Promote CHO + protein/fat combining for more modulated blood glucose

Supplement Resources

- Benefits and Dangers of Vitamin Supplements for Cancer Patients
  - MD Anderson Cancer Center website
- Nutrition for the Person with Cancer During Treatment
  - American Cancer Society website
- Natural Medicines Comprehensive Database
  - Naturaldatabase.com
- Cancer: In Depth
  - National Institutes of Health website
- Complementary and Alternative Medicine
  - National Cancer Institute website
- About Herbs, Botanicals & Other Products
  - Memorial Sloan Kettering Cancer Center
Summary

• Early identification of nutrition status and treatment-related nutrition risk
• Cancer patients’ nutrition status should be screened and routinely monitored during anticancer treatment
• Counseling by nutrition support specialist
• Prophylactic management and control of nutrition treatment-related side effects
• Long-term follow-up and assessment of nutrition therapy-related complications

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