Nutrition in Head & Neck Cancer

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An “At Risk” Population

- Alcohol use/abuse
- Tobacco use
- Up to 40% of newly diagnosed head and neck cancer patients are malnourished.
- Malnutrition has significant impact on morbidity, mortality and quality of life for cancer patients
- Physicians often do not address this issue
Causes of Malnutrition

- Diminished nutrient intake
- Increased nutrient demand not matched by intake
- Tumor-induced derangements
Diminished Nutrient Intake

- Alcohol & Tobacco
- Poor dentition
- Partial or complete obstruction of aerodigestive tract
- Trismus
- Post-surgical functional and anatomic impairments of chewing and swallowing
- Post-XRT mucositis, dysgeusia, xerostomia
- Chemotherapy-induced nausea, vomiting
Increased Nutrient Losses

- Vomiting
- Diarrhea
Increased Nutrient Demand

- Acute metabolic stresses caused by surgery, XRT, chemotherapy
- Duration and intensity of stresses depend on intensity and duration of treatment as well as complications
Tumor-induced Metabolic Abnormalities

- Abnormal metabolism of carbohydrates, lipids, and protein
- Abnormal levels of neurotransmitters leading to anorexia
- Increased basal metabolic rate
- Cytokines appear to mediate these abnormalities
  - Tumor necrosis factor, IL-1, IL-6
Impact of Malnutrition

- Stage III/IV head & neck cancer treated with multiple modalities—the strongest independent predictor of survival was pretreatment weight loss (Mick, et al).
- Head & neck cancer patients shown to have a significant decrease in survival at 2 years if malnourished (57.5% vs. 7.5%) (Brookes, et al).
- Postoperative morbidity and quality of life significantly influenced by preoperative nutrition (Bertrand, et al, Van Bokhorst-de Van der Shuer, et al)
Impact of Malnutrition

- **Immunocompetence**
  - Decreased cell-mediated immunity (anergy)
  - Depressed T-cell proliferation, NKC cytotoxicity, macrophage cytotoxicity

- **Inability to tolerate antineoplastic treatments**
  - Toxicities more severe—treatment delays, higher costs

- **Postoperative complications**
  - Wound infection, healing—quality of life, cost
Surgical Insult on Malnourished Cancer Patients

- Initiates complex series of metabolic events as response to surgery. Energy demands increase with coextant pneumonia/wound infection/sepsis.
- Increased metabolic needs when oral intake is greatly diminished—well tolerated by healthy with glucose, fluid, and electrolyte repletion.
- Glycogen depleted in 24 hours followed by catabolism of protein (muscle and visceral).
- Fat energy is not available in acute phase (vs. starvation).
Assessment of Nutritional Status

- History & physical exam
- Anthropomorphic measurements
- Skin testing
- Laboratory values
- Weight loss as percentage of baseline weight
- Dietitian referral
Laboratory Values

- Serum Albumin—levels fall only after significant protein depletion has occurred. Half-life is 20 days.

- Serum Transferrin—more sensitive marker of marginal protein depletion. Half-life is 8 days.

- Can also evaluate prealbumin, retinol-binding protein
Symptomatic Treatments

- **Mucositis**
  - Topical medications (analgesics, antifungals, etc.)
  - Baking soda and saline rinses
- **Dental care**
- **Xerostomia**
- **Nausea/Vomiting**
  - Ondansetron, Granisetron
- **Anorexia**
  - Megestrol (80-160mg qid), THC
- **Odynophagia**
Nutritional Counseling

- Appropriate for patients with mild to moderate malnutrition who tolerate PO (need 40 kcal/kg/D)

- High-calorie, high-protein foods
  - Butter, whole milk, instant breakfast, ice cream, cream, meats, legumes, mayonnaise, eggs

- High fluid intake

- Foods high in Vitamins A,C,E

- XRT/Chemo diet modification
  - Bland, avoid red meat & fruits, soft consistency
Oral Supplementation of Diet

- Appropriate for patients who are unable to meet their caloric needs through food choices.
  - Expense, intolerance over time
- Commercially-available enteral formulas
  - Intact proteins, complex carbohydrates, fats, vitamins, trace elements (caloric density usually 1 to 2 kcal/cc)
  - Lactose-free
  - Usually chosen based on palatability
- Specialized formulas
  - Fiber-added, hepatic, renal, diabetic, immunodeficient
Enteral nutrition

- Nasogastric feeding tube
- Gastrostomy feeding tube
  - Open, endoscopic, fluoroscopic, “push” vs. “pull”
- Jejunostomy feeding tube
  - Open, endoscopic, fluoroscopic
Nasogastric Feeding Tubes

- Appropriate for patients who are unable to ingest sufficient calories despite supplementation and who will need enteral nutrition for less than 30 days
- May bolus feed, but less aspiration with continuous
- Need replacement when narrow lumen clogs (about every 10-15 days)
- Patient tolerance/pressure necrosis
- Reflux, depressed cough reflex, GI dysfunction
Gastrostomy or Jejunostomy

- Appropriate for patients who will need longer-term enteral feeds (at least 2 weeks)
- Fewer complications than NGT feeding (aspiration, dumping syndrome, tube obstruction, nasal damage)
- Can be easily maintained and used in outpatient setting, less cosmetic impact
- Ideal for bolus feeds (Gastrostomy)
- Complications: leak, infection, dysfunction, pain
Jejunostomy

- Indicated for patients who need prolonged enteral feeds and who have had previous gastric surgery, severe GERD, gastric outlet obstruction
- Decreased aspiration shown in intensive care patients when compared to gastrostomy
- Does not permit bolus feeds, though continuous rate can reach as high as 250ml/hr.
NGT vs. Gastrostomy

Gibson, et al studied NGT vs. Gastrostomy one day before surgery for patients with Stage III/IV SCCA of larynx, tongue, OC, tonsil.

Gastrostomy group had significantly shorter hospital stay (60+% reduction for tonsil and laryngeal cancers).

Saunders, et al showed patients tolerated gastrostomy long-term with high patient satisfaction and no nutritional rehospitalization.
Parenteral Nutrition

- Appropriate for patients who are severely malnourished or have contraindications to enteral feeding—"If the gut works, use it"
- Composition: amino acids, dextrose, fat emulsions, vitamins, trace elements, electrolytes. May add medications (insulin, antihypertensives, etc.)
- Requires central venous line and daily laboratory evaluation and composition adjustments
- Complications: secondary to central venous access, infection and sepsis, metabolic complications
Parenteral nutrition

Transition from parenteral to enteral should be gradual with monitoring for hypoglycemia.

Should attempt to wean before general anesthesia (inadvertent hypo/hyperglycemia, hypotension)

Clinical experience indicates pretherapeutic treatment has more impact on course, though both pre and post-therapeutic TPN showed good results. (Dudrick, et al)
Impact of Nutritional Support

Bertrand, et al, and Van Bokhorst-de Van der Schuer et al showed that patients who were given 7-10 days of preoperative enteral nutrition had a 10% reduction in morbidity and improved quality of life.

Scolapio, et al showed that PEG placement before XRT resulted in prevention of weight loss, treatment interruption, and hospitalization for hydration.
Schantz, et al showed increased risk of head and neck cancer in patients with cryptoxanthin, lycopene, and Vitamins C & E-deficient diets (free radical scavengers)

Immune-enhancing enteral formulas