Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 6s, https://carcinogenesis.com/

Enteral Nutrition Management in Indian Context: Review for Head and Neck Cancer Patients and Implementation Strategies

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ABSTRACT

Background: The unique challenges of providing nutrition for head and neck cancer patients mainly stems from the need to use alternative care methods, especially using nasogastric tubes. This literature review highlights the controversial issues related to the accurate identification of baseline nutritional status and the provision of adequate nourishment through nasogastric tubes to head and neck cancer (HNC) patients undergoing intensive treatments like radiation therapy and chemotherapy. This discussion highlights the importance of developing effective nutritional management, need for early intervention, details of nutritional requirements, kinds of support available for symptoms like dysphagia and mucositis, and strategies to enhance treatment tolerance and promote wound healing.

Method: This comprehensive narrative was constructed by the key findings from empirical evidence sourced from public databases like PubMed, Google Scholar, and Embase via literature search using primary title and keywords. The manuscript then went a rigorous process of screening, study quality assessment and evaluation using selection criteria before final appraisal.

Conclusion: The study emphasizes the importance of a multidisciplinary approach to improve treatment outcomes and reduce the risks of malnutrition. Alternatively, the limitations of the selected sources include that they do not provide a comprehensive overview of the types of literature fully dedicated to specific disciplines. It should also focus on using the evidence-based approach in HNC surgeries. Therefore, a patient-centered nutritional care may serve as the principal way of achieving improved outcomes for critically ill patients.

KEYWORDS: *Head and neck cancer, nasogastric tube, malnutrition, cancer cachexia, Tumor Lysis Syndrome*

How to Cite: Shubhangi Ghosh, Koyel Pal Chowdhury, Sreejita Chatterjee, Animesh Dey., (2025) Enteral Nutrition Management in Indian Context: Review for Head and Neck Cancer Patients and Implementation Strategies, *Journal of Carcinogenesis*, *Vol.24, No.6s*, 563-569.

1. INTRODUCTION

Head and neck cancer (HNC) accounts for over 650,000 cases with 330,000 mortality rates worldwide [1], resulting in mastication and swallowing dysfunction, eating disabilities, among others, which calls for alternative nutritional support mechanisms like nasogastric tubes (NGTs). Commonly, doctors insert NGTs via the nose, extending beyond the nasopharynx, oropharynx, and esophagus to the stomach [2]. NGTs aim to achieve gastric decompression, address ileal or intestinal obstruction, and provide medication or nutrition through enteral feeding for patients who cannot tolerate oral intake, such as those with dysphagia or critical illness [3].

However, establishing a baseline nutritional status through this method presents multifaceted challenges that may be worsened by the aggressive nature of cancer treatments, as the likes of radiation therapy and chemotherapy, which further compromise oral intake collectively and impede adequate nutrient intake. Managing nutrition predominantly on nasogastric tubes after assessing the patients is a critical aspect, emerging as a vital component in the nutritional care paradigm.

Malnutrition contributes to significant mortality and morbidity in HNC patients, affecting 50 to 80% of medical oncology patients, based on the specific assays used or the demography studied [4].

The etiological factors contributing to HNC are multifactorial, including tobacco or alcohol abuse for oral or laryngeal carcinomas and oncogenic viruses such as Epstein-Barr virus or human papillomavirus (HPV), chiefly HPV-16 for pharyngeal carcinomas [4]. The management of HNC poses a unique set of hurdles, prominently including compromised swallowing function due to the location and aggressive nature of the malignancy. NGTs serve as lifelines for patients facing difficulties in oral intake, providing a route for delivering essential nutrition and hydration.

The impact of effective nutritional management extends far beyond addressing mere nutrient deficiencies. It profoundly influences treatment tolerance, wound healing, and overall patient outcomes, significantly improving the quality of life during the arduous cancer treatment journey.

As a critical aspect of their palliative care, a comprehensive nutritional regimen tailored to meet individual nutritional needs plays a pivotal role in mitigating challenges alike and constitutes the cornerstone of nutritional support. A holistic patient-centred approach that optimizes nutritional support, addresses challenges, customizes diets, and leverages supplements effectively is essential to combat malnutrition, improve treatment results and quality of life in this patient population.[17]

2. METHODS:

1. *Literature review strategy*

This literature review incorporates a systematic search strategy for screening records based on the primary title and abstract of the selected topic.

2. *Inclusion and exclusion criteria*

The second step involves choosing the selection or eligibility criteria for inclusion of data in the article, removing any duplicate records based on the exclusion criteria, and adding original peer-reviewed studies by adjudging the intervention and control groups from both randomized and quasi-randomized controlled trials, as well as review papers.

3. Data extraction and analysis

This stage entails data analysis, which coalesces results from meta-analyses of multiple clinical outcomes relating HNC and tube feeding. Consequently, it encompasses full-text retrieval of all potentially eligible articles, curating relevant information from different literature, and sorting the results into a categorical system for ease of comprehension and implementation. It also involved delving into the psychological and nutritional protocols used in past cohort studies that examine the effects of tube feeding, palliative care, or cancer etiopathological parameters.

The research delves into the psychological and nutritional methods employed in retrospective cohort studies that investigate the impact of tube feeding, palliative care, or cancer etiopathological factors. The process included guided data collection and repeatedly comparing the data matrix to each category of findings across different studies to summarize and combine the information, as well as cluster recurrent themes and sub-themes after coherent critical analysis of the subtopic using retrieved literature.

1. Study quality assessment and appraisal

The collected articles were carefully approbated and examined reiteratively to identify important methods and synthesize the results.

3. DISCUSSION:

Response assessment empirically claims the rationale and impetus of corrective cancer screening and nutritional assessment to be linked with reduced inflammation, stress, elevated physical activity, and ameliorated symptom relief and response rate [5].

Plonowaska et al. (2021) assessed the necessity of nasogastric feeding after transoral robotic surgery used for diagnosing and treating oropharynx squamous cell carcinoma via clinicopathological attributes, and found that such feeding is required for a duration exceeding 14 days in cases of bilateral neck dissections [6]. Tube insertion when employed during ongoing treatments like chemoradiation or additional radiotherapy, demonstrates the delay in tube feeding duration [7]. NGT has emerged as a vital component in the nutritional care paradigm for patients undergoing HNC treatment.

According to the Enhanced Recovery After Surgery (ERAS) Protocol, pre- and postoperative nutritional management

plays a vital role in patients' early mobility, gag reflex, gut motility, smooth metabolism, and better quality of life. As per the International Guidelines of Critical Care (ASPEN), the Nutrition Care Process (NCP) should be initiated within 24-48 hours of admission, and early enteral nutrition intervention escalates the recovery rate in critically ill patients. In HNC surgery, the patient's nutritional requirements are exceptionally high due to diminished nutrient deposition, nutrient losses during surgery, inability to chew or ingest, absence of gag reflex, altered metabolism, and immobility during recovery. The high incidence of malnutrition results from several factors, including the severity of the tumor, critical consequences before and after surgery, limited nutritional intake, significant muscle mass loss, impaired metabolic function, and organ failure.

So, the goal of nutritional intervention is to evaluate the risk of malnutrition, provide early nutrition support, adjust dietary recommendations, and track the health outcomes of the patients being monitored [22]. Treatment plans to document the patients' clinical condition and assess the nutrition risk first. Then, the individual diet would be initiated orally or via nasogastric tube based on the severity of malnutrition, surgical complications, predominant etiology, secondary infections, and other root causes. The intervention may sustain the quality of life for the patients and reduce the ICU stay as well.

Common eating disorders such as xerostomia, mucositis, dysgeusia, odynophagia, dysphagia, osteoradionecrosis, tissue fibrosis, stricture formation, and so forth have been reported so far. These morbidities have immediate and long-term implications for patients' nutritional status and quality of life [8].

Conventional radiotherapy treatments pose a threat of malnutrition like sarcopenia [9].

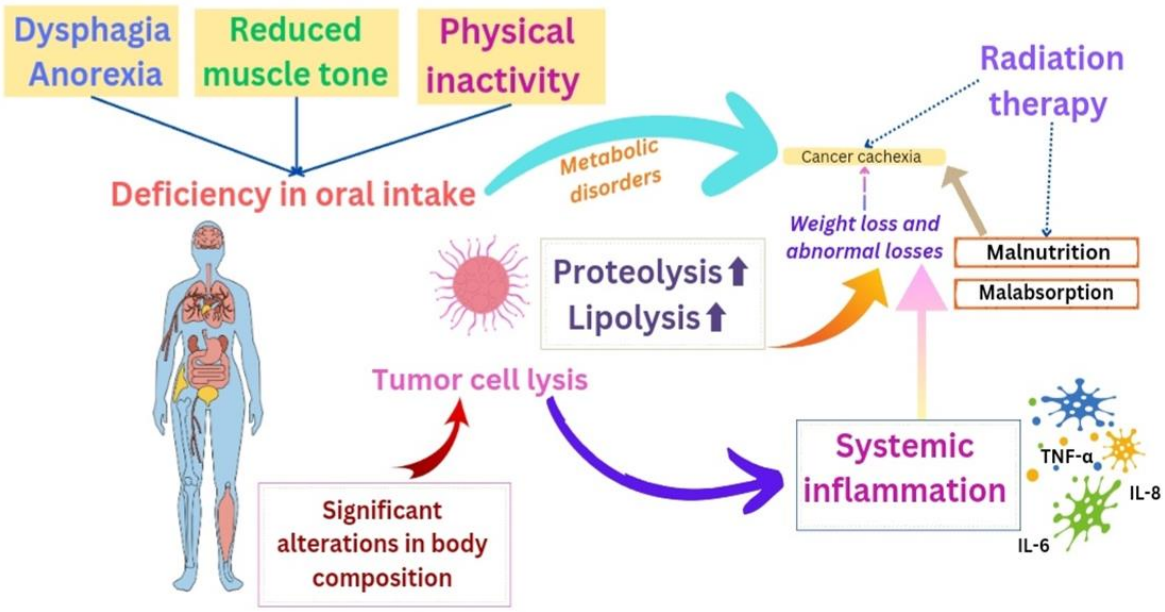

Figure 1: Illustration of the multifaceted etiology and nutritional deficiencies associated with head and neck cancer

3.1 Nutritional Requirements in Head and Neck Cancer

In most cases of HNC, patients are often malnourished before they begin treatment. Additionally, these patients experience side effects from cancer therapy, including taste changes, dry mouth, mucositis, anorexia, nausea, vomiting, and diarrhea, which can lead to malnutrition caused by cancer-related factors. Therefore, understanding and addressing the nutritional needs of such patients at a very early stage is key in preventing the development or worsening of a malnourished state at any point during treatment. This, in turn, will enhance their nutritional status, treatment tolerance, wound healing, overall recovery, and quality of life during and after such patients' treatment [21].

A. Understanding the Specific Nutritional Needs during cancer treatment and their importance in supporting recovery

Cancer is a degenerative disease that is characterized by several complications, such as

a) **Cancer Cachexia:** This is a condition that triggers tissue wasting, characterized by involuntary loss of lean body mass with or without wasting significant adipose tissue. Cancer cachexia is also followed by depletion of cardiac muscle, even though other visceral organs tend to be preserved [10, 20].

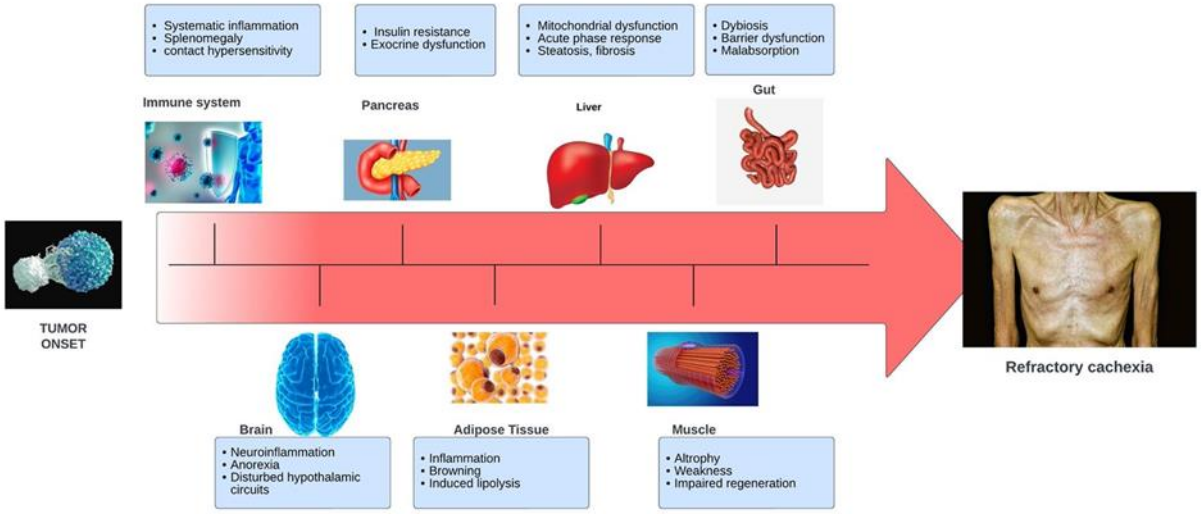

Figure 2: Pathophysiology of cancer cachexia

Tumor Lysis Syndrome: Tumor lysis syndrome (TLS) is an oncologic emergency that is caused by tremendous tumor cell lysis with the release of large amounts of potassium, phosphate, and nucleic acids into the systemic circulation [11]. Hyperuricemia, hyperphosphatemia, hyperkalemia, and secondary hypocalcemia follow this condition.

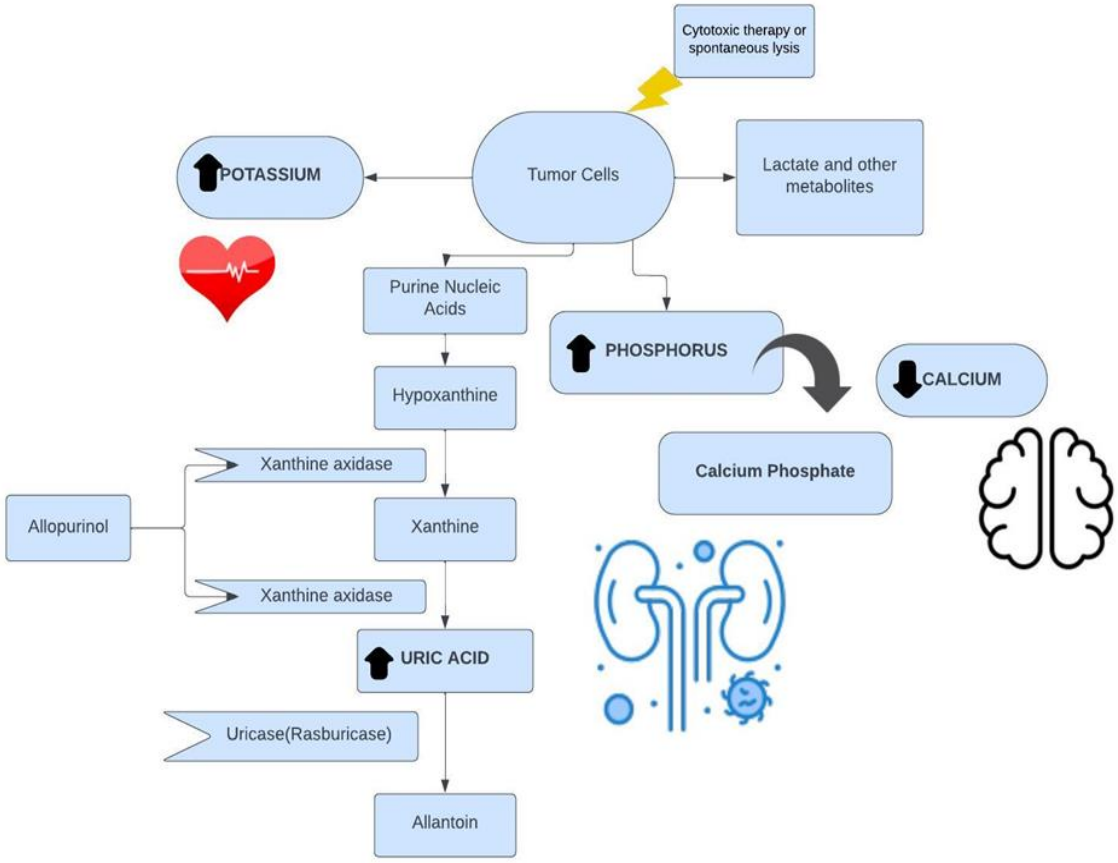

Figure 3: Metabolic changes in Tumor Lysis Syndrome

The individual nutrient requirements are as follows: [12]

a) **Energy:** Energy requirements are high in cancer patients because of a hypermetabolic state and to spare proteins for the healing of tissues and promoting weight gain. Energy requirements for cancer patients are as follows:

- ✓ Normometabolic patients: 25-30 Kcal/kg/day
- ✓ Hypermetabolic patients: 30-35 Kcal/kg/day

✓ Obese patients: 21-25 Kcal/kg/day

b) **Protein:** Adequate intake of protein is essential to prevent or reduce negative nitrogen balance and help meet the increased requirements for protein synthesis during chemotherapy.
c) Guidelines for protein requirements are as follows:
✓ Non-stressed: 1.0-1.2 g/kg/day
✓ Undergoing chemotherapy: 1.2-1.5g/kg/day
✓ Hypermetabolism: 1.5-2.0 g/kg/day

d) **Fat:** Fat intake should be moderate Fat intake should be within 30% of total energy intake. Fats help make meals calorie dense and improve the palatability of meals. It is preferable to include vegetable oils, especially those that are rich in medium-chain triglycerides like olive, coconut, and safflower oil. Red meat, ghee, and lard should be restricted.

e) **Carbohydrates:** 50-55% of total calories should come from carbohydrates, preferably complex carbohydrates. Some patients may suffer from hyperglycemia, inclusion of soluble fibre rich foods is helpful in such cases.

f) **Vitamins:** B Vitamins are essential to promote energy and protein metabolism. Vitamins A, C, and E are required for tissue synthesis and cell differentiation. Vitamin deficiencies occur as a result of inadequate food intake, malabsorption, and chemo- and radiation therapy. Multivitamin supplementation with dosages not exceeding 1–2 times the dietary recommended intake values may be beneficial.

g) **Minerals:** Among minerals, zinc, calcium and selenium supplementation is recommended. A potassium-restricted diet is suggested in case of hyperkalemia, caused due to tumour lysis [13]. A low potassium diet is defined as a dietary intake of 2-3g/day. Dietary management for potassium clearance is done using insulin lantus.

B. **Effects of cancer treatment on swallowing and eating abilities leading to challenges in meeting nutritional goals**
Treatment of HNC and neck cancer mostly involves a combination of surgery, radiation, and chemotherapy. The surgery may include partial or total glossectomy and mandibulectomy; injury to teeth may occur as well. Sometimes surgery, followed by radiation therapy, can lead to loss of taste or dryness of mouth.

C. Nutritional Strategies for Management of Cancer Treatment-Related Symptoms:
Tumors in the upper aerodigestive tract cause malnutrition during perioperative care, and total body weight drops by about 20% during the therapeutic and post-therapeutic stages [13, 23, 24].

Complications	Dietary Management
Alterations in taste, smell or anorexia	Small frequent nutrient dense meals are to be given, ensuring avoidance of drinking fluids along with meals, since it can make members feel bloated.
Dysphagia	Thickened porridges and soft or ground pureed foods are recommended.
Nausea and vomiting	Low Fat, Low fibre meals are recommended. Feeds should be of cold, soothing consistency, spicy foods and caffeine is to be avoided. It is recommended not to eat 1-2 hours before chemotherapy.
Stomatitis and mucositis	Soft, non- irritating foods are to be taken. Hot preparations, spicy foods and acidic foods are to be avoided.
Xerostomia	Small amounts of food are to be drunk or swallowed at a time, water or fluid is to be sipped after each bite; soft or pureed foods are to be tried. Hard candies can be sucked on.

Table 1: Nutritional Strategies for Management of Cancer Treatment-Related Symptoms

3.2 Nutritional Management Strategies: Monitoring and Assessment of Nutritional Status

The diet prescription should be individualized based on the patient's type and area of surgery, rate of infection and inflammation, history of comorbidities, severity of malnutrition, existing signs and symptoms related to present diseases. Nutrition assessment aids in investigating the overall nutrition risk and status of gut functioning. Corroborating information regarding dietary history and identifying the food gap and nutrition mismanagement are the primary tasks after proper assessment. Amidst the screening and assessment process, the referred dietitian can understand the clinical state of the patient and can predict the upcoming difficulties before reaching the nutritional goals. The diet formulation is based on the treatment protocol, whether it is a minor surgery, major operation, adjuvant, or neoadjuvant therapy [19]. During pre-surgery, the diet prescription should consist of balanced macronutrients to preserve the energy as glycogen, evade gluconeogenesis, restore muscle mass, fuel the body, and restrict proteolysis and lipolysis. The concept of carbohydrate load is still dismissed in Eastern India; however, ample carbohydrate consumption before surgery effectively aids in averting hypoglycemic episodes or distress from analgesics in the patients [15] . A liquid diet 2 hours before surgery can

ensure stomach clearance as well. The Nil per Mouth (NPM) remains unchanged or unclear in many setups, thereby affecting the patients' recovery. Other significant parameters to be noticed are delay in wound healing, blockage in mastication, organ insufficiency, insulin resistance, and huge oxidative stress. Within 6 hours, plain water and then a liquid diet, preferably polymeric supplements, must be recommended. One day later, you can initiate a semi-solid diet. If the oral route is not feasible due to surgery or any strictures, enteral feed is the prior option [14]. However, in some cases, feeding can be given through an IV if there are issues like an intestinal fistula, nasal bleeding, ongoing enteritis, a non-working gastrointestinal pathway, or problems with electrolytes, lipids, or liver function. Therefore, irrespective of the circumstances, artificial nutrition intervention must not be withheld during alarming situations. Enteral nutrition through an NGT or percutaneous endoscopic gastrostomy (PEG) tube can be used along with parenteral nutrition to meet nutritional needs, cushion the gastrointestinal tract, and help it revive quickly [25]. The same tactics must be followed before withdrawing EN and initiating oral treatment. Chyle leakage is another threat to be resolved. We recommend administering the medium-chain triglyceride parenterally. Glutamine may be considered as a potential option for immunotherapy. Vitamin E and zinc supplements are another modular formula that can be prescribed. At times, severe nausea and simultaneous vomiting pose a significant challenge, necessitating the implementation of rehydration therapy. Oral hygiene is a crucial component of recovery. It's important to note that a scientific supplement is essential, but if it's unavailable or unaffordable, you can include some kitchen feed for a faster recovery.

Some food particles tend to get stuck in the throat due to surgery, so water may be added with food particles to thicken and make it consumable. Blenderized feed, barley, gram flour (sattu), thickened soup, pureed khichdi, pulpy fruit juice, whey water, payasam, rice starch with rock salt, rice kanji, lassi from sour curd, and custard are the common practices in Eastern India. In Eastern India, the quality of the kitchen, the estimated budget for each patient, scientific cooking procedures, the number of feeding practitioners, one-to-one nursing care, and most importantly, nutrition awareness are all significantly compromised.In addition, limited research, inefficient resources, inactive authorities who seemingly downplay the importance and entity of the subject and its implications, make the patients' clinical outcome at stake.

4. CONCLUSION

The nutrition practice based on theory is inapplicable under the particular geographical area, partly due to unclear knowledge and aptitude. However, the goal of nutrition care is achieved effectively when interventions are done timely with close monitoring and follow-ups, considering biochemical and clinical factors, patients' tolerance and syndrome, and both medical and palliative care. Nutrition and psychological counseling to the patients and patients' party through caregivers, physicians, nurses, and medical professionals are equally beneficial for effective outcomes on the multimodality treatment algorithms [13]. Lack of communication, coordination, knowledge exchange, and other liabilities can contribute to an unfortunate or unfair illustration, potentially damaging or disabling one's life. To witness a quantum leap in this arena, more upgraded evidence-based practice must emerge in HNC surgery. Customizing and optimizing these interventions necessitates a multidisciplinary and collaborative approach involving dietitians, oncologists, healthcare providers, and nursing staff to align the regimen to each patient's individual evolving needs and mitigate the risk of malnutrition [16].

REFERENCES

[1] Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2018; 68(6):394-424.

[2] Vadivelu N, Kodumudi G, Leffert LR, et al. Evolving Therapeutic Roles of Nasogastric Tubes: Current Concepts in Clinical Practice. *Adv Ther*. 2023; 40(3):828-843.

[3] Mody MD, Rocco JW, Yom SS, Haddad RI, Saba NF. Head and neck cancer. *Lancet*. 2021; 398(10318):2289-2299.

[4] Tong H, Isenring E, Yates P. The prevalence of nutrition impact symptoms and their relationship to quality of life and clinical outcomes in medical oncology patients. *Support Care Cancer*. 2009; 17:83–90.

[5] Arends J, Baracos V, Bertz H, et al. ESPEN expert group recommendations for action against cancer-related malnutrition. 2010. 2017; 36(5):1187-1196.

[6] Plonowska KA, Ochoa E, Zebolsky AL, et. al. Nasogastric tube feeding after transoral robotic surgery for oropharynx carcinoma. *Am J Otolaryngol*. 2021; 42(3):102857.

[7] Ye X, Chang YC, Findlay M, Brown T, Bauer J. The effect of timing of enteral nutrition support on feeding outcomes and dysphagia in patients with head and neck cancer undergoing radiotherapy or chemoradiotherapy: A systematic review. *Clin Nutr ESPEN*. 2021; 44:96-104.

[8] Ackerman D, Laszlo M, Provisor A, Yu A. Nutrition Management for the Head and Neck Cancer Patient. *Cancer Treat Res*. 2018; 174:187-208.

[9] Powrózek T, Dziwota J, Małecka-Massalska T. Nutritional Deficiencies in Radiotherapy-Treated Head and Neck Cancer Patients. *J Clin Med*. 2021;10(4):574.
[10] Mary Marian, Susan Roberts. Clinical Nutrition for Oncology Patients. Jones and Bartlett Publishers, Sudbury, Massachusetts, 2010; 463.
[11] Mahan LK, Escott-Stump S, Raymond JL. 2017. Medical Nutrition Therapy for Cancer Prevention, Treatment, and Survivorship. In Krause's Food and the Nutrition Care Process. 14th Ed. Elsevier, USA; pp. 729-754.
[12] Richard A. Larson, MD, Charles-Hon Pui, MD, Tumor lysis syndrome: Prevention and treatment. 2023.
[13] Müller-Richter U, Betz C, Hartmann S, Brands RC. Nutrition management for head and neck cancer patients improves clinical outcome and survival. *Nutr Res*. 2017; 48:1-8. doi: 10.1016/j.nutres.2017.08.007.
[14] Alshadwi A, Nadershah M, Carlson ER, Young LS, Burke PA, Daley BJ. Nutritional considerations for head and neck cancer patients: a review of the literature. *J Oral Maxillofacial Surg*. 2013; 71(11):1853-60.
[15] Talwar B, Donnelly R, Skelly R, Donaldson M. Nutritional management in head and neck cancer: United Kingdom National Multidisciplinary Guidelines. *J Laryngol Otol*. 2016; 130(S2):S32-S40.
[16] Epstein JB, Huhmann MB. Dietary and nutritional needs of patients undergoing therapy for head and neck cancer. *J Am Dent Assoc*. 2011; 142(10):1163-7.
[17] Prevost V, Joubert C, Heutte N, Babin E. Assessment of nutritional status and quality of life in patients treated for head and neck cancer. *Eur Ann Otorhinolaryngol Head Neck Dis*. 2014; 131(2):113-20.
[18] Coiffier B et al. Guidelines for the management of pediatric and adult tumor lysis syndrome: an evidence-based review. *J Clin Oncol*. 2008 Jun 1;26(16):2767-78.
[19] The American Cancer Society. 2008. Nutrition and Cancer.
[20] Ferrara M, Samaden M, Ruggieri E, Vénéreau E. Cancer cachexia as a multiorgan failure: Reconstruction of the crime scene. *Front Cell Dev Biol*. 2022; 10:960341.
[21] Righini CA, Timi N, Junet P, Bertolo A, Reyt E, Atallah I. Assessment of nutritional status at the time of diagnosis in patients treated for head and neck cancer. *Eur Ann Otorhinolaryngol Head Neck Dis*. 2013;130(1):8-14.
[22] O'Neill JP, Shaha AR. Nutrition management of patients with malignancies of the head and neck. *Surg Clin North Am*. 2011; 91(3):631-9.
[23] Gill A, Farwell DG, Moore MG. Nutrition and Perioperative Care for the Patient with Head and Neck Cancer. *Oral Maxillofacial Surgery Clin North Am*. 2018; 30(4):411-420.
[24] Bartella AK, Kamal M, Teichmann J, et. al. Prospective comparison of perioperative antibiotic management protocols in oncological head and neck surgery. *J Craniomaxillofac Surg*. 2017; 45(7):1078-1082.
[25] Raykher A, Russo L, Schattner M, Schwartz L, Scott B, Shike M. Enteral nutrition support of head and neck cancer patients. *Nutr Clin Pract*. 2007; 22(1):68-73.