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Weight Loss and Sarcopenia in Patients of Head and Neck Cancers Treated with Chemoradiation- Review & Study

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Abstract: ***Locally advanced head and neck cancer shows improved disease free survival state treated with concurrent chemoradiation and is associated with numerous toxicities with substantial changes in body mass and composition.***

Keywords: HNSCC-Head and Neck cancers, Squamous cell carcinoma, HPV-Human papilloma virus, RT- Radiotherapy, CT-Chemotherapy, Sarcopenia- lean body mass.

1. Introduction

Head and neck squamous cell carcinoma is known for its capricousbiological behavior and is characterized by local tissue destruction, early and frequent metastases to the cervical lymph nodes, and a relatively high rate of distant metastases[1]. A large proportion of patients have recurrence of the primary lesionand/or develop a second primary neoplasm even after a effective local therapy. Respiratory and Cardiovascular comorbidities are common, are usually resulting from tobacco and alcohol abuse and/or poor nutrition. Human papilloma virus (HPV) associated Head and neck squamous cell carcinoma is a distinct clinical and biologic entity that responds much better than HPV-negative carcinomas to conventional therapies. However HPV related disease is much less frequent in oral cavity and larynx cancers (<5%) than it is in cancers of oropharynx (40-80%)[2].

According to *International Statistical Classification of Disease and Related Health Problems*, tenth revision is the seventh most common type of cancer, representing about 4.3% of all cases worldwide every year. History evidence of head and neck malignancies has been found in ancient skulls and the real advances in management had to wait advent of comparatively safe and effective anesthesia and surgical excision in 18 century. The majority of Head and Neck Squamous cell carcinoma to be related to tobacco in various forms, betel quid chewing, heavy alcohol drinking, and dietary micronutreint deficiency[2]. Dietary factors are estimated to account for approximately 30% of all cancers in Western countries. Poor diet is a significant risk factor for all head and neck cancers. In the extensive National Institute of Health (NIH) database in the United States found that abdominal adiposity is directly associated with increased risk.

2. Aim

We aim to summarize the current evidence on body composition changes experienced by the patients undergoing concurrent chemo- radiotherapy for head and neck cancers, and examine the impact of these changes on clinical outcomes.

3. Review

Management of HNSCC is still controversial[3]. The Non – surgical management had undergone major changes, including technological advances in radiation delivery for reducing normal tissue toxicity and increasing the dose to for tissue, as well as demonstrating the superiority of concomitant chemo-radio-therapy (CRT) over Radiotherapy alone in definitive and adjuvant settings.

Improvements in CRT, such as the establishment of concurrent platinum based Chemotherapy with external Radiotherapy as a gold standard of primary treatment, as well as addition of induction Chemothearapy and altered fractionation regimens, have increased both survival rates and organ preservation. Advances in aging have allowed for the development of techniques, such as Intensity modulated Radiotherapy, which deliver high doses of radiation precisely to tumors while sparing surrounding tissue.

Approximately 70% of patients with HNSCC will present with locally advanced disease and many treated with concurrent chemotherapy and radiation therapy and is associated with significant toxicities including mucositis, dysphagia, odynophagia, nausea and difficult eating[4]. Despite of these improvements in treatment strategies the prognosis in advanced stages remains largely unsatisfactory owing to locoregional recurrence and dose limiting toxicities which limits the utility of these strategies.

The weight loss experienced by the patients with Head and Neck squamous cell carcinoma undergoing concurrent chemo and radiation therapy is more specifically a change in body composition. Body mass or Body weight is composed of fat, bone, water and lean body mass. The loss of mean body mass accounts for 70% of weight lost during CTRT. Loss of lean body mass in cancer patients is mostly explained by sarcopenia or loss of skeletal muscle.

Skeletal muscle is the largest organ in the body and makes up approximately 50% of total body weight and is essential for movement, strength, balance, body temperature regulation and respiration[5].Maintaining muscle mass involves a balance protein breakdown (catabolism) and muscle synthesis (anabolism). Lean body mass, mostly composed of muscle and can be measured using validated direct and indirect methods.

4. Our Study

Lean Body Mass, mostly composed of muscle, can be measured using both validated direct and indirect methods. Examples of possible technique include bioelectrical impedance, measurement of air displacement plethysmography, dual energy x-ray (cross-sectional imaging on CT or magnetic resonance imaging)[6].

5. Result

Patient undergoing CTRT are often losing more than 5% of their total muscle mass in less than 6 months time which is equivalent to the amount of muscle mass lost in the average, inactive adult over the course of decade.

6. Conclusion

Patient with head and neck cancers under going CTRT experience dramatic shift in their body composition which can negatively impact clinical outcomes.

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