

**SYSTEMIC CHEMOTHERAPY AND LIMITED CONVENTIONAL
EXTERNAL BEAM IRRADIATION FOLLOWED BY
INTERSTITIAL BRACHYTHERAPY IMPLANT BOOST IN
TREATMENT OF ADVANCED CANCER OF THE HEAD AND
NECK**

**THESIS SUBMITTED FOR PARTIAL FULFILLMENT OF
M.D. DEGREE IN RADIOTHERAPY AND NUCLEAR MEDICINE**

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The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. This is followed by a detailed analysis of the data, which reveals several key findings. The results indicate that the proposed model is highly effective in capturing the essential features of the system under study. Furthermore, the analysis shows that the system exhibits a high degree of robustness and stability, which is a significant advantage in practical applications. The paper concludes by highlighting the potential of the proposed approach and suggesting directions for future research.



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Dedication

To my parents, who saved no effort ,money or support to make my life more comfortable and productive , even on the expense of their own happiness.

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Introduction

The term "head and neck cancer" generally refers to those malignancies arise from the surface epithelium of the upper aerodigestive tract. Squamous cell carcinoma, or its variants, is the histologic type in 95% of these cases (SCHNC). At diagnosis, two third of the patients presents initially with local disease have locally advanced disease (T3, T4 and N1-N3). Distant metastatic disease is found in less than 10% of the cases at diagnosis but up to 25% will die with distant metastasis and autopsy series show an incidence of 40%-50%. Treatment options for locoregionally advanced disease remain unsatisfactory. Surgery and/or radiation have long been considered standard therapies, yet the majority of these patients die of locoregional recurrence and a smaller fraction dies of distant metastases.

Surgery alone provides a 5 year locoregional control rate of 25% and an overall survival rates of 17%-29%. Most of these patients also receive adjuvant postoperative radiotherapy especially those with stage IV disease, nodal involvement and those with positive surgical margins. Despite these aggressive and often deforming therapeutic interventions, the over all results in these patients are poor, more than 60% of cancers recur locoregionally, approximately 20% of patients develop distant metastasis and 70% die within 5 years. Even considering the 30% of patient alive at 5 year, not all are free from the disease. Radiotherapy alone is commonly used for patient with inoperable and /or unresectable stage III or IV disease. However it remains highly palliative. With radiation therapy alone, the local control rate achieved in these patients approaches 50% depending on tumor size, nodal involvement and the site of primary tumor, but the recurrence rate is high. The 5 year locoregional control rate is approximately 15%, 5 year survival rate does not exceed 20% and the median survival time is 12 months. This is mainly due to the insufficient radiation dose that can be delivered to the tumor because of the tolerance of the surrounding normal tissues. Also, therapies of locally advanced head and neck cancers are often associated with considerable morbidity in the form of severe deformities, impaired speech and swallowing, osteoradionecrosis, mucositis, impaired nutrition, disturbed body image and a high suicide rate.

Given these unsatisfactory results, investigation of new approaches for improving local regional control is justified. Several different radiation strategies have been used in attempts to improve the therapeutic ratio. These include accelerated fractionation (AFRT) and hyperfractionation (HFRT). Early in 1980s new combinations

essentially cisplatin - 5 fluorouracil(5FU) with very high primary tumor and lymph node response rates , led to a re-evaluation of the role of chemotherapy in the treatment of locally advanced head and neck cancer.

Aim of the work:

With introduction of chemotherapy early in the treatment followed by limited external conventional photon irradiation then interstitial Iridium-192 implant to facilitate the delivery of a high dose of radiation (up to 90 Gy) to the tumor and spare the surrounding normal tissues have been investigated with the goals of improved survival , improved local control , reduction of distant metastasis and organ preservation with subsequent retention of important functions such as speech and swallowing by avoiding extensive deforming surgery. These advantages offer patients the potential for better quality of life , even if the survival duration is not significantly altered by chemoradiotherapy compared with traditional therapies.