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## Treatment of Head and Neck cancers with modulated radiation at an Indian Centre

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### Introduction:-

Head and neck cancers (HNC) constitute one of the most common cancers in the developing world. In India, approximately 556,400 cancer deaths in the year 2010, the most fatal cancers were HNC, including malignancies of the oral cavity, lip, oro-pharynx, nasopharynx and hypopharynx. Over 60% patients present with locally advanced disease. RT planning and treatment delivery for HNC has come a long way from being two-dimensional to three dimensional. Use of highly conformal techniques such as intensity-modulated radiotherapy (IMRT) and image guided radiotherapy (IGRT) have allowed radiation oncologists to deliver curative radiation doses to the tumour with higher accuracy, thereby restricting the dose to organs at risk and consequently reducing treatment-related morbidity. In developing countries there are limited centres with such advanced facilities. The present study evaluated the survival outcome of radical and post-operative radiotherapy (RT) among patients with head and neck cancer (HNC) treated either with IMRT or volumetric modulated radiotherapy (VMAT) at our Institute.

### Materials and methods:

1030 head and neck (HNC) cancer patients were treated between Feb 2010 to Sept 2016 patients, with at least 1 years of follow up post treatment were taken up for this study. A cohort of 696/1030 patients treated till Dec, 2014 were taken up for this study. 608/696 HNC patients were available for follow-up and analysis. The subsites included were oral cavity, oropharynx, hypopharynx, larynx and nasopharynx. Eligible patients included those treated with radical or post-operative RT between 2010 to Dec 2014. More than 90% patients received modulated radiotherapy (IMRT or VMAT) with/without concurrent chemotherapy as per indications. All patient data was extracted from electronic hospital information system and Mosaic-intranet. All patients underwent dental prophylaxis and nutritional counselling pretreatment. After informed consent, patients underwent mould room procedure (immobilization in thermoplastic mask) and simulation with contrast-enhanced CT scan with 3-mm slice thickness. IMRT or volumetric modulated arc therapy without simultaneous integrated boost plans were generated on CMS MONACO® v. 3.0 (Elekta, Stockholm, Sweden). Target volume and normal structures were delineated as per departmental protocol (RTOG and Gregoire guidelines). The treatment plans were verified and authorized after cross-sectional and dose-volume histogram analysis of the PTV and organs at risk dose assessment. RT was delivered with 6-MV photon beams on a linear accelerator. Patient alignment was checked online before treatment by using cone-beam CT. Online corrections were applied if there was deviation beyond the threshold limit 3-5 mm. In 10% cases a re-planning scan was done at 4 weeks to account for shrinkage of the tumour volume and an adaptive approach to treatment was applied. Demographic parameters and disease related factors were analysed. Disease free survival (DFS) was calculated from end date of radiotherapy till last follow up or last date of disease control. Overall survival (OS) was calculated from date of registration to last follow up date if alive. The primary end point was survival. The statistical analysis were performed using SPSS version 20.0 and Kaplan Meir method was used for calculation survival. Toxicity was recorded as per CTC version 3.0 criteria. For the ease of analysis, we divided the entire cohort into 3 broad groups viz. Oral Cavity, Oropharynx-Nasopharynx and Hypopharynx-Larynx.

### Results:

Among the evaluable patients, the median age was 60 years (range: 11-90 years) with a male preponderance (Male 513/608). Majority cases had a squamous cell carcinoma (568/608). The subsites treated were oral cavity 32%(224), oropharynx 23%(161), larynx 20%(139), hypopharynx 8.9%(62), nasopharynx 5.9%(41) and 69 miscellaneous. RT intent was radical (386) and post-operative (222) with 60% receiving concurrent chemotherapy.

There were 77% patients with advanced stage disease. With a median follow up of 2.5 years, median OS was 19 months and median DFS was 1 year among evaluable patients. The 2 year, 3 year and 5 year OS was 78%, 70% and 55% respectively for all stages combined. The early stage OS at 2 and 5 years was 90% and 65% respectively (p=0.001). As per sub site early stage larynx had best OS at 2 years; more than 90% and hypopharynx had worst 2 years OS (65%). Among the evaluable patients, 110 patients developed disease recurrence with 70% recurrences being loco-regional. They received surgical salvage, chemoradiation of hypofractionated RT depending upon the recommendation of multidisciplinary tumour board decision.

Conclusion:-Although >75% patients presenting at a late stage of disease definitive well planned and executed radiotherapy resulted in overall survival of 78% at 2 years; 70% at 3 years and 55% at 5 years. The next phase is to identify the bio-markers and smoking/non-smoking cohorts in head and neck cancers and their outcomes post treatment.

## **Country**

INDIA

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