

Frequency of Radiotherapy Induced Hearing Loss in Patients of Head and Neck Cancers

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Abstract:

Background: Radiotherapy is a treatment modality of Head & Neck cancer. Hearing loss is a common complication of radiation treatment, which hampers the quality of life of patients.

Methods: An institutional based prospective study was carried out in ENT opd of our institution. Patients with newly diagnosed Head & Neck cancer were included in the study. 41 patients were evaluated pre & post radiotherapy in different settings.

Results: Oropharynx (41.46%) is the most commonest site of H and N cancer in our study, followed by Larynx (24.4%). Hearing loss was found in 9 patients (21.95%). Among them conductive hearing loss was seen in 6 patients (66.6%) and mixed type of hearing loss was seen in 3 patients (33.4%).

Conclusion: For better rehabilitation of Head & Neck cancer patients undergoing radiotherapy, hearing loss assessment should be done.

Keywords: Radiotherapy, Head & neck carcinoma, Hearing loss.

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I. Introduction

Carcinoma of head and neck comprises about 5% of all the cancers worldwide. In India, oral cavity & pharyngeal carcinoma are the common head and neck cancer. Most of the head and neck cancers present as locally advanced disease. The standard treatment modality for localised disease is surgery followed by postoperative radiotherapy. Radiotherapy as a single modality is also a common treatment modality¹. The ionizing radiation in radiotherapy, while affecting the neoplastic tissue, also causes destructive effect on the healthy tissue. The unwanted effects on various tissue depends on the structure involved, treatment rapidity, total dose and type of radiation, age of the patient at treatment and variation of individual tolerance. Otologic complications are frequently encountered in head & neck cancers, as both the ears and the eustachian tubes are included in the radiation field. Serous otitis media has been reported starting from 2nd week in around 16% cases. The cochlea is also included in the radiation field leading to sensorineural deafness in around 42±3%^{2,3,4}. Quality of life of patients undergoing radiotherapy is decreased due to hearing loss. In this present study the frequency of radiotherapy induced hearing loss in patients of histologically proven head and neck cancer, was assessed among population of Burdwan, West Bengal.

II. Materials & methods

After getting Institutional Research Ethics Committee clearance, all newly diagnosed patients with head and neck cancer attending ENT OPD of Burdwan Medical College & Hospital, Burdwan in the time period between June 2016 to Dec 2017 were selected for this study. The enrolled patients (53 in no) were assessed thoroughly before starting, during and at completion of treatment on the following pattern: detailed history, examination, investigations, otology and neuro otologic assessments. PTA was done in 6 settings-

1. before the start of treatment
2. during mid treatment
3. at the end of the treatment,
4. 1 month after completion of RT
5. 2 month after completion of RT
6. 3 month after completion of RT

Impedance audiometry was done if required at start, during and completion of treatment. All the patients included in the study underwent carboplatin based concurrent RT. The radical doses given was 60-70

Gy. The treatment was given on the Co-60 teletherapy machine. None of the patients received adjuvant, neoadjuvant, or concurrent chemotherapy.

III. Results

Total 53 patients were included in the study. But 12 patients were lost in follow up, so their result were not included .

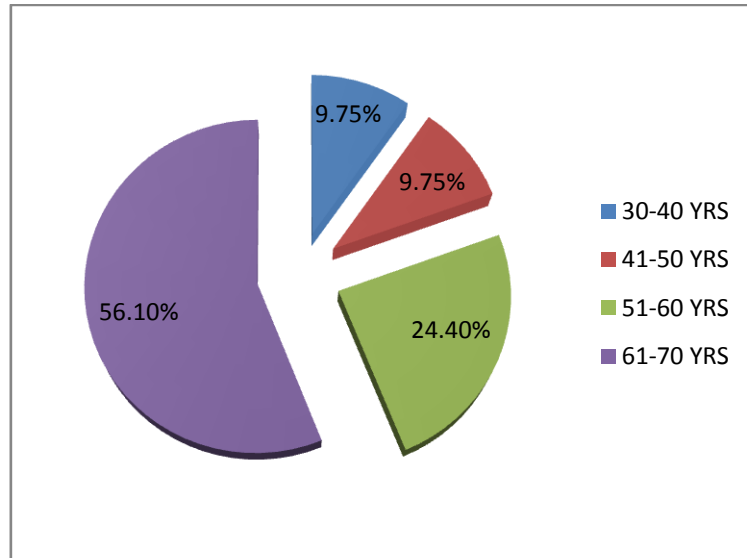


FIG 1: Age distribution of study population.

COMMENT: Mean age of study population was 58.78 ± 10.446 years, with minimum age of 32 years and maximum age of 70 years. 61- 70 years of age group(56.9%) constitutes the maximum of study population.

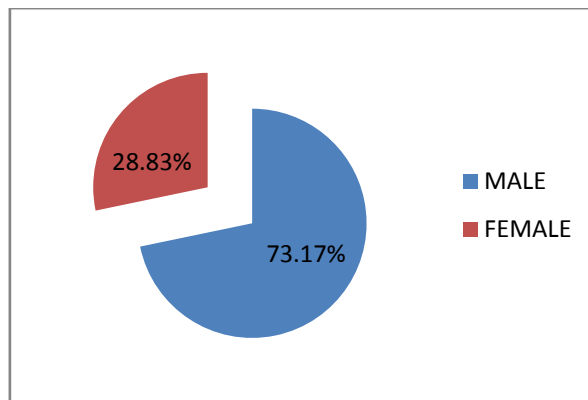


FIG 2: Sexual distribution of study population.

COMMENT: Study population constituted of maximum no of male patients (73.17%). Female patients were only 28.83%.

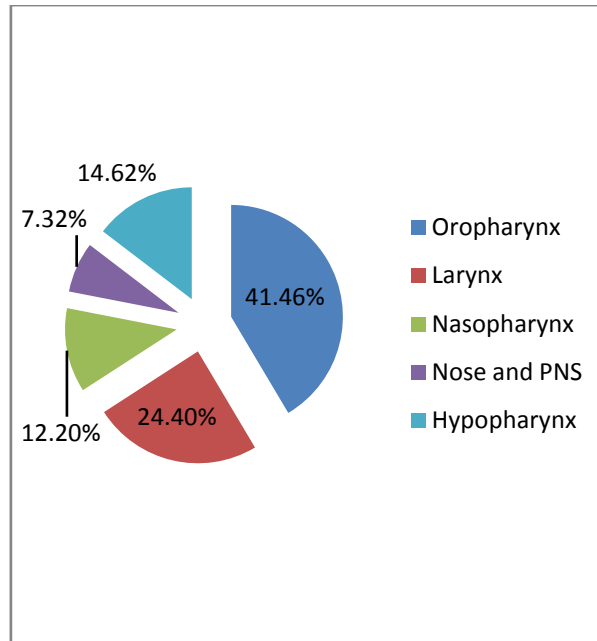


FIG 3 : Distribution of site of lesion of Head and Neck carcinoma in study population.

COMMENT: Oropharyngeal Carcinoma constitutes 41.46% of study population, followed by Laryngeal carcinoma(24.4%).

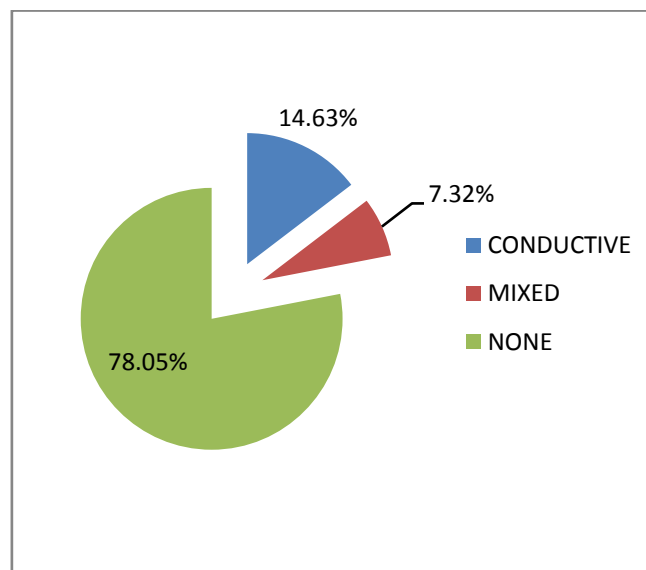


Figure 4: Showing distribution of type of hearing loss in study population

Comment: In maximum number(78.05%) of patients there is no hearing loss at all but in 14.63% conductive hearing loss was encountered followed by mixed hearing loss in 7.32%.

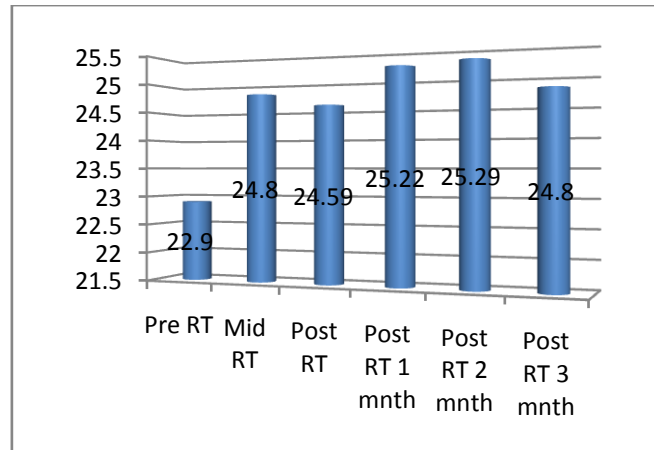


Figure 5: Showing mean values of hearing threshold (dB) right ear in various stages of treatment.

Comment: Hearing threshold of Right ear showed significant rise ($p < .05$) in mid RT (24.8dB), followed by fall in immediate post RT. There is gradually progressive rise in hearing threshold in post RT 1st month (25.22dB) and 2nd month (25.29dB) followed by a fall in 3rd month (24.8dB).

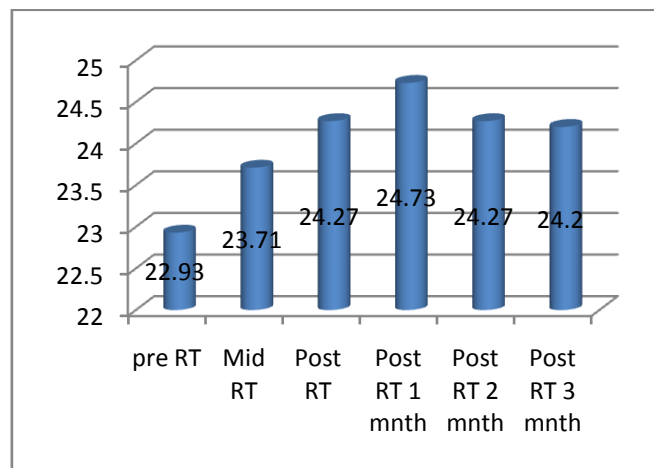


Figure 6: Showing mean values of hearing threshold (dB) left ear in various stages of treatment

Comment: Hearing threshold of Left Ear showed gradually progressive rise in pure tone hearing threshold in mid RT (23.71dB), immediate post RT (24.27dB) and post RT 1st month (24.73dB). There is progressive decrease in hearing threshold in post RT 2nd (24.27dB) and 3rd month (24.2dB).

IV. Discussion

Recently strategies for organ preservation during Radiotherapy and/or chemotherapy have been introduced. In radiation therapy, techniques to minimize the radiation exposure to the sensitive structures such as the brain stem, spinal cord, cornea, optic chiasma and pituitary gland have been adopted.

In our study mean age group of the study population was 58.78 ± 10.446 yrs with maximum and minimum being 70 and 32 yrs respectively. Among the study group 61-70 yrs of age constitutes the maximum number (56.1%), followed by 51-60yrs (24.4%). Bhattacharjee A et al⁵ found 50-60yrs of age group to be the most affected by H and N cancer. The mean age found in the study by Pan et al⁶ was 57.9 yrs whereas mean age being 53.06 ± 11.4 years was found by Kaul A et al¹.

In the present study, male patients constituted 73.17% and female patients comprises of 28.83%. Kaul A et al¹ study showed the same, male patients (65%) more common than female patients (35%). Even Bhattacharjee A et al⁵, found the same.

Oropharynx (41.46%) is the most commonest site of H and N cancer in our study, followed by Larynx (24.4%). Bhattacharjee A et al⁵, found the same with oropharyngeal carcinoma being the commonest. Pan et al⁶ study showed oral cavity, as the commonest site of H and N carcinoma. Schultz C et al⁷, found the most common tumor location being the larynx (23.4%), followed by the nasopharynx (14.8%) and tongue (10.6%). The maximum involvement of oropharynx may be due to tobacco chewing, smoking and consumption of panmasala (flavouring agents taken along with betel leaf and betel-nut); more seen amongst male.

In our study, hearing loss was found in 9 patients (21.95 %). Among them conductive hearing loss was seen in 6 patients (66.6%) and mixed type of hearing loss was seen in 3 patients(33.4%). Our study result is consistent with the studies in the literature during or immediately after radiotherapy^{8,9}. Conversely, many other studies, which reported increased incidence of SNHL after radiotherapy^{10,11,12}. They had long term follow up after radiation, which showed a high incidence of SNHL and we could not do the same because of time constraint of the study period. The diagnosis of conductive hearing loss was based on the clinical, otological findings and impedance audiometry. Mixed hearing loss was mainly diagnosed by pure tone audiometric evaluation.

Hearing threshold of Right ear showed significant rise ($p < 0.05$) in mid RT(24.8dB), followed by fall in immediate post RT. There is a gradually progressive rise in hearing threshold in post RT 1st month (25.22dB) and 2nd month(25.29dB) followed by a fall in 3rd month(24.8dB). Left Ear showed gradually progressive rise in pure tone hearing threshold in mid RT(23.71dB), immediate post RT(24.27dB) and post RT 1st month(24.73dB). There is progressive decrease in hearing threshold in post RT 2nd(24.27dB) and 3rd month(24.2dB). This finding goes with the findings of Kaul et al¹ and Pan et al⁶, who also reported the hearing loss following the exposure to RT.

V. Conclusion

The radiation induced hearing loss has been recognized as an important sideeffect in the head and neck neoplasm management. This study aimed to find out the frequency of radiotherapy induced hearing loss in Head & Neck carcinoma patients. The present study showed maximum number of oropharyngeal carcinoma among the participants, so the counselling regarding the avoidance of bidi, gutka, panmasala and khainee should be encouraged in general population. In our study, hearing loss was found in 9 patients (21.95 %). Among them conductive hearing loss was seen in 6 patients (66.6%) and mixed type of hearing loss was seen in 3 patients(33.4%).

Improvement of quality of life in patients undergoing treatment of cancer is increasing with the advancement of treatment. For better rehabilitation of the patients, determination of hearing loss should be done in head & neck carcinoma patients. Counselling regarding mental preparation of the patients regarding post irradiation hearing loss should be included in the management. Our data stresses on importance of pre & post audiological evaluation via pure tone audiometry in all head & neck cancer patients undergoing conventional radiotherapy & inclusion of these patients early on hearing rehabilitation programs.

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