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# QUALITY OF LIFE IN PATIENTS WITH HEAD AND NECK CARCINOMA RECEIVING CONCURRENT CHEMO-RADIATION USING RAPID ARC

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**Abstract**

***Objective:*** *To determine the mean change in quality of life in patients of Head & Neck carcinoma treated with concurrent chemo-radiation using rapid arc radiotherapy*

***Study Design:*** *Quasi Experimental study*

***Study setting and duration:*** *Radiotherapy department, Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore and the duration of the study was six months from April 2024 to October 2024.*

***Mythology:*** *After meeting selection criteria 60 patients were enrolled. At presentation, patients were examined by using standard EORTC questionnaires and QOL score was noted. Then radiotherapy planning was carried out using CT simulation with a 3mm slice thickness. They were assessed before and at the end of radiotherapy and were followed up after 6 weeks. After 6 weeks, patients were examined again by using standard EORTC questionnaires and QOL score was noted.*

***Results:*** *The mean age of the patients was 34.27±9.7 years, 31 (51.7%) patients were male, while 29 (48.3%) were females. The mean QOL of life of the patients before treatment was 73.25±13.75 and after treatment its mean value was reduced to 43.78±10.47 (p-value=0.038). The mean change in QOL of the patients was 29.47±9.50.*

*Conclusion: On the basis of this study we may conclude that the mean change in quality of life in patients of Head & Neck carcinoma treated with concurrent chemo-radiation using rapid arc radiotherapy was 29.47±9.50.*

## INTRODUCTION

According to NCCN guidelines, about 66,470 new cases of head and neck cancers will occur in the United States, which is approximately 3.5%. More than 90% of these tumors are squamous cell carcinomas.[1] The treatment for H&N cancers is usually multimodal. For early-stage cancer, either surgery or radiotherapy is preferred. For locoregional spread, it is either surgery followed by adjuvant radiation/chemoradiation or definitive chemoradiation.[2] With modern radiotherapy techniques (Rapid Arc), locoregional recurrence is not common and the long-term side effects are minimized. Induction chemotherapy followed by concurrent chemoradiation of 70Gy in 33 fractions is recommended in locally advanced disease for improved progression-free and overall survival.[3]

Treatment for H&N cancers can cause a change in taste, dry mouth, difficulty swallowing and chewing,

loss of hearing, lymphedema, and thyroid problems. These changes can have a drastic impact on a patient's daily life. Due to prolonged treatment duration, patients have to change their daily life and work activities.[4, 5] Quality-of-life (QOL) of a cancer patient before and after the treatment is an important issue, especially for cancer survivors and their families. QOL is defined by the World Health Organization as 'individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[6, 7] QoL is a multidimensional concept and usually involves subjective evaluations of both positive and negative aspects of life. In head and neck cancers, the European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Head and Neck module (QLQ-H&N35/ QLQ-C30) evaluates QoL. The H&N35 contains 35 items which can be condensed into seven multi-item and eleven single-item symptom scales. Higher the score, the higher the QoL[8-10]

Rationale of this study is to determine the mean change in QOL in cancer patients treated with concurrent chemo-radiation. Literature showed that concurrent chemo-radiation does not affect the QOL of cancer patients. But varied data has been found in literature. Moreover, no study had been done before in local setting. Therefore, we have planned to conduct this study to get evidence for local population and implement findings in local setting whether to apply rapid arc radiotherapy in cancer patients for early healing or not. So the objective of this study was to determine the mean change in quality of life in patients of Head & Neck carcinoma treated with concurrent chemo-radiation using rapid arc radiotherapy.

## METHODOLOGY

This study design of this study was quasi experimental which was carried out at radiotherapy department, Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore. The duration of the study was 06 months i.e. from April 2024 to October 2024. Total 60 patients were enrolled in this study by applying non-probability consecutive sampling technique. The highly advanced and precise technique of image-guided, intensity-modulated radiotherapy, which adjusts the radiation dose to closely match the three-dimensional shape of the tumor—delivering more radiation to the tumor while minimizing exposure to surrounding healthy tissues—is known as RapidArc radiotherapy. Mean change in quality of life was assessed by by filling out the standard EORTC questionnaires at baseline and after 6 weeks by multiple-dimensional concept that includes physical and functional status, and emotional and social wellbeing and change will be calculated by subtracting post-treatment score from baseline score. Total 60 patients were enrolled in this study. The sample size was calculated by using WHO sample size calculator. 95% confidence level was used with 7% margin of error. For this sample size mean change in QOL was taken as 5±2.6 after concurrent chemoradiation using rapid radiotherapy in patients with head and neck cancer [11]. For the selection of patient's non-probability consecutive sampling technique was applied. Patients having age range between 18-50 years of both gender, patients having stage I to III squamous cell carcinoma on histopathology and patients on concurrent-chemoradiation, using rapid are radiotherapy technique (on medical record) were fall in inclusion criteria. Patients with distant metastasis (on clinical examination and histopathology reports), pregnant females, recurrent disease (on medical record), on palliative chemotherapy (on medical record) and patients with any psychological disorder (on medical record) were fall in exclusion criteria. Informed consent and demographic detail including name, age, gender, BMI, duration of cancer, type of cancer, stage of cancer at enrollment, marital status, occupation, education, residence, socioeconomic status, dependency, history of smoking (>5 pack years), alcoholism (>20 ml / day), diabetes (BSR> 200 mg/dl), hypertension (BP≥140/90 mmHg), family history of cancer was noted. At presentation, patients were examined by using standard EORTC questionnaires and QOL score was noted. Then radiotherapy planning was carried out using CT simulation with a 3mm slice thickness. IV contrast is to be used and patients were immobilized using a facemask in the supine position. Patients were also booked for chemotherapy on days 1 and 22 with pre-chemo labs before every cycle. They were assessed before and at the end of radiotherapy and were

followed up after 6 weeks. After 6 weeks, patients were examined again by using standard EORTC questionnaires and QOL score was noted. All the data was recorded in proforma (attached). All the collected data was entered and analyzed on SPSS version 25.

**RESULTS:**

The mean age of the patients was 34.27±9.7 years. The mean BMI of the patients was 25.33±4.35 Kg/m2. According to this study, 31 (51.7%) patients were male, while 29 (48.3%) were female, resulting in a male-to-female ratio of 1.06:1. Among the patients, 11 (18.3%) had larynx cancer, while 6 (10.0%) had buccal mucosa cancer, 15 (25%) had hypopharynx cancer, 4 (6.7%) had nasopharynx cancer, 9 (15%) had tongue cancer, and 15 (25%) had tonsil soft palate cancer. In terms of cancer staging, 15 (25%) patients were in Stage I, while 23 (38.3%) were in Stage II, and 22 (36.7%) were in Stage III. Among the 60 patients, 48 (80%) were married, 34 (56.7%) were self-employed, and 12 (20%) were illiterate. Regarding residence and socioeconomic status, 33 (55%) were from rural areas, 21 (35%) belonged to the low socioeconomic group, 13 (21.7%) were from the middle socioeconomic group, and 26 (43.3%) were from the high socioeconomic group. Dependency was observed in 30 (50%) of the patients. Additionally, 19 (31.7%) were smokers, and 26 (43.3%) consumed alcohol. Diabetes mellitus was present in 31 (51.7%) patients, while 22 (36.7%) had hypertension. A family history of cancer was reported in 4 (6.7%) patients. Table I

Before treatment the mean QOL of the patients was 73.25±13.75 and after treatment its mean value was 43.78±10.47. Similarly the mean change of QOL was 29.47±9.50. **Table II**

In patients having age ≤35 years the mean change QOL of the patients was 31.31±9.42 and in patients having age >35 years its mean value was 27.36±9.32 (p-value=0.108). In male patents the mean change in QOL of the patients was 28.42±8.47 and in female patients its mean value was 30.58±10.53 (p-value=0.382). In patients having duration of disease ≤12 the mean change QOL of the patients was 28.65±9.38 and in patients having duration of disease >12 its mean value was 29.87±9.65 (p-value=0.642). In patients having BMI ≤25 kg/m2 the mean change QOL of the patients was 30.47±9.62 and in patients having BMI >25 kg/$m^2$ its mean value was 28.47±9.44 (p-value=0.420). In patients having stage cancer I & II the mean change QOL of the patients was 28.16±9.30 and in patients stage III cancer its mean value was 31.73±9.63 (p-value=0.163). In married patients the mean change QOL of the patients was 28.50±9.45 and in unmarried patients its mean value was 33.33±9.09 (p-value=0.116). In patients from rural area the mean change QOL of the patients was 31.82±9.98 and in patients from urban area its mean value was 26.59±8.17 (p-value=0.033). In smokers he mean change QOL of the patients was 28.84±9.20 and in non-smokers its mean value was 29.75±9.74 (p-value=0.732). Similarly DM, hypertension and family history of cancer showed statistically insignificant difference between the change in QOL of the patients (p-value=>0.05). **Table 3**

**Table I: Demographics information patients (n = 60)**

| | Mean ± SD, F (%) |
|---|---|
| Age (Years) | 34.27 ± 9.76 |
| Male | 31 (51.7%) |
| Female | 29 (48.3%) |
| BMI (Kg/$m^2$) | 25.33 |
| Type of cancer | |
| Larynx cancer | 11 (18.3%) |
| Buccal mucosa cancer | 6 (10.0%) |
| Hypopharynx cancer | 15 (25.0%) |
| Nasopharynx cancer | 4 (6.7%) |
| Tongue cancer | 9 (15.0%) |

| | |
|---|---|
| Tonsil soft palate cancer | 15 (25.0%) |
| Stage of carcinoma | |
| I | 15 (25.0%) |
| II | 23 (38.3%) |
| III | 22 (36.7%) |
| Marital Status | |
| Married | 48 (80.0%) |
| Unmarried | 12 (20.0%) |
| Occupation | |
| Employed | 34 (56.7%) |
| Unemployed | 26 (43.3%) |
| Education | |
| Illiterate | 12 (20.0%) |
| Primary | 18 (30.0%) |
| Middle | 16 (26.7%) |
| Matric & above | 14 (23.3%) |
| Residence | |
| Rural | 33 (55.0%) |
| Urban | 27 (45.0%) |
| Socioeconomic status | |
| Low | 21 (35.0%) |
| Middle | 13 (21.7%) |
| High | 26 (43.3%) |
| Dependency | 30 (50.0%) |
| Smoking | 19 (31.7%) |
| Alcoholism | 26 (43.3%) |
| Diabetes | 31 (51.7%) |
| Hypertension | 22 (36.7%) |
| FH of cancer | 4 (6.7%) |

**Table II: Comparison of before and after treatment of QOL**

| | Before | After | Change | p-value |
|---|---|---|---|---|
| QOL | 73.25 | 43.78 | 29.47 ± 9.50 | 0.038 |

**Table III: Comparison of different factors between the change in QOL of the patients**

| Variables | Categories | Chang in QOL | | | p-value |
|---|---|---|---|---|---|
| | | n | Mean | Std. Deviation | |
| Age (Years) | ≤35 | 32 | 31.31 | 9.42 | 0.108 NS |
| | >35 | 28 | 27.36 | 9.32 | |
| Gender | Male | 31 | 28.42 | 8.47 | 0.382 NS |
| | Female | 29 | 30.58 | 10.53 | |
| Duration of carcinoma | ≤ 12 | 20 | 28.65 | 9.38 | 0.642 NS |
| | >12 | 40 | 29.87 | 9.65 | |
| BMI (Kg/m2) | ≤25 | 30 | 30.47 | 9.62 | 0.420 NS |
| | >25 | 30 | 28.47 | 9.44 | |
| Stage of cancer | I&II | 38 | 28.16 | 9.30 | 0.163 NS |

| | | | | | |
|---|---|---|---|---|---|
| | III | 22 | 31.73 | 9.63 | |
| Education | Up to Middle | 46 | 29.39 | 10.05 | 0.912 NS |
| | Matric & Above | 14 | 29.71 | 7.75 | |
| Cancer Type | Oral cavity cancers | 19 | 29.16 | 7.48 | 0.866 NS |
| | Neck cancers | 41 | 29.61 | 10.39 | |
| Marital Status | Married | 48 | 28.50 | 9.45 | 0.116 NS |
| | Unmarried | 12 | 33.33 | 9.09 | |
| Occupation | Employed | 34 | 29.62 | 10.60 | 0.890 NS |
| | Unemployed | 26 | 29.26 | 8.05 | |
| Residence | Rural | 33 | 31.82 | 9.98 | 0.033* |
| | Urban | 27 | 26.59 | 8.17 | |
| SES | Low | 21 | 27.95 | 9.42 | 0.670 NS |
| | Middle | 13 | 30.38 | 9.49 | |
| | High | 26 | 30.23 | 9.79 | |
| Dependency | Yes | 30 | 30.63 | 9.44 | 0.346 NS |
| | No | 30 | 28.30 | 9.58 | |
| Smoking | Yes | 19 | 28.84 | 9.20 | 0.732 NS |
| | No | 41 | 29.75 | 9.74 | |
| Alcoholism | Yes | 26 | 29.27 | 10.04 | 0.890 NS |
| | No | 34 | 29.62 | 9.22 | |
| DM | Yes | 31 | 30.90 | 9.23 | 0.229 NS |
| | No | 29 | 27.93 | 9.71 | |
| Hypertension | Yes | 22 | 31.36 | 9.30 | 0.243 NS |
| | No | 38 | 28.36 | 9.57 | |
| FH of cancer | Yes | 4 | 33.25 | 7.36 | 0.415 NS |
| | No | 56 | 29.19 | 9.63 | |

**DISCUSSION**

The treatment of H&N cancers presents unique challenges because it often affects several critical organs. RapidArc (RA) and intensity-modulated radiation therapy (IMRT) are commonly used treatment methods for these types of cancers because they offer better radiation dose control and help protect nearby critical organs, ultimately leading to improved survival rates and a better quality of life for patients[12, 13]. In this study the mean QOL of life of the patients before treatment was 73.25±13.75 and after treyament its mean value was reduced to 43.78±10.47 (p-value=0.038). The mean change in QOL of the patients was 29.47±9.50. Some of the studies are discussed below showing their results as.

Eva Yu-Hsuan Chuang et al concluded that HNC patients treated with modern RT techniques experience improved QOL and physical function over time. The most significant improvement occurs between 2 weeks and 3 months, after which the improvement plateaus. However, social function, social contact, pain and nutrition may require longer recovery intervals after treatment. HT with daily image guidance could provide a therapeutic opportunity for improving pain relief in patients with HNC[14].

One study found that after concurrent chemo-radiation using rapid arc radiotherapy, mean change in QOL was negligible i.e. 5±2.6 in head and neck cancer.[15] Another study found that mean chance in QOL was also not significant i.e. 6.34±0.79 in head and neck cancer patients after radiotherapy, shown that concurrent therapy has no impact on QOL of patients.[16] In one more study found that mean chance in QOL was also significant i.e. 10.6±7.4 in head and neck cancer patients after radiotherapy.[17] One more study also found that mean chance in QOL was also significant i.e. 20.66±7.69 in head and neck cancer patients after radiotherapy, showing a significant fall in QOL of patients with concurrent therapy. [18]

Loorents et al.[19] reported that most symptoms and functions deteriorated significantly by the end of RT for HNC patients, improved gradually by 3 months and reached baseline levels at 12 months after RT completion. In a study conducted by Periasamy et al., the QOL in oropharyngeal, laryngeal and hypopharyngeal patients treated with VMAT returned to baseline values by 3 months post-treatment.[20] Similarly Patterson et al.[21] reported that there was a significant reduction in swallowing scores for HNC patients treated with CCRT from pretreatment to 3 months posttreatment and no improvement in scores from 3 to 12 months post-CCRT. Notably, earlier intervention potentially helped achieve better responses in terms of diet and QOL.

## CONCLUSION:

On the basis of this study we may conclude that the mean change in quality of life in patients of Head & Neck carcinoma treated with concurrent chemo-radiation using rapid arc radiotherapy was 29.47±9.50.

## CONFLICT OF INTEREST:

None.

## ACKNOWLEDGEMENT:

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