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Impact of concurrent chemoradiation on quality of life in locally advanced head and neck cancers

Abstract

Radiotherapy of head and neck cancers as a unimodality does not significantly impact on Quality of life (QOL). In contrast, multimodality treatment decreases QOL. A novel approach is necessary to assess its multidimensional aspects. A general module, which assesses symptoms commonly experienced by cancer patients, is supplemented by a site or treatment-specific module, can assess difficulties unique to that particular type of cancer. There are specific instruments with which QOL can be measured in head and neck cancer patients. This is a single arm prospective observational study to assess deterioration of QOL in locally advanced head and neck cancer patients undergoing curative concurrent chemo radiation. This study is based on the assessment of changes in various domains of Quality of life over a period of 3months post therapy.

Keywords: chemo radiation, quality of life, head and neck cancers, locally advanced

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Abbreviations: HR-QOL, health related quality of life; QOL, quality of life; EPID, electronic portal imaging device

Introduction

Common acute toxicities of head–neck chemo-radiotherapy include mucositis, dysphagia, dysgeusia and dermatitis that can severely and adversely impact upon Quality Of Life.[1] The most common and debilitating late toxicity is xerostomia-gross reduction in salivary output-leading to persistent dryness of mouth, oral discomfort, difficulty in speech and swallowing, impairment of taste, and deterioration of oro-dental hygiene.[2,3] Some other late effects include subcutaneous fibrosis, hoarseness, and mucosal atrophy resulting in chronic dysphagia and increased risk of aspiration. Thus, both the disease (head–neck cancer) and its treatment (chemo-radiotherapy) can significantly affect disease-specific health-related Quality Of Life domains such as speech, salivary, and swallowing functions as well as more general Quality Of Life domains such physical, mental, and social health.[4–6] We prospectively conducted a trial to evaluate the impact of concurrent chemo radiation in locally advanced head and neck cancers on health related quality of life (HR-QOL).

Radiotherapy as a single modality in treatment of head and neck cancers do not have an impact on Quality of life (QOL). In contrast, multimodality treatment decreases QOL.[7,8] A modular approach is necessary to assess the multidimensional aspects of Quality Of Life. A general module, with which symptoms commonly experienced by cancer patients can be assessed, is available in the literature. There are specific instruments to measure the QOL of head and neck cancer patients. This is a single arm prospective observational study to assess if there is a deterioration of QOL in locally advanced head and neck cancer patients undergoing curative intent concurrent chemo radiation. This study has assessed the changes in various domains of Quality of life from a baseline (day1) over a period of three months post therapy.

Materials and methods

Locally advanced head and neck cancers medically considered fit for concurrent chemo-radiotherapy and who satisfied the inclusion criteria were enrolled for the study.

Inclusion criteria

i. Histopathological confirmed locally advanced non-metastatic Squamous cell carcinomas of head and neck region.
ii. Age less than 75years
iii. ECOG performance status of 0-2.
iv. Hematological parameters with total leukocyte count of >4000cells/mm^3,
v. platelet counts of >1.5lakh/mm^3
vi. Renal parameters with Serum creatinine <1.5mg/dL.
vii. Patients with an informed consent.

Exclusion criteria

i. Tumors of non-squamous histology.
ii. Age greater than 75years.
iii. Performance status ECOG PS>2.
iv. Any prior treatment received for the tumor.
v. Patients with abnormal cardiac function, renal, hematological parameters or co-morbid illness.
vi. Patients who do not give an informed consent.
vii. Patient not likely to be available for follow up.

Initial evaluation and enrolment:

i. Full medical history and physical examination.
ii. Local examination as initial clinical assessment of tumor stage.
iii. Endoscopic assessment of site, nature and extent of the disease.
iv. Diagnostic workup consisting of hemoglobin, total and differential WBC count, platelet count, renal function tests (Urea, Creatinine, 24hours urinary creatinine clearance), liver function tests (Bilirubin- total, direct and indirect, SGOT, SGPT, Alkaline phosphatase, Total serum protein, albumin and globulin levels).

v. X ray chest PA view.

vi. Radiological assessment with a CT scan for site and extent of the disease.

vii. Assessment of ECOG performance score.

viii. Quality of life assessment using EORTC QLQ-C30 and QLQ-HN35 questionnaire at baseline before starting treatment.

Patient thus evaluated were assigned for further treatment as outlined in the study design. Following institutional scientific and ethics committee approval (Central Scientific and Ethics Committee Registration Number.: ECR/386), patients who fulfilled the inclusion criteria were enrolled in the study with an approved informed consent by the patient only. The study population consisted a total of 53patients of locally advanced head and neck cancers who underwent treatment in the department of radiation oncology at our hospital.

Patients received concurrent chemo-radiation as a standard of care for the selected study population in locally advanced head and neck cancers at Bangalore Institute of Oncology to a total radiation dose of 70Gy/33-35 fractions over 6 and half weeks to 7weeks using 3D-Conformal Radiation therapy or Intensity modulated radiation therapy techniques with concurrent weekly i.v. cisplatin 40mg/m^2 with adequate hydration, antiemetic prophylaxis and forced dieresis which was offered to all patients undergoing treatment. Conformal radiation therapy was either by 3D-CRT or IMRT in 2-3 sequential phases to a total dose of 70Gy/33-35 fractions over 7 weeks. 3D-CRT was a forward planning iterative with initial phase planned using 7-9 coplanar beams and subsequent plans used 3-4 conformal fields as sequential boost. Plans were generated for the patients using 6MV photons. Inverse planning for IMRT was done with 6MV photons using simultaneous integrated boost (SIB) technique with 7-9 equally placed co-planar beams. Gross disease was planned with higher dose per fraction (2.12Gy) for a total dose of 70Gy/33 fractions whereas high risk and low risk areas were treated with lower doses (59.4Gy/33fractions for high risk areas {1.8Gy/fraction} and 56Gy/33# for low risk areas {1.64Gy/Fraction}). The plans were evaluated using Dose Volume Histogram analysis and the best plan was selected for treatment, which was transferred to Siemens artiste Linear accelerator for implementation. Set up verification was done with the electronic portal imaging device (EPID), Treatment was delivered by Siemens artiste linear accelerator (LINAC) 5days a week for approximate seven and half weeks. QOL was assessed from all patients using the EORTC QLQ-C30 and the EORTC –H&N35 questionnaires at baseline before treatment and 4th week of treatment and on the date of completion of treatment after taking a written consent from the patient before being enrolled in the study.

After completion of treatment, patients were followed up as outlined below:

i. First follow up was done at 4weeks (1month) from the completion of treatment.

ii. Second follow up at 12weeks (3months) from the completion of treatment.

iii. Patients were assessed for changes in Quality of life using the EORTC QLQ- C30 and EORTC QLQ-HN35.

iv. Local examination using inspection, palpation and indirect laryngoscopy to assess mucosal integrity, skin integrity, tumor and nodal status.

v. CT scan at second follow up visit to know tumor and nodal response.

vi. Patients were also encouraged to visit earlier if any new or progressive symptoms developed. All patients were encouraged to adhere to good oral hygiene and abstain from any form of tobacco.

vii. Only patients who completed both EORTC QLQ-C30 and EORTC QLQ-HN35 on all the 5occasions (before treatment, 4thweek of treatment, just on completion of treatment, 1 month post treatment and 3months post treatment) were considered for analysis.

viii. Both EORTC QLQ C-30 and EORTC QLQ-HN35 have been translated into vernacular languages (Telugu, Kannada, Tamil, Hindi) and these were administered to patients based on their preference of making the patient more comfortable and easier to answer the questionnaires.

ix. In this single arm prospective observational study we recruited 53patients with head and neck cancers. Between 50%-80% of patients in the poor performance group (EORTC QOL C30) were having impaired function with GHQ score>3.[9] Total sample size based on this is 43subjects according to the formula below. Considering drop out of 20%, we recruited 53subjects in this study. However there were 5(10%) drop outs in this study and we present the data for 48subjects.

x. The sample size is therefore calculated using the below mentioned

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

n=required sample size; **t**=confidence level at 95% (standard value of 1.96); **p**=estimated prevalence of impairment in physical function (mostly fatigue); **m**=margin of error at 12% (standard value of 0.12); therefore, n=48.

Statistical analysis

48patients who completed all the five Questionnaires of EORTC QLQ-C30 as well as EORTC H&N35 were only considered for analysis. The answers were converted into a linear scoring scale, with values between 0 and 100, as per advocated by EORTC.[10] The results were expressed in mean values, with their respective Confidence intervals. A high score in the questions associated with the symptoms reflects more intense presence, while a high score in the questions associated with function reflects a better life condition of the patient. Data was analyzed using SPSS 16 for windows. Data analysis was done using paired t test for each variable comparing each of the assessments done during treatment, on completion of treatment, 1month post completion of treatment and 3months post completion of treatment comparing with baseline values. 5patients out of 53patients enrolled for the study could not complete the questionnaires or were lost to follow up.

Results

Total of 48 patients with locally advanced head and neck cancer patients were considered for analysis. The mean age of the study population was 52.48±11.6years (Age range 28-72years). There were 33.3% females and 66.7%males. Mean age=52.48years, Range: 28-72years. Among 48 patients, 16 were females and 32 were males. 40% of the patient sample received IMRT. Table 1 gives the sites of malignancies. 29% of patients had Stage II disease, 46% at Stage

III and 25% at Stage IV. 43.75% patients had tobacco use, whereas 56.25% had not used any form of tobacco.

Quality of Life: QLQ-C30 (Table 2)

The following QOL domains were compared during and following treatment with baseline scores using paired t test with the following results:

Global health score: Comparison of Global Quality of life scores during and following treatment with baseline score using paired t test. There was a significant decrease in global health score during treatment (t=7.50,P<0.001) and on completion of treatment(t=14.26,p<0.001) when compared to baseline scores but showing upward trends in scores post 1month and 3month of treatment with no significance compared to baseline scores. The Quality of Life is shown in Table 2.

Physical functioning: Comparison of Physical Functioning score during and following treatment with baseline score using paired t test. There was a significant decrease in global physical functioning score during treatment (t=7.14, P<0.001), just after completion of treatment (t=7.94,p<0.001), 1month post completion of treatment(t=4.2,p<0.001) and 3month post completion of treatment (t-3.3,p=0.002)compared to baseline physical function scores.

Role functioning: Comparison of role functioning scores during and following treatment with baseline using paired t test. There was a significant decrease in role functioning scores during treatment (t=5.2,P<0.001) and on completion of treatment(t=6.5,p<0.001) when compared to baseline scores but showing upward trends in scores post 1month and 3month of treatment with no significance compared to baseline scores.

Emotional functioning: Comparison of Emotional Functioning scores during and following treatment with baseline score using paired t test. There was a significant decrease in emotional functioning score s during treatment (t=5.6, p<0.001) and on completion of treatment (t=9.5, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Cognitive functioning: Comparison of Cognitive functioning scores during and following treatment with baseline score using paired t test. There was a significant decrease in cognitive functioning score during treatment (t=5.1, p<0.001) and on completion of treatment (t=8.2, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Social functioning: Comparison of Social functioning scores during and following treatment with baseline score using paired t test. There was a significant decrease in Social functioning score during treatment (t=5.0, p<0.001) and on completion of treatment (t=8.8, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Fatigue: Comparison of Fatigue scores during and following treatment with baseline score using paired t test. There was a significant increase in fatigue scores during treatment (t=-5.7, p<0.001) and on completion of treatment (t=-9.4, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Nausea and vomiting: Comparison of Nausea and vomiting scores during and following treatment with baseline score using paired t test. There was a significant increase in Nausea and Vomiting scores during treatment (t=-7.03, p<0.001) and on completion of treatment (t=-7.4, p<0.001) when compared to baseline cores but with no significant difference post 1month and 3months of treatment.

Pain: Comparison of Pain scores during and following treatment with baseline score using paired t test. There was a significant increase in pain scores during treatment (t=-6.1, p<0.001) and on completion of treatment (t=-9.1, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Insomnia: Comparison of Insomnia scores during and following treatment with baseline score using paired t test. There was a significant increase in insomnia scores during treatment (t=-8.3, P<0.001) and on completion of treatment (t=-4.4, p<0.001) when compared to baseline scores but with no significant difference post 1month and 3months of treatment.

Appetite loss: Comparison of Appetite loss scores during and following treatment with baseline score using paired t test. There was a significant increase in appetite loss scores during treatment (t=-2.6, p=0.01), on completion of treatment (t=-6, p<0.001), 1 month post completion of treatment (t=2.4, p=0.01) and 3months post completion of treatment (t=2.34, p=0.01) when compared to baseline scores.

Finance: Comparison of Finance scores during and following treatment with baseline score using paired t test. There was a significant increase in financial difficulty scores just after completion of treatment (t=-3.6, p=0.004) however there was a significant reduction in financial difficulty score 1 month post completion of treatment (t=5.3, p<0.001) and 3months post completion of treatment (t=4.3, p<0.001) when compared to baseline scores.

Quality of life: QLQ-H&N35 (Table 3)

The following QoL domains were compared during and following treatment with baseline score using Paired t test with the following results:

Pain: Comparison of pain scores during and following treatment with baseline score using paired t test. There was a significant increase in pain scores during treatment (t=-8.9, P=0.01), on completion of treatment (t=12.6, p<0.001), 1month post completion of treatment (t=-3.2, p=0.002) when compared to baseline scores.

Swallowing: Comparison of swallowing scores during and following treatment with baseline score using paired t test. There was a significant increase in swallowing difficulty scores on completion of treatment (t=12.6, p<0.001) with no significant difference during treatment, 1month post completion of treatment and with significant reduction in swallowing difficulty scores 3months post completion of treatment (t=4.26,p<0.001) when compared to baseline scores.

Senses problem: Comparison of senses problem scores during and following treatment with baseline score using paired t test. There was a significant increase in senses problem scores during treatment (t=-6.3, p<0.001), on completion of treatment (t=-6.7, p<0.001), 1month post completion of treatment (t=10, p<0.001) and 3 months post completion of treatment (t=12.33, p<0.001) when compared to baseline scores.

Speech problems: Comparison of speech problem scores during and following treatment with baseline score using paired t test. There was a significant increase in speech problem scores during treatment (t=-9.6, p<0.001), on completion of treatment (t=-10.7, p<0.001), 1 month post completion of treatment (t=-9.5, p<0.001) and 3months

post completion of treatment (t=-6.5, p<0.001) when compared to baseline scores.

Trouble with social eating: Comparison of social eating scores during and following treatment with baseline score using paired t test. There was a significant increase in social eating trouble scores on completion of treatment (t=-6.4, p<0.001) with decrease in social eating trouble scores 1month post completion of treatment (t=3.8, p<0.001) and 3months post completion of treatment (t=5.5, p<0.001) when compared to baseline scores.

Table 1 Sites of head and neck cancers

Site of malignancy	Number of patients
Oral cavity	
Retromolar trigone	4
Oro-pharynx	
Base of tongue	13
Vallecula	2
Tonsil	7
Hypo pharynx & larynx	
Post-pharyngealwall	6
Post cricoid	5
Pyriform fossa	7
Supraglottis	4

Table 2 Quality of life (QLQ) - C30 comparison with baseline scores over timelines

	Baseline	4th week of Rx	Post Rx	1 month post Rx	3 months post Rx
QOL Score	84.20±11.03	63.54±18.72***	42.19±19.55***	81.56±12.40	82.61±11.89
Physical functioning	95.14±7.74	81.25±12.72***	74.30±18.39***	87.23±10.84***	89.56±10.29**
Role functioning	96.87±7.41	82.63±18.81***	73.96±25.93***	91.48±13.84	92.39±13.92
Emotional functioning	90.27±17.89	72.22±22.69***	51.39±28.00***	87.77±11.24	91.49±11.31
Cognitive functioning	94.79±10.40	81.94±19.09***	70.13±19.12***	91.13±10.33	93.84±10.74
Social functioning	88.19±20.03	68.05±27.46***	45.49±30.89***	90.07±16.17	86.59±12.96
Fatigue	23.14±16.01	41.20±23.03***	50.69±23.25***	24.58±18.37	20.77±14.17
Nausea & vomiting	6.94±14.92	33.68±27.39***	42.36±30.55***	12.05±18.29	12.32±15.49
Pain	20.13±16.11	40.62±23.79***	58.33±25.95***	21.99±16.70	16.30±17.02
Insomnia	26.39±24.75	46.52±28.13***	63.89±33.56***	33.43±20.45	29.56±12.76
Appetite	34.72±28.31	45.13±27.92*	63.88±34.26***	44.24±26.86*	43.18±19.71*
Financial difficulty	41.66±29.57	44.44±29.44	52.77±34.94**	20.57±21.48***	20.29±20.46***

*p<0.05, **p<0.01, ***p<0.001 using paired t test.

Table 3 Quality of life QLQ - H&N35 comparison with baseline scores over various timelines

	Baseline	4th week of Rx	Post Rx	1 month post Rx	3 months post Rx
Pain	22.57±12.85	36.28±12.80	54.17±13.20	30.49±9.71	21.37±9.23
Swallowing	21.35±16.20	22.22±14.92	38.54±13.49***	20.57±13.66	12.13±8.55***
Senses problem	5.90±11.13	25.00±20.04***	26.38±20.29***	24.82±12.94***	29.35±12.75***
Speech problem	6.02±9.15	24.53±14.30***	28.00±14.85***	26.95±15.14***	19.32±11.34***
Social eating trouble	28.82±8.58	29.68±6.17	40.79±8.46***	21.52±12.13***	20.83±7.40***
Social contact problem	18.75±8.32	45.55±14.44***	49.30±14.66***	44.96±13.22***	35.89±15.13***
Sexuality	46.18±39.23	46.36±14.44***	48.61±26.37	33.33±26.63**	19.79±24.71***
Teeth problems	9.72±19.39	40.27±31.47***	40.28±29.13***	36.87±26.22***	33.33±29.97***
Dry mouth	2.08±8.15	31.94±25.68	32.63±27.06***	34.72±32.94***	31.25±30.29***
Mouth opening-problem	0.69±4.81	13.19±21.45***	13.19±21.45***	0.00±6.87	0.72±4.91
Felt ill	6.25±24.46	33.33±55.862**	70.83±65.09***	58.33±73.89***	52.08±68.384***
Pain Killer-use	89.58±85.65	133.33±66.31	152.08±54.53***	77.08±69.15	37.50±56.96**
Nutritional supplements-use	0.00±.00	0.00±.00	125.00±43.75***	120.83±54.41***	70.83±58.19***
Weight Loss	72.92±73.62	120.83±41.04***	156.25±61.56***	118.83±64.25	99.54.19±66.78

*p<0.05, **p<0.01, ***p<0.001 using paired t test.

Social contact: Comparison of social contact scores during and following treatment with baseline score using paired t test. There was a significant increase in social contact scores during treatment (t=-12.6, p<0.001), on completion of treatment (t=13.6, p<0.001), 1month post completion of treatment (t=11.7, p<0.001) and 3months post completion of treatment (t=-6.7, p<0.001) when compared to baseline scores.

Sexuality: Comparison of sexuality scores during and following treatment with baseline score using paired t test. There was a significant increase in less sexuality scores during treatment (t=4.8, p<0.001), and there was a decreasing trend in less sexuality scores post 1month of treatment (t=2.3, p=0.023)and post 3months of treatment (t=5, p<0.001) compared to baseline scores.

Teeth problems: Comparison of Teeth problem scores during and following treatment with baseline score using paired t test. There was a significant increase in teeth problem scores during treatment (t=-6.5, p<0.001, on completion of treatment (t=7.0, p<0.001), 1 month post completion of treatment (t=-6.5, p<0.001) and 3months post completion of treatment (t=5, p<0.001) when compared to baseline scores.

Dry mouth: Comparison of dry mouth scores during and following treatment with baseline score using paired t test. There was a significant increase in dry mouth scores on completion of treatment (t=-7.0, p<0.001), 1month post completion of treatment (t=-6.3, p<0.001) and 3months post completion of treatment (t=6.1, p<0.001) when compared to baseline scores.

Mouth opening: Comparison of Mouth opening scores during and following treatment with baseline score using paired t test. There was a significant increase in Problems with mouth opening scores during treatment (t=-3.86, p<0.001) and on completion of treatment (t=-3.6, p<0.001), when compared to baseline scores.

Felt ill: Comparison of felt ill scores during and following treatment with baseline score using paired t test. There was a significant increase in felt ill scores during treatment (t=-3.5, p=0.001) and on completion of treatment (t=-7.0, p<0.001), 1month post completion of treatment (t=-4.0, p<0.001) and 3months post completion of treatment (t=4.2, p<0.001) when compared to baseline scores.

Pain killers: Comparison of Pain killer scores during and following treatment with baseline score using paired t test. There was a significant increase in pain killer usage scores on completion of treatment (t=-4.1, p<0.001) and a significant reduction in usage of pain killers 3months post completion of treatment (t=3.7, p=0.001) when compared to baseline scores.

Nutritional supplements: Comparison of nutritional supplements during and following treatment with baseline score using paired t test. There was a significant increase in nutritional supplements usage scores on completion of treatment (t=19.7, p<0.001), 1month post completion of treatment (t= 15.3, p<0.001) and 3 months post completion of treatment (t=-8.3, p<0.001) when compared to baseline scores.

Weight loss: Comparison of weight loss during and following treatment with baseline score using paired t test. There was a significant increase in weight loss scores during treatment (t=-32.08, p<0.001) and on completion of treatment (t=-6.7, p<0.001), when compared to baseline scores.

Discussion

Aggressive concomitant chemo-radiation regimen has led to high loco-regional control and increased survival, as well as allowing for organ preservation; on the other hand, they impose severe acute toxicities and likely some degree of chronic impairment,[11] resulting in significant impairment of specific QOL domains as well as general QOL domains.[12,13] This study represents patients' experience of an intensive, cisplatin-based chemo-radiotherapy protocol and its effect on Quality of Life (QOL) concerns within a time frame of 3months.

As anticipated, during treatment and on assessment just after completion of treatment, Patients' Global health status/quality of life, performance status and functional status declined dramatically with a corresponding increase in symptoms during this period. There was a general trend towards improvement in most of the domains with some approaching pre-treatment levels and some better pretreatment levels. Bjordal et al.[9] prospectively evaluated QOL of 357 HNSCC patients treated by surgery, RT, and/or chemotherapy using the EORTC QLQ-C30 and QLQ-H&N35 at baseline and at 1, 2, 3, 6, and 12months. They found that QOL deteriorated significantly during treatment, followed by a slow recovery until the 12-month follow-up.[9]

Physical functioning and role functioning was at a lower level during treatment with a greater decrease in the above domains seen just after completion of treatment and there was a general trend towards improvement at 3 months post completion of treatment though not reaching the pre-treatment levels of functioning. De Graeff A et al.[7] prospectively evaluated QOL of HNSCC patients treated with radiotherapy using the EORTC QLQ-C30 and QLQ-H&N35 before treatment, and at 6, 12, 24, and 36 months later. They found that there was limited deterioration of physical and role functioning at 6 months, with improvement thereafter.

We found high disease and treatment impact on emotional, cognitive, social and personal performance during treatment and on completion of treatment with improvement in the follow up periods of 1month and 3months. Scharloo et al.[14] prospectively evaluated 177 patients of head and neck cancers, in which there was an improvement in the emotional function and a worsening in social function throughout the follow up period. There was a drop in the social functioning throughout treatment in the above study.[14] Morton and de Boer et al. found that life satisfaction score improved over time and that psychological problems decreased in head and neck cancer patients. In our study we found that fatigue was maximum during treatment and on completion of treatment with reduced fatigue post 1 month and with further reduction 3months post therapy. Irvine et al**.** studied 6 assessments on patients receiving chemotherapy and radiotherapy (before 2weeks, later during treatment and the last week of treatment, 3 and 6months later). He observed that fatigue increased over the course of treatment and was highest at the last week of treatment and returned to pre-treatment levels by 3months after treatment.[15]

We noticed an increase in nausea and vomiting in our study during treatment and post completion of treatment which gradually decreased over a period of 1month and still further 3months post completion of treatment but not reaching to pre-treatment levels. Ackerstaff et al.[16] evaluated the quality of life of 207 patients with inoperable stage IV head and neck patients undergoing concurrent chemo-radiation and found that there was significant increase in nausea and vomiting on 7thweek assessment with IV cisplatin based chemotherapy which improved over a 3-month period post completion of treatment and almost reaching baseline at 12-months post therapy.[16] Pain was a major problem for patients in our study during treatment and on completion of treatment with major pain relief seen after 1 month, reaching baseline levels post 3 months of treatment. Pain in our study was mainly caused by mucositis. The use of pain killers also reduced post treatment way below the baseline usage and coincided with the pain reduction post 3-month of treatment.

Ackerstaff et al.[16] evaluated the quality of life of 207patients with inoperable stage IV head and neck patients undergoing concurrent chemo-radiation. In the same study of Ackerstaff et al.,[16] he found that pain in the head and neck area was clearly present in pre-treatment period and increased during treatment and diminished over a course of 12-month follow-up. As a result, the need for non-narcotic painkillers decreased as well.[16]

There was significant loss of appetite and subsequent loss of weight and increase in usage of nutritional supplements in our study with most affected during treatment and on completion of treatment and there was gradual improvement in appetite and weight seen post 3months of therapy although not reaching pretreatment levels, usage of nutritional supplements were continued in above patients even at 3months post completion of treatment. Newman et al.[17] evaluated the role of concurrent chemo-radiation on functional outcomes of weight loss and eating in 47patients of head and neck cancers and concluded that there was a significant weight loss during treatment and decline in eating which improved over a period of 18months.

There was a gradual increase in swallowing difficulty during treatment and peaked at the end of treatment and difficulty was mainly for solid food and reached baseline on 3rdmonth follow-up. In the same study by Ackerstaff et al.[16] he found that there was significant swallowing difficulty when evaluated on 7thweek of treatment and almost reaching baseline at 3 months follow up in I.V Cisplatin based chemotherapy arm.[16] Eisbruch et al. objectively assessed swallowing dysfunction after concurrent chemoradiation in 29 unresectable head and neck cancers and concluded that after intensive chemoradiation significant objective swallowing difficulty is present and it promotes aspiration.[18]

In our study we noticed that patients experienced insomnia during treatment and on completion of treatment which improved in the follow up period and the same trend was noticed for financial difficulty which acts as a factor for psychological distress and in-turn leading to insomnia. Akira Kugaya et al.[19] examined one hundred and seven patients with head and neck cancer to assess their psychological distress and found that Advanced cancer correlated with psychological distress and can be related via several factors, like poor performance status, malnutrition, physiologic dysfunction, and so on.[19] Dry mouth, senses, teeth problems and speech problems were more during treatment in our study which increased on completion of treatment and persisted even after 3 months of treatment. Eva Hammerlid evaluated the quality of life in 232 patients which included dry mouth, senses and teeth problems in patients of head and neck cancers and found that these factors were worse during treatment with significant deterioration seen even after treatment, The problems of dry mouth, senses problem and teeth problems persisted even at 3years post completion of treatment and they seem to be related to the treatment given.[20]

Mouth opening difficulties posed a major problem during treatment and on completion of treatment with a great improvement seen at

3months follow up and reaching baseline levels at 3months. Jeremic G. in his preliminary study of 70patients evaluated the prevalence of trismus in head and neck cancer patients treated with radiotherapy with or without concomitant chemotherapy and surgery. Vast majority of patients showed slight to severe trismus (91.4%) and he concluded that trismus is a prevalent consequence of head and neck cancer treatment.[21] Boscollo-Rizzo et al.[22] evaluated long term quality of life in patients of 57 oro-pharyngeal cancers who underwent chemo-radiation as a part of organ preservation protocol and concluded that there was a significant problem in mouth opening in patients who have received chemo-radiation (p=0.036).[22]

Social eating and social contact were affected during treatment and on completion of treatment with improvement noticed in the follow up period reaching baseline at 3 months in social eating but not the same with social contact. Verdonck-de Leeuw et al.[23] evaluated the course of health-related quality of life (HRQOL) from diagnosis to 2 years follow-up in 164 patients with head and neck cancer (HNSCC) treated with chemo-radiation (CRT) using EORTC QLQ-C30 and QLQ-H&N35 questionnaires 1 week before and 6weeks and 6, 12, 18, and 24months after treatment. Improvement over time was observed in social eating, and social contacts.[23]

There was a decrease in sexual activities during treatment and on completion of treatment which improved over 3months and better in pretreatment levels of sexual activities. Feeling of illness was present during treatment and post treatment which persisted even at 3months of follow up. Monga U. assessed sexual functioning in 55 H&N cancer patients at post radiation: 85% showed interest in sex; 58% were satisfied with their current sexual partner and 49% were satisfied with their current sexual functioning and concluded that sexuality remains a priority for majority of patients despite experiencing sexual problems.[24] To assess the quality of life of cancer patients is complex, considering the large number of variables which impact the patient's self-perception all the way to the very particularities of their diseases. Our findings are consistent with those obtained by Schag and colleagues, who concluded that cancer survivors ''do not return to a normal state of health.[25,26]''

Conclusion

There is a significant deterioration in Quality of life during ($p<0.001$) and just after curative intent concurrent chemo-radiotherapy ($p<0.001$) in locally advanced head and neck cancers, that gradually but definitely improves over time. Incorporation of HRQOL assessments in daily clinical practice and with a close monitoring of acute side effects with implementation of appropriate symptomatic treatments, quality of life of patients during treatment can be increased. By using conformal Radiotherapy (3D-CRT and IMRT) better protection of normal tissues can be achieved which will ensure reducing late side effects, and thus may increase the patients' quality of life. It will be worthwhile to identify other predictors that impact quality of life indicators in this population. Further follow-up over a longer period of time in necessary to assess if there would be any changes in long term quality of life or individual symptom scales.

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Conflict of interest

The author declares no conflict of interest.

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