

Original Research Article

Evaluation of Treatment Related Weight Loss in Patients with Head and Neck Cancers Undergoing Radiotherapy

Dr Siddharth Vats¹, Dr Rohit Mahajan², Dr Manoj Gupta¹, Dr Rajeev K Seam²,
Dr Manish Gupta¹

¹Department of Radiotherapy and Oncology, Indira Gandhi Medical College (IGMC) Shimla, Himachal Pradesh, India

²Department of Radiotherapy and Oncology, Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala, Haryana, India

Corresponding Author: Dr Rohit Mahajan

ABSTRACT

Purpose: Weight loss is common among patients with squamous cell carcinoma of the head and neck during chemo-radiotherapy and may be due to multiple tumor and treatment related factors. The aim of the present study was to evaluate factors associated with weight loss during radiotherapy treatment of head and neck cancers.

Methods: One hundred one patients of squamous cell carcinoma of head and neck treated with concurrent chemoradiation or postoperative radiotherapy were evaluated in this analysis. Major head and neck subsites including Oropharynx, Oral cavity Hypopharynx and Nasopharynx were included in the analysis. A dose of 66-70Gy was given in the radical chemoradiation schedule. In postoperative radiotherapy, a dose of 60-64Gy was delivered. Patients were treated with two-field or three field conventional radiation techniques. Patient's weight was evaluated before, weekly during treatment and after completion of treatment to evaluate weight loss trends. Weight loss grading was done as per CTCAE v3.

Results: Analysis was done to see which factors were causative in patients having a grade 1(5-10%) and grade 2(>10%) weight loss. Three variables were found to be significant for >5% weight loss. These were a tumor located in base of tongue ($p < 0.007$), use of chemoradiation ($p < 0.013$), and a total dose of > 60 Gy ($p < 0.012$). Other factors like trismus ($p < 0.063$) and xerostomia ($p < 0.060$) also showed trend towards significance. No difference was observed in patients with weekly or 3 weekly chemo-radiation schedules.

Conclusion: Our study shows that base of tongue cancers on chemoradiation had significant weight loss compared to other head and neck subsites. Radiation doses over 60 Gy is another significant factor for weight loss.

Key Words: Head neck cancers, Weight loss, Radiotherapy.

INTRODUCTION

Patients with squamous cell carcinoma of the head and neck (SCCHN) usually suffer from nutritional impairment during treatment. Studies have reported that a prevalence of 20-67%, though definition criteria may vary in different evaluation. [1]

Weight loss is a common and easily measurable parameter used to assess nutritional status in clinical practice and a loss of more than 5% is considered as significant. [2, 3] Weight loss during chemo-radiotherapy for head and neck cancers may be due to multiple tumor and treatment

related factors. Disease associated weight loss is mainly due to cancer cachexia, obstruction and anorexia. Radiotherapy treatment further decreases oral intake due to mucositis pain and dysphagia. [4-6] In this analysis we have evaluated the factors associated with weight loss during radiotherapy.

METHODS

One hundred one patients of histologically confirmed locally advanced SCCHN attending our Head and Neck cancer clinic from May 2011 to May 2013 were included in this analysis. The patients received radical radiation alone (RT), concurrent chemoradiation (CRT) or postoperative radiotherapy. The analysis included the tumors of oral cavity, oropharynx, hypopharynx and nasopharynx. The patient workup included a complete history, physical examination including local examination of disease, neck examinations, indirect laryngoscopy, direct laryngoscopy, cytology or biopsy. Baseline investigations like complete blood count, blood biochemistry were done. Radiographic examination included X Rays of chest and soft tissue neck. Contrast enhanced tomography of head and neck was also done in all patients. All patients had a pre radiotherapy dental check-up before radiotherapy and in patients who have had undergone dental procedure, a minimum gap of three weeks was maintained between the dental procedure and beginning of radiotherapy. A dose of 66-70Gy was given in the radical chemoradiation schedule. For postoperative radiotherapy, a dose of 60-64Gy was delivered. Patients were treated with two-field or three field conventional radiation techniques.

Treatment:

Five/Four clamp thermoplastic cast was used for immobilization of all patients. Radiotherapy with 2-dimensional technique was delivered using Theratron780E and Equinox Cobalt 60 machine using a shrinking field technique. In the first

treatment phase the radiation portals encompassed primary disease, involved lymph nodes and microscopic disease around primary and in clinically uninvolved lymph nodes. The whole neck along with primary disease was included in the initial radiation portals. After a dose of 44Gy delivered in twenty-two fractions, the posterior neck field was reduced to spare the spinal cord. After the microscopic disease had received 50Gy/25#, the field was reduced to include the involved lymph node region with one level up. After 60Gy the field was further reduced to include primary sites with primary echelon and involved lymph nodes. Concurrent chemotherapy was given with Injection Cisplatin 100mg/m² 3 weekly or 40mg/m² weekly after a complete haemogram, liver function & kidney function tests.

Assessment

Weight of the patients was evaluated before and after completion of treatment. Weight loss grading was done as per CTCAE v3. Weight loss was categorized as Grade 1 ">5-10% weight loss" and Grade 2 ">10% weight loss", Grade 3 (>20%). For statistical analysis the data was analyzed using SPSS software (v 20). Descriptive statistics were generated for all parameters under study. Continuous and categorical variables were documented as mean \pm standard deviation (SD) and as numbers and percentages respectively. Student t-test and the Mann-Whitney U-test were used to compare the weight loss with the different variables under study. Univariate analysis was performed to evaluate the associations of weight loss with variables under study. Statistical significance was defined by a p value less than 0.05.

RESULTS

Patient characteristics

Median age of presentation was 52 years (range 14-85years). 48(47.5%) patients were <50 years and 53(52.4%) patients were >50 years of age. 87(86.1%) patients were males and 14(13.9%) were

females. Most of the patients were of oropharynx 61(60.4%) followed by larynx 12(11.9%). Most of the patients were of stage IVA 39(38.6%) and stage III 37(36.6%). (Table 1)

Table 1: Patient characteristics.

Characteristic	Number(%age)
Age:	
<50	48(47.5)
>50	53(52.4)
Sex:	
Male	87(86.1)
Female	14(13.9)
Site:	
Nasopharynx	8(7.9)
Oropharynx	61(60.4)
Oral cavity	10(9.9)
Hypopharynx	10(9.9)
Larynx	12(11.9)
Stage:	
I	5(5.0)
II	11(10.9)
III	37(36.6)
IVA	39(38.6)
IVB	9(8.6)
Radiation :	
Radical	77(76.2)
Post-op	24(23.7)
Treatment:	
RT alone	56(55.4)
Chemoradiation	45(44.5)
RT Dose:	
<60	17(16.8)
≥60	84(83.2)

Treatment characteristics

77(76.2%) patients were treated with radical radiation and 24(23.7%) patients received post-operative radiation. 56(55.4%) patients received RT alone while 45(44.5%) patients were treated with concurrent chemoradiation. Dose <60Gy was received by 17(16.8%) patients and ≥60Gy by 84(83.2%) patients (Table 1).

Acute toxicity

Majority of patients had from Grade 2 skin toxicity 54(53.5%) and 14(13.8%) patients had grade 3 skin reactions. Grade 2 mucositis was seen in 64(63.4%) patients and 26(25.7%) patients had grade 3 mucositis. Grade 2 dysphagia was seen in 52(51.5%) patients. Grade 2 laryngeal toxicity was seen 28(27.7%) patients. Grade 2 xerostomia was seen in 56(55.4%) patients. Trismus was present in 29(28.7%) patients (Table 2).

Table 2: Toxicity.

TOXICITY	GRADE	Number(%)	
(ACUTE TOXICITY)			
Skin:	1	30(29.7)	
	2	54(53.5)	
	3	14(13.8)	
	4	3(3.0)	
Mucositis:	1	11(10.9)	
	2	64(63.4)	
	3	26(25.7)	
Dysphagia:	0	19(18.8)	
	1	26(25.7)	
	2	52(51.5)	
	3	4(4.0)	
	Laryngeal:	0	20(19.8)
		1	53(52.5)
2		28(27.7)	
Xerostomia:	0	10(9.9)	
	1	33(32.7)	
	2	56(55.4)	
	3	2(2.0)	
Trismus:	0	72(71.3)	
	1	18(17.8)	
	2	6(5.9)	
	3	4(4.0)	
	4	1(1.0)	
	Nausea:	0	69(68.3)
		1	30(29.7)
		2	2(2.0)
Vomiting:	0	80(79.2)	
	1	17(16.8)	
	2	3(3.0)	
	3	1(1.0)	
Dysguesia:	0	21(20.8)	
	1	17(16.8)	
	2	63(62.4)	
Anorexia:	0	62(61.4)	
	1	31(30.7)	
	2	8(7.9)	
Dehydration:	0	94(93.1)	
	1	6(5.9)	
	2	1(1.0)	

Weight assessment

Weight was recorded at the start of treatment, once weekly and at the end of radiation completion. Weekly review of the patients along with weight loss assessment was done during the course of radiotherapy. Maximum number of the patients had weight loss during the 4th week of radiotherapy. Analysis was done to see which factors were causative in patients having a grade 1(5-10%) and grade 2(>10%) weight loss. Grade 1 weight loss was observed in 19(18.8%) and grade 2 weight loss was seen present in 13(11.9%) Three variables were found to be significant for >5% weight loss. These were a tumor located in base of tongue (p < 0.007), use of chemoradiation (p<0.013), and a total dose of > 60 Gy (p<0.012). Other factors like trismus (p<0.063) and xerostomia (p<0.060)

also showed trend towards significance. No difference was observed in patients with

weekly or 3 weekly chemo-radiation schedules (Table 3,4,5).

Table 3: Weekly assessment of weight loss.

Week	Wt loss(Range)	Number of patients having wt loss	Mean	Median	S.D
First	(0-5)	4	0.12	0.00	0.637
Second	(0-6)	11	0.24	0.00	0.94
Third	(0-7)	12	0.38	0.00	1.174
Fourth	(0-5)	25	0.73	0.00	1.416
Fifth	(0-8)	19	0.68	0.00	1.615
Sixth	(0-5)	21	0.65	0.00	1.334
Seventh	(0-3)	5	0.09	0.00	0.412

Table 4: Weight loss Grade.

Weight loss:	
No	69(68.3)
Grade 1(5-10%)	19(18.8)
Grade 2(10-20%)	13(12.9)

Table 5: Weight loss variables.

Variable:	p value
Age (<50 vs >50)	0.233
Sex (Male vs Female)	0.289
Primary site (Oropharynx vs others)	0.007
Stage (III,IV vs I,II)	0.379
Treatment (Chemoradiation vs Radical RT alone)	0.013
RT Dose (<60Gy vs >60Gy)	0.012
Mucositis (Gr1 vs >Gr1)	0.08
Xerostomia (Gr1 vs >Gr1)	0.06
Trismus(Yes/no)	0.063
Dysphagia(Gr1 vs >Gr1)	0.126
Nausea(Yes/no)	0.613
Vomiting (Yes/no)	0.639
Anorexia(Yes/no)	0.337
Dehydration(Yes/no)	0.747
Dysguesia(Yes/no)	0.857

DISCUSSION

Concurrent chemoradiation in locally advanced head and neck cancers is the standard of care. Head and neck cancer patients on chemoradiation tend to have decreased intake over their baseline feeding habits and this manifests primarily as an easily observable weight loss. A nutritionally poor status results in poor treatment compliance, treatment breaks and can adversely affect treatment outcomes. In our study, three variables stood out for more than 5% weight loss. We observed a total radiotherapy dose of > 60 Gy (p<0.012) to be one of the treatment related factors. It is well established that normal tissue toxicity increases with increasing the radiation dose and most radical head neck treatment protocols commonly use doses upto 70Gy in conventional fractionation. Secondly, tumors located in base of tongue (p < 0.007) emerged as having higher weight loss.

Lonbro et al however reported that tumor site might be a predictor for weight loss only in patients with a Body Mass Index (BMI) more than 25. [7] Thirdly, the use of chemoradiation (p<0.013) had impact on weight loss. There was however no difference in weight loss patterns between weekly and three weekly concurrent chemotherapy schedules. Zhao et al have reported advanced tumor stage, chemoradiation and a higher body mass index as main predictors of weight loss in head and neck cancer patients. [8] A body mass index above 25 has been associated with a weight loss more than 5%. [7] Beaver et al. reported a weight loss of 32.7% during radiotherapy which is comparable to our study in which 31.7% of the patients had more than 5% weight loss. [6] In a study by Johnston et al. 68% patients lost more than 5% of their presenting weight within 1 month after completing treatment. [9] In our study, maximum number of patients 65 (64.3%) suffered grade 1 or more weight loss during 4th to 6th week of radiation treatment with absolute weight loss upto 8 kg. In our analysis variables, like trismus (p<0.063) and xerostomia (p<0.060) also showed trend towards significance. Weight loss continues to occur post radiotherapy and might be maximum at 5- 6 months of treatment. [10,11] A weight loss of more than 10% has been associated with a decreased overall quality of life. [12] Baseline nutritional status of patients before starting treatment is another variable which may serve as a predictor for overall weight loss and needs to be evaluated.

Weight loss during treatment shows a varied association with different patient,

tumor and treatment related variables. Use of advanced techniques may lower the severity of weight loss however it cannot be totally prevented. Proper patient counselling supplemented with nasogastric feeding, nutritional supplements, medications along with careful treatment planning can help improve the outcomes. [13-15] Weight loss in head and neck cancers is also emerging as one of the parameters determining the need for adaptive planning in head and neck cancers and thus needs to be meticulously evaluated and documented in every head and neck cancer patient on radiotherapy treatment.

CONCLUSION

Chemoradiation, total radiotherapy dose and tumor sites are the variables affecting weight loss in this study. Baseline nutritional status, proper patient counselling and nutritional supplementation are important aspects when treating patients of head and neck cancers.

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How to cite this article: Vats S, Mahajan R, Gupta M et.al. Evaluation of treatment related weight loss in patients with head and neck cancers undergoing radiotherapy. *International Journal of Research and Review*. 2019; 6(6):6-10.
