

Original Article

FREQUENCY OF DYSPHAGIA AMONG HEAD AND NECK CANCER PATIENTS RECEIVING 3-D RADIOTHERAPY

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ABSTRACT:

Head and neck cancers are ranked sixth among all cancers globally with reported new patients (630,000) identified per year. Males are more prone to head and neck cancers than females across the Pakistani population.

Objective: In the current project, the goal was to determine the frequency of acute side effects in terms of dysphagia during and immediately post-irradiation period in patients receiving concurrent 3-dimensional radiation-therapy at Institute of Nuclear Medicine and Oncology (INMOL) Hospital, Lahore.

Study design: It was a descriptive case series.

Material and Methods: Current study was carried out on 106 enrolled patients from December 2019 to May 2020 at the Department of Radiation Oncology Inmol hospital following ethical approval. All patients received radiotherapy as per clinician advice and hospital protocol. All patients were evaluated at pre radiation time, at weekly intervals during treatment and at 11 weeks from 1st radiation fraction. Data was entered and analyzed by Statistical Package for Social Sciences (SPSS software, version 20). Chi-square and Fisher's exact test was applied as p-value ≤ 0.05 was considered significant.

Results: In the present study, there was a gradual increase in grades of dysphagia among all patients after treatments till 7 weeks. After one month of post-treatment, all grades of dysphagia improved among all patients.

Conclusion: Acute side effects like dysphagia occurred among all patients receiving 3-D Radiation-therapy with overall good the treatment response. No death was reported during the current study. Although, we concluded 3-D Radiation-therapy has a high incidence of treatment-related toxicities.

Key Words: Head and Neck Cancer, Radiation, Radiotherapy.

INTRODUCTION:

Today's one of the health problems is head and neck cancer (HNC) globally. Its management is a challenge for the health community. It originates from any site like lips, oral cavity, and larynx, etc. in the head and neck region. Due to its versatile involvement, its clinical presentation is variable that ranges from hoarseness to neck mass.¹

Most cases (90%) are squamous cell carcinomas (HNSCC). It is ranked sixth among all cancers globally.² In the United States, approximately 10,000 people die due to its high incidence. Human papilloma-virus (HPV) infection caused a drastic increase in oropharyngeal cancer incidence.³ Males are more prone to head and neck cancers than females across Pakistani population.^{4,5}

Many factors lead to its emergence as reported in many previous studies. Risk factors like genetics, environmental influence, occupation, and adopted lifestyle affect its incidence greatly.⁶ Loco-regional control in squamous cell cancer has been achieved by concurrent radiation therapy (RT) with cisplatin. It is now the basic component of a multi-disciplinary approach for head and neck cancer treatment. Different RT modalities damage tumor maximally with

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minimum side effects. Though it has many short-term and long-term side effects.^{7,8}

Due to the increased incidence of head and neck cancers among our Pakistani population nowadays and with lack of data regarding 3D-RT acute side effects, we planned the current study to see the frequency of dysphagia associated with 3D-RT in head and neck cancers treatment among patients. It gave a useful insight into its incidence with proper management.

MATERIAL AND METHODS:

After approval from the institutional ethical review committee, a total of 106 patients (both genders) undergoing 3D-radiotherapy, were enrolled from December 2019 to May 2020 in the Department of Oncology, INMOL, Lahore, fulfilling the all patients with H and NCA who were receiving radiotherapy or chemotherapy, age of 25-70 years, stage I-III, ECOG status 1 and 2 and both genders were included in inclusion criteria.⁹ Informed written consent was taken from each patient and patients were given identifiable codes for traceability. All patients were given radio-therapy or chemo-radiotherapy as per clinician advice and hospital protocol. The Sample size (106) cases were calculated with a 95% confidence level, 9% margin of error, and taking an expected percentage of dysphagia with 3D radiotherapy as 33.3%. Patients were enrolled by non-probability consecutive sampling. In the current study both females (62) and males (44) in ratio of 1.4:1 were included. Exclusion criteria involved patients who were unable to give informed consent, any second malignancy and pregnant ladies. All patients were evaluated at pre radiation time, at weekly intervals during treatment and at 11 weeks from 1st radiation fraction. Grades of dysphagia in current study were taken according to toxicity criteria of the Radiation Therapy Oncology Group (RTOG) and the European Organization for Research and Treatment of Cancer.¹⁰

Data was entered and analyzed by Statistical Package for Social Sciences (SPSS software,

version 20). Quantitative data like age (in years) and total radiation dose were presented as Mean \pm S.D. The categorical data like gender, site of cancer, and dysphagia were offered as frequency and percentages. Chi-square and Fisher's exact test was used to compare the frequency of dysphagia among different, based on gender and the site of cancer. p-value \leq 0.05 was considered significant.

RESULTS:

Age ranged from 25-70 years among 106 enrolled patients. All these parameters were noted at the time of enrollment. Demographic parameters like age and dose of radiation as mean \pm S.D are described in the table-1 below.

Table-1: Descriptive statistics of patients with respect to age and total radiation dose

	Mean \pm S.D	Minimum	Maximum
Age (years)	57.8 \pm 8.3	39	70
Hemoglobin (g/dl)	10.7 \pm 1.24	9.0	13.0
Total (Grays) radiation dose	62.8 \pm 7.4	30	70

The most common site was oral cavity 31(29.2%) and the least common site was larynx 8 (7.5%) (Table-2).

Table-2: Distribution of participants with respect to gender, site of cancer and stages of cancer

Variable	Category	Frequency	Percentage (%)
Gender	Male	44	41.5
	Female	62	58.5
Site	Pharynx	23	21.7
	Hypopharynx	22	20.8
	Larynx	8	7.5
	Nasopharynx	22	20.8
	Oral cavity	31	29.2
Cancer	Stage 1	41	38.7
	Stage 2	46	43.4
	Stage 3	19	17.9

There was a gradual increase in grades of dysphagia among patients after treatments with 3-D RT till 7 weeks. After one month of post-treatment, grades of dysphagia among all patients improved. At the 7th week

of treatment, dysphagia of grade 4 was observed in 40 (37.7%) patients, dysphagia of grade 2 and 3 was observed in 19 (17.9%) and 47 (44.3%) patients respectively (Table-3).

Chi-square and Fisher's exact test was used to compare the frequency of dysphagia grades between male and female patients. There was no significant difference in the frequency of

dysphagia grades between any week of treatment (Table-4).

Chi-square and Fisher's exact test was used to compare the frequency of dysphagia grades among sites. No significant difference was observed in the frequency of dysphagia's grades among sites at 1st, 7th, and 11th week of treatment (Table-5).

Table-3: Distribution of patients according to the grade of Dysphagia

Week	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
1 st	106(100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2 nd	42(39.6%)	64(60.4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3 rd	5(4.7%)	61(57.5%)	40(37.7%)	0 (0%)	0 (0%)	0 (0%)
4 th	0 (0%)	65(61.3%)	41(38.7%)	0 (0%)	0 (0%)	0 (0%)
5 th	0 (0%)	22(20.8%)	44(41.5%)	40(37.7%)	0 (0%)	0 (0%)
6 th	0 (0%)	1(0.9%)	23(21.7%)	82(77.4%)	0 (0%)	0 (0%)
7 th	0 (0%)	0 (0%)	19(17.9%)	47(44.3%)	40(37.7%)	0 (0%)
11 th	42(39.6%)	24(22.6%)	40(37.7%)	0 (0%)	0 (0%)	0 (0%)

Table-4: Comparison of grades of dysphagia between both genders

Week	Gender	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	p-value
1 st	Male	44(100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.345
	Female	62(100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4 th	Male	0 (0%)	25(56.8%)	19(43.2%)	0 (0%)	0 (0%)	0 (0%)	0.423
	Female	0 (0%)	40(64.5%)	22(35.5%)	0 (0%)	0 (0%)	0 (0%)	
7 th	Male	0 (0%)	0 (0%)	11(25.0%)	14(31.8%)	19(43.2%)	0 (0%)	0.069
	Female	0 (0%)	0 (0%)	8(12.9%)	33(53.2%)	21(33.9%)	0 (0%)	
11 th	Male	0 (0%)	18(40.9%)	7(15.9%)	19(43.2%)	0 (0%)	0 (0%)	0.345
	Female	0 (0%)	24(38.7%)	17(27.4%)	21(33.9%)	0 (0%)	0 (0%)	

Table-5: Comparison of the grade of Dysphagia among sites

Week	Site	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	p-value
1 st	Pharynx	0 (0%)	11(47.8%)	12(52.2%)	0 (0%)	0 (0%)	0 (0%)	0.134
	Hypopharynx	0 (0%)	13(59.1%)	9(40.9%)	0 (0%)	0 (0%)	0 (0%)	
	Larynx	0 (0%)	6(75.0%)	2(25.0%)	0 (0%)	0 (0%)	0 (0%)	
	Nasopharynx	0 (0%)	11(50.0%)	11(50.0%)	0 (0%)	0 (0%)	0 (0%)	
	Oral cavity	0 (0%)	24(77.4%)	7(22.6%)	0 (0%)	0 (0%)	0 (0%)	
7 th	Pharynx	0 (0%)	0 (0%)	2(8.7%)	10(43.5%)	11(47.8%)	0 (0%)	0.265
	Hypopharynx	0 (0%)	0 (0%)	2(9.1%)	11(50.0%)	9(40.9%)	0 (0%)	
	Larynx	0 (0%)	0 (0%)	2(25.0%)	4(50.0%)	2(25.0%)	0 (0%)	
	Nasopharynx	0 (0%)	0 (0%)	5(22.7%)	6(27.3%)	11(50.0%)	0 (0%)	
	Oral cavity	0 (0%)	0 (0%)	8(25.8%)	16(51.6%)	7(22.6%)	0 (0%)	
11 th	Pharynx	0 (0%)	6(26.1%)	6(16.1%)	11(47.8%)	0 (0%)	0 (0%)	0.094
	Hypopharynx	0 (0%)	6(27.3%)	7(31.8%)	9(40.9%)	0 (0%)	0 (0%)	
	Larynx	0 (0%)	5(62.5%)	1(12.5%)	2(25.0%)	0 (0%)	0 (0%)	
	Nasopharynx	0 (0%)	10(45.5%)	1(4.5%)	11(50.0%)	0 (0%)	0 (0%)	
	Oral cavity	0 (0%)	15(48.4%)	9(29.0%)	7(22.6%)	0 (0%)	0 (0%)	

DISCUSSION:

Radiation Therapy (RT) was planned for patients with head and neck carcinoma (HNSCC). Acute side effects related to RT are not reviewed routinely in our setups so we planned to see the frequency of acute side effects in terms of dysphagia during and immediately post-irradiation period (upto 11 weeks from the first fraction) in patients receiving concurrent 3-dimensional radiotherapy. Thus we examined the efficacy and safety of RT in non-metastatic, stage I to stage III HNSCC patients.¹¹

In the current study, sample size of the patients was 106 which was comparable to another study comprising of 221 patients who presented with symptoms of head and neck cancer.¹² In contrast, one study carried on the Brazilian population included 30 head and neck cancer patients.¹¹

Age (mean \pm SD) of enrolled patients in our study was 57.8 ± 8.3 years (Table-1) years in conformity with the previous study where age (mean \pm SD) of enrolled head and neck cancer patients among European population was 64 ± 12 years. In past researches, the median age was 53 years (37–68) rather than mean of age.¹³

Both males and females were recruited in our work as in other previous studies. Females were 58.5% (62) while males were 41.5% (44) (table-2) paradoxically to the fact that males (21%) suffer more from head and neck cancers than females (11%) across Pakistani population respectively as well as globally.¹⁴ Selection of gender among subjects was paradoxical to our study i.e 83% males and 17% females in one Brazilian population.¹⁵

In this project, acute side effect like dysphagia was seen during and immediately after post-treatment at 4 weeks interval. There was a gradual increase in grades of dysphagia in all patients after treatments till 7 weeks in our current study. Dysphagia of grade 1 was observed in only 64 (60.4%) patients after 2 weeks of treatment. At 4th week after treatment, Dysphagia of grade 1 and 2 was observed in 106 (100.0%) patients. At the 7th week of treatment, Dysphagia of grade 4 was observed in 40 (37.7%) patients,

Dysphagia of grade 2 and 3 was observed in 19 (17.9%) and 47 (44.3%) patients respectively. After one month of post-treatment, a decrease in grades of Dysphagia in all patients was observed. Dysphagia of grade 3 was observed in 40 (37.7%) patients. However, Dysphagia of grades 1 and 2 was observed in 42 (39.6%) and 24 (22.6%) patients respectively as shown in table-3. Our work was in line with a previous study carried on the Dutch population showing similar results.¹⁵

LIMITATIONS:

This study had several limitations like financial constraints and fewer resources. We did not perform Positron Emission Tomography (PET) scan and genetic study to see genetic variability among enrolled subjects.¹⁵

CONCLUSION:

Dysphagia of different grades appeared among all patients receiving 3-D Radiation-therapy although the treatment response was good. Hence, we concluded 3-D Radiation-therapy has a high incidence of treatment-related toxicity.

AUTHOR'S CONTRIBUTION:

SZ: Write up and literature review.
SN: Literature review help in write-up.
AB: Literature review help in write-up.
MSY: Collecting and arranging the data
SS: Analysis literature review, help in write up.
AA: Overall supervision and write up.
MR: Review critically

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