QUAD SHOT - HYPOFRACTIONATED RADIOTHERAPY FOR PALLIATION IN ADVANCED SQUAMOUS CELL CARCINOMA OF HEAD AND NECK

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ABSTRACT

Objective: The objective of this study was to determine the efficacy of quad-shot radiation therapy for palliation in locally advanced and metastatic inoperable squamous cell carcinomas of head and neck.

Study Design: A quasi-experimental study.

Place and Duration of Study: Oncology department, Combined Military Hospital Rawalpindi, from Sep 2012 to Sep 2013.

Material and Methods: Thirty five patients were included with histologically confirmed advanced inoperable squamous cell carcinoma in head and neck region, performance status 2 or 3 and survival ≥3 months. Patients were treated with radiation therapy 14 Gy in four fractions, megavoltage beam, twice daily fractions (at least 6 hours apart), for 2 consecutive days. Symptoms due to cancer (pain and dysphagia) were assessed as per common toxicity criteria adverse event version 4.0 on day 0 before treatment and day 21 after start of treatment.

Results: Grades of pain and dysphagia showed significant improvement after treatment with a *p*-value <0.001. A total of 91.4% patients showed an improvement in grade of pain (32 out of 35 patients) and 45.7% of patients showed improvement in grade of dysphagia (16 out of 35 patients). There was a statistically significant decrease in grades of pain and dysphagia after treatment.

Conclusion: The short duration of hypofractionated radiotherapy with Quad Shot was effective with respect to symptom palliation in locally advanced and metastatic inoperable head and neck cancers.

Keywords: Hypofractionated, Radiotherapy, Squamous cell carcinoma.

INTRODUCTION

Squamous cell carcinoma of the head and neck (SCCHN) is the sixth most common cancer around the world and there are about half a million new cases diagnosed each year[1,2]. SCCHN comprises over quarter of the cancer patients in some of the low income countries[3]. A major proportion of head and neck cancer patients present with incurable advanced disease and have a short life expectancy[4]. Most of these patients have a relatively poorer prognosis and die due to uncontrolled loco-regional disease[4].

Radiotherapy (RT) alone has long been the standard non-surgical therapy for locally advanced disease[5]. RT is an effective palliation regimen for advanced malignancies but there is a paucity in literature regarding the optimal palliative protocol for these patients and there is no standard fractionation regimen[6]. Different practices have been used ranging from a short course of large daily fractions to conventional radical doses upto 70 Gy to achieve symptom palliation and increase overall survival[7]. Ali MY and colleagues reported a 100% improvement in pain and 90% improvement in dysphagia following a short course palliative radiotherapy regimen[7]. The establishment of an effective palliative protocol for incurable head and neck cancer is very important to the radiation oncologist as these patients constitute a major portion of the total head and neck cases being treated. This hypofractionation schedule is appealing in the palliative setting, as it provides an effective dose in a short period[4].

No study has been performed earlier at our centre to determine efficacy of hypofractionated

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RT in advanced SCCHN. Our study was designed and carried out to establish a treatment protocol for our local centre, considering the massive workload of the palliative RT for advanced SCCHN. The patient with such advanced disease have a relatively poor prognosis with regard to overall survival (OS) so only the effectiveness of treatment for the relief of disease related symptoms(pain and dysphagia) was studied.

Fractionation scheme for the relief of symptoms in advanced head and neck cancer needs to be re-evaluated in local setting. Quad Shot if proven to be efficacious in advanced SCCHN will result in symptom palliation in few visits to the hospital and better quality of life of patients. It will also decrease the workload on our Linear Accelerator machine and make it possible to pay more attention to patients requiring RT with curative intent.

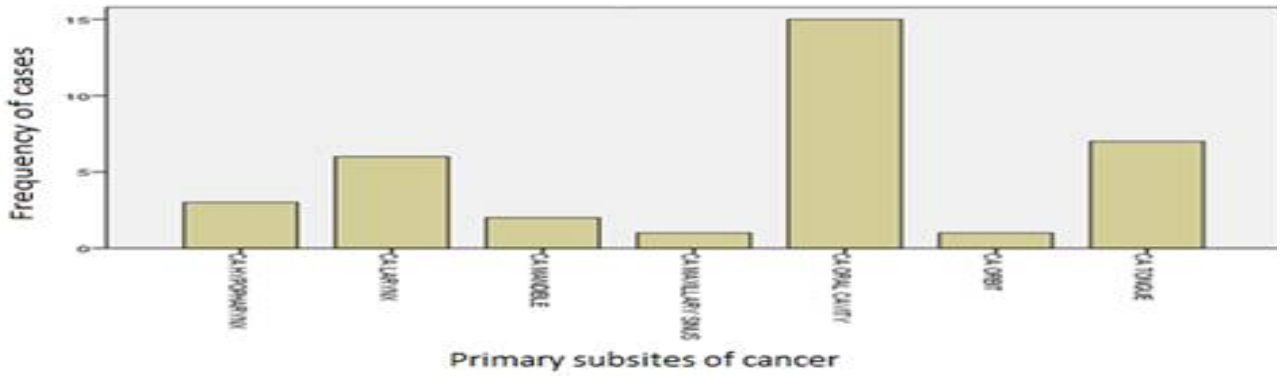

Figure-1: Distribution of primary sub-sites in head and neck cancer.

MATERIAL AND METHODS

This quasi experimental study was performed at Oncology department, CMH Rawalpindi. The duration of this study was from 1st Sep 2012 to 1st Sep 2013. Thirty five patients were included using nonprobability consecutive sampling with histologically confirmed squamous cell carcinoma of head and neck (SCCHN), age ≥18 years, Eastern Cooperative Oncology Group performance status (ECOG PS) 2 to 3, survival of ≥3 months and advanced inoperable disease not suitable for curative treatment. All patients who had been radiated previously or had a history of concomitant second cancer were excluded from the study.

After enrollment, following diagnostic work-up was performed in all patients: General physical examination and radiological test (chest x-rays and computed tomography (CT) scan of the head and neck). ECOG PS was documented. Patient's disease was staged according to the 2010 The American Joint Committee on Cancer (AJCC) Tumor-node-metastasis (TNM) classification.

Quad shot radiotherapy was delivered, at the Oncology department CMH Rawalpindi, using two opposing lateral beams, target volume included the gross disease with a 2 cm margin all around. Radiation was delivered using 6 MV photon beam. The RT fractionation scheme was 14 Gy in four fractions, twice daily (at least 6hrs apart), for 2 consecutive days.

Symptoms including pain and dysphagia, were graded according to Common Toxicity Criteria Adverse Event (CTCAE) version 4.0. The patients symptoms were recorded at the baseline Day 0 before treatment and at day 21 after treatment. Data at day 21 were compared with Day 0 data to establish the efficacy of Quad Shot RT in palliation of advance inoperable SCCHN. Data analysis was done using SPSS version 19. For numerical variable like age, mean and standard deviation were calculated. For categorical data like gender, stage and grade of symptoms, frequency and percentages were calculated. Wilcoxon signed rank test was

applied to compare symptoms grade before and after intervention.

RESULTS

Thirty five patients of HNSCC were included in the study from Oncology department, Combined Military Hospital Rawalpindi. The average age of the patients was 58.54 ± 7.17 years with minimum age of 40 and maximum age of 71 years. Twenty three (65.3%) of the patients were male and 12 (34.7%) were female. Oral cavity was the most common site of involvement as shown in fig-1. 20 (57.1%) patients had ECOG performance status of 2 ,while ECOG performance status was 3 in 15 (42.9%) patients.

The pre and post radiation therapy frequency of distribution of grades of pain and dysphagia is shown in fig-2 and fig-3 respectively. A total of 91.4% of patients showed an improvement in grade of pain (32 out of 35 patients), while 45.7% of patients showed improvement in grade of dysphagia (16 out of 35 patients). There was a statistically significant decrease in grades of pain and dysphagia after treatment.

The comparative analysis of grades of symptoms assessed, for improvement with treatment, by using Wilcoxon Sign Rank Test, showed improvment in symptoms of pain (*p*-value <0.001) and dysphagia (*p*-value<0.001) with treatment at day 21.

DISCUSSION

Palliative radiotherapy is administered in advanced incurable cancers to relieve symptoms with minimal toxicity to the patient. It is also important to deliver the treatment in shortest possible time to make it convenient for the patient and the care givers. Different fractionation have been used by different institution taking in to account its capacity and other national, cultural factors[8]. The hypofractionated treatment protocols have not been widely used due to lack of experience with large fractions, issues regarding acute toxicity

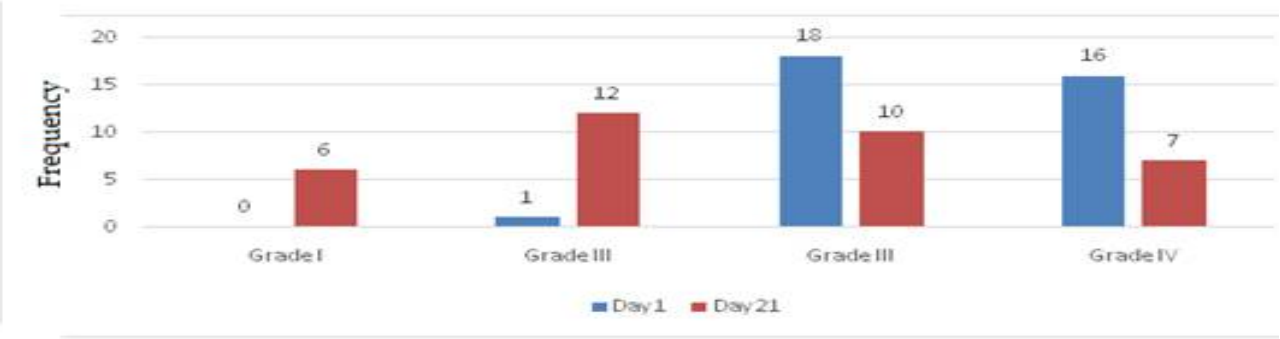

Figure-2: Distribution of grade of pain at day 0 and day 21.

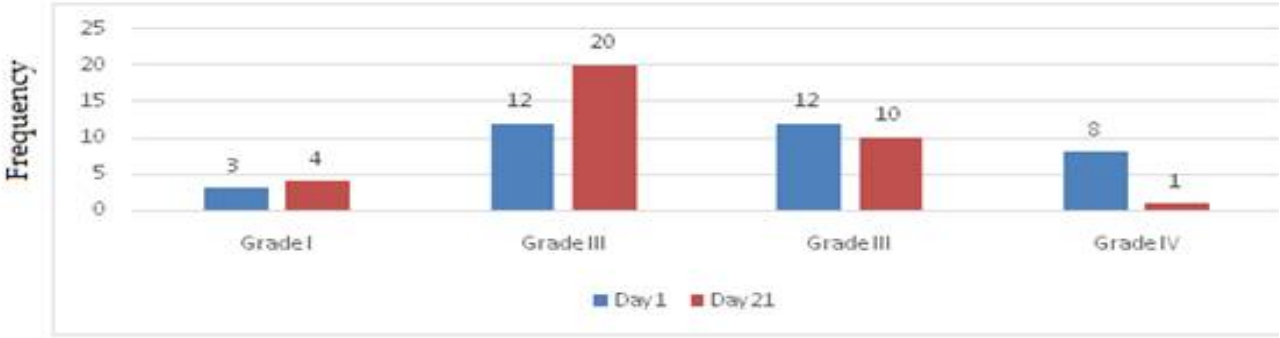

Figure-3: Distribution of grade of dysphagia at day 0 and day 21.

and no fixed criteria regarding selection of appropriate patients.

Results achieved in our study are similar to those seen in other published studies. Corry et al[9] reported on the results of a phase II prospective palliative radiotherapy study for head and neck cancer known as the ''Quad Shot''. The study population and RT protocol in that study was similar to ours. RT protocol was designed to administer biologically equivalent dose which does not exceed the threshold for mucositis. This schedule was effective and well tolerated. Of the 30 eligible patients 16 (53%) had an objective response (complete response or partial response) and 44% experienced an improvement in quality of life (QoL). However, the median overall survival was 5.7 months. "Hypo Trial" by Porceddu SV et al using 30 Gy in 5 fractions at 2/week, at least 3 days apart, reported reported an overall response of 80%[4]. While a large study from India by Mohanti et al of 505 patients, reported a partial response of 37% using 20 Gy in five fractions for advanced head and neck cancer[10]. It appears that the protocol of Quad Shot is giving better efficacy in symptom palliation compared to the "Hypo Trial" protocol or the more popular with radiation oncologists 20 Gy in 5 fractions protocol.

CONCLUSION

The short duration of hypofractionated radiotherapy with Quad Shot was effective with respect to symptom palliation in locally advanced and metastatic inoperable head and neck cancers.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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