

Original Research Article

Patterns of radiation treatment default and its evaluation in a cancer center in the Southern part of Odisha: a retrospective study

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ABSTRACT

Background: The incidence of cancer in India is alarming. However, many patients discontinued their treatment protocols resulting in higher mortality rate. This study aims to find out different patterns of treatment defaults in cancer patients receiving external beam radiation in the radiotherapy department of a cancer center in the southern part of Odisha state.

Methods: It is a retrospective epidemiological study carried out in cancer patients receiving external beam radiotherapy for their cancer treatment but had not completed the full course of treatment during the study period from January 2018 to May 2019. Patterns of failure in relation to various demographic and socio-economic statuses were analyzed.

Results: One hundred seven defaulter patients were included in this study. The mean age of the patients was 50.93 ± 14.3 years (range 12 to 90 years) and 66(61.7%) were being females. Out of 107 patients, 53.2% patients were receiving treatment in curative intent, 28.0% patients were treated in adjuvant intent and 18.2% in palliative intent. Forty-two (39.2%) patients were from a distance >50 km from the study center, 74.7% of patients belong to low socio-economic status and 60.7% patients were illiterate. Only 33.3% of patients completed more than 15 fractions of radiation excluding the palliative cases. The comparison of various factors such as distance from study center ($p=0.759$), education ($p=0.2428$), socio-economic status ($p=0.6628$) and acute radiation toxicity ($p=0.9359$) among the groups of patients receiving more or less than 15 fractions of radiation did not showed any statistical significant differences.

Conclusions: Radiation induced acute toxicity, distance from study center, education and socio-economic status might be responsible for the treatment discontinuation. There is no particular association of age, disease site and intent of treatment with default among patients.

Keywords: Cancer, Curative intent, Defaulter, Radiotherapy

INTRODUCTION

Cancer is a public health problem for its epidemiological, social and economic relevance.¹ The upward trend in cancer incidence globally and in India has become a matter of great concern. According to the World Health Organization (WHO 2006), cancer is one of the leading causes of death worldwide, the second common cause of death in developed countries and the third leading cause

of death in developing countries.² During the last 20 years, India has emerged as a fast growing economy with changes in lifestyle-related behavior partially responsible for the increasing cancer burden and is among top three killers among adults in both rural and urban India.³

Radiotherapy forms an important constituent in multimodality treatment approach in the treatment of cancers along with chemotherapy and surgery. In many

cases, radiotherapy is the primary treatment modality also. Timely completion of radiotherapy with appropriate doses is one of the important factors in overall prognosis and survival of the patients being treated with both radical and adjuvant intent.⁴

Discontinuation of total prescribed radiotherapy dose or missing last fractions of radiation may cause disease progression or residual disease, which may lead the patient to undergo other modalities of cancer treatment resulting in treatment failure and a poor quality of life. Potential metastases could become established during treatment gap or defaults, thereby transforming the cancer into a generally incurable metastatic disease.⁴

The numerous myths and ignorance that prevail in the Indian society result in an unrealistic fear of the disease.⁵ It is very much essential to investigate into various causes and patterns of default among patients receiving EBRT.

Cancer treatment in India is still in developing stage, though various new machines and techniques are under trial, many centers are dependent on Cobalt 60 machines for treatment delivery. There is always a demand of more Radiotherapy machines and treatment centers as the cancer cases are increasing day by day.⁶

There is paucity of literatures on various causes of discontinuation of radiation therapy in cancer patients in India. This study aims to identify various patterns of default and associated causes among patients receiving EBRT in conventional technique with Co-60 machine at a tertiary care center in the eastern part of India.

METHODS

This study was conducted in the Department of Radiotherapy of Maharaja Krishna Chandra Gajapati Medical College, Berhampur, Odisha situated in the eastern part of India. In this department, all the cancer patients were treated in conventional technique by Co60 radiotherapy machine.

Study subject

All cancer patients who had discontinued radiotherapy treatment and had not received the total prescribed dose during the study period from January 2018 to May 2019.

Inclusion criteria

- All age groups
- Both males and females
- Patients with adjuvant, curative and palliative treatment intentions

Exclusion criteria

- Patients with unscheduled treatment gaps.

Data collection

Patient's information includes socio-demographic, educational, clinical profile, sites of cancer, treatment intentions, treatment toxicities etc. were obtained in a predesigned case format from hospital radiotherapy treatment records.

Statistical analysis

All the data were collected, summarized, and analyzed by SPSS version 16 IBM SPSS Statistics for Windows, (IBM Corp., Armonk, N.Y., USA). The data were presented by their number and percentage. The categorical data were analyzed and compared by Chi-square test. Level of statistical significance was considered as $p < 0.05$.

RESULTS

A total of 107 patients were defaulted their radiotherapy treatment in the department of radiotherapy. Out of this 38.3% were male and 61.7% were females. Out of 107 patients, 74.7% of patients belonged to low socio-economic group and rest were of medium socio-economic group. Similarly, 60.7% of all defaulters were illiterate and only 5.6% of the population completed their high school education. Out of total 107 defaulters 42(39.2%) are staying at a distance of more than 50 km from the cancer center.

According to the various intentions of treatment 53.2% of the patients were under curative treatment, 28% of the defaulters were receiving adjuvant treatment and 18.8% patients received radiation in palliative intent. The socio-demographic and clinical feature of all recruited patients has been illustrated in Table 1. All defaulters excluding the palliative cases are grouped into two groups depending on the fractions of radiation received and 66.6% of these patients received less than 15 fractions.

When literacy, distance from treatment center, socio-economic status and acute radiation toxicities were compared with the fractions of radiation completed, it is found that 69% of total illiterates, 64.6% of low socio economic group, 68.9% patients with acute radiation toxicity and 61.1% defaulters residing at a distance more than 50 km from the center have received less than 15 fractions. The comparison of different variables among groups of patients receiving different fractions of radiation has been shown in Table 2.

DISCUSSION

Cancer cases are found in all age groups with highest among the elderly people. Females are more affected than males. In this study the female defaulters (61.7%) were more than male defaulters (38.3%) which may be due to higher negligence towards health and greater household responsibilities in females.

Table 1: Socio-demographic and clinical profile among the study subjects (n=107).

	Variables	Number	Percentage
Occupation	Business	15	14.02
	Farmer	32	29.91
	Housewife	45	42.06
	Govt	8	7.48
	Daily labour	7	6.54
Distance from home to study center (in kilometers)	≤10	25	23.36
	>10-30	14	13.08
	30-50	26	24.30
	>50	42	39.25
Education	Illiterate	65	60.75
	< 5 th standard	18	16.82
	5 th -10 th Standard	18	16.82
	>10 th Standard	6	5.61
Socio economic status	Low	80	74.77
	Medium	27	25.23
Treatment (intent)	Adjuvant	30	28.04
	Curative	57	53.27
	Palliative	20	18.69
Acute radiation toxicities	Present	39	36.45
	Absent	68	63.55

Table 2: Comparison of variables among groups of patients receiving different fractions of radiation.

Variables	Fractions of radiation completed		Statistics X 2 value; p value
	≤15# Number (%)	>15# Number (%)	
Distance from home to study center (in kilometers)	≤10	15(75)	1.175; 0.759
	>10-30	7(70)	
	30-50	14(66.67)	
	>50	22(61.11)	
Education	Illiterate	38(69.09)	4.178; 0.2428
	< 5 th standard	7(53.85)	
	5 th -10 th standard	8(57.14)	
	>10 th standard	5(100)	
Socio economical status	Low	42(64.62)	0.1901; 0.6628
	Medium	16(72.73)	
Acute radiation toxicities	Present	20 (68.97)	0.006; 0.9354
	Absent	38 (31.03)	

Education and awareness about cancer and its treatment outcome is very much important for patients seeking early treatment and better cure rate. In this study, highest numbers of defaulters were illiterate and constitute 60.7% of the total defaulters. Occupation wise highest group (42%) of defaulters were housewives doing household works. Education level independently has also been shown to affect treatment outcome in a large study of radiation regimens in head and neck that revealed a significantly improved overall survival and loco regional control in patients with post-secondary education that was independent of stage of disease presentation.⁷ In Indian health care scenario, there is always a demand of more cancer centers and Radiotherapy machines. The

existing centers are overburdened with patients. Moreover, most of the patients are taking treatment in a day care basis with daily up and down from their home and distance from the cancer center may play a big role in continuation of treatment. In this study approximately 40% of defaulters were coming from a distance more than 50 km. The time to travel to the hospital, distance from the patient's home to the hospital as well as long waiting times for medical appointments at a cancer hospital reflects different dimensions of access to care.⁸

Socio-economic status of the patients also plays a remarkable role in cancer treatment, as it is highly expensive and may result in loss of gross family income

due to longer treatment course, nursing care by other family members and associated co-morbidities. Low-socio-economic status may lead to treatment discontinuation due to poor family economy. In this study 74.7% of defaulters belong to low-socio-economic group.

Various intentions of cancer treatment are neo-adjuvant, adjuvant, curative or palliative. Treatment with curative intent mostly constitutes chemo-radiation which has more side effects as compared to radiation and mostly advised to in-operable and locally advanced cases. Presence of different disease specific co-morbidities and treatment related toxicities may lead to discontinuation or irregular treatment schedules. 53.2% of defaulters received chemo radiation in this study as compared to 60.8% in the study undertaken in the same state of Odisha.⁹ Patients recruited in the study undertaken in Cuttack was belonging to different regions of Odisha state because it is the only referral apex regional cancer center in the state of Odisha. However, patients recruited in this study were restricted to Southern districts of Odisha state.

The group of defaulters those received less than 15 fractions of radiation includes 69% of total illiterates, 64.6% of low socio economic group, 68.9% patients with acute radiation toxicity and 61.1% defaulters residing at a distance more than 50 km from the study center and are higher than the group receiving more than 15 fractions. Cancer patients experiences numerous geographic and health care system challenges, resulting in significant delays in receiving diagnosis and treatment, even for cancers highly amenable to early intervention. This situation is likely explained by limited knowledge about cancer among patients and health care professionals, government neglect, poverty, and reliance on traditional healers.¹⁰

CONCLUSION

Treatment default in radiotherapy modality of cancer management is a big concern for radiation oncologists. Not only it leads to treatment failure but also it spreads a wrong message that cancer is not curable with radiotherapy. From this retrospective study it is evident that poor literacy, low economic status, distance from treatment center, acute radiation toxicities and household responsibilities especially among female cancer patients contribute to large extent towards treatment defaults. So early counseling, proper guidance regarding treatment benefits and timely management of acute toxicities with regular follow-up is essential to minimize the defaults for a better treatment outcome.

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