Original Article

# To Assess the Incidence of Radiation Dermatitis among the Cancer Patients Receiving Radiotherapy

**Lt Col Vandana Agnihotri[1], A. Y. Kshirsagar[2]**

[1]Department of Medical-Surgical Nursing, College of Nursing, INHS Asvini, Mumbai, Maharashtra, India, [2]Department of Surgery, Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, India

## Abstract

**Introduction:** Radiation dermatitis is one of the most common side effects of radiotherapy.

**Aim:** An observational study to assess the incidence of radiation dermatitis among the cancer patients receiving radiotherapy was undertaken.

**Methods:** The study included 100 cancer patients receiving a curative dose of radiotherapy at a tertiary care hospital. Majority of the patients, i.e., 61% were aged between 51 and 60 years with maximum number of patients, i.e., 38% having head and neck cancer followed by respiratory tract. Majority of the patients were in the second stage of cancer and received 46–50 CG radiations in 26–30 fractions, only two patients received 71–75 CG radiations.

**Results:** Skin assessment during the 04 weeks of radiation revealed that in the 1st week score was 0. In the 4th week, 69% of patients had the acute radiation morbidity score 0. 15% of patients had the score 1. 14 patients had score 2. Only two patients had acute radiation morbidity score 3.

**Conclusion:** A study concluded that radiation dermatitis is more seen in the 4th week of radiation.

**Keywords:** CG, radiodermatitis, radiotherapy

## Introduction

Cancer patients are treated with either radiotherapy or chemotherapy or both after the surgery depending on the stage of cancer. According to American Society for Radiation Oncology, nearly 75% of oncology patient received radiation therapy as a part of curative or palliative care. Radiation dermatitis is one of the most common side effects of radiotherapy. 95% of patients receiving radiotherapy will experience mild, moderate, or severe radiation-induced skin reactions called radiodermatitis.[1-3]

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The severity of the reaction depends on various factors such as a total dose of radiation, field area, concurrent chemotherapy, and certain individual factors. Despite various improvements in irradiation techniques, most of the patients are still experiencing radiodermatitis. Skin being highly proliferative and self-renewing organ is susceptible to damage by ionizing radiations even though they are given in multiple small doses called fractions. These skin reactions vary from mild redness (erythema) to wet desquamation or necrosis. Up to an estimated 95% of patients, receiving radiation therapy will experience some degree of skin reaction, which may include erythema, dry desquamation, and moist desquamation.[4-6] The actual incidence of radiodermatitis resulting from new technologies along with the increased use of multimodality therapy is not known.

**Address for Correspondence:**
Lt Col Vandana Agnihotri, Department of Medical-surgical Nursing, College of Nursing, INHS Asvini, Mumbai, Maharashtra, India. E-mail: vandu.agnihotri@yahoo.com

## Materials and Methods

The study was conducted during the period from March 2015 to May 2016 at the Radiotherapy center in Pune. 100 cancer patients receiving radiotherapy at the cancer center by purposive sampling technique were included in the study. Radiation therapy group of oncology (RTOG) and acute morbidity scoring criteria were used to assess the radiation dermatitis from the 1st week until the completion of radiation.

### Inclusion criteria

The following criteria are included in the study:

- The pre- and post-operated cancer patients in the age of 20–80 years with carcinoma referred for radiotherapy, with or without adjuvant post-operative chemotherapy, or hormonal treatment.
- Cancer patients receiving 40 CG and above radiation.
- Willing to participate.

### Exclusion criteria

Cancer patients rash, ulceration, bleeding, or unhealed scar in the treatment area.

- Skin involvement by tumor, history of, or current connective tissue disorder, medical contraindication (allergy or sensitivity) to Aloe vera.
- Cancer patients receiving palliative dose of radiation.

### Statistical analysis

Statistical analysis was performed using descriptive statistics of percentage and means and to find the association between the site of cancer and the radiation dermatitis Chi-square test was used. For the test, P value of $< 0.05$ was considered statistically significant.

## Results

### General characteristics

Maximum patients were in the age group of 51–60 years with 53% females and 47% males.

**Table 1:** Age-wise distribution of cancer patients

| Age (years) | Frequency |
|---|---|
| 20–30 | 3 |
| 31–40 | 6 |
| 41–50 | 24 |
| 51–60 | 33 |
| 61–70 | 28 |
| 71–80 | 6 |
| Total | 100 |

**Table 2:** Gender wise distribution of cancer patients

| Gender | Control |
|---|---|
| Male | 47 |
| Female | 53 |
| Total | 100 |

**Table 3:** Site of cancer wise distribution of cases

| Site of cancer | Frequency |
|---|---|
| Head and neck | 38 |
| Oral cavity | 14 |
| Tongue | 11 |
| Buccal mucosa | 8 |
| Alveolus | 2 |
| Maxilla | 2 |
| Parotid | 1 |
| Respiratory tract | 16 |
| Nasopharynx | 3 |
| Hypopharynx | 6 |
| Oropharynx | 0 |
| Supraglottis | 2 |
| Larynx | 5 |
| Lung | 3 |
| Breast | 14 |
| GI tract | 11 |
| Esophagus | 6 |
| Stomach | 0 |
| Colorectal | 1 |
| Rectum | 4 |
| Pancreas | 0 |
| Genitourinary | 14 |
| Cervix | 12 |
| Endometrium | 2 |
| Others | 4 |
| Periampullary | 1 |
| Sarcoma | 2 |
| Iliac fossa mass | 1 |
| Total | 100 |

**Table 4:** Stage of cancer wise distribution of cancer patients

| Stage of cancer | Frequency |
|---|---|
| Stage I | 12 |
| Stage II | 43 |
| Stage III | 26 |
| Stage IV | 19 |
| Total | 100 |

**Table 5:** Dose of radiation wise distribution of cases

| Dose of radiation CG | Frequency |
|---|---|
| 40–45 | 12 |
| 46–50 | 39 |
| 51–55 | 2 |
| 56–60 | 27 |
| 61–65 | 1 |
| 66–70 | 18 |
| 71–75 | 1 |
| Total | 100 |

**Table 6:** Week wise distribution of acute radiation morbidity score

| Weeks | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| 1st week | 100 | - | - | - |
| 2nd week | 95 | 4 | 1 | - |
| 3rd week | 82 | 14 | 4 | - |
| 4th week | 69 | 15 | 14 | 2 |

**Table 7:** Site of cancer and skin reaction wise distribution of cases

| Site of cancer | n | Skin reaction at 1st week | Skin reaction at 2nd week | Skin reaction at 3rd week | Skin reaction at 4th week |
|---|---|---|---|---|---|
| Head and neck | 38 | 0 | 2 | 8 | 22 |
| Respiratory tract | 16 | 0 | 0 | 3 | 8 |
| Lung | 3 | 0 | 0 | 0 | 0 |
| Breast | 14 | 0 | 0 | 3 | 6 |
| GI tract | 11 | 0 | 1 | 2 | 7 |
| Genitourinary | 14 | 0 | 0 | 2 | 5 |
| Others | 4 | 0 | 0 | 1 | 1 |
| Total | 100 | 0 | 3 | 19 | 49 |

Majority were females with maximum (38%) having head and neck cancer followed by 16% of respiratory tract, 14% each of genitourinary and breast, 11% GI tract, and 4% in others category. 43% were in Stage II of cancer and majority, i.e., 39% received 46–50 CG radiation. In the 1st week of radiation, all the patients had 0 score as per the acute radiation morbidity score. In the 2nd week, only one patient had the score of 2. In the 3rd week, 14 patients had the score of 1 and four patients had the score 2 of acute radiation morbidity score. The 69% of patients in the 4th week had 0 score, 15% of patients had the score 1. 14 patients had score 2. Only two patients had score 3 at the 4th week of radiation [Tables 1-7].

Maximum number of patients with head and neck cancer, i.e., 22 of 38 (57.89%) had skin reaction in the 4th week. 08 of 16 (50%) patients with respiratory tract cancer, 06 of 14 (42%) with breast cancer, and 07 of 11 (63%) with gastrointestinal tract had skin reaction in the 4th week. Patients with lung cancer had no skin reaction.

## Discussion

Newer techniques and machines have not eliminated dermatitis (Ryan, 2012). Fortunately, skin reaction in palliative radiotherapy is seen less commonly than with standard radiotherapy doses (Bolderston et al., 2006). A study was conducted to investigate the consensus of skin care advice given by nurses during radiotherapy. 67 nurses, identified through nine Belgian radiotherapy departments, responded to a questionnaire survey consisting of 58 items regarding prevention and management of erythema, dry desquamation, and moist desquamation. Consensus for a given advice was categorized as small if <50% of the nurses gave the same answer, as moderate if between 50% and 75%, and as large when more than 75%. Overall, 33% of the items showed small consensus, 29% showed moderate consensus, and 38% showed large consensus. The highest consensus was seen for advice in cases of moist and dry desquamation. There was less agreement in the case of erythema, and it decreased further for preventive advice. Some skin care techniques that were frequently used by the nurses cannot be supported by the literature. Furthermore, some techniques recommended by the literature are not frequently used. Further, few differences ($P < 0.05$) between nurses working in a university hospital and the ones working in a non-university hospital were found in terms of advice given to patients. To increase consensus on skin care issues, more conclusive research is needed. Of equal importance is the translation of existing research results into daily clinical practice.[7]

Another study conducted to determine if Biafine compared to best supportive care (BSC) is effective in minimizing or preventing radiation-induced dermatitis in women undergoing breast irradiation. Patients were randomized between Biafine ($n = 83$) and BSC ($n = 89$). The institutions identified preference for BSC at the time of randomization. A no-treatment arm was allowed (16% received no treatment). Patients were instructed to apply randomized product 3 times a day, but not within 4 h of their daily RT session. Application began following their first radiation treatment and continued 2 weeks post-radiation. Skin dermatitis was scored weekly utilizing the RTOG and oncology nursing society skin toxicity scales, a weekly patient satisfaction, and quality-of-life questionnaire. Using the RTOG toxicity scale, there was no overall difference for maximum dermatitis during RT between Biafine and BSC ($P = 0.77$). There was no difference in maximum toxicity by arm or breast size. There was an interaction between breast size and toxicity, with large-breasted women exhibiting more toxicity. Large-breasted women receiving Biafine were more likely to have no toxicity 6 weeks post-RT. There was no overall difference between BSC and Biafine in the prevention, time to, or duration of radiation-induced dermatitis.[8]

The present study supports the literature findings that skin reaction is more common toward the completion week, i.e., 4th week.

## Conclusion

Majority of the patients, i.e., 61% were aged between 51 and 60 years. Mean age was 55 years. There were 53% females and 47% males. Majority of the patients (38%) were with head and neck cancer and 45.5% were in the second stage of cancer. A maximum number of the patients, i.e., 39% received 46–50 CG radiations in 26–30 fractions.

Radiodermatitis is a common side effect of radiotherapy that is associated with pain, decreased quality of life, and treatment delays that may compromise the effectiveness of radiation treatment. Radiodermatitis ranges from mild to severe and may be acute or chronic. The study concluded that the radiation dermatitis mostly occurs in the 4th week of radiation therapy.

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