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To assess the efficacy of cryotherapy on mucositis in patients of Head and Neck cancer undergoing radiotherapy: A clinical study

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Abstract

Background: Head and neck cancer is a group of cancers that starts within the mouth, nose, throat, larynx, sinuses, or salivary glands. Radiotherapy is required in large number of cases either alone or as an adjunct to surgery. Mucositis is most common side effects seen in patients undergoing radiotherapy. The present study was conducted to assess the efficacy of cryotherapy (Ice Cubes) on mucositis in patients undergoing radiotherapy.

Materials & Methods: It included 30 patients undergoing radiotherapy of head and neck cancer. Patients were divided into 2 groups. Group I (Study) included 15 patients who were instructed for standard oral care for mucositis such as use of a soft toothbrush with nonabrasive toothpaste and dental floss twice a day. They were also instructed to suck ice cubes before and after each radiotherapy session for five minutes. Group II (Control) group included 15 patients were received instructions for standard oral care such as use of a soft toothbrush with nonabrasive toothpaste and dental floss twice a day and was left to routine hospital care for mucositis. WHO mucositis scale was used to judge mucositis. Grading was assessed on Ist day, mid (16th) day and last (30th) day of radiotherapy in all patients.

Results: Group I had mean age of 44.12± 2.4 years and group II had 42.35± 2.8 years. The difference was non - significant ($P > 0.05$). Group I had 8 males and 7 females and group II had 10 males and 5 females. The difference was non - significant ($P > 0.05$). In group I, 13 were married and 2 were non married. In group II, 14 were married and 1 was single. In group I, 7 had habit of smoking and 8 had no smoking habit similarly in group II, 6 had habit of smoking and 9 had no smoking habit. In group I, the site of tumor was lip (4), oral cavity (3), neck (3) and pharynx (5). In group II, the site of tumor was lip (5), oral cavity (5), neck (2) and pharynx (3). The difference was non - significant ($P > 0.05$). In group I, 9 were literate and 6 were illiterate. In group II, 7 were literate and 8 were illiterate. The difference was non - significant ($P > 0.05$). Group I had less mucositis at 1st day, midst (7th day) and latest (14th day) as compared to group II. The difference was significant ($P < 0.05$). Patient judged mucositis grading was significantly ($P < 0.05$) lowered in group I at 1st day (0), midst day (0.14) and latest day (0.18) as compared to group II, 1st day (0), midst day (1.4) and latest day (1.1). In group I, at latest day only 4 patients had pain while in group II, 12 patients had pain. The difference was significant ($p < 0.05$).

Conclusion: Cryotherapy is found to be effective in reducing mucositis in head and neck cancer patients. This can be considered a preventive measure in patients undergoing radiotherapy.

Keywords: Cancer, Cryotherapy, Mucositis

Introduction

Head and neck cancer is generally considered as a group of cancers that usually begins inside the mouth, nose, throat, larynx, sinuses, or salivary glands. Symptoms may include a lump or sore that does not heal, a sore throat that does not diminish, difficulty in deglutination or a slight alteration in pitch of voice [1].

Roughly 80% of head and neck cancer is because of the consumption of alcohol or tobacco. Some of the additional risk factors comprise certain types of human papillomavirus, radiation exposure, certain workplace exposures, and Epstein-Barr virus [1]. Head and neck cancers are most commonly of the squamous cell carcinoma type. Head and neck cancer is strongly associated with certain environmental and lifestyle risk factors which includes smoking, alcohol usage, ultra violet light, chemicals used in certain workplaces [2]. In 2013 head and neck cancers globally affected more than 4.6 million people and resulted in more than 362,000 deaths. Together they are the seventh most frequent cancer and the ninth most frequent cause of death from cancer [2]. In the United States about one percent of people are affected at some point in their life and males are affected twice as often as females. The usual age at diagnosis is between 55 and 65 years. The

average 5 year survival following diagnosis in the developed world is 42 to 64% [3].

Management includes surgery and radiotherapy. Head and neck cancer is highly curable if detected early, usually with some form of surgery, but radiation therapy may also play an important role, while chemotherapy is often ineffective [4].

Radiotherapy is required in most of the cases. Mucositis is most common side effects seen in patients undergoing radiotherapy. The more important clinical features are erythema and/or ulceration. Oral Mucositis symptoms are generally found as mild pain to severe ulceration of the oral mucosa, oral mucositis can have serious adverse effects on patient quality of life. Mucositis can lead to malnutrition, and may possibly entail the usage of total parenteral nutrition if mouth sores are severe enough to prevent the patient from eating and drinking [5]. Cryotherapy is done by application of low temperatures on a body part. It reduces inflammation, cellular metabolism, pain and spasm and increase vasoconstriction and cellular survival [6]. The present study was conducted to assess the efficacy of cryotherapy on mucositis in patients undergoing radiotherapy.

Materials & Methods

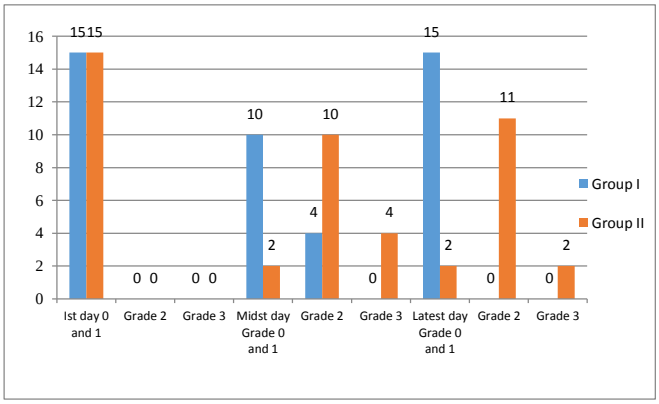
This study included 30 patients undergoing radiotherapy of head and neck cancer. They were informed regarding the study and written consent was obtained. Demographic data such as name, age, gender etc. was recorded. Patients with complete or partial exposure to head and neck to radiation, patients receiving minimum of 1.8- 2.2 Gy in each session was included in study. Patients were divided into 2 groups. Group I (Study) included 15 patients who were instructed for standard oral care for mucositis such as use of a soft toothbrush with nonabrasive toothpaste and dental floss twice a day. They were instructed to suck ice cubes before and after each radiotherapy session for five minutes during the study period. Group II (Control) group included 15 patients were received instructions for standard oral care such as use of a soft toothbrush with nonabrasive toothpaste and dental floss twice a day and was left to routine hospital care for mucositis. WHO mucositis scale was used to judge mucositis. Grading was assessed on Ist day, mid (16th) day and last (30th) day of radiotherapy in all patients. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

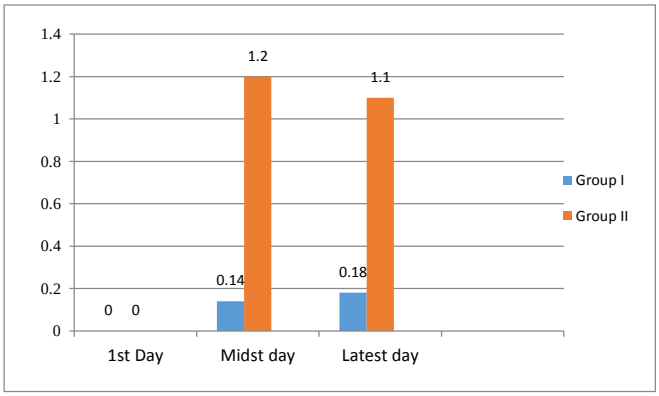
Table I shows demographic data of patients. Group I had mean age of 44.12± 2.4 years and group II had 42.35± 2.8 years. The difference was non - significant (P > 0.05). Group I had 8 males and 7 females and group II had 10 males and 5 females. The difference was non - significant (P > 0.05). In group I, 13 were married and 2 were non married. In group II, 14 were married and 1 was single. The difference was non - significant (P > 0.05). In group I, 7 had habit of smoking and 8 had no smoking habit similarly in group II, 6 had habit of smoking and 9 had no smoking habit. The difference was non - significant (P > 0.05). In group I, the site of tumor was lip (4), oral cavity (3), neck (3) and pharynx (5). In group II, the site of tumor was lip (5), oral cavity (5), neck (2) and pharynx (3). The difference was non - significant (P > 0.05). In group I, 9 were literate and 6 were illiterate. In group II, 7 were literate and 8 were illiterate. The difference was non - significant (P > 0.05). Graph I shows that group I had less mucositis at 1st day, midst (7th day) and latest (14th day) as compared to group II. The difference was significant (P < 0.05). Graph II shows that patient judged mucositis grading was significantly (P < 0.05) lowered in group I at 1st day (0), midst day (0.14) and latest day (0.18) as compared to group II, 1st day (0), midst day (1.4) and latest day (1.1). Graph III shows that in group I, at latest day only 4 patients had pain while in group II, 12 patients had pain (significant; p < 0.05).

Table 1: Demographic Data of Patients

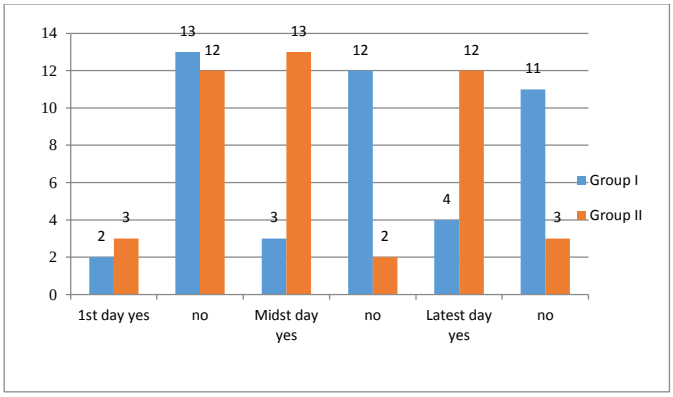
	Group I	Group II	P value
Age (Mean) years	44.12± 2.4	42.35± 2.8	0.1
Gender			
Male	8	10	0.3
Female	7	5	0.2
Marital status			
Married	13	14	0.1
Single	2	1	1
Smoking Habit			
Yes	7	6	1
No	8	9	0.1
Site of tumor			
Lip	4	5	0.2
Oral cavity	3	5	0.2
Neck	3	2	0.22
Phranyx	5	3	0.4
Education			
Literate	9	7	0.5
Illiterate	6	8	0.7



Graph 1: The distribution of mucositis severity grades according to WHO Mucositis scale in both groups



Graph 2: Distribution of patient judged mucositis grading in both groups



Graph 3: Comparison of pain in both groups

Discussion

Mucositis is common complication of radiotherapy of head and neck cancers. Treatment of mucositis is mainly based on supportive therapies, i.e., oral hygiene, consumption of adequate liquids, and use of mouth washes. Patients are usually suggested to stay away from alcohol, citrus fruits, and hot foods. Related studies have introduced various substances and agents as effective medications for reducing or limiting signs and symptoms of mucositis. In this way, cryotherapy has been introduced as an effective therapy, but the evidence that it prevents mucositis is still inadequate and unreliable.7 The present study was conducted to assess the efficacy of cryotherapy on mucositis in patients undergoing radiotherapy. In this study, patients were divided into 2 groups. We found that Group I had mean age of 44.12± 2.4 years and group II had 42.35± 2.8 years. We also recorded the site of tumor in both groups. A study done by Svanberg [8] found that in cryosurgery group, maximum patients were of females and had habit of smoking. We compared the mucositis scale given by WHO in both groups. We found that group I had less mucositis at Ist day, mid (16th) day and last (30th) day as compared to group II. This is in accordance to Thai [9] and Katrancy *et al.*, [10] in their study. In present study, we compared patient – judged mucositis grading in both groups and found that it was lowered in group I at 1st day (0), midst day (0.14) and latest day (0.18) as compared to group II, at 1st day (0), midst day (1.4) and latest day (1.1). Similar results were seen in study by Nikoletti S *et al*. [11]. We compared the pain in both groups and found in group I, at latest day only 4 patients had pain while in group II, 12 patients had pain. This shows that cryosurgery has better control over pain. This is in accordance to Mahmood DJ *et al*. [12] This study results revealed that cryotherapy is an effective method for reducing pain severity and mucositis in patients with head and neck carcinomas, undergoing radiotherapy, however it was not found efficient in recovering signs of mucositis. Although, our study results are purely based on a randomized controlled trial where the sample size was limited to 30 only. Additionally there is significant lack of straight and concert approach for cryotherapy application in the oral cavity, which leads to inconsistencies and delinquencies in the overall outcomes of the study results.

Conclusion

Cryotherapy is found to be effective in reducing mucositis in head and neck cancer patients. This can be considered a preventive measure in patients undergoing radiotherapy.

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