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Original Article

Efficacy of potent topical corticosteroid (betamethasone valerate 0.1%) compared with mild topical corticosteroid (hydrocortisone 1%) in the management of acute radiodermatitis

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Abstract

Background In clinical radiotherapy, most of the patients tolerate dosage of radiation without any side effects. However, some patients develop adverse effects, which may be mild or moderate in severity. Approximately 5-10% of the subjects do show acute or chronic reactions. The acute skin reaction begins during the first 7-10 days following radiotherapy. Epilation and desquamation follow with increasing dosage. There is a substantial lack of evidence-based treatments for this condition.

Objective The study was targeted at determining the comparative efficacy of potent topical corticosteroid (betamethasone valerate 0.1%) cream and mild potency topical corticosteroid (hydrocortisone 1%) cream in the management of acute radiation dermatitis.

Patients and methods The current study was carried out in the follow up clinic of Karachi Institute of Radiotherapy and Nuclear Medicine, over a period of 3 months from 1st October 2004 to 31st December 2004. All patients presenting with the features of acute radiation dermatitis during the above period fulfilling the selection criteria were enrolled. All these patients were on photon or/and electron therapy. The patients were studied in 2 groups labeled A and B. The patients in the group A were given once daily application of hydrocortisone 1% cream, while the group B subjects were managed with betamethasone valerate 0.1% cream applied once daily. The patients were followed up on 5th, 7th, 10th and 15th day of therapy.

Results A total of 50 patients were included in the study comprising 28 females (56%) and 22 males (44%). Both the groups i.e. A and B contained 14 females and 11 males each. The age range was 25-70 years, the mean being 48.2 years. In group B, all the patients responded with a significant decrease in the erythema and exudation by the 5th day ($p<0.001$). The patients in the group A showed a little improvement by the end of 5th day, but definite improvement by the 7th day ($p<0.001$). By the 10th day, patients in group B were left with residual pigmentation while group A subjects had mild erythema. Both the groups had residual pigmentation at the end of 15th day.

Conclusion Both potent and mild potency topical corticosteroids are effective in the management of acute radiation dermatitis, but potent steroids produce an earlier response.

Key words
Radiodermatitis, topical corticosteroids, hydrocortisone 1%, betamethasone valerate 0.01%.

Introduction

Ionizing radiations play a well-defined role in the management of neoplasms as far as the therapeutic options are concerned.[1] In clinical radiotherapy, most of the patients tolerate the dosage of radiation without any side effects. However, some patients develop adverse effects, which may be mild or moderate in severity. Approximately 5-10% of the subjects do show acute or chronic reactions.[2] The acute skin reaction begins during the 1st 7-10 days following radiotherapy, starting as erythema and exudation and leads to progressive pigmentation.[3,4] Epilation and desquamation follow with increasing dosage.[3] Dry desquamation may progress to moist desquamation, which usually heals within 50 days of discontinuing the therapy or may progress to necrosis.[5,6] Saline soaks, modified Burrow's solution, non-ionic moisturizers and hydrocortisone 1% cream are helpful with variable results in the management of acute radiodermatitis.[3,7] There is a substantial lack of evidence-based treatments for this condition.[8] A potent topical corticosteroid "betamethasone valerate 0.01%" (cream), useful in the management of various inflammatory skin disorders, has been proved to be helpful in treating acute radiodermatitis.

The study was targeted at determining the comparative efficacy of potent topical corticosteroid (betamethasone valerate 0.1%) cream and mild potency topical corticosteroid (hydrocortisone 1%) cream in the management of acute radiation dermatitis.

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Patients and methods

The current study was carried out in the follow up clinic of Karachi Institute of "Radiotherapy and Nuclear Medicine, over a period of 3 months from 1st October 2004 to 31st December 2004.

All patients presenting with features of acute radiation dermatitis during the above period, belonging to both sexes and all age groups were enrolled in the study. The predominant features in all subjects were erythema and exudation having an onset within first week of radiotherapy. All patients were included in the study irrespective of the type of malignancy. Patients with some primary dermatoses or any other specific skin disease simultaneously were ruled out of the study. All patients enrolled were on photon or and electron therapy. Patients receiving more than 3000 cGy were excluded. The patients were studied in 2 groups labeled A and B. The patients in the group A were given once daily application of hydrocortisone 1% cream, while group B subjects were managed with betamethasone valerate 0.1% cream applied once daily. All patients were advised to apply emollients once daily. The patients were followed up on 5th, 7th, 10th and 15th day of therapy. The therapy was continued during the trial.

Results

A total of 50 patients were included in the study comprising 28 females (56%) and 22 males (44%). Both the groups i.e. A and B contained 14 females and 11 males each.

The age range was 25-70 years, mean age being 48.2 years. **Table 1** reveals the sites of involvement, trunk being the most commonly effected (74%). Types of energy with the dose range (200-3000 cGy) are given in **Table 2**. The response to treatment in both the groups is shown in **Table 3**.

In group B, all the patients responded with a significant decrease in the erythema and exudation by the 5th day ($p<0.001$). The patients in the group A showed a little improvement by the end of 5th day, but there was a definite improvement by the 7th day with decreasing erythema and exudation ($p<0.001$). By the 10th day, patients in group B were left with residual pigmentation, while group A subjects had mild erythema. Both the groups had residual pigmentation at the end of 15th day.

Thus, potent topical steroid produced an early improvement as compared to mild topical steroid in acute radiation dermatitis.

Table 1 Sites of involvement (n=50)

Sites	*n (%)*
Head and neck	22 (44)
Trunk	37 (74)
More than 1 sites	9 (18)

Table 2 Types of energy/dosage (n=50)

Types of radiations	*Radiation dose range (cGy)*		
	200-1000	1000-2000	2000-3000
Photon n=34 (68%)	5 (10%)	12 (24)	17 (34)
Electron n=16 (32%)	4 (8%)	6 (12%)	6 (12%)

Table 3 Clinical improvement at follow up (n=50)

Follow up	*Group A*	*Group B*
Day 5	10%	30%
Day 7	40%	70%
Day 10	80%	95%
Day 15	95-100%	100%

Discussion

Radiation therapy plays a central role in the management of various types of cancers. The effects of ionizing radiations on skin are well known since the discovery of X-rays in 1895. Radiation induced skin changes were identified soon after the discovery of X-rays and were scientifically reported in the year 1902.[9]

Ionizing radiations used for the treatment of various malignancies include X-rays, gamma rays, grenz rays, alpha rays, beta rays, fast neutron beams and electron beams.[10] Acute or chronic reactions to radiations are well known.[11]

However, care accorded is diverse for such patients on radiotherapy.[12] The frequency and extent of tissue damage from radiation is dependent on a wide variety of factors: total radiation dose, fraction size and interval between fractions, quality and types of radiation, rate of dosage, intrinsic radiosensitivity and the tissue irradiated.[3]

Radiation-induced dermatitis is a very common side effect of radiotherapy and may necessitate the stoppage of therapy, at times creating problem not only for the patient but also for the radiotherapist.[8,13] A wide variety of pharmacological and non-pharmacological therapies have been suggested for radiation dermatitis from time to time.[13] Topical corticosteroids for their anti-inflammatory effects are well-known to be helpful in many skin disorders including radiation dermatitis. Topical corticosteroids inhibit up-regulation of IL-6 in response to ionizing radiations.[14] The role of topical corticosteroids to prevent or treat radiation

dermatitis is somewhat controversial.[9] Studies have been conducted world wide from time to time to determine the role of topical corticosteroids in the management of acute radiation dermatitis. However, the results in response to topical corticosteroids instituted before or during the onset of acute radiation dermatitis have shown conflicting results.[9]

Bostrom *et al*.[8] reported potent topical steroids to be more beneficial as compared to emollients in the management of acute radiodermatitis. In the current study, the efficacy of betamethasone valerate (0.1%) cream (group B) was compared with that of hydrocortisone (1%) cream (group A) i.e. potent versus mild topical steroid. The patients in the group B responded by the 5th day of therapy with decreasing erythema, edema and exudation. On the contrary, the clinical response in group A was seen by day 7. Thus, potent topical steroids produced an earlier response as compared to the patients on mild potency steroid. At the end of 10th day, patients in group B were left with residual pigmentation while those in the group A showed residual erythema. At the completion of therapy, both the groups had residual pigmentation at the sites of involvement. Therefore, it can be observed that both potent and mild potency topical steroids are equally effective in the management of acute radiodermatitis, the only difference being an earlier response with potent steroids. The findings in our study are consistent with the reports in literature.[8] Moreover, Potera *et al*.[15] have shown no statistically significant difference between mild potency topical corticosteroids (hydrocortisone) and placebo. Likewise, Glees *et al*.[16] in a comparative trial with mild (1% hydrocortisone) and potent (0.025% clobetasone butyrate) topical steroid creams proved beneficial effects with either, but potent steroids lead to severe reactions.

Conclusion

It can be concluded from the above study, that both potent and mild potency topical steroids are effective in the management of acute radiation dermatitis, but potent steroids produce an earlier response.

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